# RECORD OF DECISION

Operable Unit 1 of the Solvay Wastebeds 1-8 Subsite
of the Onondaga Lake Superfund Site
Town of Geddes, Onondaga County, New York

New York State Department of Environmental Conservation
and
United States Environmental Protection Agency
Region II
December 2014

## DECLARATION FOR THE RECORD OF DECISION

## SITE NAME AND LOCATION

Operable Unit 1 of the Solvay Wastebeds 1-8 Subsite of the Onondaga Lake Superfund Site
Geddes, Onondaga County, New York
Superfund Site Identification Number: NYD986913580
Operable Unit: 22

## STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the New York State Department of Environmental Conservation (NYSDEC) and U.S. Environmental Protection Agency's (EPA's) selection of a remedy for Operable Unit (OU) 1 of the Solvay Wastebeds 1-8 subsite (Subsite) of the Onondaga Lake Superfund site, chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. § 9601-9675, and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300 (NCP). This decision document explains the factual and legal basis for selecting a remedy to address the Solvay waste and contaminated soil/fill materials associated with the Subsite. The attached index (see Appendix III) identifies the items that comprise the Administrative Record upon which the selected remedy is based.

NYSDEC is the lead agency for this Subsite and has prepared the remedy selected in this ROD. The EPA has determined that the selected remedy meets the requirements for a remedial action as set forth in CERCLA Section 121, 42 USC § 9621. As such, for the purpose of satisfying this remedy selection criterion of the NCP, NYSDEC, on behalf of New York State, supports the selected remedy. NYSDOH also supports the selection of this remedy; its letter of concurrence is attached (see Appendix IV)."

## ASSESSMENT OF THE SITE

The response action selected in this Record of Decision is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances, pollutants or contaminants from this Subsite.

## DESCRIPTION OF THE SELECTED REMEDY

The selected remedy (Alternative 3) for the Solvay Wastebeds 1-8 Subsite to address the Solvay waste and contaminated soil/fill materials includes the following components:

*One-foot thick vegetated soil cover (for passive recreation areas) - approximately 39 acres:* In areas of anticipated passive recreational use (regardless of whether 6 NYCRR Part 375-6 soil cleanup objectives (SCOs) for commercial use are exceeded or not), a 1-foot thick vegetated soil

cover will be installed.

*Two-foot thick vegetated soil cover (for active recreation areas or where ecological SCOs in surface soil are exceeded) - approximately 27 acres:* In areas of anticipated active recreational use (regardless of whether the restricted residential SCOs are exceeded or not) and also where SCOs for protection of ecological resources will apply and are exceeded, a two-foot thick vegetated soil cover will be installed.

*One and a half-foot thick vegetated soil cover (where ecological SCOs in surface soil are exceeded) - approximately 10 acres:* Additional soil cover will be applied to the three upland staging areas associated with the Interim Remedial Measure (IRM).[1] Restoration of these areas as part of the IRM consisted of a six-inch topsoil cover. The additional 1.5-feet of cover material will provide for a two-foot cover over this area where protection of ecological resources SCOs are exceeded.

*One-foot thick vegetated structural fill cover (where commercial use SCOs in surface soil are exceeded) - approximately 19 acres:* This cover will be applied to areas of anticipated New York State (NYS) Fairgrounds overflow parking (passive recreational use) where SCOs for commercial use are exceeded. The structural fill cover will consist of a compacted mixture of aggregate and soil. This cover will be placed directly over existing soil/fill to support vehicle traffic and provide water holding capacity, rooting volume and growing conditions to support vegetation. While the thickness of the structural fill layer is assumed (for cost-estimating purposes) to be one foot, the actual thickness and locations where it will be placed will be determined during remedial design.

*Vegetation enhancement cover (over the remaining areas) - approximately 76 acres:* This cover will consist of wood fiber mulch/compost and fertilizer mixed with seeds and will be applied to areas where surface soil concentrations are below applicable SCOs. While the thickness of the mulch and seed application is assumed (for cost estimate purposes) to be approximately 4 inches, the actual thickness and locations will be determined during remedial design.

Any fill material brought to the Subsite will need to meet the requirements for the identified site use as set forth in 6 NYCRR Part 375-6.7(d). Native species will be used for the vegetative component of covers. For the purpose of developing cost estimates, the seed application is anticipated to consist of a grassland seed mix native to NYS and selected for its ability to attain relatively high growth rates and ecological function.

Structures, such as buildings, pavement, or sidewalks, as part of the future development at OU1 could serve as acceptable substitutes for any of the vegetated cover types described above.

Approximately 58 acres (where SCOs for protection of commercial use are not exceeded in surface soil) of the 77 acres of the Subsite used as parking lots associated with the New York State

[1] The IRM is described in the "Interim Remedial Measure" section.

Fairgrounds are already covered with an estimated two to seven feet of imported fill, including at least one-foot of gravel/fill at the surface. The existing cover thickness will be confirmed during remedial design and additional cover will be placed, if needed, to provide for at least a one foot thickness. Existing parking lot surfaces, the County's public paved recreation trail, the Crucible landfill area, and vegetated covers/road beds associated with the I-690/NY-695 corridor, and other Subsite roads/infrastructure will also be maintained.

Clean fill staging areas, which support the IRM, Ninemile Creek, and Onondaga Lake site remediation projects, were constructed using a minimum of 6 inches of crushed stone. Restoration of the clean fill staging areas will consist of placement of 6 inches of vegetated, clean fill over the top of the crushed stone in order to provide for a one-foot cover over these areas.

Institutional controls, such as environmental easements, will be used to ensure that any intrusive activities in areas where contamination remains are in accordance with a NYSDEC-approved Site Management Plan, which will include the following:

- Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the remedy and details the steps and media-specific requirements necessary to ensure the following institutional and engineering controls remain in place and effective:

    - environmental easements and/or an environmental notice;
    - Site cover systems described above;
    - excavation plan which details the provisions for management of future excavations in areas of remaining contamination;
    - descriptions of the provisions of the institutional controls including any land use restrictions;
    - provision that future on-Site construction should include vapor intrusion sampling and/or installation of mitigation measures, if necessary;
    - provisions for the management and inspection of the identified engineering controls;
    - maintaining Subsite access controls and Department notification; and
    - steps necessary for periodic reviews and certification of the institutional and/or engineering controls.

- Monitoring Plan to assess the performance and effectiveness of the remedy. The plan will include, but may not be limited to, monitoring for vapor intrusion for any buildings developed on the Subsite, as may be required by the Institutional and Engineering Control Plan discussed above.

The selected remedy includes continued monitoring and maintenance associated with the IRM components relating to soil, sediment, fill, and Solvay waste (*e.g.*, shoreline stabilization system, mitigation wetlands, the vegetative cover, and access roads constructed to support the IRM). Maintenance and monitoring for the IRM mitigation wetlands and cover systems will include monitoring to document that success criteria are met and to identify the need for corrective action(s), as warranted. Corrective actions for cover types/zones may include repair of cover cross-

sections in areas of disturbance or re-application of vegetation in areas of non-survivorship.

The remedial design program will provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. The need for a demarcation layer between the soil cover and the underlying substrate will be evaluated during design.

Green remediation techniques, as detailed in NYSDEC's Green Remediation Program Policy - DER-31,[2] and the EPA Region 2's Clean and Green policy[3] will be considered for the preferred alternative to reduce short-term environmental impacts. Green remediation best practices such as the following may be considered:

- Use of renewable energy and/or purchase of renewable energy credits to power energy needs during construction and/or operation and maintenance of the remedy.
- Reduction in vehicle idling, including both on and off road vehicles and construction equipment during construction and/or operation and maintenance of the remedy.
- Design of cover systems, to the extent possible, to be usable for alternate uses, require minimal maintenance (*e.g.*, less mowing), allow for infiltration of storm water and/or be integrated with the planned use of the property. For example, the use of vegetated structural fill to create parking surfaces as identified in both Alternatives 2 and 3, will address storm water management in these areas, while resulting in a surface usable for current and intended land use in these areas.
- Beneficial reuse of material that will otherwise be considered a waste.
- Use of Ultra Low Sulfur Diesel (ULSD).

Because this alternative will result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the remedy be reviewed at least once every five years. If justified by the review, remedial actions may be evaluated to remove, treat, or contain the contaminated soils remaining at OU1.

## DECLARATION OF STATUTORY DETERMINATIONS

### Part 1- Statutory Requirements

The selected remedy meets the requirements for remedial actions set forth in CERCLA in Section 121, 42 U.S.C. § 9621, because as implemented : 1) it is protective of human health and the environment; 2) it meets a level of standard of control of the hazardous substances, pollutants, and contaminants which at least attains the legally applicable or relevant and appropriate requirements under the federal and State laws; 3) it is cost-effective; and 4) it utilizes permanent solutions and

[2] See http://www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf.

[3] See http://epa.gov/region2/superfund/green_remediation.

alternative treatment technologies to the maximum extent practicable.

**Part 2- Statutory Preference for Treatment**

CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances as a principal element (or justify not satisfying the preference). For the Solvay waste and contaminated soil/fill materials of the Site, NYSDEC and the EPA do not believe that treatment is practicable or cost effective given the widespread nature of the Solvay waste and soil contamination and the high volume of Solvay waste and soils that would need to be addressed.

**Part 3- Five-Year Review Requirements**

Because this remedy is anticipated to result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

## ROD DATA CERTIFICATION CHECKLIST

The ROD contains the remedy selection information noted below. More details may be found in the Administrative Record file for Operable Unit 1 of the Solvay Wastebeds 1-8 Subsite.

- Contaminants of concern and their respective concentrations in the "Summary of Site Characteristics" section;

- Baseline risk represented by the contaminants of concern in the "Summary of Subsite Risks" section;

- Cleanup levels established for contaminants of concern and the basis for these levels in the "Remedial Action Objectives" section;

- Manner of addressing source materials constituting principal threats in the "Principal Threat Waste" section;

- Potential land and groundwater use that will be available at the Subsite as a result of the selected remedy in the "Expected Outcomes of the Selected Remedy" section;

- 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 in the "Description of the Selected Remedy" section; and

- Key factors used in selecting the remedy (*i.e.*, how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) in the "Summary of the Rationale for the Selected Remedy"

section.

**AUTHORIZING SIGNATURES**

December 2, 2014

Robert W. Schick P.E., Director
Division of Environmental Remediation
NYSDEC

Date

December 2, 2014

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

Date

# DECISION SUMMARY

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## SUBSITE NAME, LOCATION, AND DESCRIPTION

On June 23, 1989, the Onondaga Lake site was added to the New York State Registry of Inactive Hazardous Waste Disposal Sites. On December 16, 1994, Onondaga Lake, its tributaries, and the upland hazardous waste sites which have contributed or are contributing contamination to the lake (subsites) 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.

Since many Superfund sites are complex and have multiple contamination problems and/or areas, they are often divided into several operable units (OUs) for the purpose of managing the site-wide response actions. The NCP (at Section 300.5) defines an 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 initial phases of an action, or may consist of any set of actions performed over time or any actions that are concurrent but located in different parts of a site."

The New York State Department of Environmental Conservation (NYSDEC) and the EPA have, to date, organized the work for the Onondaga Lake NPL site[1] into discrete subsites. These subsites are also considered by the EPA to be OUs of the NPL site. One of the subsites is the Solvay Wastebeds 1-8 subsite (Subsite). The Subsite consists of two OUs: OU1, which addresses the Solvay waste and contaminated soil/fill materials and is the subject of this Record of Decision; and OU2, which will address the contaminated groundwater and impacted media in a surface water drainage ditch, Ditch A in the future. A remedial investigation (RI)[2] has been completed and a feasibility study (FS)[3] is currently underway for OU2. A Proposed Plan for OU2 will be released following the development of the FS.

The 404-acre Subsite includes eight irregularly shaped wastebeds that extend roughly 1.5 miles along the shore, with a maximum width of 0.5 miles. The wastebeds consist primarily of inorganic waste materials (Solvay waste) from the production of soda ash (sodium carbonate) using the Solvay process. Other contaminants (*e.g.*, benzene, toluene, ethylbenzene, and xylenes [BTEX], naphthalene and assorted polycyclic aromatic hydrocarbons [PAHs], phenolic compounds, polychlorinated biphenyls [PCBs] pesticides, and inorganics), which are not related to soda ash production, are also present at the Subsite. A surface water drainage feature, Ditch A, runs along the southern and eastern Subsite boundaries and discharges stormwater from roads, parking areas

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[1] The Onondaga Lake Superfund Site's Superfund site Identification Number is NYD986913580. NYSDEC is the lead agency for this OU; the EPA is the support agency.
[2] An RI determines the nature and extent of the contamination at a site and evaluates the associated human health and ecological risks.
[3] An FS identifies and evaluates remedial alternatives to address the contamination at a site.

and the overland surface flow from the Subsite to Ninemile Creek and Onondaga Lake. Subsite elevations range from approximately 363 feet above mean sea level (MSL) at the shores of Onondaga Lake to 430 feet above MSL. The Subsite location is shown on Figure 1, and a Site Plan is included as Figure 2.

Interstate 690 (I-690) and interchanges associated with New York State (NYS) Route 695 (NY-695), NYS Fairgrounds parking lots, access roads for the parking lots, and foot bridges are present and in use at the Subsite. The NYS Fairgrounds parking lots (approximately 77 acres) consist of over two feet of gravel and fill material placed over the Subsite's soil/fill/Solvay waste material. Other infrastructure and development present include the approximate 2.5-mile Onondaga County West Shore Trail Extension (a public recreation trail) and a 20-acre permitted, closed landfill formerly operated by Crucible Specialty Metals (Crucible). An approximate 17-acre Biosolids Area used by the City of Syracuse and Onondaga County for sewage sludge disposal is located near the southeastern end of the Subsite over portions of Wastebeds 1 and 2. Lakeview Point, which generally comprises Wastebed 6, forms one of the Subsite's more prominent features--a peninsula that extends into Onondaga Lake near the northern end of the Subsite.

The portion of the property that is developed as parking lots and roadways is, in general, owned by NYS, and there are property easements for highway and stormwater drainage features. The remaining portion of the Subsite is owned by Onondaga County. The County-owned portion is largely undeveloped, characterized by varying degrees of vegetation ranging from sparsely vegetated areas to stands of mature trees. The County-owned property is deed-restricted to "park purposes" use. Figure 2 depicts the approximate property boundaries.

## SUBSITE HISTORY AND ENFORCEMENT ACTIVITIES

The lowering of the lake level in 1822 to the same level as the Seneca River resulted in the formation of the Geddes Marsh. The wastebeds were constructed and operated over the Geddes Marsh by a series of companies, of which Honeywell International Inc. is the successor. The Subsite is composed primarily of Solvay waste, a material consisting largely of calcium carbonate, calcium silicate, and magnesium hydroxide and which in an unweathered state has elevated pH levels. These wastes were generated at the former Solvay Process Main Plant as part of soda ash production using the Solvay process. Soda ash production began in 1884 and continued until 1986. The Solvay waste was hydraulically placed in the wastebeds in slurry form.

In addition to wastes generated from soda ash production, waste materials from other nearby manufacturing facilities were likely disposed of at the Subsite. Chlorinated benzene production at the nearby Willis Avenue plant occurred between 1918 and 1977. Additional operations reportedly took place at the Willis Avenue plant from 1918 to 1977, including production of hydrochloric acid, caustic soda, caustic potash, and chlorine gas. The Benzol plant operated from 1915 to 1970 at the nearby Main Plant. This plant produced benzene, toluene, xylenes, and

naphthalene by the fractional distillation of coke "light oil." The Solvay Process Company operated a coke plant from 1892 through 1923. A phenol production plant operated from 1942 to 1946. Materials associated with these operations may have been disposed of in Wastebeds 1-8 with the Solvay waste slurry or by alternative means, although there are no records or reports to confirm this.

Wastebeds 1-6 were in use before 1926 and may have become operational as early as 1916, although no definitive construction date is available. Ninemile Creek was rerouted to the north to permit the construction of Wastebeds 5 and 6, and the former creek channel was buried. Wastebeds 7 and 8 were not utilized until after 1939 and remained in use with Wastebeds 1-6 until 1943. The location of each wastebed is included on Figure 2.

Subsequent uses of the Subsite included construction of a 1.2-mile stretch of I-690 prior to 1958, construction of the I-690 and NY-695 interchange between 1973 and 1978, and the operation of a landfill on a portion of Wastebed 5 by Crucible Specialty Metals from 1973 to 1988. The Crucible Landfill covers an area of approximately 20 acres and contains an estimated 225,100 cubic yards (CY) of non-hazardous and hazardous wastes. NYSDEC approved the Crucible Landfill closure plan in 1986, and the landfill was closed with a cap in 1988. Long-term monitoring of the Crucible Landfill is performed annually consistent with the landfill closure requirements. The City of Syracuse and Onondaga County utilized a portion of the wastebeds as a biosolids disposal area from 1925 to 1978 for municipal sewage sludge.

A portion of the Subsite was used for NYS Fairgrounds parking over 50 years ago, and this use continues to the present day. While the parking lots are not paved, they have received gravel and fill over the years, and currently over two feet, and as much as seven feet of gravel and fill overlay the Solvay waste in these areas.

In 2004, Honeywell and NYSDEC entered into an Order on Consent (Index #D-7-0002-02-08) to conduct a Preliminary Site Assessment and RI/FS.

***Interim Remedial Measure***

An Interim Remedial Measure (IRM)[4] is being implemented at the Subsite in order to prevent the continued migration of contaminants into Ninemile Creek and Onondaga Lake. The IRM is supported by a Streamlined Risk Evaluation (SRE) conducted as part of a 2010 Focused Feasibility Study (FFS). The FFS evaluated areas of the Subsite where contaminant migration

[4] The use of the term "Interim Remedial Measure" throughout this document is not intended to mean that this removal action is a "remedial action" as that term is defined in the federal law, CERCLA. An IRM is an activity that is necessary to address either emergency or non-emergency site conditions, which in the short-term need to be undertaken to prevent, mitigate, or remedy environmental damage or the consequences of environmental damage attributable to a site. An IRM is equivalent to a non-time critical removal under the CERCLA removal program pursuant to 40 CFR Section 300.415(b)(2).

was documented or likely to occur, and the SRE provided a concise evaluation of potential risks to human and ecological receptors from those limited areas of the Subsite. Specifically, it was determined in the SRE and the FFS that there is a potential threat to human health and the environment from contaminant migration from eastern shore shallow and intermediate groundwater, as well as from seeps, surface Solvay waste along the eastern shore, and surface water/sediment/Solvay waste in the lower reach of Ditch A. It was concluded, therefore, that an IRM was needed to address migration of contaminants from these media via several measures discussed in more detail below.

Coincident with the planning for the IRM, several additional response elements were identified and added to the scope of the IRM. Specifically, a wetlands mitigation project, a hydraulic groundwater control system along the northern shoreline, and restoration and cleaning in the middle reach of Ditch A were incorporated into the IRM design. The objective of the mitigation wetlands is to compensate for the loss of wetland functions and values related to actions at the Subsite and the nearby Wastebed B/Harbor Brook subsite, and for the loss of lake surface area resulting from placement of a barrier wall and light weight fill off-shore of the nearby Willis Avenue subsite. An objective for the hydraulic control of groundwater in the area of Onondaga Lake adjacent to the northern shoreline of the Subsite is to reduce groundwater upwelling velocities that may impact the isolation cap to be placed in that area of the lake as part of the separate Lake Bottom OU remedy selected for Onondaga Lake itself. The objective of sediment removal and maintenance of the Middle Reach of Ditch A is to mitigate transport of soil/fill material substrate and sediment to Onondaga Lake and to Ninemile Creek.

Construction of the IRM began in 2011 and is anticipated to be completed by December 2014. The IRM includes:

- Shoreline stabilization system (*i.e.,* vegetated on-shore revetment) – A shoreline stabilization system was installed along a portion of the Northern and Eastern Shorelines. A vegetated on-shore revetment was installed along the steep cliffs to reduce erosion from wind-wave and ice action, and to provide habitat enhancement.

- Groundwater and seep collection trenches, including pump stations and associated forcemain piping – Groundwater trenches (including passive wells) and seep collection trenches were installed throughout the Subsite along Ninemile Creek and the Eastern and Northern shorelines. Upon collection, the groundwater and seep water are conveyed to the Willis Avenue Groundwater Treatment Plant (GWTP).

- Ditch A – Work associated with Lower Ditch A included culvert installation, substrate excavation, and installation of a low permeability habitat layer. Additional work within Ditch A included culvert rehabilitation in the upper reach of Ditch A and sediment removal and maintenance in the middle reach of Ditch A.

- Mitigation wetlands establishment consisting of aquatic habitat connected to Onondaga

Lake and inland wetlands - 9.5 acres of mitigation wetlands are being constructed, of which 2.3 acres will be connected wetlands and 7.2 acres will be inland wetlands, within the low-lying Eastern Shoreline.

- Vegetative Cover - A vegetative cover system is being constructed on the Eastern Shoreline in areas not occupied by other elements of the IRM (*i.e.*, mitigation wetlands, stormwater features, berms, and access pathways).

The IRM-related monitoring will be performed to document that success criteria (*e.g.*, vegetation establishment, wildlife observations) are being met and to identify the need for corrective action(s), as warranted. Corrective actions for cover types/zones may consist of repair of cover cross-sections in areas of disturbance or re-application of vegetation in areas of non-survivorship. Maintenance of IRM-related access roadways will also be included in the cover system maintenance.

## HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI/FS report and a Proposed Plan supporting this OU1 remedy were released to the public for comment on September 17, 2014. These documents were made available to the public via the NYSDEC's website and at information repositories maintained at the Solvay Library, the Onondaga County Public Library, Atlantic States Legal Foundation, NYSDEC Region 7 office located in Syracuse, New York, and the NYSDEC Division of Environmental Remediation office located in Albany, New York. A NYSDEC listserv bulletin notifying the public of the availability for the above-referenced documents, the comment period start, completion dates, and the date of the planned public meeting was issued on September 17, 2014. A notice providing the same information was published in the *Syracuse Post-Standard* on September 18, 2014. The public comment period ran from September 17, 2014 to October 17, 2014.

On September 30, 2014, NYSDEC conducted a public meeting at the Martha Eddy Room in the Art and Home Center at the NYS Fairgrounds to inform local officials and interested citizens about the Superfund process, to present the Proposed Plan for the Subsite, including the preferred remedy, to respond to questions, and to accept comments. There were approximately 40 attendees. Responses to the questions and comments received at the public meeting and to comments submitted in writing during the public comment period are included in the Responsiveness Summary (see Appendix V).

## SCOPE AND ROLE OF THE OPERABLE UNIT

### Operable Units within the Solvay Wastebeds 1-8 Subsite

As discussed on page 1, the Solvay Wastebeds 1-8 Subsite is an OU of the Onondaga Lake NPL site. NYSDEC and EPA have, to date, organized the work for the Onondaga Lake NPL site into

11 subsites. These subsites, which are historical and/or current sources of contamination to Onondaga Lake, are also considered by EPA to be operable units of the NPL site. The media of concern at this Subsite are being addressed through two OUs. OU1 of the Subsite includes the Solvay waste and contaminated soil/fill materials. OU2 includes Subsite groundwater and impacted media in a surface water drainage ditch, Ditch A. OU1 also includes the shoreline stabilization system, mitigation wetlands, vegetative cover and access roads constructed to support part of the IRM described above.

As discussed below in the "Summary of Subsite Risks" section of this ROD, the human health risk assessment (HHRA) and baseline ecological risk assessment (BERA) for the Subsite identified unacceptable risks associated with the Subsite for human and ecological receptors. Although both risk assessments were conducted for the Solvay Wastebeds 1-8 Subsite as a whole, the exposure assessments utilized varying subareas of the Solvay Wastebeds 1-8 Subsite, depending on the route of exposure and the receptor being assessed. The HHRA and BERA are applicable to both OUs 1 and 2 of the Solvay Wastebeds 1-8 Subsite.

## SUMMARY OF SUBSITE CHARACTERISTICS

The RI activities that were conducted at the Solvay Wastebeds 1-8 Subsite included geological and hydrogeological investigations, an ecological assessment, wetlands delineation and the collection of samples from the surface soil (top two feet of soil), subsurface soil (below two feet), groundwater, surface water, and sediment.

Based upon the results of the RI, the primary contaminants of concern (COCs) include benzene, toluene, ethylbenzene, and xylene (BTEX), naphthalene and other assorted PAHs, PCBs, phenolic compounds, pesticides, and inorganics (*e.g.*, arsenic, barium, chromium, mercury, nickel). The results of the RI are summarized below.

### *Site Geology and Hydrogeology*

The Subsite geology consists of seven distinct layers including fill/Solvay waste, marl/peat, silt and clay, silt and fine-grained sand, basal sand and gravel, basal till, and bedrock (Vernon Shale). The Subsite hydrogeology consists of an Upper Groundwater System and a Lower Groundwater System separated by a confining silt and clay layer which is present across much of the Subsite.

The Upper Groundwater System consists of the anthropogenic fill/Solvay waste and the native marl/peat, as well as deltaic deposits associated with the former, buried Ninemile Creek channel in a portion of the Subsite. The Lower Groundwater System consists of the silt and fine grained sand deposits, the basal sand and gravel deposits, and a bedrock zone. The water table is typically 20 to 35 feet below ground surface (bgs) on top of the upper wastebed tiers, and 10 to 18 feet bgs on the lower wastebed tiers adjacent to Ninemile Creek. As mentioned above, Subsite groundwater will be addressed under a subsequent OU2 FS.

Shallow groundwater generally flows radially from the wastebeds toward Onondaga Lake, Ninemile Creek, and drainage ditches. Some groundwater flows along the buried, former Ninemile Creek channel deltaic deposits toward Onondaga Lake and Ninemile Creek.

***Surface Soil/Fill Material/Solvay Waste (0 to 2 feet bgs)***

Volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, PCBs, and inorganics were detected in surface soil/fill material/Solvay waste at OU1. Surface soil/fill material/Solvay waste contaminant levels for the Parking lot, Upland, and Lakeshore Areas are presented in Tables 1A, 1B, and 1C, respectively.

VOCs detected above unrestricted SCOs in surface soil included acetone, methylene chloride, and xylenes. Detected levels of these VOCs ranged from 2.5 to 400 micrograms per kilogram (µg/kg). SVOCs detected above unrestricted SCOs included benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzofuran, dibenzo(a,h)anthracene, hexachlorobenzene, indeno(1,2,3-cd)pyrene, and naphthalene. Detected levels of these SVOCs ranged from 36 to 25,000 µg/kg. Pesticides detected above unrestricted SCOs included 4,4'-DDT, 4,4'-DDE, 4,4'-DDD, alpha-chlordane, and dieldrin. Detected levels of these pesticides ranged from 0.40 to 1,600 µg/kg. PCBs were detected at concentrations above the unrestricted SCO in the Upland and Lakeshore Areas. Detected levels of PCBs ranged from 1.6 to 33,000 µg/kg. The highest levels of PCBs were detected in the Biosolids Area. PCBs were not detected at levels above the SCO in the parking lot area. Inorganic contaminants detected above unrestricted SCOs included arsenic, barium, cadmium, chromium, copper, hexavalent chromium, lead, manganese, mercury, nickel, selenium, silver, and zinc. Detected levels of these inorganic contaminants ranged from 10 to 14,000,000 µg/kg. There is no evident distribution pattern of inorganic or organic constituents in surface soil within the parking area, the upland area or the lakeshore area of OU1 with the exception of higher concentrations of chromium, nickel, and selenium in the western half of the upper parking lot area adjacent to the Crucible Landfill and higher levels of metals and PCBs in the Biosolids Area relative to other parts of the upland area.

In existing or planned commercial use areas of OU1 (*e.g.*, walking trails, parking lots), data were compared to the SCOs for commercial use (which includes passive recreational use). A total of approximately 24 acres of existing or planned commercial use areas at OU1 exceed commercial use SCOs in the top 2 feet.

In areas of OU1 that include proposed development (*e.g.*, lawn seating areas within the amphitheater footprint), data were compared to the SCOs for restricted residential use (which includes active recreational use). Based on information provided by the County, the amphitheater may be constructed within/proximal to the Lakeview Point portion of OU1. Because the exact location of the amphitheater is unknown, samples within the footprint of Wastebed 6 and areas extending to the shoreline of Onondaga Lake around Wastebed 6 were evaluated using these more

stringent SCOs. There were no contaminants of potential concern (COPCs) in surface soils which exceeded the restricted residential use SCOs (applicable for active recreational use) in this area.

In areas of OU1 that are heavily wooded, steeply sloped, or not planned for active or passive uses, surface soil data (within the top 2 feet) were compared to the SCOs for protection of ecological resources. The locations of the majority of ecological protection SCO exceedances, which consisted of metals, pesticides, PCBs and SVOCs, are located within the footprint of the Biosolids Area and within the footprint of the IRM (eastern shoreline, staging areas, and clean fill staging area near the upper parking lot). Approximately 30 acres of the Subsite that are heavily wooded, steeply sloped, or not planned for active or passive recreational uses exceed ecological use SCOs in surface soil in these areas.

***Subsurface Soil/Fill Material/Solvay Waste (at depths greater than 2 feet bgs)***

During the RI, subsurface soil samples (deeper than 2 feet) were collected from soil borings and test pits. Based on Subsite data, VOCs, SVOCs, pesticides, PCBs and/or inorganics were detected in subsurface soil/fill materials/Solvay waste throughout OU1 at levels above the relevant SCOs for unrestricted use (See Table 1D). VOCs detected above unrestricted SCOs in subsurface soil included 2-butanone, acetone, benzene, ethylbenzene, methylene chloride, toluene, and xylenes. Detected levels of these VOCs ranged from 0.35 to 500,000 µg/kg. The highest VOC concentrations were found at depths of over 70 feet bgs. SVOCs detected above unrestricted SCOs included 2-methylphenol, 4-methylphenol, benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzofuran, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, and phenol. Detected levels of these SVOCs ranged from 0.74 to 1,700,000 µg/kg. The location and depth of SVOCs vary by individual compound; however, in general, the higher concentrations of SVOCs found at OU1 were located in excess of 40 feet bgs. The samples that exhibited the highest concentrations of organic contaminants are found within a layer of stained Solvay waste that is located within the footprints of Wastebeds 1-4. This stained Solvay waste was typically encountered in a defined layer of orange-brown to dark brown colored Solvay waste, below the white to medium gray unstained Solvay waste. The thickness of the stained material ranges from 3 to 17 feet, and it is located above native material at a depth range of approximately 40 to 70 feet bgs. Pesticides detected above unrestricted SCOs included 4,4'-DDD, alpha-chlordane, and dieldrin. Detected levels of these pesticides ranged from 0.33 to 240 µg/kg. PCBs were detected at concentrations above the unrestricted SCO for PCBs. Detected levels of PCBs ranged from 9.4 to 4,300 µg/kg. Inorganic contaminants detected above unrestricted SCOs included arsenic, barium, cadmium, chromium, copper, hexavalent chromium, cyanide, lead, manganese, mercury, nickel, selenium, silver, and zinc. Detected levels of these inorganics ranged from 4 to 7,110,000 µg/kg.

***Transport of Constituents from Soil to Groundwater***

Analytical results obtained during the RI and prior investigations suggest that certain constituents are being leached from the soil. Compounds detected in soils and groundwater at the greatest

frequency included BTEX, phenolic compounds, PAHs, dieldrin and DDT, and inorganic constituents (*e.g.*, arsenic, barium, chloride, lead, manganese, mercury, selenium, sodium, and sulfate). BTEX, naphthalene and assorted PAHs, phenolic compounds, pesticides, and inorganics (*e.g.*, arsenic, barium, chromium, mercury, and nickel) have been detected at levels in Subsite groundwater above applicable standards and/or guidance values.

***Transport of Constituents from Soil to Surface Water Bodies via Surface Water***

Transport of constituents from soils to surface water bodies via surface water runoff may have occurred from areas in close proximity to Onondaga Lake, Ninemile Creek, and the drainage ditches. Transport potentially occurred in areas where surface water bodies and Subsite ditches are adjacent to steeply sloped berms with poor vegetative cover, which allowed for runoff down slope to the adjacent Ninemile Creek, Onondaga Lake, and Subsite ditches. Berms with established vegetation, terraced construction, or both potentially reduced this soil erosion and limited the transport of soils to surface water. Onondaga Lake potentially received soil via runoff from the sparsely vegetated portions of the berms along Wastebeds 3, 4, and 6, with some transport also potentially occurring along the northern berms of Wastebeds 1 and 2. This surface runoff has been addressed by the IRM and is not considered a current transport pathway in these areas. Minimal surface water runoff is expected from the central areas of the Subsite and areas of flat relief along the wastebed berms because of vegetation and little topographic relief, which reduces runoff and promotes evapotranspiration. Also, the porous fill material associated with the parking lots limits the scouring of soils and promotes infiltration rather than overland flow.

***Transport of Constituents from Soil/ Groundwater to Soil Vapor***

Soil vapor samples were collected from the shallow subsurface soil (0-8 feet bgs) during the RI. Among the most frequently detected analytes were gasoline type components (toluene, trimethylbenzene, ethylbenzene, xylene, and benzene). Also detected were methylene chloride, acetone, carbon disulfide, naphthalene, trichloroethene, chloroform, carbon tetrachloride, 1,1,1-trichloroethane, and chloromethane. Benzene and trichloroethene in soil vapor samples were detected in exceedance of EPA shallow soil gas guidance values.

The analytes detected in soil vapor were consistent with those detected in shallow groundwater and Subsite soils, with the exception of trichloroethene. The constituents present in soil vapor, and their presence in shallow groundwater and subsurface soils suggest that consideration of vapor intrusion mitigative actions will be required if future construction takes place on the Subsite. In particular, the presence of trichloroethene and benzene at concentrations above the guidance values indicate that future building construction may need to address potential vapor intrusion.

***IRM Staging Areas***

Excavation spoils (materials excavated from groundwater collection trenches, regrading, etc.)

were staged in three designated staging areas on the Subsite during construction of the IRM. Staging Areas A, B, and C are situated near the northern shoreline, Ninemile Creek shoreline, and within the former County Biosolids Area, respectively (see Figure 3). Staging Areas A and B are each approximately 2 acres in size and contain approximately 5,000 and 9,000 CY, respectively, and Staging Area C is approximately 6 acres in size and contains approximately 20,000 CY. Characterization sampling and analysis were performed during the placement of materials within the staging areas to document that materials being placed within these footprints did not exhibit hazardous waste characteristics, as per the IRM design, so that it could potentially be managed consistent with the material below and adjacent to it. Soil/fill material/Solvay waste that was placed within Staging Areas A, B, and C contained contaminant concentrations that exceeded the SCOs for protection of ecological resources. These areas are included in the approximately 30 acres of OU1 that exceed the ecological use SCOs in the areas described above.

### *Conclusions*

Based on the results of the RI, the following conclusions have been drawn:

- Contaminants include BTEX, naphthalene and other assorted PAHs, PCBs, phenolic compounds, pesticides, and inorganics (*e.g.*, arsenic, barium, chromium, mercury, nickel).
- Two areas of stained materials, which contain organic compounds (*e.g.* benzene, naphthalene) and have odors, are present along the lakeshore on the eastern side of Lakeview Point and along the southeastern lakeshore of the Subsite. The stained materials vary in thickness and are generally found within 12 feet of the ground surface. Concentrations of benzene and naphthalene in these materials were reported as high as 20,000 µg/kg and 180,000 µg/kg, respectively. It is important to note that the stained materials are not necessarily representative of the highest contaminant concentrations present in the lakeshore area.
- A layer of stained Solvay waste (described above) is present at the base of Wastebeds 1-4 approximately 60 feet bgs. This deep layer may be the source of BTEX, naphthalene, other PAHs, and phenol concentrations along the lakeshore and southeastern portions of the Subsite.
- Contaminated soil/fill/Solvay waste, groundwater and surface water from the Subsite have the potential to directly impact sediment, surface water, and fish in the lake.

## CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

### *Land Use*

The Subsite is zoned for industrial use and is bounded by commercial and industrial properties to the south and west, which include the NYS Fairgrounds, the Crucible Specialty Metals facility, and State Fair Boulevard. The current and reasonably anticipated future land uses for the Subsite

are commercial and recreational, and to provide areas which are protective of and which can sustain valuable ecological resources.

Current uses of the State-owned lands include overflow parking lots for the NYS Fairgrounds and venues for outdoor events, such as recreational vehicle vendor shows. The NYS properties that are part of the Subsite also include approximately 1.2 miles of I-690, and interchanges associated with I-690 and NY-695. The anticipated future use for NYS lands is not anticipated to change at this time.

Onondaga County owned lands feature a public recreation trail and the closed Crucible Landfill. The anticipated future use of the portion of the Subsite owned by the County includes the continued use of the existing public recreation trail and the use of the northwestern portion of the Subsite, near Lakeview Point, for an amphitheater to be constructed in 2015. The remainder of the property owned by Onondaga County may be subject to future development as opportunities become available.

***Summary of Existing Soil Covers and Infrastructure***

Approximately 254 acres of the 404-acre Subsite have cover materials or infrastructure located on it. These areas are:

- Approximately 90 acres of vegetated covers and road beds associated with the I-690/NY-695 corridor and other Subsite roads/infrastructure.
- Approximately 77 acres used as parking lots associated with the NYS Fairgrounds are already covered with an estimated two to seven feet of imported fill, including at least one foot of gravel/fill at the surface.
- Approximately 58 acres of soil/fill/Solvay waste material in the lake shoreline areas where the IRM is being implemented exhibit contaminant concentrations above SCOs for the protection of ecological resources. Vegetated covers, seep aprons, shoreline stabilization and constructed wetlands are elements of the IRM. Vegetated covers and constructed wetlands incorporate soil covers and/or liner thicknesses that are two feet thick. Seep aprons consist of a total thickness of 18 inches of material (rock and soil), and a liner, which are considered adequate barriers to ecological receptors. This also includes the clean fill staging areas that currently support the IRM, Ninemile Creek, and Onondaga Lake site remediation, and that were constructed using a minimum of 6 inches of crushed stone.
- Approximately 20 acres occupied by the Crucible Landfill, which is a permitted landfill that was closed in 1988 with a cap constructed in accordance with landfill closure requirements specified in 6 NYCRR Part 360. Long-term monitoring is performed annually consistent with the landfill closure requirements.
- Approximately nine acres of the Onondaga County West Shore Trail Extension (public recreation trail), which is a paved walking and biking trail.

## SUMMARY OF SUBSITE RISKS

As part of the RI process, baseline quantitative risk assessments were conducted for the Subsite to estimate the risks to human health (under current and reasonably anticipated future land uses) and the environment. Baseline risk assessments, consisting of an HHRA, which evaluates potential risks to people, and a BERA, which evaluates potential risks to the environment, analyze the potential for adverse effects caused by hazardous substance releases from a site assuming no further actions to control or mitigate exposure to these hazardous substances are taken. The risk assessments for this Subsite (see associated HHRA and BERA Reports discussed below) are available in the information repositories discussed above in Highlights of Community Participation.

The HHRA and BERA are applicable to both OU1 and OU2.

### *Human Health Risk Assessment*

The 2011 baseline HHRA considered a number of current and future exposure scenarios for different receptors, including a transient trespasser, lunchtime trespasser, utility worker, commercial worker, all-terrain-vehicle (ATV) rider, construction worker, state fair attendee, ditch maintenance worker, fisherperson, and resident. Exposure media considered in both current and future scenarios include soil, sediment (seep and ditch sediment), surface water (including seep water), groundwater, and ambient air. As discussed previously, fill material and Solvay waste are found throughout the Subsite; the risk assessment also considered exposure to these materials. Receptors that may be exposed to surface soils (0-2 feet bgs) include trespassers, commercial/industrial workers, state fairgrounds maintenance workers, and state fairgrounds attendees. Construction workers, commercial/industrial workers, and utility/sewer workers may contact upper soils (0-10 feet bgs). Trespassers, utility/sewer workers, construction workers, and ditch maintenance workers may be exposed to surface sediment (0–1 foot bgs). Trespassers, utility workers, construction workers, and ditch maintenance workers may be exposed to surface water. Construction workers, utility/sewer workers, and commercial/industrial workers may contact shallow ground water (0-10 feet bgs). A summary of the exposure scenarios evaluated in the HHRA is included in Table 2.

Potential unacceptable risks related to human exposures to soil/fill material/Solvay waste were limited to non-cancer risks driven by inhalation of metals in dust. Chemical specific information, such as the exposure point concentration and toxicity information for the risk driving chemicals, is presented in Tables 3 – 5.

It should be noted that the HHRA found no unacceptable risks for most Subsite visitors and exposure scenarios (*e.g.*, transient trespasser, lunchtime trespasser, State Fair attendee, or fisherperson/trespasser). For Subsite visitors, the only receptors and exposure scenarios for which risks or hazards were potentially unacceptable were for recreational receptors engaging in specific activities (*e.g.*, ATV recreators), or receptors that would be involved in intrusive work such as a

construction worker. This information is presented in Table 6. Specifically, the reasonable maximum exposure (RME) non-cancer human health hazard index (HI) is 7 for the older child trespasser/ATV recreator, with the hazard primarily driven by inhalation exposure to nickel and manganese in particulate matter in outdoor air.

RME non-cancer hazards attributable to exposure to fugitive dust and dermal exposure to groundwater exceeded the acceptable threshold for construction workers. Therefore, a construction worker can and should employ measures (*e.g.*, use of personal protective clothing and equipment) in accordance with Site-specific Health and Safety plans to ensure worker protection while engaging in on-Site construction activities. It should be noted that this ROD does not address shallow groundwater. Therefore, the HI for the construction worker exposed only to the fugitive dust were considered, and this value exceeds 1, with manganese and nickel as the most significant contributors, as shown in Table 6.

Also, a 2009 EPA human health risk assessment which examined potential risks associated with the bike trail indicated that risks and hazards to receptors using the bike trail as intended were within acceptable regulatory limits, and a 2014 Supplemental Human Health Risk Evaluation conducted by the EPA found that risks and hazards associated with amphitheater attendees and maintenance workers were within acceptable risk ranges and targets. For amphitheater construction workers, non-cancer hazards may exceed the threshold value (as discussed above). Therefore, an amphitheater construction worker can and should employ safety measures as discussed above for the construction worker who engages in on-Site construction activities

The vapor intrusion pathway was evaluated qualitatively in the HHRA for the commercial/ industrial worker. Screening for the indoor air exposure was conducted through two separate analyses. First, concentrations of volatile constituents in shallow groundwater were compared to the EPA groundwater-to-indoor air criteria to determine if these constituents in groundwater could pose a risk attributable to indoor air vapor intrusion. The maximum concentration of five constituents exceeded screening levels. The ratios of the five retained constituents to the selected screening value are: bis(2-ethylhexyl)phthalate (1,016); naphthalene (39); benzene (2,800); toluene (6); and vinyl chloride (1). The second analysis to assess potential risk to the potential future commercial/industrial worker from the indoor air pathway was to screen the available soil vapor data consistent with the EPA Region 2 screening guidance for indoor air. This comparison suggested the potential for exceedances of the $10^{-6}$ risk threshold for benzene, carbon tetrachloride, chloroform, tetrachloroethene, and trichloroethene. Based on the conclusions of these two assessments, a vapor intrusion evaluation is warranted prior to the construction of buildings at the Subsite, and preventative measures may be warranted in the design and construction of buildings at the Subsite to mitigate the risk of exposure to soil gas. Such measures may include the use of a vapor barrier or the installation of a venting system.

A full discussion of the HHRA evaluation and conclusions is presented in the HHRA Report, the Wastebeds 1-8 Bike Trail Risk Assessment, and the Wastebeds 1-8 Lakeview Amphitheater Supplemental Human Health Risk Evaluation.

### *Ecological Risk Assessment*

The majority of estimated ecological risk at this Subsite is associated with terrestrial exposure. Potential unacceptable risks to terrestrial ecological receptors (American robin, shrew, Red-tailed hawk and fox) were associated with potential exposures to metals (*e.g.*, chromium, cadmium, vanadium, thallium, and mercury), pesticides, SVOCs, and PCBs in soil/fill/Solvay waste material. The calculated risk estimates (*i.e.*, ecological hazard quotients [HQs]) for ecological receptors were based on both the no-observed-adverse-effect level (NOAEL), representing the highest chemical of concern (COC) concentration at which no adverse effects are seen, and the lowest-observed-adverse-effect level (LOAEL), representing the lowest COC concentration shown to produce adverse effects. Food chain calculations yielded 56 NOAEL-based ecological HQs and 32 LOAEL-based ecological HQs that were greater than one, which is the threshold value above which adverse ecological effects may occur. The majority of the metals contamination is associated with the Biosolids Area. To a lesser extent than metals, organic constituents including BTEX compounds, naphthalene, phenols, and several other compounds detected at low frequencies but retained for their bioaccumulative properties presented potential risk to terrestrial ecological receptors exposed to soil/fill/Solvay waste.

A full discussion of the BERA evaluation and conclusions is presented in the 2011 BERA Report.

### *Summary of Human Health Risks and Ecological Risks*

The results of the human health risk assessment indicate that the contaminated soil/fill/Solvay waste present an unacceptable human exposure risk and the ecological risk assessment indicates that the contaminated soil/fill/Solvay waste pose an unacceptable ecological exposure risk.

Based upon the results of the RI and the risk assessments, the EPA has determined that actual or threatened releases of hazardous substances present at this Subsite, if not addressed by the selected remedy or one of the other active measures considered, may present a current or potential threat to human health and the environment.

### *Basis for Action*

Based upon the quantitative human-health risk assessment and ecological evaluation, the EPA has determined that actual or threatened releases of hazardous substances from the Subsite, if not addressed by the response action selected in this ROD, may present a current or potential threat to human health and the environment.

## 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 established using the risk assessments. The following RAOs have been established for OU1:

- Prevent, ingestion/direct contact with soil/fill material/Solvay waste in surface and subsurface soil above levels that would result in unacceptable human exposure.
- Prevent or minimize inhalation of or exposure to contaminants volatilizing from contaminated soil/fill material/Solvay waste that would result in unacceptable human exposure. In the event that buildings are constructed, mitigate impacts to public health resulting from soil vapor intrusion into those buildings, as may be warranted.
- Prevent or minimize, adverse ecological impacts to biota from ingestion/direct contact with soil/fill material/Solvay waste causing toxicity or impacts from bioaccumulation through the terrestrial food chain.
- Prevent or minimize, the further migration of contaminants that would result in groundwater, sediment, or surface water contamination.

NYSDEC's SCOs have been identified as remediation goals to help address these RAOs. SCOs are risk-based criteria which are protective of human health, ecological exposure, or groundwater depending upon the existing and anticipated future use of a site. While the land use of the Subsite has historically been industrial/commercial, current and reasonably anticipated future Subsite uses of some areas are recreational, and several areas include valuable ecological resources. Thus, the restricted-residential use, commercial use, and the protection of ecological resources SCOs have been identified to help address the direct-contact RAOs, and the protection of groundwater SCOs have been identified to address the migration RAO. (See Table 7.)

## SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA Section 121(b)(1), 42 U.S.C. § 9621(b)(1), mandates that remedial actions must be protective of human health and the environment, be cost-effective, comply with ARARs, and utilize permanent solutions, alternative treatment technologies, and resource recovery alternatives to the maximum extent practicable. CERCLA 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 Section 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 that at least attains federal and state ARARs, unless a waiver can be justified pursuant to CERCLA Section 121(d)(4), 42 U.S.C. § 9621(d)(4).

Detailed descriptions of the remedial alternatives for addressing the contamination associated with the Subsite can be found in the FS report. The FS report presents five alternatives.

The construction time for each alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate the performance of the remedy with any potentially responsible parties, or procure contracts for design and construction.

The remedial alternatives are:

**Alternative 1 - No Action**

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. The no-action remedial alternative does not include any physical remedial measures that address the problem of soil and sediment contamination at OU1.

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

| | |
|---|---|
| Capital Cost: | $0 |
| Annual Operation and Maintenance (O&M) Cost: | $0 |
| Present-Worth Cost: | $0 |
| Construction Time: | 0 years |

**Alternative 2 - Cover System**

This alternative was developed to be integrated with the IRM actions which address soil, sediment, fill, and Solvay waste in the areas of the Subsite where the IRM is being implemented (*e.g.*, shoreline stabilization, mitigation wetlands establishment, and associated vegetative cover) and relies on existing cover material where it provides adequate protection on portions of the Subsite. These IRM actions address direct-contact exposure at 58 acres of the Subsite. The IRM also addresses the potential for contaminant migration at perimeter boundaries of the Subsite. Because the potential for contaminant migration is primarily being addressed by the IRM, and protective cover materials which provide adequate protection are already present on other areas of the Subsite, the additional measures below focus primarily on direct-contact exposures associated with the remaining 171 acres of the Subsite which were not addressed under the IRM and which presently do not have adequate cover material, and potential vapor intrusion.

Solvay wastes, soils, and fill material (to as deep as 70 feet bgs) would be managed in place.

This alternative includes the placement of several types of vegetated cover systems in discrete areas. The specific cover type for a given area is based on remediation goals (SCOs) in surface soil, and current and reasonably anticipated future land uses at the given Subsite area. The cover systems would be applied over 171 acres of the Subsite in areas which do not have existing covers or infrastructure located on them and other areas which need additional cover material, (*e.g.*, the upland staging areas associated with the IRM and a portion of the parking lot areas). The extent and type of covers included in this alternative are shown on Figure 4 and are described below**:**

**Cover Types**

*One-foot thick vegetated soil cover (where commercial use SCOs in surface soil are exceeded) - approximately 5 acres:* In areas of anticipated passive recreational use (for OU1 these activities could potentially include walking trails or buffer zones along trails and parking areas) where SCOs for commercial use are exceeded.

*Two-foot thick vegetated soil cover (where restricted residential use or ecological SCOs in surface soil are exceeded) - approximately 20 acres:* In areas of anticipated active recreational use (for OU1 these activities could potentially include lawn seating areas and playing fields) where SCOs for restricted residential use are exceeded or where SCOs for protection of ecological resources would apply and are exceeded.

*One and a half-foot thick vegetated soil cover (where ecological SCOs in surface soil are exceeded) - approximately 10 acres:* Additional soil cover would be applied to the three upland staging areas associated with the IRM. Restoration of these areas under the IRM currently consists of a six-inch topsoil cover. The additional 1.5 feet of cover material would provide for a two-foot cover over this area where protection of ecological resources SCOs are exceeded.

*One-foot thick vegetated structural fill cover (where commercial use SCOs in surface soil are exceeded) - approximately 19 acres:* This cover would be applied to areas of anticipated NYS Fairgrounds overflow parking (passive recreational use) where SCOs for commercial use are exceeded. The structural fill cover would consist of a compacted mixture of aggregate and soil. This cover would be placed directly over existing soil/fill/Solvay waste to support vehicle traffic and provide water holding capacity, rooting volume and growing conditions to support vegetation. While the thickness of the structural fill layer is assumed (for cost estimate purposes) to be 1 foot, the actual thickness and locations where it will be placed would be determined during remedial design.

*Vegetation enhancement cover (where surface soil SCOs are not exceeded) - approximately 117 acres:* This cover would consist of wood fiber mulch/compost and fertilizer mixed with seeds and would be applied to areas where surface soil concentrations are below applicable SCOs. While the thickness of the mulch and seed application is assumed (for cost estimate purposes) to be approximately 4 inches, the actual thickness and locations would be determined during remedial design. The placement of a vegetation enhancement cover would help to stabilize surface

soil and reduce the potential for erosion which may result in potential exposure to contaminants in subsurface soil. Based on Subsite data, VOCs, SVOCs, pesticides, PCBs and/or inorganics were detected in subsurface soil/fill materials/Solvay waste throughout the Subsite at levels above SCOs for unrestricted use.

Any fill material brought to the Subsite would need to meet the requirements for the identified Subsite use as set forth in 6 NYCRR Part 375-6.7(d). Native species would be used for the vegetative component of covers. For the purpose of developing cost estimates, the seed application is anticipated to consist of a grassland seed mix native to NYS and selected for its ability to attain relatively high growth rates and ecological function.

Structures, such as buildings, pavement, and sidewalks which may be developed would serve as acceptable substitutes for any of the vegetated soil cover types described above.

Approximately 58 acres (where SCOs for protection of commercial use are not exceeded in surface soil) of the 77 acres of the Subsite used as parking lots associated with the New York State Fairgrounds are already covered with an estimated 2 to 7 feet of imported fill, including at least one foot of gravel/fill at the surface. The existing cover thickness would be confirmed during remedial design, and additional cover would be placed, if needed, to provide for at least a one-foot thickness. Existing parking lot surfaces, the County's public paved recreation trail, the Crucible landfill area, and vegetated covers/road beds associated with the I-690/NY-695 corridor, and other Subsite roads/infrastructure would also be maintained.

Clean fill staging areas, which support the IRM, Ninemile Creek, and Onondaga Lake Subsite remediation, were constructed using a minimum of 6 inches of crushed stone. Restoration for these areas would consist of placement of 6 inches of vegetated, clean fill over the top of the crushed stone in order to provide for a 1-foot cover over these areas.

Institutional controls would be used to ensure that any intrusive activities in areas where contamination remains are in accordance with a NYSDEC-approved Site Management Plan, which would include the following:

- Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for OU1 and details the steps and media-specific requirements necessary to ensure the following institutional and engineering controls remain in place and effective:

    - environmental easements and/or an environmental notice;
    - Subsite cover systems described above;
    - excavation plan which details the provisions for management of future excavations in areas of remaining contamination;
    - descriptions of the provisions of the institutional controls including any land use restrictions;

- provision that future on-site construction should include vapor intrusion sampling and/or installation of mitigation measures, if necessary;
- provisions for the management and inspection of the identified engineering controls;
- maintaining Subsite access controls and NYSDEC notification; and
- steps necessary for periodic reviews and certification of the institutional and/or engineering controls.

- Monitoring Plan to assess the performance and effectiveness of the remedy. The plan would include, but may not be limited to, monitoring for vapor intrusion for any buildings developed on the Subsite, as may be required by the Institutional and Engineering Control Plan.

The alternative includes continued monitoring and maintenance associated with IRM elements which pertain to the shoreline stabilization system, mitigation wetlands, the vegetative cover, and Subsite access roads constructed to support the IRM. Maintenance and monitoring for the IRM mitigation wetlands and cover systems would include monitoring to document that success criteria are met and to identify the need for corrective action(s), as warranted. Corrective actions for cover types/zones may consist of cover repair in areas of disturbance or re-application of vegetation in areas of non-survivorship.

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

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|---|---|
| Capital Cost: | $14,300,000 |
| Annual Operation and Maintenance (O&M) Cost (years one to five): | $129,000[5] |
| Annual Operation and Maintenance (O&M) Cost (years six to 30): | $99,000 |
| Present-Worth Cost: | $16,600,000 |
| Construction Time: | 6 years |

[5] The annual O&M cost estimates associated with monitoring of the vegetative cover for the first five-year period following completion of the IRM were included in the cost estimates developed for the IRM. The annual O&M cost estimates associated with monitoring of the vegetative cover between years six to 30, for maintenance of the vegetative cover, and for monitoring and maintenance of the other IRM elements cited here are included in the cost estimates for this alternative.

**Alternative 3 - Enhanced Cover System**

This alternative is identical to Alternative 2, except: (a) in areas where the current or planned use is active recreation (*e.g.*, lawn seating areas and playing fields), a two-foot thick vegetated soil cover would be installed regardless of whether the restricted residential SCOs are exceeded in surface soil or not, and (b) in areas where current or planned use is passive recreation (*e.g.*, walking trails or buffer zones along trails and parking areas) a one-foot thick vegetated soil cover would be installed, regardless of whether the commercial use SCOs are exceeded in surface soil or not. In passive and active recreation areas where SCOs are not exceeded, the one- or two-foot cover, respectively, replaces the vegetated enhancement cover that would have been provided under Alternative 2 in these areas. The thicker covers in these recreational areas where SCOs are not exceeded in surface soil would further reduce potential human exposure to contamination in subsurface soil. The estimated acreages corresponding to the respective cover types are listed below and shown on Figure 5.

*One-foot thick vegetated soil cover (for passive recreation areas) - approximately 39 acres:* In areas of anticipated passive recreational use (regardless of whether the commercial use SCOs are exceeded or not), a one-foot thick vegetated soil cover would be installed.

*Two-foot thick vegetated soil cover (for active recreation areas or where ecological SCOs in surface soil are exceeded) - approximately 27 acres:* In areas of anticipated active recreational use (regardless of whether the restricted residential SCOs are exceeded or not) and also where SCOs for protection of ecological resources would apply and are exceeded, a two-foot thick vegetated soil cover would be installed.

*One and a half-foot thick vegetated soil cover (where ecological SCOs in surface soil are exceeded) - approximately 10 acres:* Additional soil cover would be applied to the three upland staging areas associated with the IRM. Restoration of these areas under the IRM consisted of a six-inch topsoil cover. The additional 1.5-feet of cover material would provide for a two-foot cover over this area where protection of ecological resources SCOs are exceeded.

*One-foot thick vegetated structural fill cover (where commercial use SCOs in surface soil are exceeded) - approximately 19 acres:* This cover would be applied to areas of anticipated NYS Fairgrounds overflow parking (passive recreational use) where SCOs for commercial use are exceeded. The structural fill cover would consist of a compacted mixture of aggregate and soil. This cover would be placed directly over existing soil/fill to support vehicle traffic and provide water holding capacity, rooting volume and growing conditions to support vegetation. While the thickness of the structural fill layer is assumed (for cost estimate purposes) to be one-foot, the actual thickness and locations where it would be placed would be determined during remedial design.

*Vegetation enhancement cover (over the remaining areas) - approximately 76 acres:* This cover would consist of wood fiber mulch/compost and fertilizer mixed with seeds. While the thickness

of the mulch and seed application is assumed (for cost estimate purposes) to be approximately four inches, the actual thickness and locations would be determined during remedial design.

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

| | |
|---|---|
| Capital Cost: | $17,800,000 |
| Annual Operation and Maintenance (O&M) Cost (years one to five): | $128,000 |
| Annual Operation and Maintenance (O&M) Cost (years six-30): | $98,000 |
| Present-Worth Cost: | $20,000,000 |
| Construction Time: | 8 years |

**Alternative 4A – Excavation and Off-Site Disposal/Treatment/Reuse (Full Removal)**

Under this alternative, the Subsite would be restored to pre-disposal conditions through the excavation of all soil/fill/Solvay waste. This would include temporary relocation and removal of the portions of I-690 and interchanges associated with NY-695 that traverse the Subsite in order to access the underlying material.

The estimated volume of soil/fill/Solvay waste that would be excavated is approximately 26 million CY, representing fill material placed on the former Geddes Marsh and deeper contaminated soil, with estimated excavation depths of 5 to 70 feet bgs. It is assumed that a portion of the excavated soil/fill/Solvay waste would require stabilization prior to off-site transport for disposal or beneficial reuse; therefore, the estimated volume of material that would require off-site management is 26.6 million CY. Potential beneficial reuses might include fill material, landfill cover, or as aggregate. Additionally, it was assumed for cost-estimating purposes that 1.7 million CY of stained material (indicative of elevated concentrations of VOCs) would require *ex-situ* thermal treatment prior to disposal at an existing non-hazardous waste disposal facility or reuse.

In addition to the 26 million CY of soil/fill/Solvay waste material to be excavated, approximately 70,000 CY of construction and demolition (C&D) material associated with demolition of the existing highways and exchanges would require removal and off-site disposal at a C&D landfill.

The excavated areas would be backfilled and restored as a marsh along Onondaga Lake. This would require the use of an estimated 1.9 million CY of clean backfill soils. The removed portions

of I-690 and interchanges associated with NY-695 would be replaced. Long-term maintenance of vegetated areas would be included in this option. This alternative would take approximately 30 years to implement due to the large volume of soil/fill material requiring excavation and off-site management.

| | |
|---|---|
| Capital Cost: | $6,135,000,000 |
| Annual Operation and Maintenance (O&M) Cost (years one to five): | $1,360,000 |
| Annual Operation and Maintenance (O&M) Cost (years six-30): | $170,000 |
| Present-Worth Cost: | $6,142,000,000 |
| Construction Time: | 30 years |

**Alternative 4B – Partial Excavation and Off-Site Disposal/Treatment/Reuse (Partial Removal)**

Under this alternative, the Subsite would be restored to pre-disposal conditions through the excavation of all soil/fill/Solvay waste with the exception of the areas underlying the portions of I-690 and interchanges associated with NY-695 that traverse the Subsite and, as determined by geotechnical analysis, immediately adjacent areas where excavation would result in conditions which would potentially undermine the stability of the roadways. Any immediately adjacent areas which may not be excavated because of stability concerns would receive a cover of suitable type and thickness, as may be appropriate, consistent with surface and subsurface soil conditions and the current and future anticipated land use of the adjacent areas.[6]

The estimated volume of soil/fill/Solvay waste that would be excavated is approximately 23 million CY. It is assumed that a portion of the excavated soil/fill/Solvay waste would require stabilization prior to off-site transport for disposal or beneficial reuse; therefore, the estimated volume of material that would require off-site management is 23.5 million CY. Potential beneficial reuses might include fill material, landfill cover, or as aggregate. Additionally, it was assumed for cost-estimating purposes that 1.7 million CY of stained soil (indicative of elevated concentrations of VOCs), would require *ex-situ* thermal treatment prior to disposal at an existing non-hazardous waste disposal facility or reuse.

A Site Management Plan, periodic reviews, and institutional controls would be included in this alternative.

[6] The cost estimate for this alternative assumes that excavation would occur in areas up to the roadways.

This alternative would take approximately 27 years to implement due to the large volume of soil/fill material requiring excavation and off-site management.

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

| | |
|---|---|
| Capital Cost: | $5,124,000,000 |
| Annual Operation and Maintenance (O&M) Cost (years one to five): | $1,172,000 |
| Annual Operation and Maintenance (O&M) Cost (years six-30): | $157,000 |
| Present-Worth Cost: | $5,130,000,000 |
| Construction Time: | 27 years |

## COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, EPA considered the factors set out in CERCLA §121, 42 U.S.C. § 9621, by conducting a detailed analysis of the viable remedial response measures pursuant to the NCP, 40 CFR §300.430(e)(9) and OSWER Directive 9355.3-01. The detailed analysis consisted of an assessment of the individual response measured against each of the nine evaluation criteria in the FS report. This section profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other alternatives under consideration.

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***Threshold Criteria*** *- The first two criteria are known as "threshold criteria" because they are the minimum requirements that each response measure must meet to be eligible for selection as a remedy.*

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1. **Overall Protection of Human Health and the Environment**

*Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.*

Alternative 1 would not provide protection of human health and the environment, whereas Alternatives 2, 3, 4A and 4B would each be protective of human health and the environment. Alternative 4A provides protectiveness through full removal of the soil/fill/Solvay waste and Alternative 4B provides protectiveness through a combination of removal and site management of remaining soil/fill/Solvay waste. Alternatives 2 and 3 provide protectiveness through covering the soil/fill/Solvay waste and site management in order to prevent exposures/reduce risks.

Alternative 1 does not meet the RAOs. Alternatives 2, 3, 4A, and 4B meet the RAOs. Alternative 3 provides added protectiveness as compared to Alternative 2 through added thickness of vegetated covers for areas of OU1 reasonably anticipated to be used for active or passive recreational uses.

**2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)**

*Section 121 (d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4). Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those State standards identified by a state in a timely manner and that are more stringent than Federal requirements may be applicable.*

*Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site. Only those State standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate.*

*Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides a basis for an invoking waiver.*

Chemical-, location-, and action-specific ARARs/TBCs identified for consideration are summarized in Table 8. Alternative 1 does not achieve chemical-specific ARARs/TBCs (SCOs).

Exposures to soil/fill/Solvay waste exceeding chemical-specific ARARs/TBCs would be managed through the cover systems and institutional controls in Alternatives 2 and 3. Under Alternatives 4A and 4B, exposures to soil/fill/Solvay waste exceeding chemical-specific ARARs/TBCs would be managed through excavation of soil/fill/Solvay waste or partial excavation in conjunction with a Site Management Plan and institutional controls. The substantive requirements of Title 6 NYCRR Part 360 that would apply to Alternatives 2 and 3 would be met by the cover systems. The more robust cover system under Alternative 3 (in areas where the reasonably anticipated land uses are active or passive recreation) would more reliably contain and prevent exposure to the underlying Solvay waste.

Construction methods would be implemented to adhere to the location- and action-specific ARARs/TBCs identified for Alternatives 2, 3, 4A and 4B. No action- or location-specific ARARs/TBCs were identified for Alternative 1, the no action alternative. Alternatives 2, 3, and 4B would comply with the action-specific ARARs/TBCs. Specifically, institutional controls would be implemented under Alternatives 2, 3, and 4B in conformance with NYSDEC's guidance DER-33, Institutional Controls: A Guide to Drafting and Recording Institutional Controls. Additionally, the cover systems in Alternatives 2 and 3 would prevent erosion and exposure to soil/fill/Solvay waste. Cover systems would be implemented in conformance with NYSDEC's guidance DER-10, Technical Guidance for Site Investigation and Remediation. Construction and O&M activities in Alternatives 2, 3, 4A and 4B would be conducted in compliance with Occupational Safety and Health Administration requirements.

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***Primary Balancing Criteria*** *- The next five criteria, criteria 3 through 7, are known as "primary balancing criteria." These criteria involve the assessment of factors between response measures so that the best option will be chosen, given site-specific data and conditions*

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**3. Long-Term Effectiveness and Permanence**

*Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain on site following remediation and the adequacy and reliability of controls.*

Alternative 1 would not provide long-term effectiveness and permanence, whereas Alternatives 2, 3, 4A and 4B would. Alternative 4A provides for the most reliable long-term effectiveness and permanence through removal of soil/fill/Solvay waste. Alternative 4B provides a similar degree of long term effectiveness and permanence except that the soil/fill/Solvay waste that would not be excavated would rely upon site management and the institutional controls in order to ensure effectiveness and permanence for the soil/fill/Solvay waste that would not be excavated. Alternatives 2 and 3 also rely on site management and institutional controls to ensure long-term effectiveness, but the less robust cover provided under Alternative 2 in areas where

the reasonably anticipated uses are active or passive recreation would be expected to need repair/replacement more frequently over the long term compared to Alternative 3.

**4. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment**

*Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.*

There would be no reduction in toxicity, mobility, or volume provided in Alternative 1. Alternatives 2 and 3 would reduce mobility associated with erosion and infiltration of contaminants in soil/fill/Solvay waste through vegetated cover systems but involve no treatment. Alternative 3 would provide for greater reduction in mobility of soil/fill/Solvay waste constituents as compared to Alternative 2 because of placement of a cover in portions of OU1 where only vegetation enhancement is included in Alternative 2. Alternatives 4A and 4B would reduce toxicity, mobility, and volume of contaminants in soil/fill/Solvay waste through the excavation, treatment (of a portion of the excavated materials) and off-site management of materials.

**5. Short-Term Effectiveness**

*Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.*

Alternative 1 does not include any physical measures in any areas of contamination and, therefore, would not present any potential adverse impacts to remediation workers or the community as a result of its implementation. Alternatives 2, 3, 4A and 4B would be constructed using proper protective equipment to manage potential risks to on-site workers, and proper precautions and monitoring would be utilized to be protective of the general public and the environment. Alternatives 2 and 3 would meet the RAOs related to preventing direct contact exposures once the cover is placed. Placement of cover materials over the entire Subsite under Alternative 2 is estimated to take six years and for Alternative 3, placement of cover materials is estimated to take eight years. Alternatives 4A and 4B would require a significantly longer timeframe to implement as excavation is estimated to take place over approximately 30 and 27 years, respectively.

Excavation of anticipated volumes would be very difficult. Excavation considerations that limit the implementability of Alternatives 4A and 4B include construction water management, air quality concerns, and odors. Construction water management is anticipated to be significant during the excavation of the approximately 5 to 70-foot thick area of 280 to 340 acres (including excavation below the groundwater table) anticipated in Alternatives 4A and 4B. The treatment capacity is assumed to be available through repurposing of the Lake Bottom Sediment Containment Area treatment plant. However, the viability of this option would require further

evaluation. Air quality and odors would be controlled during construction. However, given the elevated concentrations of VOCs in the stained material, volatilization of VOCs and generation of odors may hinder productivity and, thus, may result in significant delays to the implementation timeframe of this alternative. Because of the volume of soil/fill/Solvay waste requiring excavation and off-site management and the estimated construction duration, Alternatives 4A and 4B would result in substantially greater impacts to the community and the environment associated with transporting, via truck, excavated materials for off-site disposal and/or beneficial reuse, and there would be significant adverse traffic impacts related to temporary relocations and restrictions of the impacted section of I-690 and interchanges associated with NY-695.

Impacts to the community resulting from the construction of Alternatives 2, 3, 4A and 4B would primarily be due to increased truck traffic and noise for the duration of construction. Because of the increased quantity of materials and enhanced cover associated with Alternative 3, there could be slightly increased impacts to the community relative to truck traffic and noise during the construction of Alternative 3 as compared to Alternative 2. Construction of Alternative 4A and 4B would result in substantial, long-term community impacts because of construction-related noise, odors, dust, and most notably traffic. As it relates to traffic, transportation of excavated materials under Alternatives 4A and 4B is anticipated to require 1.3 to 1.5 million truck trips over 27 to 30 years to and from the Subsite as compared to 9,000 to 12,000 large trucks necessary for construction of Alternatives 2 and 3. The increased traffic associated with Alternatives 4A and 4B would present a more significant risk to worker and community safety than would Alternatives 2 and 3. Also, reconstruction of the highway under Alternative 4A would likely cause significant traffic impacts.

Dust, emissions and surface water runoff controls would be implemented during construction phase activities associated with each of the active remedial alternatives. Only limited clearing and grubbing would be required under Alternative 2, while Alternative 3 would require some additional clearing and grubbing of existing vegetation to support the implementation of the soil cover systems. Comparatively, Alternatives 4A and 4B would require clearing and grubbing of existing vegetation for nearly the entire Subsite to support excavation activities. Installation of cover systems in Alternatives 2 and 3 and replacement of the pre-existing marshes (that existed prior to the creation of Wastebeds 1-8) in Alternatives 4A and 4B, would result in enhancements to existing ecological habitats.

Short-term environmental impacts resulting from construction of Alternatives 2 and 3 would be minimal; however, because of the increased quantity of materials and increased acreage of surfaces requiring clearing under Alternative 3, there is a slightly increased environmental footprint associated with Alternative 3 as compared to Alternative 2. Substantial negative short-term environmental impacts would result from soil/fill/Solvay waste excavation, transportation and off-site management activities associated with Alternatives 4A and 4B, compared to cover system construction activities associated with Alternatives 2 and 3. Alternative 4A would result in a greater environmental impact as compared to Alternative 4B because of the additional removals and reconstruction of portions of I-690 and NYS Route 695.

The cover system included in Alternatives 2 and 3 would be consistent with current and reasonably anticipated future land use of the Subsite. Alternatives 1, 4A and 4B would not be consistent with the current and reasonably anticipated future land use. Alternatives 4A and 4B would require removal of land mass at the location of the existing NYS Fairgrounds parking lots and public recreation trail and at the site of the proposed amphitheater and related facilities.

While the excavation and removal of soil/fill/Solvay waste included in Alternatives 4A and 4B would attain RAOs, the impacts to the community and environment, current and anticipated future land use, and the duration (*e.g.*, approximately 30 years) of these alternatives as compared to Alternatives 2 and 3 render them highly disadvantageous in relation to short-term impacts. These areas would become a restored "Geddes Marsh" along the banks of Onondaga Lake and would no longer be available for their current land uses, which include overflow parking areas for events at the State Fairgrounds.

**6. Implementability**

*Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.*

Alternatives 2 and 3 can be readily constructed and operated and the materials necessary for their construction are reasonably available. The cover systems in Alternatives 2 and 3 would incorporate constructible and reliable technologies. Monitoring the effectiveness of Alternatives 2 and 3 would be accomplished through cover system inspections and maintenance to verify continued cover integrity, visual signs of erosion, and condition of the cover.

The excavation and off-site management of 23 to 26 million CY of soil/fill/Solvay waste associated with Alternatives 4A and 4B would be much more difficult to implement than Alternatives 2 and 3. Specifically, there are significant implementability limitations associated with excavation, transportation, disposal, and reuse capacity of this volume of material. These include:

- Transportation of anticipated volumes presents significant hazards and disruption to the community. Transportation considerations that severely limit the implementability of Alternatives 4A and 4B include significantly increased traffic, fuel usage and adverse effects on air quality and community safety. It is estimated that approximately 896,000 CY of material would be shipped off-site each year in 50,000 truckloads (180 truck-loads per day). During an 8-hour work day, this would equate to approximately 1 truck entering or leaving the Subsite every 3 minutes. In addition to the potentially significant effects on local air quality and community traffic patterns, traffic of this magnitude is anticipated to result in significant effects on conditions of roadways.

- Sufficient capacity for the disposal of the anticipated volumes of waste may not exist. Because of the volume anticipated to be excavated, off-site disposal capacity for excavated materials would be a critical factor and may significantly limit the implementability of this alternative. An estimated 26.6 and 23.4 million CY (estimated to be approximately 32.0 and 28.1 million tons) would require off-site disposal. Given the magnitude of this volume, multiple commercial landfill facilities would be necessary. While disposal within 200 miles of the Subsite has been assumed for cost estimation purposes, given the timeframe of approximately 30 and 27 years to implement Alternatives 4A and 4B, respectively, it is not possible to reliably predict that disposal capacity for this volume of material would exist within the assumed distance from the Subsite. Lack of landfill capacity would result in significant delays to the implementation timeframe of this alternative.

- Because of the volume anticipated to be excavated, reuse opportunities for excavated materials are anticipated to be a critical factor for Alternatives 4A and 4B and may significantly limit their implementability. It should be noted that the physical and geotechnical characteristics of this material would restrict potential options for its reuse. Notwithstanding these limitations based on physical characteristics and given the magnitude of this volume, it is anticipated that multiple end-use facilities would be necessary. While reuse within 400 miles of the Subsite has been assumed for cost estimation purposes, it is unlikely that reuse capacity for this volume of material would exist given the timeframe of approximately 27 to 30 years to implement these alternatives. Lack of reuse capacity may result in an even longer timeframe for implementation of this alternative.

Each alternative would require coordination with other agencies, including NYSDOH, New York State Department of Transportation, New York State Department of Agriculture and Markets (NYS Fairgrounds), Onondaga County, and the Town of Geddes. The necessary equipment and specialists would be available for each alternative. Cover system construction materials are anticipated to be available; however, material sources and availability of cover system materials would be further evaluated during the design. Because of the temporary relocations and restrictions of the existing highways and interchanges, Alternative 4A would be even more difficult to implement than Alternative 4B.

**7. Cost**

*Includes estimated capital and O&M costs, and net present worth value of capital and O&M costs.*

The present-worth costs were calculated using a discount rate of seven percent and a thirty-year time interval for post-construction monitoring and maintenance period.

The estimated capital, annual O&M, and present-worth costs for each of the alternatives are presented in the table below. The estimated costs for the action alternatives are directly related to the given alternative's corresponding total volumes of soil and sediments to be excavated.

| **Alternatives** | **Capital** | **Annual O&M[7]** | **Total Present Worth** |
|---|---|---|---|
| 1 – No Action | $0 | $0 | $0 |
| 2 – Cover System | $14.3 million | $99,000-$129,000 | $16.6 million |
| 3 – Enhanced Cover System | $17.8 million | $98,000-$128,000 | $20 million |
| 4A – Full Removal | $6.1 billion | $170,000-$1,362,000 | $6.1 billion |
| 4B – Partial Excavation | $5.1 billion | $157,000-$1,172,000 | $5.1 billion |

***Modifying Criteria*** *- The final criteria 8 and 9, are known as "modifying criteria." Community and support agency acceptance are factors that are assessed by reviewing comments received during the public comment period, including new information made available after publication of the proposed plan that significantly changes basic features of the remedy with respect to scope, performance, or cost.*

**8. State Acceptance**

*Indicates whether, based on its review of the RI/FS reports and the Proposed Plan, the state supports, opposes, and/or has identified any reservations with the selected response measure.*

NYSDEC is the lead agency for this Subsite and has prepared the remedy selected in this ROD. The EPA has determined that the selected remedy meets the requirements for a remedial action as set forth in CERCLA Section 121, 42 USC § 9621. As such, for the purpose of satisfying this remedy selection criterion of the NCP, NYSDEC, on behalf of New York State, supports the selected remedy. NYSDOH also supports the selection of this remedy; its letter of concurrence is attached (see Appendix IV)."

**9. Community Acceptance**

*Summarizes the public's general response to the response measures described in the Proposed Plan and the RI/FS reports. This assessment includes determining which of the response measures the community supports, opposes, and/or has reservations about.*

[7] The higher end of the range of annual O&M cost estimates represent the cost estimates in years one to five, and the lower end of the range of annual O&M cost estimates represent the cost estimates in years six to 30.

Comments received during the public comment period are summarized and addressed in the Responsiveness Summary, which is attached as Appendix V to this document.

## PRINCIPAL THREAT WASTE

The NCP establishes an expectation that the 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 will 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 those remedy-selection criteria that are described above. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

NYSDEC and EPA have not identified material at this Subsite as principal threat wastes.

## SELECTED REMEDY

### *Summary of the Rationale for the Selected Remedy*

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, NYSDEC and EPA have determined that Alternative 3 - Enhanced Cover System, 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, set forth at 40 CFR § 300.430(e)(9).

Alternatives 2, 3, 4A, and 4B (the action alternatives) would each be protective of human health and the environment and would address the RAOs. However, Alternatives 4A and 4B would be technically and administratively difficult to implement, would present significant short-term impacts to the surrounding community during the lengthy construction phase, would result in substantial environmental impacts, would not be consistent with current and reasonably anticipated future land uses, and would take significantly longer to implement as compared to Alternatives 2 and 3.

While Alternatives 2 and 3 would both achieve protectiveness of human health and the environment and achieve the RAOs, and are consistent with current and reasonably anticipated future use of the Subsite, Alternative 3 would provide increased cover thicknesses relative to

Alternative 2 in approximately 41 acres of the Subsite where visitors would attend events at the planned amphitheater facilities and/or engage in other recreational activities. The additional cover thicknesses prescribed under Alternative 3 in these areas would provide added long-term effectiveness and permanence relative to that offered by the cover system associated with Alternative 2 by further reducing potential human exposure to contamination in subsurface soil. Based on information currently available, NYSDEC and EPA believe that the selected remedy meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. NYSDEC and EPA expect the selected remedy to satisfy the following statutory requirements of CERCLA §121(b): 1) be protective of human health and the environment; 2) comply with ARARs; 3) be cost-effective; 4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and 5) satisfy the preference for treatment as a principal element (or justify not meeting the preference).

NYSDEC and EPA have determined that the selected remedy is protective of human health and the environment; provides the greatest long-term effectiveness; is able to achieve cleanup objectives more quickly than other alternatives; and is cost-effective. The selected remedy utilizes permanent solutions, alternative treatment technologies, and resource-recovery technologies to the maximum extent practicable.

***Description of the Selected Remedy***

The selected remedy (Alternative 3) for the Solvay Wastebeds 1-8 Subsite to address the Solvay waste and contaminated soil/fill materials includes the following components:

*One-foot thick vegetated soil cover (for passive recreation areas) - approximately 39 acres:* In areas of anticipated passive recreational use (regardless of whether the commercial use SCOs are exceeded or not), a one-foot thick vegetated soil cover will be installed.

*Two-foot thick vegetated soil cover (for active recreation areas or where ecological SCOs in surface soil are exceeded) - approximately 27 acres:* In areas of anticipated active recreational use (regardless of whether the restricted residential SCOs are exceeded or not) and also where SCOs for protection of ecological resources will apply and are exceeded, a two-foot thick vegetated soil cover will be installed.

*One and a half-foot thick vegetated soil cover (where ecological SCOs in surface soil are exceeded) - approximately 10 acres:* Additional soil cover will be applied to the three upland staging areas associated with the IRM. Restoration of these areas as part of the IRM consisted of a six-inch topsoil cover. The additional 1.5-feet of cover material will provide for a two-foot cover over this area where protection of ecological resources SCOs are exceeded.

*One-foot thick vegetated structural fill cover (where commercial use SCOs in surface soil are exceeded) - approximately 19 acres:* This cover will be applied to areas of anticipated NYS

Fairgrounds overflow parking (passive recreational use) where SCOs for commercial use are exceeded. The structural fill cover will consist of a compacted mixture of aggregate and soil. This cover will be placed directly over existing soil/fill to support vehicle traffic and provide water holding capacity, rooting volume and growing conditions to support vegetation. While the thickness of the structural fill layer is assumed (for cost estimating purposes) to be one-foot, the actual thickness and locations where it will be placed will be determined during remedial design.

*Vegetation enhancement cover (over the remaining areas) - approximately 76 acres:* This cover will consist of wood fiber mulch/compost and fertilizer mixed with seeds and will be applied to areas where surface soil concentrations are below applicable SCOs. While the thickness of the mulch/compost and seed application is assumed (for cost estimate purposes) to be approximately 4 inches, the actual thickness and locations will be determined during remedial design.

Any fill material brought to the Subsite will need to meet the requirements for the identified site use as set forth in 6 NYCRR Part 375-6.7(d). Native species will be used for the vegetative component of covers. For the purpose of developing cost estimates, the seed application is anticipated to consist of a grassland seed mix native to NYS and selected for its ability to attain relatively high growth rates and ecological function.

Structures, such as buildings, pavement, or sidewalks, as part of the future development at OU1 could serve as acceptable substitutes for any of the vegetated cover types described above.

Approximately 58 acres (where SCOs for protection of commercial use are not exceeded in surface soil) of the 77 acres of the Subsite used as parking lots associated with the New York State Fairgrounds are already covered with an estimated two to seven feet of imported fill, including at least one-foot of gravel/fill at the surface. The existing cover thickness will be confirmed during remedial design and additional cover will be placed, if needed, to provide for at least a one foot thickness. Existing parking lot surfaces, the County's public paved recreation trail, the Crucible landfill area, and vegetated covers/road beds associated with the I-690/NY-695 corridor, and other Subsite roads/infrastructure would also be maintained.

Clean fill staging areas, which support the IRM, Ninemile Creek, and Onondaga Lake site remediation projects, were constructed using a minimum of six inches of crushed stone. Restoration of the clean fill staging areas will consist of placement of six inches of vegetated, clean fill over the top of the crushed stone in order to provide for a one-foot cover over these areas.

Institutional controls, such as an environmental easement, will be used to ensure that any intrusive activities in areas where contamination remains are in accordance with a NYSDEC-approved Site Management Plan, which will include the following:

- Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the remedy and details the steps and media-specific requirements

necessary to ensure the following institutional and engineering controls remain in place and effective:

- environmental easements and/or an environmental notice;
- cover systems described above;
- excavation plan which details the provisions for management of future excavations in areas of remaining contamination;
- descriptions of the provisions of the institutional controls including any land use restrictions;
- provision that future on-Site construction should include vapor intrusion sampling and/or installation of mitigation measures, if necessary;
- provisions for the management and inspection of the identified engineering controls;
- maintaining Subsite access controls and NYSDEC notification; and
- steps necessary for periodic reviews and certification of the institutional and/or engineering controls.

- Monitoring Plan to assess the performance and effectiveness of the remedy. The plan will include, but may not be limited to, monitoring for vapor intrusion for any buildings developed on the Subsite, as may be required by the Institutional and Engineering Control Plan discussed above.

The selected remedy includes continued monitoring and maintenance associated with the IRM components relating to soil, sediment, fill, and Solvay waste (*e.g.*, shoreline stabilization system, mitigation wetlands, the vegetative cover, and access roads constructed to support the IRM). Maintenance and monitoring for the IRM mitigation wetlands and cover systems will include monitoring to document that success criteria are met and to identify the need for corrective action(s), as warranted. Corrective actions for cover types/zones may include repair of cover cross-sections in areas of disturbance or re-application of vegetation in areas of non-survivorship.

The remedial design will provide the details necessary for the construction, operation, maintenance and monitoring of the remedial action. The need for a demarcation layer between the soil cover and the underlying substrate will be evaluated during design.

Green remediation techniques, as detailed in NYSDEC's Green Remediation Program Policy - DER-31,[8] and the EPA Region 2's Clean and Green policy[9] will be considered for the preferred alternative to reduce short-term environmental impacts. Green remediation best practices such as the following may be considered:

---

[8] See http://www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf

[9] See http://epa.gov/region2/superfund/green_remediation

- Use of renewable energy and/or purchase of renewable energy credits to power energy needs during construction and/or operation and maintenance of the remedy.
- Reduction in vehicle idling, including both on and off road vehicles and construction equipment during construction and/or operation and maintenance of the remedy.
- Design of cover systems, to the extent possible, to be usable for alternate uses, require minimal maintenance (*e.g.*, less mowing), allow for infiltration of storm water and/or be integrated with the planned use of the property. For example, the use of vegetated structural fill to create parking surfaces as identified in both Alternatives 2 and 3 will address storm water management in these areas, while also resulting in a surface usable for current and intended land use in these areas.
- Beneficial reuse of material that will otherwise be considered a waste.
- Use of Ultra Low Sulfur Diesel (ULSD).

Because this alternative will result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the remedy be reviewed at least once every five years. If justified by the review, remedial actions may be evaluated to remove, treat, or contain the contaminated soils remaining at OU1.

***Summary of the Estimated Remedy Costs***

The estimated capital cost of the selected remedy is $17,800,000; the annual O&M is $98,000 (for years one to five) and $128,000 (for years six to 30); and the total present-worth costs (using a seven percent discount rate) is $20,000,000. Table 9 provides the basis for the cost estimates for Alternative 3.

It should be noted that these cost estimates are expected to be within +50 to -30 percent of the actual project cost. These cost estimates are based on the best available information regarding the anticipated scope of the selected remedy.

***Expected Outcomes of the Selected Remedy***

The results of the HHRA indicate that the Subsite, if not remediated, presents a potentially unacceptable noncancer hazard for recreational receptors engaging in specific activities (*e.g.*, ATV riding), or receptors that would be involved in intrusive work such as a construction worker. The results of the BERA indicate that the Subsite, if not remediated, poses an unacceptable ecological exposure risk.

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

and surface water, and by providing and/or maintaining open space for recreational and commercial use.

Under the selected remedy, potential risks to human health and the environment will be reduced to acceptable levels.

## 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, DEC and the EPA have determined that the selected remedy meets these statutory requirements.

### *Protection of Human Health and the Environment*

The results of the risk assessment indicate that, if no action is taken, the OU1 area poses an unacceptable increased future ecological and human health risk.

The selected remedy will adequately protect human health and the environment by eliminating the direct contact exposure pathway risk to human and environmental receptors. In addition, the alternative will eliminate the possibility of Subsite contamination from spreading to surface water bodies or soil in the future. This action will result in the reduction of exposure levels to acceptable risk levels within EPA's generally acceptable risk range of $10^{-4}$ to $10^{-6}$ for carcinogens and at or below a HI of 1 for non-carcinogens. Implementation of the Selected Remedy will not pose unacceptable short-term risks or adverse cross-media impacts.

### *Compliance with ARARs and Other Environmental Criteria*

The selected remedy will comply with the location-, chemical- and action-specific ARARs identified.

The ARARs, TBCs, and other guidelines for the selected remedy are provided in Table 8.

***Cost-Effectiveness***

A cost-effective remedy is one whose costs are proportional to its overall effectiveness (NCP Section 300.430(f)(1)(ii)(D)). Overall effectiveness is based on the evaluations of the following: 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 and will achieve the cleanup levels in the same amount of time in comparison to the more costly alternatives.

Each of the alternatives underwent a detailed cost analysis. In that analysis, capital and annual O&M costs were estimated and used to develop present-worth costs. In the present-worth cost analysis, annual O&M costs were calculated for the estimated life of the alternatives and related monitoring using a seven percent discount rate and a 30-year interval. The estimated capital, annual O&M, and total present-worth costs for the selected remedy, assuming local disposal, are $17,800,000, $98,000 (for years one to five) and $128,000 (for years six to 30), and $20,000,000, respectively.

Both Alternatives 2 and 3 would effectively achieve the SCOs. Although Alternative 3 is more expensive than Alternative 2, Alternative 3 would provide increased cover thicknesses relative to Alternative 2 in approximately 41 acres of the Subsite where visitors would attend events at the planned amphitheater facilities and/or engage in other recreational activities. The additional cover thicknesses prescribed under Alternative 3 in these areas would provide added protectiveness relative to that offered by the cover system associated with Alternative 2.

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

The selected remedy provides the best balance of tradeoffs among the alternatives with respect to the balancing criteria set forth in NCP Section 300.430(f)(1)(i)(B), such that it represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Subsite.

The selected remedy will reduce mobility associated with erosion and infiltration of contaminants in soil/fill/Solvay waste through vegetated cover systems but involve no treatment. The selected remedy will permanently address the contamination associated with OU1.

***Preference for Treatment as a Principal Element***

CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity or mobility of hazardous substances as a principal element (or justify not satisfying the preference). The selected remedy does not include treatment. NYSDEC and the EPA do not believe that treatment of the materials contained within the

wastebeds is practicable or cost effective given the large volume of materials that would need to be addressed.

***Five-Year Review Requirements***

The selected remedy, once fully implemented, will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure. Consequently, a statutory review will be conducted within five years after initiation of remedial action, and at five year intervals thereafter, to ensure that the remedy is, or will be, protective of human health and the environment.

## DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan, released for public comment on September 17, 2014, identified Alternative 3, Enhanced Cover System as the preferred remedy for Solvay waste and contaminated soil/fill materials. Based upon its review of the written and verbal comments submitted during the public comment period, the NYSDEC and the EPA determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

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

**Site**

| | |
|---|---|
| Site name: | Onondaga Lake Site; Operable Unit 1 of the Solvay Wastebeds 1-8 Subsite |
| Subsite location: | Geddes, Onondaga County, New York |
| Site HRS score: | 50.00 |
| Listed on the NPL: | December 16, 1994 |

**Record of Decision**

| | |
|---|---|
| Date signed: | December 2, 2014 |
| Selected remedy: | Placement of a cover system that will be protective for current and/or reasonably anticipated future land uses (*e.g.*, active and passive recreational uses). In general, the remedy consists of a two-foot thick soil cover over areas where active recreation is planned or where appropriate to protect ecological resources and a one-foot thick soil cover where passive recreation is planned. Other areas of the Subsite will be covered with a vegetation enhancement layer to promote growth of vegetation. A Site Management Plan and institutional controls will also be included. |
| Capital cost: | $17,800,000 |
| Annual operation and maintenance cost: | $98,000-$128,000* |
| Present-worth cost: | $20,000,000 |

**Lead** NYSDEC

| | |
|---|---|
| Primary Contact: | Tracy Alan Smith, Project Manager, (518) 402-9676 |
| Secondary Contact: | Donald Hesler, Section Chief, (518) 402-9676 |

**Main PRPs** Honeywell International, Inc.

**Waste**

| | |
|---|---|
| Waste types: | Benzene, toluene, ethylbenzene, and xylenes (BTEX), naphthalene and other assorted polycyclic aromatic hydrocarbons, PCBs, phenolic compounds, pesticides, and inorganics (*e.g.*, arsenic, barium, chromium, mercury, nickel). |
| Waste origin: | Local waste disposal activities |
| Contaminated media: | Soil |

_____

* The higher end of the range of Annual O&M cost estimates represents the cost estimates in years one to five, and the lower end of the range of Annual O&M cost estimates represents the cost estimates in years six to 30.

**OPERABLE UNIT 1 OF THE SOLVAY WASTBEDS 1-8 SUBSITE**
**OF THE ONONDAGA LAKE SUPERFUND SITE**
**RECORD OF DECISION**

# APPENDIX I

# FIGURES

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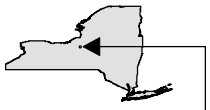
ADAPTED FROM: SYRACUSE WEST, NY USGS QUADRANGLE.

HONEYWELL
WASTEBEDS 1 - 8
OU-1 FEASIBILITY STUDY
WASTEBEDS 1-8
GEDDES, NEW YORK



QUADRANGLE LOCATION

N

## SITE LOCATION

0 1,000 2,000 4,000 6,000 8,000

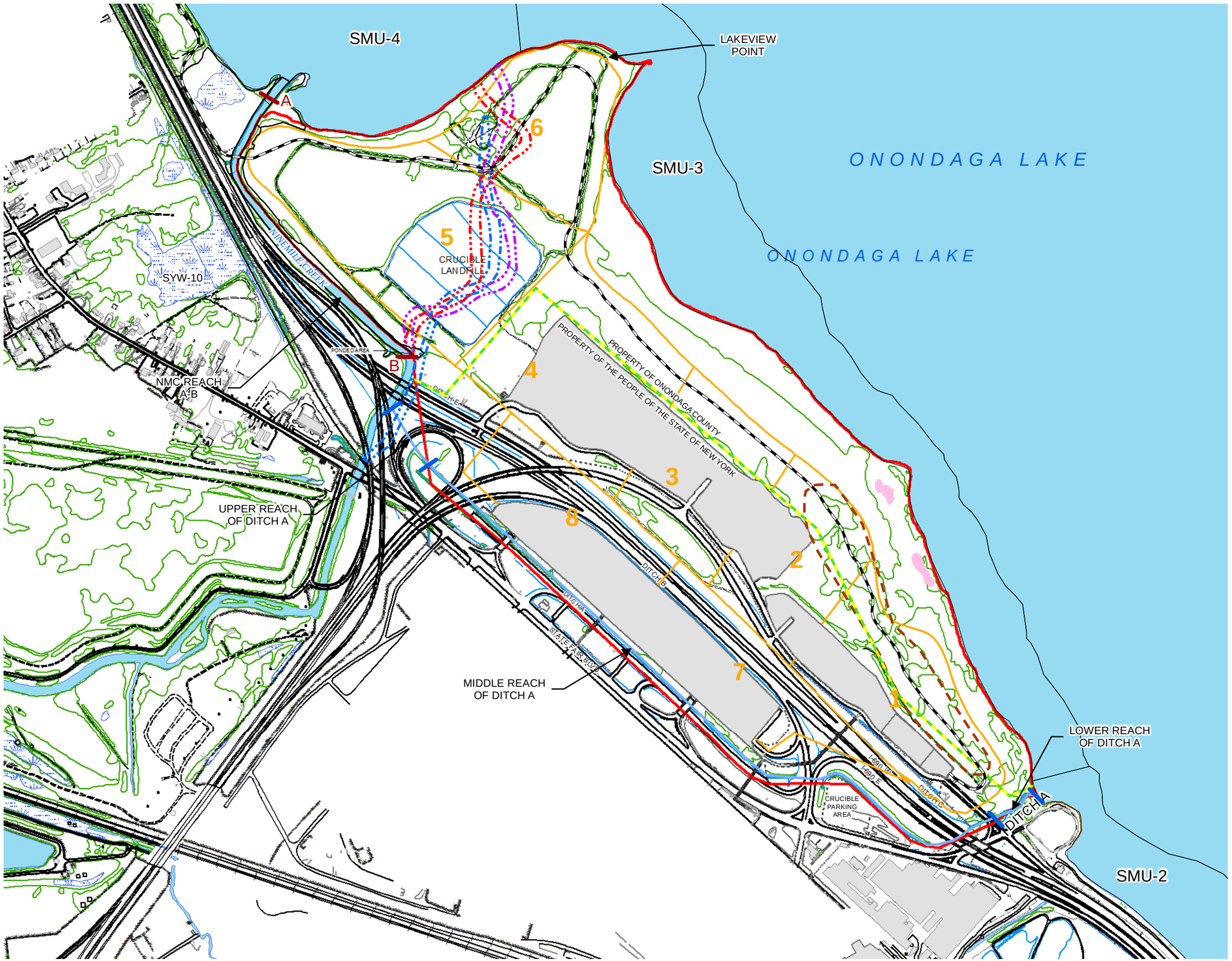
Feet

SEPTEMBER 2014
1163.45176

1:24,000

O'BRIEN & GERE

# FIGURE 2

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## LEGEND

- ONONDAGA COUNTY WEST SHORE TRAIL
- SMU-2 ONONDAGA LAKE SEDIMENT MANAGEMENT UNIT BOUNDARY
- DELINEATED WETLANDS
- PARKING LOT
- WASTEBEDS 1-8 PROPERTY BOUNDARY (PEOPLE OF THE STATE OF NY AND ONONDAGA COUNTY)
- APPROXIMATE WASTEBED BOUNDARY
- WASTEBEDS 1-8 SITE
- BIOSOLIDS AREA

**FORMER NINEMILE CREEK CHANNEL**

- USGS TOPO MAP 1898
- THOMSEN ASSOCIATES
- ALLIED DRAWING 1937

HONEYWELL INTERNATIONAL INC.
OU-1 FEASIBILITY STUDY
WASTEBEDS 1- 8
GEDDES, NEW YORK

## SITE PLAN

0 400 800 1,600
Feet

SEPTEMBER 2014
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# FIGURE 3

N

## LEGEND

- SEEP COLLECTION TRENCH
- GROUNDWATER COLLECTION TRENCH
- DITCH A IRM
- ACCESS PATHWAYS
- REVETMENT
- SEEP APRON
- VEGETATIVE COVER / RESTORED AREA / SHORELINE STABILIZATION / WET SWALE
- MITIGATION WETLAND
- BIOSOLIDS AREA
- WASTEBEDS 1-8 SITE

HONEYWELL INTERNATIONAL INC.
OU-1 FEASIBILITY STUDY
WASTEBEDS 1- 8
GEDDES, NEW YORK

## INTEGRATED IRM COMPONENTS

0 350 700 1,400
Feet

SEPTEMBER 2014
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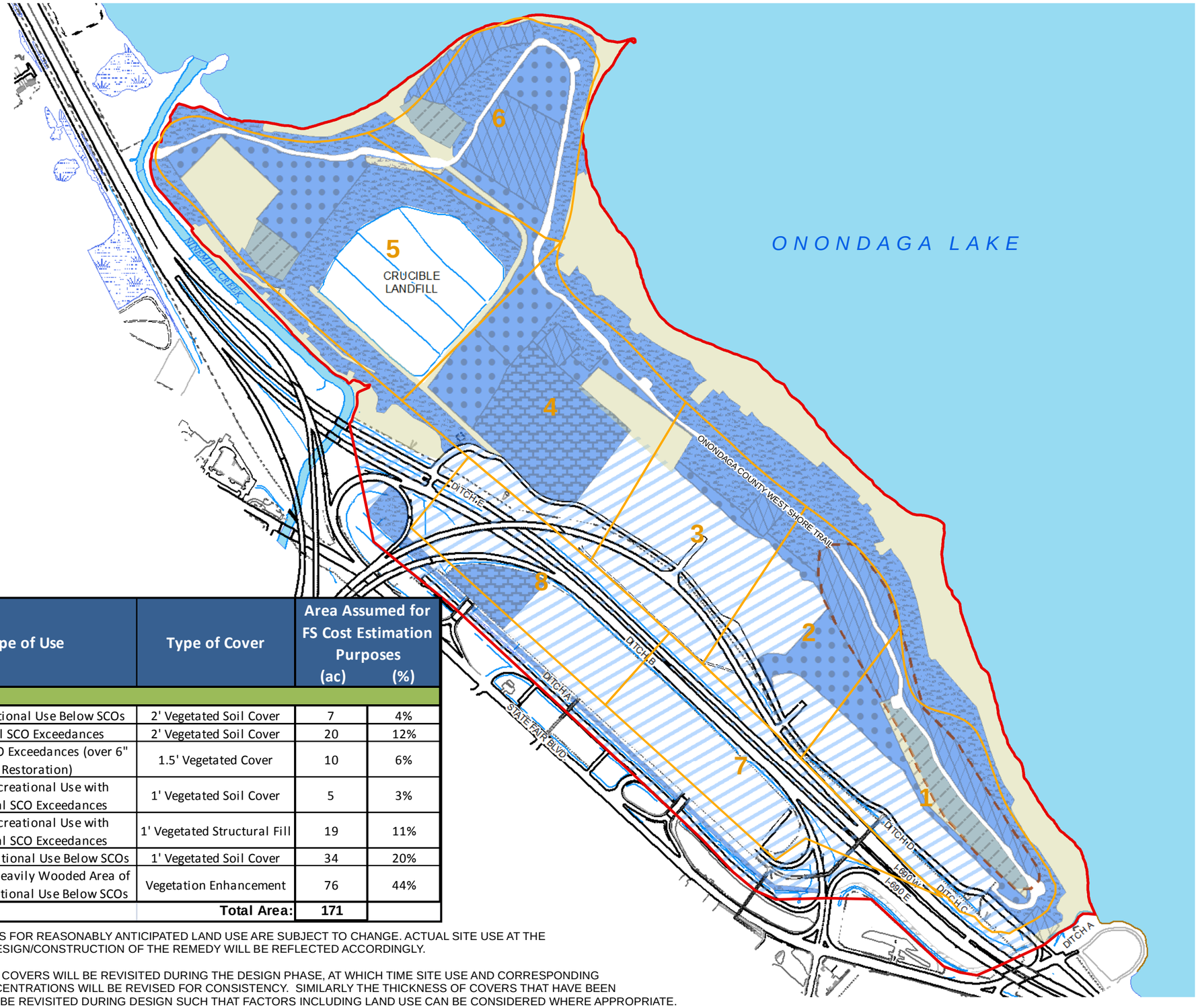
# FIGURE 4




| Type of Use | Type of Cover | Area Assumed for FS Cost Estimation Purposes (ac) | (%) |
|---|---|---|---|
| Active Recreational Use Below SCOs | 2' Vegetated Soil Cover | 7 | 4% |
| Ecological SCO Exceedances | 2' Vegetated Soil Cover | 20 | 12% |
| Ecological SCO Exceedances (over 6" IRM Restoration) | 1.5' Vegetated Cover | 10 | 6% |
| Passive Recreational Use with Commercial SCO Exceedances | 1' Vegetated Soil Cover | 5 | 3% |
| Passive Recreational Use with Commercial SCO Exceedances | 1' Vegetated Structural Fill | 19 | 11% |
| Passive Recreational Use Below SCOs | 1' Vegetated Soil Cover | 34 | 20% |
| Steep Slopes/Heavily Wooded Area of Limited Recreational Use Below SCOs | Vegetation Enhancement | 76 | 44% |
| | **Total Area:** | **171** | |

[1] ASSUMED AREAS FOR REASONABLY ANTICIPATED LAND USE ARE SUBJECT TO CHANGE. ACTUAL SITE USE AT THE TIME OF THE DESIGN/CONSTRUCTION OF THE REMEDY WILL BE REFLECTED ACCORDINGLY.

[2] THE EXTENT OF COVERS WILL BE REVISITED DURING THE DESIGN PHASE, AT WHICH TIME SITE USE AND CORRESPONDING SURFACE CONCENTRATIONS WILL BE REVISED FOR CONSISTENCY. SIMILARLY THE THICKNESS OF COVERS THAT HAVE BEEN ASSUMED WILL BE REVISITED DURING DESIGN SUCH THAT FACTORS INCLUDING LAND USE CAN BE CONSIDERED WHERE APPROPRIATE.

N

## LEGEND

- NO FURTHER ACTION AREAS (EXISTING FILL) TO BE CONFIRMED AS PART OF OU-1 FS DESIGN[2] (118 ac)
- ALTERNATIVE 3 FOOTPRINT (171 ac)
- AREAS RESTORED AS PART OF INTEGRATED IRM (71 ac)
- STAGING AREAS ADDRESSED AS PART OF INTEGRATED IRM AND OU-1 FS
- EXISTING VEGETATION ENHANCEMENT
- BIOSOLIDS AREA FOOTPRINT
- APPROXIMATE WASTEBED BOUNDARY
- WASTEBEDS 1-8 SITE

**TYPE OF COVER[1,2]**

- 1' VEGETATED SOIL COVER[1,2]
- 1' VEGETATED STRUCTURAL FILL[1,2]
- 1.5' VEGETATED SOIL COVER[1,2]
- 2' VEGETATED SOIL COVER[1,2]
- VEGETATION ENHANCEMENT[1,2]

HONEYWELL INTERNATIONAL INC.
OU-1 FEASIBILITY STUDY
WASTEBEDS 1- 8
GEDDES, NEW YORK

## SELECTED REMEDY: ALTERNATIVE 3 - ENHANCED VEGETATED COVER SYSTEM

0 350 700 1,400
Feet

SEPTEMBER 2014
1163.45176

O'BRIEN & GERE

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# OPERABLE UNIT 1 OF THE SOLVAY WASTBEDS 1-8 SUBSITE OF THE ONONDAGA LAKE SUPERFUND SITE RECORD OF DECISION

## APPENDIX II

## TABLES

| Table 1A Detected Parking Lot Area Surface Soil CPOIs | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **No. of Samples** | **No. of Detects** | **Mean Detected Conc.[2]** | **Maximum Detected Conc.** | **No. of Exceedances[1]** | **NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives** |
| **Volatile Organic Compounds (µg/kg)** | | | | | | |
| Acetone | 29 | 2 | 48.8 | 95.0 | 1 | 50 |
| **Semivolatile Organic Compounds (µg/kg)** | | | | | | |
| Benzo(B)fluoranthene | 28 | 18 | 768 | 3,900 | 4 | 1,000 |
| Benzo(A)pyrene | 28 | 16 | 898 | 4,100 | 4 | 1,000 |
| Benzo(K)fluoranthene | 28 | 15 | 783 | 3,300 | 4 | 800 |
| Indeno(1,2,3-CD)pyrene | 28 | 12 | 530 | 1,700 | 4 | 500 |
| Chrysene | 28 | 19 | 749 | 3,700 | 3 | 1,000 |
| Benzo(A)anthracene | 28 | 17 | 759 | 3,600 | 3 | 1,000 |
| Dibenzo(A,H)anthracene | 28 | 9 | 310 | 1,100 | 3 | 330 |
| Fluoranthene | 28 | 22 | 979 | 5,000 | 0 | 100,000 |
| Phenanthrene | 28 | 20 | 617 | 3,000 | 0 | 100,000 |
| Pyrene | 28 | 20 | 1,277 | 7,500 | 0 | 100,000 |
| Benzo(G,H,I)perylene | 28 | 13 | 581 | 2,000 | 0 | 100,000 |
| Anthracene | 28 | 11 | 332 | 970 | 0 | 100,000 |
| Acenaphthylene | 28 | 10 | 285 | 1,100 | 0 | 100,000 |
| Fluorene | 28 | 7 | 166 | 370 | 0 | 30,000 |
| Naphthalene | 28 | 7 | 210 | 540 | 0 | 12,000 |
| 2-Methylnaphthalene | 28 | 10 | 137 | 380 | NA | NC |
| Bis(2-ethylhexyl)phthalate | 28 | 9 | 107 | 340 | NA | NC |
| **Pesticides (µg/kg)** | | | | | | |
| Dieldrin | 28 | 14 | 195 | 900 | 9 | 5 |
| 4,4'-DDT | 28 | 11 | 9.38 | 34.0 | 7 | 3.3 |
| 4,4'-DDD | 28 | 1 | 6.10 | 6.10 | 1 | 3.3 |
| **PCBs (µg/kg)** | | | | | | |
| Aroclor-1268 | 28 | 8 | 21.7 | 79.0 | 0 | 100 |

| Table 1A Detected Parking Lot Area Surface Soil CPOIs | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **No. of Samples** | **No. of Detects** | **Mean Detected Conc.[2]** | **Maximum Detected Conc.** | **No. of Exceedances[1]** | **NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives** |
| Aroclor-1254 | 28 | 6 | 16.4 | 21.0 | 0 | 100 |
| Aroclor-1260 | 28 | 5 | 10.4 | 25.0 | 0 | 100 |
| **Inorganics (mg/kg)** | | | | | | |
| Calcium | 28 | 28 | 143,725 | 280,000 | 28 | 100(a) |
| Magnesium | 28 | 28 | 38,839 | 96,000 | 28 | 600(a) |
| Potassium | 28 | 27 | 1272 | 3,390 | 26 | 400(a) |
| Chromium | 38 | 38 | 660 | 14,000 | 23 | 30 |
| Aluminum | 28 | 28 | 5714 | 17,200 | 15 | 4,800(c) |
| Nickel | 28 | 28 | 609 | 9,800 | 15 | 30 |
| Hexavalent Chromium | 10 | 6 | 5.08 | 6.60 | 6 | 1 |
| Antimony | 28 | 22 | 1.19 | 16.0 | 4 | 0.6(a) |
| Copper | 28 | 28 | 60.0 | 750 | 3 | 50 |
| Lead | 28 | 28 | 32.5 | 160 | 3 | 63 |
| Manganese | 28 | 28 | 674 | 5,100 | 3 | 1,600 |
| Selenium | 28 | 19 | 3.95 | 35.0 | 3 | 3.9 |
| Thallium | 28 | 3 | 3.17 | 3.90 | 3 | 0.1(a) |
| Zinc | 28 | 28 | 47.3 | 120 | 2 | 109 |
| Arsenic | 28 | 28 | 5.08 | 19.0 | 1 | 13 |
| Mercury | 28 | 28 | 0.06 | 0.19 | 1 | 0.18 |
| Barium | 28 | 28 | 84.3 | 200 | 0 | 350 |
| Beryllium | 28 | 28 | 0.33 | 0.87 | 0 | 7.2 |
| Sodium | 28 | 27 | 123 | 260 | 0 | 750(a) |
| Cyanide | 28 | 6 | 0.66 | 1.00 | 0 | 27 |
| Cadmium | 28 | 5 | 0.17 | 0.51 | 0 | 2.5 |
| Silver | 28 | 1 | 0.51 | 0.51 | 0 | 2 |
| Cobalt | 28 | 28 | 50.9 | 780 | NA | NC |

Table 1A Detected Parking Lot Area Surface Soil CPOIs

| Parameter | No. of Samples | No. of Detects | Mean Detected Conc.[2] | Maximum Detected Conc. | No. of Exceedances[1] | NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives |
|---|---|---|---|---|---|---|
| Iron | 28 | 28 | 23,311 | 180,000 | NA | NC |
| Vanadium | 28 | 28 | 63.2 | 830 | NA | NC |

Notes:
1 – Exceeds NYSDEC (2006) Part 375.6 Table 6.8(a) Unrestricted Use Soil Cleanup Objectives.
2 – Mean concentration values have been rounded.
NA = not applicable as no criterion is available. NC = no criterion (SCO).
(a) - Background values established by McGovern, 1988.; (c) Typical concentrations in Solvay Waste, Calocerinos & Spina, 1980.

| Table 1B Detected Upland Area Surface Soil CPOIs | | | | | | |
|---|---|---|---|---|---|---|
| Parameter | No. of Samples | No. of Detects | Mean Detected Conc.[2] | Maximum Detected Conc. | No. of Exceedances[1] | NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives |
| **Volatile Organic Compounds (µg/kg)** | | | | | | |
| Methylene chloride | 59 | 6 | 34.7 | 80.0 | 1 | 50 |
| **Semivolatile Organic Compounds (µg/kg)** | | | | | | |
| Indeno(1,2,3-CD)pyrene | 59 | 36 | 1,078 | 5,400 | 25 | 500 |
| Chrysene | 59 | 46 | 1,906 | 18,000 | 24 | 1,000 |
| Benzo(A)pyrene | 59 | 42 | 1,875 | 17,000 | 23 | 1,000 |
| Benzo(A)anthracene | 59 | 42 | 2,009 | 19,000 | 21 | 1,000 |
| Benzo(B)fluoranthene | 59 | 42 | 1820 | 18,000 | 21 | 1,000 |
| Benzo(K)fluoranthene | 59 | 40 | 1,633 | 15,000 | 21 | 800 |
| Dibenzofuran | 59 | 18 | 346 | 2,900 | 7 | 7,000 |
| Hexachlorobenzene | 61 | 5 | 1,562 | 2,700 | 5 | 330 |
| Fluoranthene | 59 | 51 | 3,199 | 30,000 | 0 | 100,000 |
| Pyrene | 59 | 50 | 3,016 | 33,000 | 0 | 100,000 |
| Phenanthrene | 59 | 42 | 2,686 | 32,000 | 0 | 100,000 |
| Benzo(G,H,I)perylene | 59 | 36 | 1,241 | 4,400 | 0 | 100,000 |
| Acenaphthylene | 59 | 30 | 690 | 6,300 | 0 | 100,000 |
| Anthracene | 59 | 30 | 1,015 | 7,700 | 0 | 100,000 |
| Naphthalene | 59 | 18 | 516 | 3,800 | 0 | 12,000 |
| Acenaphthene | 59 | 16 | 418 | 2,700 | 0 | 20,000 |
| Fluorene | 59 | 16 | 899 | 8,600 | 0 | 30,000 |
| Dibenzo(A,H)anthracene | 59 | 21 | 536 | 2,300 | NA | 330 |
| Carbazole | 59 | 19 | 322 | 2,000 | NA | NC |
| Bis(2-ethylhexyl)phthalate | 59 | 21 | 781 | 2,300 | NA | NC |
| 2-Methylnaphthalene | 59 | 17 | 465 | 4,000 | NA | NC |
| 1-Phenyl-1-(2,4- | 22 | 13 | 563 | 2,100 | NA | NC |

| Table 1B Detected Upland Area Surface Soil CPOIs | | | | | | |
|---|---|---|---|---|---|---|
| Parameter | No. of Samples | No. of Detects | Mean Detected Conc.[2] | Maximum Detected Conc. | No. of Exceedances[1] | NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives |
| Dimethylphenyl)ethane | | | | | | |
| 4-Chloroaniline | 59 | 12 | 5,625 | 16,000 | NA | NC |
| **Pesticides (µg/kg)** | | | | | | |
| Dieldrin | 59 | 17 | 378 | 1,600 | 17 | 5 |
| 4,4'-DDT | 59 | 15 | 20.2 | 120 | 6 | 3.3 |
| Alpha-chlordane | 59 | 8 | 111 | 290 | 4 | 94 |
| 4,4'-DDE | 59 | 2 | 84 | 160 | 2 | 3.3 |
| **PCBs (µg/kg)** | | | | | | |
| Aroclor-1260 | 59 | 21 | 4,637 | 33,000 | 13 | 100 |
| Aroclor-1254 | 59 | 14 | 88.7 | 250 | 4 | 100 |
| Aroclor-1268 | 59 | 4 | 24.7 | 44 | 0 | 100 |
| Aroclor-1248 | 59 | 1 | 19.0 | 19.0 | 0 | 100 |
| **Inorganics (mg/kg)** | | | | | | |
| Aluminum | 59 | 59 | 8538 | 20,100 | 59 | 4,800(c) |
| Calcium | 59 | 59 | 176092 | 370,000 | 59 | 100(a) |
| Magnesium | 59 | 59 | 18261 | 33,500 | 59 | 600(a) |
| Chromium | 80 | 80 | 280 | 2,150 | 39 | 30 |
| Potassium | 59 | 44 | 1,351 | 3,430 | 35 | 400(a) |
| Nickel | 59 | 59 | 74.5 | 281 | 30 | 30 |
| Sodium | 59 | 53 | 1,310 | 3,300 | 28 | 750(a) |
| Mercury | 61 | 61 | 1.89 | 11.5 | 24 | 0.18 |
| Lead | 59 | 59 | 293 | 1,670 | 22 | 63 |
| Copper | 59 | 59 | 284 | 1,980 | 18 | 50 |
| Zinc | 59 | 59 | 978 | 8,880 | 16 | 109 |
| Cadmium | 59 | 27 | 57.5 | 203 | 15 | 2.5 |
| Silver | 59 | 15 | 48.8 | 80.2 | 15 | 2 |

| Table 1B Detected Upland Area Surface Soil CPOIs | | | | | | |
|---|---|---|---|---|---|---|
| Parameter | No. of Samples | No. of Detects | Mean Detected Conc.[2] | Maximum Detected Conc. | No. of Exceedances[1] | NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives |
| Arsenic | 59 | 59 | 12.8 | 74.3 | 14 | 13 |
| Barium | 59 | 59 | 184 | 817 | 13 | 350 |
| Thallium | 59 | 13 | 1.28 | 2.20 | 13 | 0.1(a) |
| Antimony | 59 | 32 | 2.03 | 16.5 | 9 | 0.6(a) |
| Hexavalent Chromium | 21 | 6 | 37.7 | 124 | 6 | 1 |
| Selenium | 59 | 36 | 1.71 | 4.00 | 1 | 3.9 |
| Manganese | 59 | 59 | 431 | 784 | 0 | 1600 |
| Beryllium | 59 | 46 | 0.86 | 5.40 | 0 | 7.2 |
| Cyanide | 51 | 41 | 7.91 | 20.0 | 0 | 27 |
| Iron | 59 | 59 | 15,026 | 35,400 | NA | NC |
| Vanadium | 59 | 58 | 25.2 | 83.0 | NA | NC |
| Cobalt | 59 | 50 | 11.5 | 65.6 | NA | NC |

Notes:
1 – Exceeds NYSDEC (2006) Part 375.6 Table 6.8(a) Unrestricted Use Soil Cleanup Objectives.
2 – Mean concentration values have been rounded.
NA = not applicable as no criterion is available. NC = no criterion (SCO).
(a) - Background values established by McGovern, 1988.; (c) Typical concentrations in Solvay Waste, Calocerinos & Spina, 1980.

| Table 1C Detected Lakeshore Area Surface Soil CPOIs | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **No. of Samples** | **No. of Detects** | **Mean Detected Conc.[2]** | **Maximum Detected Conc.** | **No. of Exceedances[1]** | **NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives** |
| **Volatile Organic Compounds (µg/kg)** | | | | | | |
| Xylenes, total | 28 | 8 | 104 | 400 | 1 | 260 |
| Acetone | 28 | 2 | 60.5 | 100 | 1 | 50 |
| Toluene | 28 | 16 | 14.1 | 45.0 | 0 | 700 |
| Benzene | 27 | 7 | 10.8 | 33.0 | 0 | 60 |
| 2-Butanone | 27 | 6 | 4.75 | 6.20 | 0 | 120 |
| **Semivolatile Organic Compounds (µg/kg)** | | | | | | |
| Naphthalene | 28 | 20 | 1674 | 25,000 | 1 | 12,000 |
| Fluoranthene | 28 | 23 | 115 | 300 | 0 | 100,000 |
| Pyrene | 28 | 22 | 83.1 | 270 | 0 | 100,000 |
| Chrysene | 28 | 17 | 56.2 | 170 | 0 | 1,000 |
| Phenanthrene | 28 | 17 | 167 | 1,800 | 0 | 100,000 |
| Benzo(A)anthracene | 28 | 15 | 39.3 | 100 | 0 | 1,000 |
| Benzo(B)fluoranthene | 28 | 15 | 57.7 | 160 | 0 | 1,000 |
| Benzo(A)pyrene | 28 | 14 | 36.9 | 110 | 0 | 1,000 |
| Benzo(G,H,I)perylene | 28 | 14 | 29.9 | 75.0 | 0 | 100,000 |
| Indeno(1,2,3-CD)pyrene | 28 | 14 | 27.3 | 68.0 | 0 | 500 |
| Dibenzofuran | 28 | 13 | 78.1 | 870 | 0 | 7,000 |
| Anthracene | 28 | 12 | 12.4 | 34.0 | 0 | 100,000 |
| Acenaphthylene | 28 | 11 | 14.4 | 36.0 | 0 | 100,000 |
| Acenaphthene | 28 | 9 | 3.22 | 6.60 | 0 | 20,000 |
| Dibenzo(A,H)anthracene | 28 | 9 | 7.50 | 23.0 | 0 | 330 |
| 1-Phenyl-1-(2,4-Dimethylphenyl)ethane | 14 | 14 | 882 | 5,000 | NA | NC |
| 1-Phenyl-1-(4-Methylphenyl)ethane | 14 | 14 | 147 | 1,000 | NA | NC |

| Table 1C Detected Lakeshore Area Surface Soil CPOIs | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **No. of Samples** | **No. of Detects** | **Mean Detected Conc.[2]** | **Maximum Detected Conc.** | **No. of Exceedances[1]** | **NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives** |
| Di-N-butyl phthalate | 28 | 13 | 7.10 | 14.0 | NA | NC |
| 2-Methylnaphthalene | 28 | 12 | 522 | 5,300 | NA | NC |
| Benzaldehyde | 14 | 11 | 78.2 | 220 | NA | NC |
| Caprolactam | 14 | 11 | 24.4 | 50 | NA | NC |
| Carbazole | 28 | 8 | 4.91 | 11.0 | NA | NC |
| 1,1'-Biphenyl | 14 | 6 | 99.7 | 530 | NA | NC |
| Acetophenone | 14 | 3 | 154 | 390 | NA | NC |
| **Pesticides (µg/kg)** | | | | | | |
| 4,4'-DDD | 14 | 1 | 3.70 | 3.70 | 1 | 3.3 |
| 4,4'-DDE | 14 | 1 | 5.90 | 5.90 | 1 | 3.3 |
| Delta-bhc | 14 | 4 | 3.28 | 7.30 | 0 | 40 |
| 4,4'-DDT | 14 | 3 | 1.18 | 2.50 | 0 | 3.3 |
| **PCBs (µg/kg)** | | | | | | |
| Aroclor-1260 | 14 | 8 | 41.4 | 250 | 1 | 100 |
| **Inorganics (mg/kg)** | | | | | | |
| Calcium | 28 | 28 | 315,893 | 420,000 | 28 | 100(a) |
| Magnesium | 28 | 28 | 13,389 | 36,000 | 28 | 600(a) |
| Sodium | 28 | 28 | 1,455 | 5,700 | 24 | 750(a) |
| Mercury | 28 | 28 | 0.28 | 2.20 | 14 | 0.18 |
| Aluminum | 28 | 28 | 4,718 | 9,600 | 13 | 4,800(c) |
| Thallium | 28 | 8 | 1.82 | 3.10 | 8 | 0.1(a) |
| Chromium | 33 | 33 | 29.1 | 340 | 7 | 30 |
| Potassium | 28 | 22 | 343 | 1290 | 7 | 400(a) |
| Barium | 28 | 28 | 361 | 2350 | 5 | 350 |
| Nickel | 28 | 28 | 16.0 | 47.0 | 3 | 30 |
| Copper | 28 | 28 | 16.6 | 190 | 1 | 50 |

## Table 1C Detected Lakeshore Area Surface Soil CPOIs

| Parameter | No. of Samples | No. of Detects | Mean Detected Conc.[2] | Maximum Detected Conc. | No. of Exceedances[1] | NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives |
|---|---|---|---|---|---|---|
| Lead | 28 | 28 | 23.9 | 260 | 1 | 63 |
| Zinc | 28 | 28 | 60.2 | 1,000 | 1 | 109 |
| Cadmium | 28 | 20 | 1.20 | 16.0 | 1 | 2.5 |
| Silver | 28 | 15 | 0.93 | 10.0 | 1 | 2 |
| Hexavalent Chromium | 5 | 1 | 3.6 | 3.6 | 1 | 30 |
| Arsenic | 28 | 28 | 7.43 | 13.0 | 0 | 13 |
| Cyanide | 28 | 28 | 3.53 | 20.0 | 0 | 27 |
| Manganese | 28 | 28 | 203 | 520 | 0 | 1,600 |
| Beryllium | 28 | 23 | 0.44 | 1.10 | 0 | 7.2 |
| Antimony | 28 | 9 | 0.42 | 0.58 | 0 | 0.6(a) |
| Selenium | 28 | 7 | 0.49 | 0.65 | 0 | 3.9 |
| Iron | 28 | 28 | 4,858 | 9,600 | NA | NC |
| Vanadium | 28 | 28 | 11.5 | 27.3 | NA | NC |
| Cobalt | 28 | 25 | 2.38 | 8.10 | NA | NC |

Notes:
1 – Exceeds NYSDEC (2006) Part 375.6 Table 6.8(a) Unrestricted Use Soil Cleanup Objectives.
2 – Mean concentration values have been rounded.
NA = not applicable as no criterion is available. NC = no criterion (SCO).
(a) - Background values established by McGovern, 1988.; (c) Typical concentrations in Solvay Waste, Calocerinos & Spina, 1980.

| Table 1D Detected Subsurface Soil CPOIs | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **No. of Samples** | **No. of Detects** | **Mean Detected Conc.[2]** | **Maximum Detected Conc.** | **No. of Exceedances[1]** | **NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives** |
| **Volatile Organic Compounds (µg/kg)** | | | | | | |
| Benzene | 203 | 105 | 6,099 | 210,000 | 79 | 60 |
| Toluene | 203 | 90 | 18,003 | 420,000 | 52 | 700 |
| Acetone | 202 | 67 | 330 | 3,300 | 48 | 50 |
| Xylenes, total | 117 | 55 | 8,132 | 120,000 | 46 | 260 |
| 2-Butanone | 20 | 95 | 167 | 1,400 | 38 | 120 |
| Xylenes, m & p | 86 | 43 | 57,749 | 500,000 | 31 | 260 |
| o-Xylene | 86 | 41 | 18,852 | 180,000 | 26 | 260 |
| Ethylbenzene | 203 | 74 | 2,178 | 26,000 | 18 | 1,000 |
| Methylene chloride | 202 | 54 | 54.9 | 260 | 17 | 50 |
| Carbon disulfide | 202 | 43 | 16.8 | 130 | NA | NC |
| Isopropylbenzene | 152 | 33 | 4,343 | 24,000 | NA | NC |
| Methylcyclohexane | 152 | 32 | 889 | 5,800 | NA | NC |
| **Semivolatile Organic Compounds (µg/kg)** | | | | | | |
| Naphthalene | 203 | 111 | 104,183 | 1,700,000 | 37 | 12,000 |
| Phenol | 175 | 88 | 526 | 3,400 | 37 | 330 |
| 4-Methylphenol | 175 | 82 | 611 | 5,200 | 29 | 330 |
| 2-Methylphenol | 171 | 67 | 173 | 930 | 9 | 330 |
| Chrysene | 203 | 36 | 372 | 6,800 | 3 | 1,000 |
| Benzo(A)pyrene | 203 | 26 | 369 | 4,500 | 3 | 1,000 |
| Benzo(K)fluoranthene | 203 | 11 | 722 | 4,100 | 3 | 800 |
| Benzo(B)fluoranthene | 203 | 34 | 283 | 4,400 | 2 | 1,000 |
| Indeno(1,2,3-CD)pyrene | 203 | 19 | 261 | 2,400 | 2 | 500 |
| Dibenzofuran | 203 | 61 | 944 | 7,800 | 1 | 7,000 |
| Benzo(A)anthracene | 203 | 29 | 361 | 5,200 | 1 | 1,000 |
| Fluorene | 203 | 23 | 4,020 | 34,000 | 1 | 30,000 |

| Table 1D Detected Subsurface Soil CPOIs | | | | | | |
|---|---|---|---|---|---|---|
| Parameter | No. of Samples | No. of Detects | Mean Detected Conc.[2] | Maximum Detected Conc. | No. of Exceedances[1] | NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives |
| Dibenzo(A,H)anthracene | 203 | 5 | 330 | 1,400 | 1 | 330 |
| 1,2-Dichlorobenzene | 51 | 1 | 1,500 | 1,500 | 1 | 1,100 |
| Phenanthrene | 203 | 91 | 1,161 | 21,000 | 0 | 100,000 |
| Fluoranthene | 203 | 72 | 433 | 14,000 | 0 | 100,000 |
| Pyrene | 203 | 58 | 503 | 16,000 | 0 | 100,000 |
| 2-Methylnaphthalene | 203 | 80 | 12,769 | 120,000 | NA | NC |
| Bis(2-ethylhexyl)phthalate | 203 | 59 | 614 | 21,000 | NA | NC |
| 1,1'-Biphenyl | 150 | 47 | 1,240 | 8,500 | NA | NC |
| 1-Phenyl-1-(2,4-Dimethylphenyl)ethane | 82 | 44 | 19,755 | 620,000 | NA | NC |
| Acetophenone | 150 | 43 | 124 | 1,800 | NA | NC |
| 1-Phenyl-1-(4-Methylphenyl)ethane | 82 | 42 | 14,616 | 310,000 | NA | NC |
| Benzaldehyde | 146 | 33 | 135 | 560 | NA | NC |
| **Pesticides (µg/kg)** | | | | | | |
| Dieldrin | 136 | 5 | 80.1 | 240 | 3 | 5 |
| 4,4'-DDD | 136 | 2 | 74.5 | 130 | 2 | 3.3 |
| Alpha-chlordane | 136 | 5 | 40.1 | 110 | 1 | 94 |
| **PCBs (µg/kg)** | | | | | | |
| Aroclor-1260 | 136 | 10 | 1,299 | 3,600 | 7 | 100 |
| Aroclor-1248 | 136 | 2 | 2,215 | 4,300 | 2 | 100 |
| Aroclor-1254 | 136 | 1 | 20.0 | 20.0 | 0 | 100 |
| Aroclor-1268 | 136 | 1 | 7.90 | 7.90 | 0 | 100 |
| **Inorganics (mg/kg)** | | | | | | |
| Calcium | 203 | 203 | 239,382 | 429,000 | 203 | 100(a) |
| Magnesium | 203 | 203 | 20,319 | 57,000 | 203 | 600(a) |
| Sodium | 203 | 203 | 4,832 | 31,400 | 193 | 750(a) |

Table 1D Detected Subsurface Soil CPOIs

| Parameter | No. of Samples | No. of Detects | Mean Detected Conc.[2] | Maximum Detected Conc. | No. of Exceedances[1] | NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives |
|---|---|---|---|---|---|---|
| Potassium | 203 | 154 | 990 | 4,390 | 130 | 400(a) |
| Aluminum | 203 | 203 | 5,322 | 23,400 | 126 | 4,800(c) |
| Barium | 203 | 203 | 268 | 7,110 | 25 | 350 |
| Thallium | 203 | 19 | 1.06 | 3.30 | 19 | 0.1(a) |
| Mercury | 203 | 109 | 0.26 | 7.70 | 13 | 0.18 |
| Chromium | 215 | 213 | 22.6 | 1330 | 12 | 30 |
| Arsenic | 203 | 192 | 6.47 | 77.3 | 12 | 13 |
| Copper | 203 | 200 | 20.7 | 600 | 8 | 50 |
| Cyanide | 203 | 140 | 8.90 | 53.0 | 7 | 27 |
| Nickel | 203 | 161 | 12.2 | 87.0 | 6 | 30 |
| Antimony | 203 | 25 | 0.63 | 2.70 | 6 | 0.6(a) |
| Lead | 203 | 162 | 23.6 | 1,000 | 5 | 63 |
| Cadmium | 203 | 57 | 2.96 | 56.0 | 5 | 2.5 |
| Zinc | 203 | 184 | 38.4 | 980 | 4 | 109 |
| Silver | 203 | 36 | 3.03 | 38.0 | 4 | 2 |
| Hexavlent Chromium | 12 | 3 | 32.3 | 72.6 | 3 | 30 |
| Selenium | 203 | 48 | 1.07 | 5.80 | 2 | 3.9 |
| Manganese | 203 | 203 | 321 | 2,530 | 1 | 1,600 |
| Beryllium | 203 | 89 | 0.34 | 0.94 | 0 | 7.2 |
| Iron | 203 | 203 | 8,126 | 32,000 | NA | NC |
| Vanadium | 203 | 161 | 11.1 | 44.6 | NA | NC |
| Cobalt | 203 | 110 | 3.88 | 39.0 | NA | NC |

Notes:
1 – Exceeds NYSDEC (2006) Part 375.6 Table 6.8(a) Unrestricted Use Soil Cleanup Objectives.
2 – Mean concentration values have been rounded.
NA = not applicable as no criterion is available. NC = no criterion (SCO).
(a) - Background values established by McGovern, 1988.; (c) Typical concentrations in Solvay Waste, Calocerinos & Spina, 1980.

**Table 2**
**Selection of Exposure Pathways**

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Current/Future | Surface soil (0-2 ft bgs) | Surface soil | Surface soil throughout Exposure Unit 1 | Transient trespasser | Older child (6 -18 yrs) | Ingestion | Quantitative | Transient trespassers on-site may incidentally ingest surface soil during the course of their activities. |
| | | | | | | Dermal | Quantitative | Transient trespassers using the Site may have dermal contact with surface soil during the course of their activities. |
| | | Fugitive dust | Outdoor ambient air | Transient trespasser | Older child (6 -18 yrs) | Inhalation | Quantitative | Transient trespassers may inhale fugitive dust as a result of normal activities in this exposure unit. |
| | | Volatile emissions | Outdoor ambient air | Transient trespasser | Older child (6 -18 yrs) | Inhalation | Quantitative | The transient tresspasser may be exposed to constituents volatilized from surface soil in this exposure unit. |
| | Sediment (0-1 ft bgs) | Ponded Area and Ditch A - South | Ponded Area and Ditch A - South | Transient trespasser | Older child (6 -18 yrs) | Dermal | Quantitative | Transient trespassers using the Site may have dermal contact with sediment during the course of their activities. |
| | | Seep sediment | Site seeps | Transient trespasser | Older child (6 -18 yrs) | Ingestion | Quantitative | Transient trespassers using the Site may incidentally ingest seep sediment during the course of their activities. |
| | | | | | | Dermal | Quantitative | Transient trespassers using the Site may have dermal contact with seep sediment during the course of their activities. |
| | Surface water | Ponded Area and Ditch A - South | Ponded Area and Ditch A - South | Transient trespasser | Older child (6 -18 yrs) | Dermal | Quantitative | Transient trespassers may have dermal contact with surface water from the Ponded Area during the course of their activities. |
| | | Seep surface water | Site seeps | Transient trespasser | Older child (6 -18 yrs) | Dermal | Quantitative | Transient trespassers using the Site may have dermal contact with seep surface water during the course of their activities. |

**Table 2**
**Selection of Exposure Pathways**

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Current/Future | Surface soil (0-2 ft bgs) | Surface soil | Surface soil throughout Exposure Unit 2 | Lunchtime trespasser | Adult (> 18 yrs) | Ingestion | Quantitative | Lunchtime trespassers on the site may incidentally ingest surface soil during the course of their activities. |
| | | | | | | Dermal | Quantitative | Lunchtime trespassers on the site may have dermal contact with surface soil during the course of their activities. |
| | | Fugitive dust | Outdoor ambient air | Lunchtime trespasser | Adult (> 18 yrs) | Inhalation | Quantitative | Lunchtime trespassers may inhale fugitive dust as a result of normal activities in this exposure unit. |
| | | Volatile emissions | Outdoor ambient air | Lunchtime trespasser | Adult (> 18 yrs) | Inhalation | Quantitative | Lunchtime trespassers may be exposed to constituents volatilized from surface soil in this exposure unit. |
| | Surface and subsurface soil (0-10 ft bgs) | Surface and subsurface soil | Surface and subsurface soil throughout Exposure Unit 2 | Utility/sewer worker | Adult (> 18 yrs) | Ingestion | Quantitative | Utility or sewer workers performing excavation activities may be exposed to and incidentally ingest surface and subsurface soil. |
| | | | | | | Dermal | Quantitative | Utility or sewer workers performing excavation activities may be exposed to and have dermal contact with surface and subsurface soil. |
| | | Fugitive dust | Outdoor ambient air | Utility/sewer worker | Adult (> 18 yrs) | Inhalation | Quantitative | Utility or sewer workers may inhale fugitive dust as a result of normal activities in this exposure unit. |
| | | Volatile emissions | Outdoor ambient air | Utility/sewer worker | Adult (> 18 yrs) | Inhalation | Quantitative | Utility or sewer workers may be exposed to constituents volatilized from surface and subsurface soil in this exposure unit. |

**Table 2**
**Selection of Exposure Pathways**

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Future | Sediment (0-1 ft bgs) | Seep sediment | Site seeps | Lunchtime trespasser | Adult (> 18 yrs) | Ingestion | Quantitative | Lunchtime trespassers using the Site may incidentally ingest seep sediment during the course of their activities. |
| | | | | | | Dermal | Quantitative | Lunchtime trespassers using the Site may have dermal contact with seep sediment during the course of their activities. |
| | | | | Utility/sewer worker | Adult (> 18 yrs) | Ingestion | Quantitative | Utility workers could ingest seep sediment originating from soil excavations as part of repairing or installing on-site utilities. |
| | | | | | | Dermal | Quantitative | Utility workers may have dermal contact with seep sediment originating from soil excavations as part of repairing or installing on-site utilities. |
| | Seep surface water | Seep surface water | Site seeps | Lunchtime trespasser | Adult (> 18 yrs) | Dermal | Quantitative | Lunchtime trespassers using the Site may have dermal contact with seep surface water during the course of their activities. |
| | | | | Utility/sewer worker | Adult (> 18 yrs) | Dermal | Quantitative | Utility or sewer workers using the Site may have dermal contact with seep surface water during the course of their activities. |
| | Surface soil (0-2 ft bgs) | Surface soil | State fairgrounds parking area | Commercial/ industrial worker | Adult (> 18 yrs) | Ingestion | Quantitative | If future buildings were constructed, a commercial/industrial worker may incidentally ingest soil while performing his/her duties outside. |
| | | | | | | Dermal | Quantitative | If future buildings were constructed, a commercial/industrial worker may have dermal exposure to soil while performing his/her duties outside. |
| | | Fugitive dust | Outdoor ambient air | Commercial/ industrial worker | Adult (> 18 yrs) | Inhalation | Quantitative | A commercial/industrial worker could inhale fugitive dust while performing his/her duties outside. |

**Table 2**
**Selection of Exposure Pathways**

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Future | Surface and subsurface soil (0-10 ft bgs) | Volatile emissions | Outdoor ambient air | Commercial/ industrial worker | Adult (> 18 yrs) | Inhalation | Quantitative | A commercial/industrial worker could inhale vapors while performing his/her duties outside. |
| | | Air | Indoor air - vapor intrusion | Commercial/ industrial worker | Adult (> 18 yrs) | Inhalation | Qualitative | Vapors originating from soil VOCs may enter building workspace. When soil vapor data is available, detected constituents are screened using the framework presented in USEPA (2004) Developing Indoor Air Decision Matrices for Screening and Interim Actions. When soil vapor data is unavailable, shallow ground water data will be evaluated against USEPA OSWER (2002) ground water to indoor air criteria. |
| Current/Future | Surface soil (0-2 ft bgs) | Surface soil | Surface soil throughout Exposure Unit 3 | Trespasser/ATV recreator | Older child (12-18 yrs) and young adult (18-30 yrs) | Ingestion | Quantitative | Trespassers using ATVs at the Site may incidentally ingest surface soil during the course of their activities. The trespasser/ATV recreator scenario is considered to be protective of the recreator/bike path user. |
| | | | | | | Dermal | Quantitative | Trespassers using ATVs at the Site may have dermal contact with surface soil during the course of their activities. The trespasser/ATV recreator scenario is considered to be protective of the recreator/bike path user. |
| | | Fugitive dust | Outdoor ambient air | Trespasser/ATV recreator | Older child (12-18 yrs) and young adult (18-30 yrs) | Inhalation | Quantitative | Fugitive dust may be generated as a result of operating an ATV. The trespasser/ATV recreator scenario is considered to be protective of the recreator/bike path user. |

**Table 2**
**Selection of Exposure Pathways**

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| | | Volatile emissions | Outdoor ambient air | Trespasser/ATV recreator | Older child (12-18 yrs) and young adult (18-30 yrs) | Inhalation | Quantitative | The trespasser/ATV recreator may be exposed to constituents volatilized from surface soil. The trespasser/ATV recreator scenario is considered to be protective of the recreator/bike path user. |
| | Sediment (0-1 ft bgs) | Seep sediment | Site seeps | Trespasser/ATV recreator | Older child (12-18 yrs) and young adult (18-30 yrs) | Ingestion | Quantitative | Trespassers using ATV at the Site may incidentally ingest seep sediment during the course of their activities. The trespasser/ATV recreator scenario is considered to be protective of the recreator/bike path user. |
| | | | | | | Dermal | Quantitative | Trespassers using ATV at the Site may have dermal contact with seep sediment during the course of their activities. The trespasser/ATV recreator scenario is consiered to be protective of the recreator/bike path user. |
| | Surface water | Seep surface water | Site seeps | Trespasser/ATV recreator | Older child (12-18 yrs) and young adult (18-30 yrs) | Dermal | Quantitative | Trespassers using ATVs in this exposure area may have dermal contact with seep surface water during the course of their activities; however, seep flow is intermittent throughout the year. The trespasser/ATV recreator scenario is considered to be protective of the recreator/bike path user. |

**Table 2**
**Selection of Exposure Pathways**

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Future | Surface and subsurface soil (0-10 ft bgs) | Surface and subsurface soil | Surface and subsurface soil throughout Exposure Unit 3 | Construction worker | Adult (> 18 yrs) | Ingestion | Quantitative | Construction and excavation in this exposure unit may contribute to incidental ingestion of surface soil. |
| | | | | | | Dermal | Quantitative | Construction and excavation in this exposure unit may contribute to dermal contact with surface soil. |
| | | Fugitive dust | Outdoor ambient air | Construction worker | Adult (> 18 yrs) | Inhalation | Quantitative | Construction activities could cause fugitive dust to become airborne, facilitating inhalation of Site constituents. |
| | | Volatile emissions | Outdoor ambient air | Construction worker | | Inhalation | Quantitative | Construction workers may be exposed to volatile emissions from Site soils during on-grade construction and/or excavation activities. |
| | Sediment (0-1 ft bgs) | Seep sediment | Site seeps | Construction worker | Adult (> 18 yrs) | Ingestion | Quantitative | Construction of structures in the Lakeshore portion of this exposure unit may contribute to incidental ingestion of seep sediment. |
| | | | | | | Dermal | Quantitative | Construction of structures in the Lakeshore portion of this exposure unit may contribute to dermal contact with seep sediment. |
| | Surface water | Seep surface water | Site seeps | Construction worker | Adult (> 18 yrs) | Dermal | Quantitative | Construction of structures in the Lakeshore portion of this exposure unit may contribute to dermal contact with seep surface water. |

**Table 2**
**Selection of Exposure Pathways**

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Future | Surface and subsurface soil (0-10 ft bgs) | Surface and subsurface soil | Surface and subsurface soil throughout Exposure Unit 3 | Construction worker | Adult (> 18 yrs) | Ingestion | Quantitative | Construction and excavation in this exposure unit may contribute to incidental ingestion of surface soil. |
| | | | | | | Dermal | Quantitative | Construction and excavation in this exposure unit may contribute to dermal contact with surface soil. |
| | | Fugitive dust | Outdoor ambient air | Construction worker | Adult (> 18 yrs) | Inhalation | Quantitative | Construction activities could cause fugitive dust to become airborne, facilitating inhalation of Site constituents. |
| | | Volatile emissions | Outdoor ambient air | Construction worker | | Inhalation | Quantitative | Construction workers may be exposed to volatile emissions from Site soils during on-grade construction and/or excavation activities. |
| | Sediment (0-1 ft bgs) | Seep sediment | Site seeps | Construction worker | Adult (> 18 yrs) | Ingestion | Quantitative | Construction of structures in the Lakeshore portion of this exposure unit may contribute to incidental ingestion of seep sediment. |
| | | | | | | Dermal | Quantitative | Construction of structures in the Lakeshore portion of this exposure unit may contribute to dermal contact with seep sediment. |
| | Surface water | Seep surface water | Site seeps | Construction worker | Adult (> 18 yrs) | Dermal | Quantitative | Construction of structures in the Lakeshore portion of this exposure unit may contribute to dermal contact with seep surface water. |

**Table 2**
**Selection of Exposure Pathways**

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Current/Future | Surface soil (0-2 ft bgs) | Surface soil | State fairgrounds parking area | State fairgrounds attendee | Adult, older child (12-18 yrs), and younger child (0-6 yrs) | Ingestion | Quantitative | Persons attending events at the state fairgrounds may incidentally ingest surface soil from the parking area. |
| | | | | | | Dermal | Quantitative | Persons attending events at the state fairgrounds may have dermal contact with surface soil from the parking area. |
| | | | | State fairgrounds maintenance worker | Adult (> 18 yrs) | Ingestion | Quantitative | Periodic maintenance occuring on the grounds may contribute to incidental ingestion of surface soil. |
| | | | | | | Dermal | Quantitative | Periodic maintenance occuring on the grounds may contribute to dermal contact with surface soil. |
| | | Fugitive dust | Outdoor ambient air | State fairgrounds attendee | Adult, older child (12-18 yrs), and younger child (0-6 yrs) | Inhalation | Quantitative | Persons attending events may be exposed to fugitive dust. |
| | | | | State fairgrounds maintenance worker | Adult (> 18 yrs) | Inhalation | Quantitative | Maintenance workers may be exposed to fugitive dust. |
| | | Volatile emissions | Outdoor ambient air | State fairgrounds attendee | Adult, older child (12-18 yrs), and younger child (0-6 yrs) | Inhalation | Quantitative | Persons attending events could be exposed to volatile emissions from Site soils. |
| | | | | State fairgrounds maintenance worker | Adult (> 18 yrs) | Inhalation | Quantitative | Maintenance workers may be exposed to volatile emissions from Site soils. |

**Table 2**
**Selection of Exposure Pathways**

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Current/Future | Sediment (0-1 ft bgs) | Ditch and seep sediment | Site ditches | Ditch maintenance worker | Adult (> 18 yrs) | Ingestion | Quantitative | Periodic maintenance necessary to keep ditches functioning may contribute to incidental ingestion of ditch sediment. |
| | | | | | | Dermal | Quantitative | Periodic maintenance necessary to keep ditches functioning may contribute to dermal contact with ditch sediment. |
| | Surface water | Ditch and seep water | Site ditches | Ditch maintenance worker | Adult (> 18 yrs) | Dermal | Quantitative | Periodic maintenance necessary to keep ditches functioning may contribute to dermal contact with standing ditch surface water. |
| | | | | | | Inhalation | Qualitative | No default approach to model volatilization from surface water currently exists. A discussion will be added to the uncertainty section of the HHRA Report. |
| Current/Future | Surface soil (0-2 ft bgs) | Surface soil | Surface soil throughout Exposure Unit 6 | Trespasser/ fisherperson | Adult (> 18 yrs) | Ingestion | Quantitative | Trespassers such as fisherpersons may visit the EU-6 to access Onondaga Lake and incidentally ingest surface soil. Hazard and risks associated with the trespasser/fisherperson recreator scenario is protective of waterfowl hunters. |
| | | | | | | Dermal | Quantitative | Trespassers such as fisherpersons may visit the EU-6 to access Onondaga Lake and have dermal contact with surface soil. Hazard and risks associated with the trespasser/fisherperson recreator scenario is protective of waterfowl hunters. |

**Table 2**
**Selection of Exposure Pathways**

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| | | Volatile emissions | Outdoor ambient air | Trespasser/ fisherperson | Adult (> 18 yrs) | Inhalation | Quantitative | The trespasser/fisherperson may be exposed to constituents volatilized from surface soil in this exposure area. |
| | Sediment (0-1 ft bgs) | Ditch A - South sediment | Ditch A - South | Trespasser/ fisherperson | Adult (> 18 yrs) | Dermal | Quantitative | Trespassers such as fisherpersons may visit Ditch A - South to access Onondaga Lake and have dermal contact with sediment. Hazard and risks associated with the trespasser/fisherperson recreator scenario is protective of waterfowl hunters. |
| | | Seep sediment | Site seeps | Trespasser/ fisherperson | Adult (> 18 yrs) | Ingestion | Quantitative | Trespassers such as fisherpersons may visit the Lakeshore Area to access Onondaga Lake and incidentally ingest seep sediment. Hazard and risks associated with the trespasser/fisherperson recreator scenario is protective of waterfowl hunters. |
| | | | | | | Dermal | Quantitative | Trespassers such as fisherpersons may visit the Lakeshore Area to access Onondaga Lake and have dermal contact with seep sediment. Hazard and risks associated with the trespasser/fisherperson recreator scenario is protective of waterfowl hunters. |

**Table 2**
**Selection of Exposure Pathways**

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| | Surface water | Ditch A - South surface water | Ditch A - South | Trespasser/ fisherperson | Adult (> 18 yrs) | Dermal | Quantitative | Trespassers such as fisherpersons may visit the Lakeshore Area to access Onondaga Lake and have dermal contact with Ditch A - South surface water. Hazard and risks associated with the trespasser/fisherperson recreator scenario is protective of waterfowl hunters. |
| | | Seep surface water | Site seeps | Trespasser/ fisherperson | Adult (> 18 yrs) | Dermal | Quantitative | Trespassers such as fisherpersons may visit the Lakeshore Area to access Onondaga Lake and have dermal contact with seep surface water. Hazard and risks associated with the trespasser/fisherperson recreator scenario is protective of waterfowl hunters. |
| Current/Future | Shallow ground water (0-10 ft bgs) | Site wide shallow ground water | Utility or sewer excavations within EU-2 | Utility/sewer worker | Adult (> 18 yrs) | Ingestion | None | Incidental ingestion of ground water is unlikely and considered *de minimis*. |
| | | | | | | Dermal | Quantitative | Utility or sewer workers performing subsurface excavation activities may be exposed to and have dermal contact with ground water |
| Future | Shallow ground water (0-10 ft bgs) | Site wide shallow ground water | Construction excavations within EU-3 | Construction worker | Adult (> 18 yrs) | Ingestion | None | Incidental ingestion of ground water is unlikely and considered *de minimis*. |
| | | | | | | Dermal | Quantitative | Construction workers performing subsurface excavation activities may be exposed to and have dermal contact with ground water |

**Table 2**
**Selection of Exposure Pathways**

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|
| Future | Ground water | Site wide drinking water* | Potable water sites | Resident | Child (0-6 yrs) | Ingestion | Quantitative | Child residents may ingest ground water during the course of normal activities, such as drinking potable water. |
| | | | | | | Dermal | Quantitative | Child residents may have dermal contact with ground water during the course of normal activities, such as bathing/showering. |
| | | | | | | Inhalation | Quantitative | Child residents may inhale ground water during the course of normal activities, such as bathing/showering. |
| | | | | | Adult (> 18 yrs) | Ingestion | Quantitative | Adult residents may ingest ground water during the course of normal activities, such as drinking potable water. |
| | | | | | | Dermal | Quantitative | Adult residents may have dermal contact with ground water during the course of normal activities, such as bathing/showering. |
| | | | | | | Inhalation | Quantitative | Adult residents may inhale ground water during the course of normal activities, such as bathing/showering. |
| | Shallow ground water (0-10 ft bgs) | Air | Indoor air - vapor intrusion within EU-2 | Commercial/ industrial worker | Adult (> 18 yrs) | Inhalation[1] | Quantitative | Constituents in ground water also have the potenial to migrate to the occupational workspace. When sub-surface soil vapor data are unavailable, ground water data will be evaluated with respect to USEPA OSWER (2002) ground water to indoor air critieria. |

**Table 3**
**Summary of Chemicals of Concern and**
**Medium-Specific Exposure Point Concentrations**

**Scenario Timeframe: Current/Future**
**Medium: Soil**
**Exposure Medium: Surface Soil (0-2 ft bgs)**

| Exposure Point | Chemical of Concern | Concentration Detected Average | Concentration Detected Maximum | Concentration Units | Exposure Point Concentration | Exposure Point Concentration Units | Statistical Measure |
|---|---|---|---|---|---|---|---|
| Exposure Unit 3 | Manganese | 4.32E+02 | 5.10E+03 | mg/kg | 6.75E+02 | mg/kg | 95% C |
| | Nickel | 1.92E+02 | 9.80E+03 | mg/kg | 8.08E+02 | mg/kg | 97.5% C |

95% C = 95% Chebyshev (Mean, Sd) UCL

97.5% C = 97.5 % Chebyshev (Mean,Sd) UCL

## Table 4
## Non-Cancer Toxicity Data Summary

**Pathway: Ingestion/Dermal**

| Chemicals of Concern | Chronic/ Subchronic | Oral RfD Value | Oral RfD Units | Absorp. Efficiency (Dermal) | Adjusted RfD (Dermal) | Adj. Dermal RfD Units | Primary Target Organ | Combined Uncertainty /Modifying Factors | Sources of RfD Target Organ | Dates of RfD |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |
| Manganese | Chronic | 1.40E-01 | mg/kg-day | 0.04 | 5.60E-03 | mg/kg-day | CNS | 1 | IRIS | 2/1/2008 |
| Nickel | Chronic | 2.00E-02 | mg/kg-day | 4.00E-02 | 8.00E-04 | mg/kg-day | Body Weight | 300 | IRIS | 2/1/2008 |

**Pathway: Inhalation**

| Chemicals of Concern | | Chronic/ Subchronic | Inhalation RfC | Inhalation RfC Units | Inhalation RfD (If available) | Inhalation RfD Units (If available) | Primary Target Organ | Combined Uncertainty /Modifying Factors | Sources of RfD Target Organ | Dates of RfC |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |
| Manganese | | Chronic | 5.00E-05 | mg/m3 | 1.43E-05 | mg/kg-day | CNS | 1000 | IRIS | 1/22/2008 |
| Nickel | | Chronic | 9.00E-05 | mg/m3 | 2.57E-05 | mg/kg-day | Respiratory | 30 | ATSDR | 9/1/2005 |

CNS: Central Nerviou System

**Sources:**

Tier 1 - IRIS - United States Environmental Protection Agency (USEPA) Integrated Risk Information System (Available at: http://www.epa.gov/iris).

Tier 2 - PPRTV - USEPA Provisional Peer Reviewed Toxicity Values from the Office of Research and Development/National Center for Environmental Assessment/Superfund Health Risk Technical Support Center (STSC).

Tier 3 - Tox values approved by Superfund Technical Support Center. ATSDR - Agency for Toxic Substances and Disease Registry Minimal Risk Levels (MRLs, Available at: http://www.atsdr.cdc.gov/mrls/index.html);

## Table 5
## Cancer Toxicity Data Summary

**Pathway: Ingestion/ Dermal**

| Chemical of Concern | Oral Cancer Slope Factor | Units | Adjusted Cancer Slope Factor (for Dermal) | Slope Factor Units | Weight of Evidence/ Cancer Guideline | Source | Date |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| Manganese | NA | NA | NA | NA | D | NA | NA |
| Nickel | NA | NA | NA | NA | NA | NA | NA |

**Pathway: Inhalation**

| Chemical of Concern | Unit Risk | Units | Inhalation Cancer Slope Factor | Slope Factor Units | Weight of Evidence/ Cancer Guideline | Source | Date |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| Manganese | NA | NA | NA | NA | D | NA | NA |
| Nickel | 2.60E-01 | per mg/m3 | 9.10E-01 | per mg-kg-day | A | CalEPA | 4/29/2008 |

NA: Toxicity values are not available

Codes for Weight of Evidence: A - Human Carcinogen; B - Probable Human Carcinogen; C - Possible Human Carcinogen; D - Not Classifiable as to Human Carcinogenicity;

E - Evidence of Non-Carcinogenicity in Humans.

**Sources:**

Tier 1 - IRIS - United States Environmental Protection Agency (USEPA) Integrated Risk Information System (Available at: http://www.epa.gov/iris).

Tier 2 - PPRTV - USEPA Provisional Peer Reviewed Toxicity Values from the Office of Research and Development/National Center for Environmental Assessment/Superfund Health Risk Technical Support Center.

Tier 3 - Tox values approved by Superfund Technical Support Center. ATSDR - Agency for Toxic Substances and Disease Registry Minimal Risk Levels (MRLs, Available at: http://www.atsdr.cdc.gov/mrls/index.html);

CALEPA - California Environmental Protection Agency toxicity criteria database (Available at: htp://www.oehha.ca.gov/risk/chemicalDB//index.asp);

HEAST - USEPA Health Effects Assessment Summary Tables from the USEPA STSC; Memo from Southerland. OSWER Directive 9285.7-75. USEPA (1993) Provisional Guidance for Quantitative Risk

NCEA - National Center for Environmental Assessment;USEPA (2003).

Assessment of Polycyclic Aromatic Hydrocarbons, EPA/600/R-93/089).

## Table 6
## Risk Characterization Summary - Non-Carcinogens

**Scenario Timeframe**: Current/Future
**Receptor Population**: Trespasser/ATV Recreator
**Receptor Age**: Older Child

| Medium | Exposure Medium | Exposure Point | Chemical Of Concern | Primary target Organ | Non-Carcinogenic Hazard Quotient | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| | | | | | | | | |
| Soil | Outdoor Air | Exposure Unit 3 | Manganese | CNS | | 3 | | 3 |
| | | | Nickel | Respiratory | | 2 | | 2 |
| | | | Chemical Total | | | | | 7 |
| | | Exposure Point Total | | | | | | 7 |

Total Nervous System Effects HI Across All Media = 3 E+00
Total Nasal/Respiratory Effects HI Across All Media = 4 E+00

**Scenario Timeframe**: Future
**Receptor Population**: Adult
**Receptor Age**: Construction Worker

| Medium | Exposure Medium | Exposure Point | Chemical Of Concern | Primary target Organ | Non-Carcinogenic Hazard Quotient | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Ingestion | Inhalation | Dermal | Exposure Routes Total |
| | | | | | | | | |
| Soil | Outdoor Air | Exposure Unit 3 | Manganese | CNS | | 3 | | 3 |
| | | | Nickel | Respiratory | | 1 | | 1 |
| | | | Chemical Total | | | | | 5 |
| | | Exposure Point Total | | | | | | 5 |

Total Nervous System Effects HI Across All Media = 3 E+00
Total Nasal/Respiratory Effects HI Across All Media = 1 E+00

| Table 7<br>Wastebeds 1-8<br>Remediation Goals | | | | |
|---|---|---|---|---|
| Parameter | Part 375 Protection of Groundwater[1] | Part 375 Restricted Residential[1] | Part 375 Commercial[1] | Part 375 Protection of Ecological Resources[1] |
| **Volatile Organic Compounds (μg/kg)** | | | | |
| Acetone | 50 | 100,000 | 500,000 | 2,200 |
| Benzene | 60 | 4,800 | 44,000 | 70,000 |
| 2-Butanone | 120 | 100,000 | 500,000 | 100,000 |
| Ethylbenzene | 1,000 | 41,000 | 390,000 | NS |
| Methylene Chloride | 50 | 100,000 | 500,000 | 12,000 |
| Toluene | 700 | 100,000 | 500,000 | 36,000 |
| Xylenes, M & P | 1,600 | 100,000 | 500,000 | 260 |
| Xylene, O | 1,600 | 100,000 | 500,000 | 260 |
| Xylenes, Total | 1,600 | 100,000 | 500,000 | 260 |
| **Semivolatile Organic Compounds (μg/kg)** | | | | |
| Benzo(a)anthracene | 1,000 | 1,000 | 5,600 | NS |
| Benzo(a)pyrene | 22,000 | 1,000 | 1,000 | 2,600 |
| Benzo(b)fluoranthene | 1,700 | 1,000 | 5,600 | NS |
| Benzo(k) fluoranthene | 1,700 | 3,900 | 56,000 | NS |
| Chrysene | 1,000 | 3,900 | 56,000 | NS |
| Dibenzo(a,h)anthracene | 1,000,000 | 330 | 560 | NS |
| Dibenzofuran | 210,000 | 59,000 | 350,000 | NS |
| 1,2-Dichlorobenzene | 1,100 | 100,000 | 500,000 | NS |
| Fluorene | 386,000 | 100,000 | 500,000 | 30,000 |
| Hexachlorobenzene | 3,200 | 1,200 | 6,000 | NS |
| Indeno(1,2,3-cd)pyrene | 8,200 | 500 | 5,600 | NS |
| 2-Methylphenol | 330 | 100,000 | 500,000 | NS |
| 4- Methylphenol | 330 | 100,000 | 500,000 | NS |
| Naphthalene | 12,000 | 100,000 | 500,000 | NS |

| Table 7<br>Wastebeds 1-8<br>Remediation Goals | | | | |
|---|---|---|---|---|
| Parameter | Part 375 Protection of Groundwater[1] | Part 375 Restricted Residential[1] | Part 375 Commercial[1] | Part 375 Protection of Ecological Resources[1] |
| Phenol | 330 | 100,000 | 500,000 | 30,000 |
| **Pesticides (µg/kg)** | | | | |
| Alpha-Chlordane | 2,900 | 4,200 | 24,000 | 1,300 |
| 4,4'-DDD | 14,000 | 13,000 | 92,000 | 3.3 |
| 4,4'-DDE | 17,000 | 8,900 | 62,000 | 3.3 |
| 4,4'-DDT | 136,000 | 7,900 | 47,000 | 3.3 |
| Dieldrin | 100 | 200 | 1,400 | 6 |
| **PCBs (µg/kg)** | | | | |
| Aroclor-1248 | 3,200 | 1,000 | 1,000 | 1,000 |
| Aroclor -1254 | 3,200 | 1,000 | 1,000 | 1,000 |
| Aroclor -1260 | 3,200 | 1,000 | 1,000 | 1,000 |
| **Inorganic Compounds (mg/kg)** | | | | |
| Arsenic | 16 | 16 | 16 | 13 |
| Barium | 820 | 400 | 400 | 433 |
| Cadmium | 7.5 | 4.3 | 9.3 | 4 |
| Chromium | NS | 180 | 1,500 | 41 |
| Copper | 1,720 | 270 | 270 | 50 |
| Cyanide | 40 | 27 | 27 | NS |
| Hexavalent Chromium | 19 | 110 | 400 | 1 |
| Lead | 450 | 400 | 1,000 | 63 |
| Manganese | 2,000 | 2,000 | 10,000 | 1,600 |
| Mercury | 0.73 | 0.81 | 2.8 | 0.18 |
| Nickel | 130 | 310 | 310 | 30 |
| Selenium | 4 | 180 | 1,500 | 3.9 |
| Silver | 8.3 | 180 | 1,500 | 2 |

| Table 7<br>Wastebeds 1-8<br>Remediation Goals | | | | |
|---|---|---|---|---|
| Parameter | Part 375 Protection of Groundwater[1] | Part 375 Restricted Residential[1] | Part 375 Commercial[1] | Part 375 Protection of Ecological Resources[1] |
| Zinc | 2,480 | 10,000 | 10,000 | 109 |

Notes:
1 - NYSDEC (2006) Part 375.6 Table 6.8 Soil Cleanup Objectives.
NS = Not developed for this parameter.

**Source: O'Brien & Gere**

| TABLE 8 - POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS | | | | | |
|---|---|---|---|---|---|
| **Medium/Location/ Action** | **Citation** | **Requirements** | **Comments** | **Potential ARAR** | **Potential TBC** |
| **Potential chemical-specific ARARs and TBCs** | | | | | |
| Soil/fill material | 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives | Promulgated state regulation that provides guidance for soil cleanup objectives for various restricted property uses (industrial, commercial, restricted residential, and residential), for the protection of groundwater and ecological resources, and for unrestricted property use. Commercial use includes passive recreational use that refers to recreational uses with limited potential for soil contact, such as: (1) artificial surface fields; (2) outdoor tennis or basketball courts; (3) other paved recreational facilities used for roller hockey, roller skating, shuffle board, etc.; (4) outdoor pools; (5) indoor sports or recreational facilities; (6) golf courses; and (7) paved (raised) bike or walking paths (DER-10 (NYSDEC 2010)). Restricted residential includes active recreational use that refers to recreational activities with a reasonable potential for soil contact, such as: (1) designated picnic areas; (2) playgrounds; or (3) natural grass sports playing fields, including surrounding unpaved spectator areas (DER-10 (NYSDEC 2010)). | Soil cleanup objectives for restricted use (Restricted residential and commercial) are potentially relevant and appropriate to site soil/fill material for areas where reasonably anticipated future property use includes active recreational use and passive recreational use, respectively. Soil cleanup objectives for the protection of ecological resources are potentially relevant and appropriate to site soil/fill material for areas other than where conditions of the land (*e.g.* , paved, covered by impervious surfaces, buildings or other structures) preclude the existence of ecological resources. Soil cleanup objectives for the protection of groundwater may not be applicable, relevant or appropriate because migration of shallow/intermediate groundwater is currently being controlled, however, they are being considered for this FS. | Yes | |
| **Potential location-specific ARARs and TBCs** | | | | | |
| Construction of Buildings | NYSDOH's October 2006 Guidance for Evaluating Soil Vapor Intrusion in the State of New York | Guidance document that provides thresholds for indoor air and subslab soil vapor above which vapor mitigation is required. | Not currently applicable, because no buildings are present on the Site. Potentially applicable if future buildings are constructed at the Site. | No | Yes |
| Water Bodies | 33 CFR 320 - 330 | Regulatory policies and permit requirements for work affecting waters of the United States and navigable waterways. | Substantive, non-administrative requirements potentially applicable to work affecting Ninemile Creek or Onondaga Lake. | Yes | No |
| Wetlands | 6 NYCRR 663 - Freshwater wetland permit requirements | Actions occurring in a designated freshwater wetland (within 100 ft) must be approved by NYSDEC or its designee. Activities occurring adjacent to freshwater wetlands must: be compatible with preservation, protection, and conservation of wetlands and benefits; result in no more than insubstantial degradation to or loss of any part of the wetland; and be compatible with public health and welfare. | Delineated wetlands at the site are on the eastern shore, and are not within the footprint of upland portions of the site to be addressed in the FS. However, substantive requirements are potentially applicable for activities being implemented in proximity of delineated wetlands at the site. | Yes | No |
| | Clean Water Act Section 404<br>33 CFR Parts 320 - 330 | Regulatory policies and permit requirements for work affecting waters of the United States, including wetlands. | Delineated wetlands at the site are on the eastern shore, and are not within the footprint of upland portions of the site to be addressed in the FS. However, substantive requirements are potentially applicable for activities being implemented in proximity of delineated wetlands at the site. | Yes | No |
| | Clean Water Act Section 404<br>40 CFR Parts 230-231 | Provides for restoration and maintenance of integrity of waters of the United States, including wetlands, through the control of dredged or fill material discharge. | Delineated wetlands at the site are on the eastern shore, and are not within the footprint of upland portions of the site to be addressed in the FS. However, substantive requirements are potentially applicable for activities being implemented in proximity of delineated wetlands at the site. | Yes | No |
| | Executive Order 11990 - Protection of Wetlands | Executive order requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction or loss of wetlands if a practical alternative exists. | Delineated wetlands at the site are on the eastern shore, and are not within the footprint of upland portions of the site to be addressed in the FS. However, potentially applicable for activities being implemented in proximity of delineated wetlands at the site. | Yes | No |
| Wetlands & Floodplains | Policy on Floodplains and Wetland Assessments for CERCLA Actions (OSWER Directive 9280.0-2; 1985) | Policy and guidance requiring Superfund actions to meet substantive requirements of Executive Orders 11988 and 11990. Describes requirements for floodplain assessment during remedial action planning. | Not applicable or relevant and appropriate if during OU-1 remedy design it is confirmed that all OU-1 remedial activities will occur outside the 100-year and 500-year floodplains as defined by FEMA. A floodplain and wetland assessment was completed for the shorelines of the site. If an additional floodplain assessment is required for the OU-1 remedy area based on remedial design findings, a floodplain assessment would be completed. The assessment would document a description of the proposed OU-1 remedial actions and other remedial alternatives considered, the effects of the proposed action and other remedial alternatives on the floodplain, and measures to mitigate potential impacts to the floodplain. Upland portions of the site addressed in the FS are not within the 100-year floodplain or delineated wetlands at the site. | No | Yes |
| | Policy on Flood Plains and Wetland Assessments for CERCLA Actions (OSWER Directive 9280.0-02) | Federal guidance that provides requirements for wetlands and floodplain assessments. | Not applicable or relevant and appropriate if during OU-1 remedy design it is confirmed that all OU-1 remedial activities will occur outside the 100-year and 500-year floodplains as defined by FEMA. A floodplain and wetland assessment was completed for the shorelines of the site. If an additional floodplain assessment is required for the OU-1 remedy area based on remedial design findings, a floodplain assessment would be completed consistent with OSWER Directive 9280.0-02). Upland portions of the site addressed in the FS are not within the 100-year floodplain or delineated wetlands at the site. | No | No |

| TABLE 8 - POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS | | | | | |
|---|---|---|---|---|---|
| **Medium/Location/ Action** | **Citation** | **Requirements** | **Comments** | **Potential ARAR** | **Potential TBC** |
| **Potential location-specific ARARs and TBCs (continued)** | | | | | |
| Floodplains | 6 NYCRR 373-2.2 - Location standards for hazardous waste treatment, storage, and disposal facilities -100-yr floodplain | Hazardous waste treatment, storage, or disposal facilities located in a 100-yr floodplain must be designed, constructed, operated and maintained to prevent washout of hazardous waste during a 100-yr flood. | Not applicable or relevant and appropriate. Wetland and 100-yr floodplain are not present within upland portions of the site to be addressed in the FS. Further, no hazardous waste treatment, storage, or disposal facilities are planned to be located on site. | No | No |
| | 40 CFR Part 264.18(b) - Location Standards - Floodplains | Hazardous waste treatment, storage, or disposal facilities located in a 100-yr floodplain must be designed, constructed, operated and maintained to prevent washout of hazardous waste during a 100-yr flood. | Not applicable or relevant and appropriate. Wetland and floodplain are not present within upland portions of the site to be addressed in the FS. Further, no hazardous waste treatment, storage, or disposal facilities are planned to be located on site. | No | No |
| | Executive Order 11988 - Floodplain Management | USEPA is required to conduct activities to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupation or modification of floodplains. The procedures also require USEPA to avoid direct or indirect support of floodplain development wherever there are practicable alternatives and minimize potential harm to floodplains when there are no practicable alternatives. | Not applicable or relevant and appropriate if during OU-1 remedy design it is confirmed that all OU-1 remedial activities will occur outside the 100-year and 500-year floodplains as defined by FEMA and wetlands. Wetland and floodplain are not believed to be present within upland portions of the site to be addressed in the FS. If, during design, portions of the OU-1 remedy are found to be within the floodplain or a wetland, remedial activities will be conducted in a manner so as to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupation or modification of floodplains. | No | No |
| | 6 NYCRR 500 - Floodplain Management Regulations Development Permits | Promulgated state regulations providing permit requirements for development in areas of special flood hazard (floodplain within a community subject to a one percent or greater chance of flooding in any given year). | Not applicable or relevant and appropriate if during OU-1 remedy design it is confirmed that all OU-1 remedial activities will occur outside the 100-year and 500-year floodplains as defined by FEMA and wetlands. Wetland and floodplain are not believed to be present within upland portions of the site to be addressed in the FS. If, during design, portions of the OU-1 remedy are found to be within the floodplain or a wetland, remedial activities would be conducted in accordance with the statutory requirements of flood-associated permits. | No | No |
| | Town of Geddes Flood Protection Ordinance | Permit requirements for work in areas of special flood hazard. | Not applicable or relevant and appropriate if during OU-1 remedy design it is confirmed that all OU-1 remedial activities will occur outside the 100-year and 500-year floodplains as defined by FEMA and wetlands. Floodplain is not believed to be present within upland portions of the site to be addressed in the FS. If, during design, portions of the OU-1 remedy are found to be within the floodplain or a wetland, remedial activities would be conducted in accordance with the statutory requirements of Town of Geddes Flood Protection Ordinances. | No | No |
| Within 61 meters (200 ft) of a fault displaced in Holocene time | 40 CFR Part 264.18(a) - Location Standards - Seismic considerations | New treatment, storage, or disposal of hazardous waste is not allowed. | Not applicable or relevant and appropriate. Site is not located within 200 ft of a fault displaced in Holocene time, as listed in 40 CFR 264 Appendix VI. None listed in New York State. | No | No |
| Within salt dome or bed formation, underground mine, or cave | 40 CFR Part 264.18 (c) - Location standards; salt dome formations, salt bed formations, underground mines and caves. | Placement of non-containerized or bulk liquid hazardous waste is not allowed. | Not applicable or relevant and appropriate. No salt dome formations, salt bed formations, underground mines or caves present at site. | No | No |
| Habitat of an endangered or threatened species | 6 NYCRR 182 | Promulgated state regulation that provides requirements to minimize damage to habitat of an endangered species. | Not applicable or relevant and appropriate. No endangered or threatened wildlife species, rare plants or significant habitats were identified at the site. One threatened plant within 2 miles of site on north shore of Onondaga Lake not anticipated to be impacted by site activities. | No | No |
| | Endangered Species Act | Provides a means for conserving various species of fish, wildlife, and plants that are threatened with extinction. | Not applicable or relevant and appropriate. No endangered or threatened wildlife species, rare plants or significant habitats were identified at the site. One threatened plant within 2 miles of site on north shore of Onondaga Lake not anticipated to be impacted by site activities. | No | No |
| | 50 CFR Part 17 - Endangered and Threatened Wildlife and Plants<br>and<br>50 CFR Part 402 - Interagency Cooperation | Promulgated federal regulation that requires that federal agencies ensure authorized, funded, or executed actions will not destroy or have adverse modification of critical habitat. | Not applicable or relevant and appropriate. No endangered or threatened wildlife species, rare plants or significant habitats were identified at the site. One threatened plant within 2 miles of site on north shore of Onondaga Lake not anticipated to be impacted by site activities. | No | No |

| TABLE 8 - POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS | | | | | |
|---|---|---|---|---|---|
| **Medium/Location/ Action** | **Citation** | **Requirements** | **Comments** | **Potential ARAR** | **Potential TBC** |
| **Potential location-specific ARARs and TBCs (continued)** | | | | | |
| Historical property or district | National Historic Preservation Act<br>36 CFR 800- Preservation of Historic Properties Owned by a Federal Agency | Remedial actions are required to account for the effects of remedial activities on any historic properties included on or eligible for inclusion on the National Register of Historic Places. | Potentially applicable. A draft Phase 1 assessment identified the potential for prehistoric and historic resources in and in the vicinity of the Site. | Yes | No |
| | National Historic Preservation Act<br>36 CFR Part 65 - National Historic Landmarks Program | Promulgated federal regulation requiring that actions must be taken to preserve and recover historical/archeological artifacts found. | Potentially applicable. A draft Phase 1 assessment identified the potential for prehistoric and historic resources in and in the vicinity of the Site. | Yes | No |
| | New York State Historic Preservation Act of 1980<br>9 NYCRR Parts 426 - 428 | State law and regulations requiring the protection of historic, architectural, archeological and cultural property. | Potentially applicable. A draft Phase 1 assessment identified the potential for prehistoric and historic resources in and in the vicinity of the Site. | Yes | No |
| Wilderness area | Wilderness Act<br>50 CFR Part 35 - Wilderness Preservation and Management | Provides for protection of federally-owned designated wilderness areas. | Not applicable or relevant and appropriate. Site not located in wilderness area. | No | No |
| Wild, scenic, or recreational river | Wild and Scenic Rivers Act | Provides for protection of areas specified as wild, scenic, or recreational. | Not applicable or relevant and appropriate. Site not located near wild, scenic or recreational river. | No | No |
| Coastal zone | Coastal Zone Management Act | Requires activities be conducted consistent with approved State management programs. | Not applicable or relevant and appropriate. Site not located in coastal zone. | No | No |
| Coastal barrier | Coastal Barrier Resources Act | Prohibits any new Federal expenditure within the Coastal Barrier Resource System. | Not applicable or relevant and appropriate. Site not located in coastal barrier. | No | No |
| Protection of waters | 33 U.S.C. 1341 - Clean Water Act Section 401, State Water Quality Certification Program | States have the authority to veto or place conditions on federally permitted activities that may result in water pollution. | Potentially applicable to site. | Yes | Yes |
| **Potential action-specific ARARs and TBCs** | | | | | |
| Institutional controls | NYSDEC DER-33 Institutional Controls: A Guide to Drafting and Recording Institutional Controls, December 2010 | Technical guidance document that provides guidelines for proper development and recording of institutional controls as part of a site remedial program. | Potentially applicable TBC when institutional controls are implemented as a component of the selected remedy. | No | Yes |
| Cover systems | NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, May 2010 | Technical guidance document that provides guidelines for cover thicknesses as they relate to property use in areas where exposed surface soil exceeds NYCRR Part 375 soil cleanup objectives. Specifically, where the exposed surface soil at the site exceeds the applicable SCO for protection of human health and/or ecological resources, the soil cover for restricted residential use, is to be two feet; for commercial or industrial use, is to be one foot; or when an ecological resource has been identified is to be a minimum of two feet; and when such a concern is identified by DEC, consideration should be given to supplementing the demarcation layer to serve as an impediment to burrowing. | Potentially applicable TBC for cover alternatives. | No | Yes |
| Landfilling of solid wastes | 40 CFR Part 257 - Criteria for Classification of Solid Waste Disposal Facilities and Practices | Promulgated federal regulation that provides criteria for solid waste disposal facilities to protect health and the environment. | Landfilling of wastes may be applicable for the site. | Yes | No |
| Generation and management of solid waste | 6 NYCRR 360 - Solid Waste Management Facilities | Promulgated state regulation that provides requirements for management of solid wastes, including disposal and closure of disposal facilities. | Potentially applicable to alternatives including disposal of residuals generated by treatment processes as well as capping alternatives. | Yes | No |

| TABLE 8 - POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS | | | | | |
|---|---|---|---|---|---|
| **Medium/Location/ Action** | **Citation** | **Requirements** | **Comments** | **Potential ARAR** | **Potential TBC** |
| **Potential action-specific ARARs and TBCs (continued)** | | | | | |
| Land disposal | 6 NYCRR 376 - Land Disposal Restrictions | Promulgated federal and state regulations that provide treatment standards to be met prior to land disposal of hazardous wastes. | Potentially applicable. | Yes | No |
| | 40 CFR Part 268 - Land Disposal Restrictions | | | | |
| | 62 CFR 25997 - Phase IV Supplemental Proposal on Land Disposal of Mineral Processing Wastes | | | | |
| Beneficial use | 6 NYCRR 360 - General Provisions, Beneficial Use | Promulgated federal and state regulations that provide criteria for beneficial use and recycling of solids wastes and soils. Provisions for case-specific beneficial use and recycling are also identified. | Potentially applicable to alternatives including beneficial use of excavated soil/fill material. | Yes | No |
| | 60 CFR 261 - Solid Waste Recycling/Reuse | | | | |
| Green remediation | NYSDEC DER-31 Green Remediation Program Policy, January 2011 | State and federal technical guidance documents that provide guidelines for the development of site remediation strategies in a manner that minimizes environmental impacts and applies green remediation concepts (e.*g.,* reduction in green house gas emissions, energy consumption and resource use, promotion of recycling of materials and conservations of water, land and habitat). | Potentially applicable TBC | No | Yes |
| | Superfund Green Remediation Strategy, September 2010 | | | | |
| General excavation | 6 NYCRR 257 - Air Quality Standards | Promulgated state regulation that provides specific limits on generation of $SO_2$, particulates, $CO_2$, photochemical oxidants, hydrocarbons (non-methane), $NO_2$, fluorides, beryllium and H2S from point sources. | No air emissions sources anticipated as part of alternatives. | No | No |
| | 40 CFR Part 50.1 - 50.12 - National Ambient Air Quality Standards | Promulgated federal regulation that provides air quality standards for pollutants considered harmful to public health and the environment. The six principle pollutants are carbon monoxide, lead, nitrogen dioxide, particulates, ozone, and sulfur oxides. | Potentially applicable to alternatives during which dust generation may result, such as during earth moving, grading, and excavation. | Yes | No |
| | NYS TAGM 4031 - Dust Suppressing and Particle Monitoring at Inactive Hazardous Waste Disposal Sites | State guidance document that provides limitations on dust emissions. | To be considered material where more stringent than air-related ARARs. | No | Yes |
| Construction | 29 CFR Part 1910.120 - Occupational Safety and Health Standards - Hazardous Waste Operations and Emergency Response | Promulgated federal regulation requiring that remedial activities must be in accordance with applicable OSHA requirements. | Potentially applicable for construction activities. | Yes | No |
| | 29 CFR Part 1926 - Safety and Health Regulations for Construction | Promulgated federal regulation requiring that remedial construction activities must be in accordance with applicable OSHA requirements. | Potentially applicable for construction activities. | Yes | No |
| Transportation | 6 NYCRR 364 - Waste Transporter Permits | Promulgated state regulation requiring that hazardous waste transport must be conducted by a hauler permitted under 6 NYCRR 364. | Potentially applicable. | Yes | No |
| | 49 CFR 107, 171-174 and 177-179 - Department of Transportation Regulations | Promulgated federal regulation requiring that hazardous waste transport to offsite disposal facilities must be conducted in accordance with applicable DOT requirements. | Potentially applicable. | Yes | No |

Notes:

ARARs - Applicable or Relevant and Appropriate Requirements
CERCLA - Comprehensive Environmental Response, Compensation, and Liability
Act CFR - Code of Federal Regulations
DOT - Department of Transportation
FEMA - Federal Emergency Management Agency
FS - Feasibility Study
FT - Feet or Foot
IRM - Interim Remedial Measure
NYCRR - New York Code of Rules and Regulations
NYSDEC - New York State Department of Environmental Conservation
NYSDOH - New York State Department of Environmental Conservation
OSHA - Occupational Safety and Health Administration
OSWER - Office of Solid Waste and Emergency Response
OU - Operable Unit
RI - Remedial Investigation
SCO - Soil Cleanup Objectives
SPDES - State Pollutant Discharge Elimination System
SVOCs - Semi Volatile Organic Compounds
TAGM - Technical and Administrative Guidance Memorandum
TBC - To be Considered
TOGS - Technical and Operational Guidance Series
USC - United States Code
USEPA or EPA - United States Environmental Protection Agency
USFWS - United States Fish and Wildlife Service
Shaded cells - not identified as Potential ARARs or TBCs

## TABLE 9 - SELECTED REMEDY (ALTERNATIVE 3 ENHANCED VEGETATED COVER SYSTEM) COST ESTIMATE

### COST ESTIMATE SUMMARY

| | | | | |
|---|---|---|---|---|
| Site: | Honeywell Wastebeds 1 - 8 | 171 | Acres | |
| Location: | Geddes, NY | 8 | Construction Seasons | |
| Phase: | Feasibility Study | | | |
| Base Year: | 2014 | | | |

| ITEM | UNIT | ESTIMATED QUANTITY | ESTIMATED UNIT COST | ESTIMATED COST | NOTES |
|---|---|---|---|---|---|
| **Direct Capital Costs** | | | | | |
| General Conditions | WK | 250 | $9,500 | $2,375,000 | Trailer, fuel, small tools, consumables and safety |
| Mobilization | LS | 8 | $54,000 | $432,000 | One per construction season |
| Air Monitoring | WK | 168 | $7,500 | $1,260,000 | Active construction periods only |
| Surveys | WK | 168 | $3,000 | $504,000 | Active construction periods only |
| Irrigation | WK | 32 | $5,000 | $160,000 | Germination periods only/ 4 wks per year |
| Environmental Easement | LS | 1 | $30,000 | $30,000 | |
| Site Management Plan | LS | 1 | $50,000 | $50,000 | |
| Site Preparation | | | | | |
| Access Roadways | LF | 3,000 | $20 | $60,000 | For currently inaccessible areas only |
| Clearing and Grubbing | AC | 66 | $3,200 | $211,200 | 2-ft and 1-ft Vegetative cover areas |
| Rough Grading | AC | 95 | $800 | $76,000 | |
| Mixing Area | EA | 3 | $32,000 | $96,000 | 50-ft by 50-ft |
| QA/QC | | | | | |
| Materials QA/QC Testing - Topsoil | EA | 132 | $230 | $30,314 | 1/500 cy of imported materials |
| Materials QA/QC Testing - Fill and Stone | EA | 287 | $70 | $20,104 | 1/500 cy of imported materials |
| Erosion and Sediment Control | LF | 145,000 | $2.75 | $398,750 | Reinforced silt fence |
| Structural Soil Cover - 1-ft | | | | | *Assume 19 acres total parking and travel lanes* |
| Seeding | AC | 14.0 | $13,000 | $182,000 | Modified old field successional with fertilizer and hydromulch |
| Structural Stone - 1-ft thickness | CY | 22,700 | $30 | $681,000 | NYSDOT Type 3A Stone |
| Topsoil | CY | 4,550 | $28 | $127,400 | 20% by volume of 1-ft thickness |
| Structural Soil Mixing | CY | 27,250 | $6 | $163,500 | Mechanically mix stone and topsoil by loader/excavator |
| Structural Soil Placement | CY | 22,700 | $8 | $181,600 | Includes placement and compaction |
| Geogrid | SY | 24,000 | $3.25 | $78,000 | Placed beneath travel areas only |
| Travel Lanes | CY | 8,000 | $28 | $224,000 | 12-inches Crusher Run gravel, Geogrid; 15-ft width; approx 4.6 acres |
| Vegetative Soil Cover, 2-ft | | | | | *Assume 27 acres total* |
| Place Topsoil to 6-inch depth | CY | 21,800 | $45 | $981,000 | Placement by conventional equipment in 6-inch lifts |
| Place Imported Fill to 18-inch depth | CY | 65,300 | $32 | $2,089,600 | Placement by conventional equipment in 6-inch lifts |
| Seeding | AC | 27 | $13,000 | $351,000 | Modified old field successional with fertilizer and hydromulch |
| Vegetative Soil Cover, 1.5-foot | | | | | *Assume 10 acres total* |
| Place Topsoil to 6-inch depth | CY | 8,050 | $45 | $362,250 | Placement by conventional equipment in 6-inch lifts |
| Place Imported Fill to 12-inch depth | CY | 16,100 | $32 | $515,200 | Placement by conventional equipment in 6-inch lifts |
| Seeding | AC | 10 | $13,000 | $130,000 | Modified old field successional with fertilizer and hydromulch |
| Vegetative Soil Cover, 1-foot | | | | | *Assume 39 acres total* |
| Place Topsoil to 6-inch depth | CY | 31,500 | $45 | $1,417,500 | Placement by conventional equipment in 6-inch lifts |
| Place Imported Fill to 6-inch depth | CY | 31,500 | $32 | $1,008,000 | Placement by conventional equipment in 6-inch lifts |
| Seeding | AC | 39 | $13,000 | $507,000 | Modified old field successional with fertilizer and hydromulch |
| Vegetative Enhancement, 4-inches | | | | | *Assume 76 acres total* |
| Hydromulch installation | CY | 40,900 | $42 | $1,717,800 | Mulch/Seed placement by blown-in methods |
| Seeding | AC | 76 | $3,000 | $228,000 | Raw seed cost only; installed with solid media. |
| | | | **SUBTOTAL (rounded):** | **$16,650,000** | |

## TABLE 9 - SELECTED REMEDY (ALTERNATIVE 3 ENHANCED VEGETATED COVER SYSTEM) COST ESTIMATE

### COST ESTIMATE SUMMARY

| | | | |
|---|---|---|---|
| Site: | Honeywell Wastebeds 1 - 8 | 171 | Acres |
| Location: | Geddes, NY | 8 | Construction Seasons |
| Phase: | Feasibility Study | | |
| Base Year: | 2014 | | |

| ITEM | UNIT | ESTIMATED QUANTITY | ESTIMATED UNIT COST | ESTIMATED COST | | NOTES |
|---|---|---|---|---|---|---|
| | | | | **TOTAL DIRECT CAPITAL COST (rounded):** | **$16,650,000** | |
| | | | | **ENGINEERING/MANAGMENT, CONSTRUCTION OVERSIGHT, OBG OH&P** | **$3,163,500** | 6%, 8%, and 5% respectively |
| | | | | **CONTINGENCY (15%)** | **$2,497,500** | Scope Contingency |
| **Annual Operation and Maintenance Costs** | | | | | | |
| Annual | | | | | | |
| Cover inspection - vegetated covers | MH | 128 | $120 | $15,360 | | Assumes 2 scientists/engineers, 4 days, 8 hours/day; Twice annually |
| Reporting | EA | 1 | $10,000 | $10,000 | | |
| Years 1-5 | | | | | | |
| Vegetation maintenance | AC | 16.6 | $3,000 | $49,800 | | Spot seeding; 10% of all areas annually |
| Soil Cover maintenance and incidental repairs | AC | 76 | $225 | $17,100 | | Topsoil repair, 5 cy per acre annually |
| Vegetative enhancement maintenance/repair | AC | 0.8 | $25,600 | $19,456 | | Reinstallation over eroded areas; 4-inches of hydromulch over 1% enhanced areas annually |
| Structural cover maintenance/repair | AC | 14.0 | $1,100 | $15,400 | | Spot stone fill 10 cy per acre annually; regrade/reseed 10% annually |
| Structural cover travel lane repair | AC | 0.10 | $4,600 | $460 | | Resurface (1-inch crushed stone) and regrade travel lanes; 10% annually |
| Years 6-30 | | | | | | |
| Cover inspection - veg. covers and Int. IRM | MH | 224 | $120 | $26,880 | | Assumes 2 scientists/engineers, 7 days, 8 hours/day; Twice annually |
| Vegetation Maintenance | AC | 1.7 | $3,000 | $4,980 | | Spot seeding; 1% of all areas annually |
| Soil Cover maintenance and incidental repairs | AC | 76 | $225 | $17,100 | | Topsoil repair, 5 cy per acre annually |
| Vegetative enhancement maintenance/repair | AC | 0.8 | $25,600 | $19,456 | | Reinstallation over eroded areas; 4-inches of hydromulch over 1% enhanced areas annually |
| Structural Cover maintenance/repair | AC | 14.0 | $1,100 | $15,400 | | Spot stone fill 10 cy per acre annually; regrade/reseed 10% annually |
| Structural Cover travel lane repair | AC | 0.10 | $4,600 | $460 | | Resurface (1-inch crushed stone) and regrade travel lanes; 10% annually |
| Spot Repair of Integrated IRM covers | SF | 31,365 | $0.12 | $3,764 | | 5% of cover annually; years 1-5 carried in 2010 FFS |
| Years 5, 10, 15, 20, 25, 30 | | | | | | |
| Five Year Review | EA | 1 | $15,000 | $15,000 | | |
| Maintenance of Integrated IRM paths | SY | 57,525 | $10 | $575,250 | | Place and grade 6-inch resurface; 20% of Total Area; commencing Yr 10 |

| **Present Worth Analysis Years (1-30)** | | Discount Factor | **Present Worth ($)** | |
|---|---|---|---|---|
| Cost Type | Cost | Df=7 | **(rounded)** | |
| Capital Cost - Year 0 | 22,310,000 | $0.799 | **$17,820,000** | Phased construction. Assumed over 8 construction seasons; average discount years 0-7 |
| Annual O&M - Years 1-5 | 127,576 | $0.820 | **$520,000** | Average discount factor for years 1-5 |
| Annual O&M - Years 6-30 | 98,040 | $0.332 | **$810,000** | Average discount factor for years 6-30 |
| Periodic O&M - Years 5, 10, 15, 20, 25, 30 | 15,000 | $0.360 | **$32,000** | Average discount factor for years 5, 10, 15, 20, 25 and 30 |
| Periodic O&M - Years 10, 15, 20, 25, 30 | 575,250 | $0.289 | **$850,000** | Average discount factor for years 10, 15, 20, 25 and 30 |
| | | **TOTAL PRESENT WORTH ESTIMATED ALTERNATIVE COST (rounded):** | **$20,000,000** | |

# OPERABLE UNIT 1 OF THE SOLVAY WASTBEDS 1-8 SUBSITE OF THE ONONDAGA LAKE SUPERFUND SITE RECORD OF DECISION

## APPENDIX III

## ADMINISTRATIVE RECORD INDEX

**Administrative Record Index**
**Operable Unit 1 of the Solvay Wastebeds 1-8 Site**

(New York State Inactive Hazardous Waste Disposal Site #7-34-081)

| RI/FS Activities | Documents |
|---|---|
| Remedial Investigation/Feasibility Study Work Plans | Citizen Participation Plan for the Onondaga Lake National Priority List Site (1996)<br><br>Wastebeds 1-8 RI/FS Work Plan (November 2006) |
| Remedial Investigation Reports | Wastebeds 1-8 Baseline Ecological Risk Assessment (March 2011)<br><br>Wastebeds 1-8 Human Health Risk Assessment (April 2011)<br><br>Wastebeds 1-8 Revised Remedial Investigation Report (August 2014)<br><br>Email from Bob Nunes to Tracy Smith re: Wastebeds 1-8 (October 30, 2014) |
| Feasibility Study | Wastebeds 1-8 Operable Unit 1 Revised Final Feasibility Study Report (September 2014) |
| Documents Related to IRM Activities | Wastebeds 1-8 Consent Order (January 2004)<br><br>Wastebeds 1-8 Focused Feasibility Study (June 2010)<br><br>Wastebeds 1-8 Site IRM Response Action Document (August 2011)<br><br>Cultural Resource Management Report Phase 1B Reconnaissance Survey, Onondaga Lake Upland Project, Wastebed 1-8 Shoreline and Wastebeds 1-8 Supplemental Work (September 2011)<br><br>Wastebeds 1-8 Integrated IRM: Cultural Resouces Management Report Phase 1B Reconnaissance Survey (October 2012) |

| | |
|---|---|
| | Wastebeds 1-8 Integrated IRM, Mitigation Wetlands, and Remediation Area A Hydraulic Control System 100% Design Report (October 2012)<br><br>Wastebeds 1-8 Integrated IRM Construction Work Plan (March 2013) |
| EPA Human Health Risk Assessments | Human Health Risk Assessment, Wastebeds 1-8 Site: Bike Trail (January 2009)<br><br>Supplemental Human Health Risk Evaluation Wastebeds 1-8 Lakeview Amphitheater Facility (June 2014)<br><br>Addendum to Supplemental Human Health Risk Evaluation (October 2014) |
| Proposed Plan Released<br><br>Start of Public Comment Period | Proposed Plan (September 17, 2014)<br><br>Notice of Public Meeting and Opportunity to Comment (September 18, 2014) |
| Public Meetings Held | Documentation and Transcript of June 11, 2009 Public Meeting (Attached to the Record of Decision as Appendix E)<br><br>Written Comments on Selected Remedy (Attached to the Record of Decision as Appendix E) |
| Record of Decision Issued | Record of Decision and Responses to Comments (Responsiveness Summary) – December 2, 2014 |
| Enforcement Documents | Wastebeds 1-8 Consent Order (January 2004) |

**OPERABLE UNIT 1 OF THE SOLVAY WASTBEDS 1-8 SUBSITE**
**OF THE ONONDAGA LAKE SUPERFUND SITE**
**RECORD OF DECISION**

# APPENDIX IV

# NEW YORK STATE DEPARTMENT OF HEALTH LETTER OF CONCURRENCE

NEW YORK
state department of
HEALTH

Howard A. Zucker, M.D., J.D.
Acting Commissioner of Health

Sue Kelly
Executive Deputy Commissioner

September 15, 2014

Mr. Robert Schick, Director
NYS Dept. of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

Re: **Proposed Plan — Operable Unit 1**
Solvay Wastebeds 1-8
Site #734081
Geddes, Onondaga County

Dear Mr. Schick:

At your Department's request, staff reviewed the NYSDEC and US EPA's *Proposed Plan* for Operable Unit 1 (soil/fill materials/Solvay waste) of the referenced site (a sub-site of the Onondaga Lake Superfund Site) to determine whether the proposed remedy is protective of public health. I understand that human exposures to contamination in this operable unit will be addressed by the proposed remedy as follows:

- A cover system will be installed to allow for active and passive recreational uses in accordance with 6NYCRR Part 375.
- Future excavations will be conducted in accordance with an approved site management plan to ensure that human exposures to contaminated soil are properly managed.
- A soil vapor intrusion evaluation will be completed and appropriate actions to address exposures will be implemented for any new buildings constructed on this portion of the site.

Periodic reviews will be completed to certify that these elements of the remedy are being implemented and remain effective. Based on this information, I believe this remedy for soil, fill materials and Solvay waste on the site is protective of public health and concur with the *Proposed Plan*. If you have any questions, please contact Ms. Maureen Schuck or me at 518-402-7860.

Sincerely,

Krista M. Anders

Krista M. Anders, Director
Bureau of Environmental Exposure Investigation

ec: A. Salame-Alfie, Ph.D.
M. Schuck / M. Sergott / e-File
J. Strepelis – NYSDOH CRO
K. Zimmerman – OCHD
M. Ryan / A. Daniels / W. Daigle / D. Hesler / T. Smith – NYSDEC Central Office
H. Warner – NYSDEC Region 7

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# OPERABLE UNIT 1 OF THE SOLVAY WASTBEDS 1-8 SUBSITE OF THE ONONDAGA LAKE SUPERFUND SITE RECORD OF DECISION

## APPENDIX V

## RESPONSIVENESS SUMMARY

**RESPONSIVENESS SUMMARY**
**FOR THE**
**RECORD OF DECISION**
**OPERABLE UNIT 1 OF THE SOLVAY WASTEBEDS 1-8**
**SUBSITE OF THE ONONDAGA LAKE SUPERFUND SITE**
**TOWN OF GEDDES, ONONDAGA COUNTY, NEW YORK**

## INTRODUCTION

This Responsiveness Summary provides a summary of the public's comments and concerns received during the public comment period related to operable unit (OU) 1 of the Solvay Wastebeds 1-8 subsite (Subsite) of the Onondaga Lake Superfund site Proposed Plan and provides the New York State Department of Environmental Conservation (NYSDEC) and U.S. Environmental Protection Agency (EPA) responses to those comments and concerns. All comments summarized in this document have been considered in NYSDEC and the EPA's final decision in the selection of a remedy to address the contamination at OU1 of the Subsite.

## SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

Honeywell International, Inc., (Honeywell), under NYSDEC's oversight, conducted field investigations at the Subsite from February 2004 through August 2014, which culminated in the completion of a remedial investigation (RI)[1] report in August 2014 and a feasibility study (FS)[2] report in September 2014. The NYSDEC and the EPA's preferred remedy and the basis for that preference were identified in a Proposed Plan.[3] The RI/FS reports and Proposed Plan were released to the public for comment on September 17, 2014. These documents were made available to the public on its website, http://www.dec.ny.gov/chemical/37558.html, and at information repositories maintained at the Solvay Library, 615 Woods Road, Solvay, New York; Onondaga County Public Library, 447 South Salina Street, Syracuse, New York; Atlantic States Legal Foundation, 658 West Onondaga Street, Syracuse, New York; NYSDEC, Division of Environmental Remediation, 625 Broadway, Albany, New York and NYSDEC Region 7, 615 Erie Boulevard West, Syracuse, New York. A NYSDEC listserv bulletin notifying the public of the availability for the above-referenced documents, the comment period start and completion dates and the date of the planned public meeting was issued on September 17, 2014. A notice providing the same information was published in *The Post-Standard* on September 18, 2014. The public comment period ran from September 17, 2014 to October 17, 2014.

On September 30, 2014, NYSDEC conducted a public meeting at the Martha Eddy Room in the Art and Home Center at the New York State Fairgrounds to inform local officials and interested citizens about the Superfund process, present the Proposed Plan for the Subsite, including the preferred remedy and respond to questions and comments from the public. Approximately 40

[1] An RI determines the nature and extent of the contamination at a site and evaluates the associated human health and ecological risks.
[2] An FS identifies and evaluates remedial alternatives to address the contamination.
[3] A Proposed Plan describes the remedial alternatives considered for a site and identifies the preferred remedy with the rationale for this preference.

people, including residents, the media, representatives of local businesses and local government officials, attended the public meeting.

## SUMMARY OF COMMENTS AND RESPONSES

Comments were received at the public meeting and in writing. Written comments were received from:

- J. Michael House, Sevenson Environmental Services, Inc., via a September 24, 2014 email.
- Joseph J. Heath, General Counsel for the Onondaga Nation, via an October 16, 2014 letter.

The transcript from the public meeting can be found in Appendix V-d.

The written comments submitted during the public comment period can be found in Appendix V-e.

A summary of the comments provided at the public meeting and in writing, as well as NYSDEC and EPA's responses to them, are provided below.

### Treatment and Reuse Options

Comment #1: A commenter notes that plasma gasification, a process that utilizes a plasma torch at temperatures ranging from 4,000 to 25,000°F to ionize gas and catalyze organic matter into synthetic gas and solid waste, has not been investigated or considered for any aspect of the overall remedial program at the Onondaga Lake site. The commenter suggests that this technology be considered for the Solvay Wastebeds 1-8 Subsite.

Response #1: Plasma gasification would not be an attractive remedy for the Subsite for the following reasons:

- there are no plasma gasification facilities in close proximity to Onondaga Lake. Therefore, such a facility would need to be either constructed locally or the contaminated soils and wastes would need to be transported a considerable distance to an existing facility. Both of these options would increase the cost of the remedy substantially;
- the large amount of material present (in excess of 20 million cubic yards) would make plasma gasification extremely difficult to implement due to some of the same reasons as full removal (*i.e.*, costly construction water management, air quality concerns and odors associated with the excavation of 280 to 340 acres to a maximum depth of 70 feet and air quality and community traffic pattern disruption concerns related to transporting approximately 180 truckloads of material per day over 27 to 30 years); and
- the feedstock for plasma waste treatment is often municipal solid waste, organic waste or both. Since Solvay waste contains mainly inorganic contaminants, the amount of synthetic gas recovered would likely be low and/or the process would not be cost-effective.

For these reasons, the technology screening in the FS did not identify this as a viable technology for treating these wastes.

Comment #2: A commenter inquired as to the types of reuse that have been evaluated for the Subsite and whether Solvay waste has been reused elsewhere.

Response #2: Based on available information, there appear to be only limited feasible reuse options for Solvay waste. Potential beneficial reuses considered in the Proposed Plan include use as fill material, landfill cover or as aggregate.

There are, however, technical concerns with the reuse of Solvay waste. For example, there are physical and geotechnical characteristics of this material that make it difficult to handle and manage and, therefore, restrict potential options for its reuse. When it is wet, it is slippery, making it a physical hazard. When Solvay waste is dry, it can be dusty and difficult to excavate. The Solvay waste at the Subsite is also, in some areas, comingled with other contaminants, such as benzene, toluene, ethylbenzene and xylene, polycyclic aromatic hydrocarbons, phenols and heavy metals, which could further limit its use. In addition, in order for the material to be usable for the suggested beneficial reuses, it would need to meet the specific criteria developed for the intended end use and not cause adverse impacts. For example, material intended to be used as daily cover in landfills would need to be able to effectively control odors and vectors.

Even if there were not technical concerns associated with utilizing Solvay waste, the very large volume present at the Subsite could limit the ability to find sufficient outlets for reuse.

**Support for Remedy**

Comment #3: A commenter expressed support for the proposed remedy and asked that the remedial plan be implemented as soon as possible.

Response #3: NYSDEC and the EPA will seek to have Honeywell design and implement the selected remedy pursuant to an administrative order as soon as possible.

**Property Use and the Remedy**

Comment #4: A commenter asked if the same remedy would be proposed if there was not an amphitheater proposed for the Subsite. Another commenter asked how the proposed remedy and construction of the amphitheater are linked.

Response #4: Because of the large volume of waste material and the marginal exceedances of human health and ecological risk thresholds in surface soils, a remedy other than capping/covering is not likely to be more appropriate, regardless of the anticipated use of the property. Based upon consideration of the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the detailed analysis of the remedial alternatives, NYSDEC and

the EPA determined that the selected remedy best satisfies the requirements of CERCLA Section 121, 42 U.S.C. § 9621, and provides the best balance among the remedial alternatives with respect to the National Oil and Hazardous Substances Pollution Contingency Plan's (NCP's) nine evaluation criteria, set forth at 40 CFR § 300.430(e)(9). The selected remedy, which is protective of public health and the environment, is flexible enough to be implemented whether the proposed amphitheater project advances or not. The type of cover system placed on any given area of the Subsite will be compatible with the specific type of use for the area. If there is any change in Subsite use in the future, then the cover may be modified to allow that use. A Site Management Plan (SMP), which is included as part of the remedy, will provide for long-term maintenance, inspection and modification/enhancement of the Subsite cover system, as appropriate.

Comment #5: A commenter asked if the proposed amphitheater will be constructed over the wastebeds and if the amphitheater construction would commence before the end of this year

Response #5: The proposed amphitheater and related facilities would be constructed in areas which include Wastebeds 5 and 6. The amphitheater project construction is currently anticipated to commence in early 2015.

**Contamination Delineation**

Comment #6: A commenter asked if there is a good understanding of the types of contaminants present at the Subsite and if the investigations performed at the Subsite were sufficient.

Response #6: NYSDEC and the EPA have a detailed understanding of the chemicals that are present in the wastes that were generated and disposed of in the wastebeds. Based on this information, as well as the data collected (over 300 soil samples and over 100 groundwater samples) during the Preliminary Site Assessment/Remedial Investigation at the Subsite, there is a sufficient and detailed understanding of the types of contaminants present at the Subsite.

**Post-Remediation Groundwater Discharge**

Comment #7: A commenter asked how much groundwater will discharge to Onondaga Lake following the implementation of the remedy.

Response #7: Extensive remedial activities have been performed at the Subsite to prevent the off-site migration of contaminants to Ninemile Creek and Onondaga Lake. Groundwater collection trenches (including passive wells) and seep collection trenches (where needed) were installed along the Ninemile Creek and Eastern and Northern shorelines of Onondaga Lake. It is estimated that 74 million gallons per year of collected groundwater and seep water will be conveyed to the Willis Avenue groundwater treatment plant from the Subsite. An evaluation of whether different and/or additional actions are needed to address contaminated groundwater will be performed as part of the FS for OU2.

**Soil Vapor Intrusion**

Comment #8: A commenter asked how the cover will address soil vapor intrusion of contaminants at the Subsite.

Response #8: Soil vapor intrusion is a process by which volatilized chemicals in soil or groundwater migrate to indoor air in buildings in proximity of such contamination. The vegetative cover will not address the potential for soil vapor intrusion to occur for any buildings constructed on the site. However, the remedy also includes a provision that a soil vapor intrusion evaluation be conducted and/or appropriate actions taken to mitigate potential exposures for any new buildings constructed on the Subsite.

**Construction Timeframe**

Comment #9: A commenter inquired about the estimated eight-year construction duration for the selected remedy and if construction of the remedy in the amphitheater area would be complete before the amphitheater is used.

Response #9: Yes, remediation of the immediate area where the amphitheater and related facilities are to be constructed will need to be completed prior to any use of the facilities. The implementation of the selected remedy will be phased beginning with the areas of the site associated with the amphitheater and related facilities. NYSDEC and the EPA will consult with the New York State Department of Health (NYSDOH) to ensure that the appropriate remedial actions are identified and implemented prior to public use of the amphitheater. Remediation of other areas would be sequenced in a manner so as to minimize disruption of the public uses of the Subsite. Generally speaking, public access to areas of the Subsite that are not yet remediated will be restricted with appropriate signage and/or physical barriers, as appropriate.

Comment #10: A commenter opined that the construction times for the remedial alternatives were inflated.

Response #10: The estimated construction times for the remedial alternatives as presented in the FS are supported by assumptions that are included in the report. The assumptions are reasonable and sufficient for purposes of alternative comparison and remedy selection.

**Additional Remedial Alternatives**

Comment #11: A commenter suggested that additional remedial alternatives should be evaluated that include both excavation and cover.

Response #11: Additional remedial alternatives beyond Alternative 4B which combine both excavation and placement of cover would not provide any additional benefits in terms of risk reduction or significant reduction in contaminant mass. Moreover, partial removal of the

waste/contaminated soils would still present the potential for adverse short-term impacts to workers and the community, require long-term management of residuals, and be more costly to manage on a unit price basis. For these reasons, additional remedial alternatives combining both excavation and placement of cover were not included in the detailed evaluation.

**Cost Estimates and Benefits**

Comment #12: A commenter claimed that the cost estimates for the excavation remedial alternatives (Alternatives 4A and 4B) were inflated and the benefits of full removal of the waste material were not included. Another commenter suggested that barge or rail transport of excavated materials should have also been considered.

Response #12: The cost estimates provided in the FS are sufficient for the purpose of evaluating the alternatives, since the difference in cost between either of the excavation alternatives and the costs of either of the capping alternatives are several orders of magnitude. In addition, transport of excavated materials by rail may require construction of a dedicated rail yard, including provisions for temporary staging of materials and equipment for loading rail cars. The costs of this would reduce the savings of rail transport compared to truck transport. Also, construction of an adequate rail yard may not be feasible at the Subsite, so trucks would still be needed to transport the excavated materials to an existing or new rail yard located at an appropriate site in the region. Moreover, because there may be limited disposal facilities equipped to receive the waste material by rail, offloading onto trucks for final delivery could also still be needed. Furthermore, shipping 23-26 million cubic yards of material would require a large volume of landfill space.

As for barge transport, similar types of issues as those identified above for rail transport would also apply.

It is acknowledged that full removal would address long-term exposures to human health associated with soil exceeding unrestricted use and also present some benefits relative to the selected remedy, such as it may eliminate the need to continue collecting and treating shallow groundwater at the Subsite in perpetuity once the remedy is fully implemented. However, implementing a remedy involving full removal would be extremely difficult, present significant short-term impacts to the surrounding community during the lengthy construction phase, result in substantial environmental impacts, would be orders of magnitude more costly, and would take significantly longer to implement as compared to the selected remedy. As these considerations significantly outweigh the potential benefits offered by full removal, the full removal alternative is not considered to be a more appropriate approach than the selected remedy.

Comment #13: A commenter opined that the Proposed Plan is inconsistent in its assessments of costs and benefits across the remedial alternatives and provided three supporting examples:

- The Proposed Plan notes that Alternatives 2 and 3 would provide benefits through carbon sequestration due to the vegetation established on-site, but fails to consider the sequestration

benefits provided by Alternatives 4A and 4B, which could be restored as wetlands or other natural areas;

- The Proposed Plan makes a broad comparison of air emissions from truck traffic under Alternatives 4A/4B and Alternatives 2/3, but fails to separate local emissions (that is, those generated on or near Wastebeds 1-8) from more distant emissions (that is, those generated at or near final disposal sites);

- The carbon emissions for Alternative 4A are calculated for the entire life of the project, while carbon emission calculations for Alternatives 2 and 3 only include active construction periods and ignore the Subsite maintenance and vegetative cover repair that will be required in perpetuity.

Response #13: Consistent with NYSDEC and EPA guidance on remedy selection and the agencies' policies on green remediation, carbon sequestration was not factored into the comparative analysis of alternatives in the Proposed Plan and was not a significant consideration in remedy selection for the Subsite. However, carbon sequestration related to the alternatives was discussed in the FS report. With regard to carbon sequestration that could occur on-site under Alternative 4A or 4B, it is assumed that such benefits would be realized only after excavation and restoration are completed, which would be at least 25 years later than the selected remedy. Furthermore, it is uncertain whether carbon sequestration associated with Subsite restoration under Alternatives 4A and 4B would be significantly different from that for Alternatives 2 and 3.

Comparing truck emissions under Alternatives 2 and 3 to the "local" emissions associated with Alternatives 4A and 4B, the emissions associated with Alternatives 4A and 4B would be significantly greater than those for Alternatives 2 and 3.

Carbon emissions for remedial alternatives are typically calculated for the active construction period. If carbon emissions were calculated for the entire life of the project, the emissions under Alternative 3, the selected remedy, would still be orders of magnitude less than those that would be associated with Alternatives 4A and 4B. Once covers are established under the selected remedy, there should be minimal maintenance and cover repair needed and, therefore, minimal corresponding emissions. These same types of activities would also be needed in order to maintain the containment measures (cap or cover) at the off-site disposal location(s) under Alternatives 4A or 4B.

**Complete Excavation of Contamination**

Comment #14: A commenter suggested that the long-term benefits of full removal of the waste material would be greater due to potential ecological uses of the Subsite being restored as wetlands and eliminating the need for long-term collection and treatment of groundwater.

Response #14: The Wastebeds 1-8 Interim Remedial Measure (IRM)[4], portions of which are components of the selected remedy, will increase the ecological value of the site by creating 9.5 acres of wetlands along the lakeshore, adding vegetative cover areas, and stabilizing the shoreline. In addition, even if all the Solvay waste was removed, groundwater collection and treatment may still be necessary, because there is contaminated groundwater present in the intermediate groundwater zone below the Solvay waste. It should also be noted that NYSDEC consideration of current and reasonably anticipated future land use is provided under State regulations at 6 NYCRR Part 375-1.8(f)(9). The current and reasonably anticipated future land uses for the Subsite are commercial and recreational, and to provide areas which are protective of and which can sustain valuable ecological resources. While full removal of the waste material may result in greater potential ecological use of the Subsite, achieving this result would not necessarily be of greater value than would realizing the commercial and recreational benefits that would be obtained in the near term under the selected remedy. It would also not be commensurate with the negative environmental and quality of life impacts that the community would have to endure during the 30-year construction timeframe that would be necessary to implement a full removal alternative. (Also, see Responses #4 and 12.)

Comment #15: A commenter stated that full removal of industrial wastes from this portion of the lakeshore might allow the Onondaga Nation to reclaim some traditional uses of the shoreline. These traditional uses, including hunting, fishing and gathering of medicinal plants, have essentially been taken from the Nation by the pervasive and on-going contamination of Onondaga Lake and its shorelines. The benefits of restoring such uses, translated into monetary terms, are certainly enormous. In addition, while the cover alternatives (Alternatives 2 and 3) may reduce the risk to casual users, neither the Proposed Plan nor any of the underlying documents consider the residual risk to traditional or subsistence users of the site under these alternatives. A full removal alternative, on the other hand, will eliminate contaminant-related risks created by practicing traditional uses at the site. At a minimum, the Proposed Plan should acknowledge and make some effort to quantify or balance these benefits against the costs of the removal actions.

Response #15: As noted in the Proposed Plan, the Subsite is owned by the State of New York and Onondaga County. The portion of the property that is developed as parking lots and roadways is, in general, owned by the State of New York and there are property easements for highway and stormwater drainage features. The remaining portion of the site is owned by Onondaga County. The County-owned portion is largely undeveloped, characterized by varying degrees of vegetation ranging from sparsely vegetated areas to stands of mature trees.

As the County-owned property is deed restricted to “park purposes” use, use of the Subsite for traditional or subsistence purposes would not be consistent with the current and future reasonably anticipated land use for the Subsite. For that reason and because the Subsite is located in an urban setting, potential exposures associated with traditional and subsistence use were not evaluated in

[4] An IRM is an activity that is necessary to address either emergency or non-emergency site conditions, which in the short-term need to be undertaken to prevent, mitigate, or remedy environmental damage or the consequences of environmental damage attributable to a site. An IRM is being implemented at the Subsite in order to prevent the continued migration of contaminants into Ninemile Creek and Onondaga Lake.

the baseline human health risk assessment (HHRA). Nevertheless, recognizing the Onondaga Nation's concerns, partial and full removal alternatives were developed as part of the FS and were evaluated in the Proposed Plan and the ROD. (Also, see Response #4)

**Land Use**

Comment #16: A commenter stated that consistency with current or anticipated future land use may not be an appropriate factor to be considered because it relies on the proposed amphitheater and there is no basis for NYSDEC and the EPA to presume that the Subsite will be used as an amphitheater. The commenter further opined that NYSDEC and the EPA should focus on actual development and formal land use plans instead of proposed land uses. The sole land use restriction to be considered for the Subsite is the deed restriction that limits its use to park or park purposes.

Response #16: NYSDEC and the EPA typically consider the current, intended and reasonably anticipated future land use of a site in the remedy selection process. The selected remedy does not rely upon the use of the Subsite as an amphitheater. It should be noted that the State Environmental Quality Review process for the amphitheater project has been completed. (See also Response #4.)

Comment #17: A commenter stated that the division between "active use" and "passive use" areas within Alternatives 2 and 3 is meaningless, since this entire area covered by Wastebeds 1-8 is formally designated for recreational use. This designation suggests largely unrestricted access and potential active uses across the entire Subsite. The commenter suggested that Alternative 3 be revised to include a two-foot vegetated cover across all areas of the Subsite where installation would not require the removal of mature, densely packed forest stands or disruption of steep, unstable slopes.

Response #17: Active and passive recreation denote distinct recreational uses. For example, active recreational uses would include amphitheater lawn seating areas and playing fields, while passive recreational uses could include walking trails or buffer zones along trails or parking areas. As noted above, a portion of the Wastebeds 1-8 site that is owned by the State of New York is developed as parking lots and roadways, and includes property easements for highway and stormwater drainage features. This area of the site is not designated for park purposes. The remaining portion of the Subsite, which is owned by Onondaga County, is deeded for "park purposes." A one-foot cover in areas of the Subsite where passive recreation is the current or anticipated use is sufficient to be protective of human health. If there is any change in the type of recreational use for a given area in the future, the existing cover can be modified to the appropriate type of cover as identified by the ROD, as needed. The SMP will provide for long-term inspection, maintenance and repair and modification/enhancement of the cover system if uses change.

**Contaminant Hotspots**

Comment #18: A commenter suggested that the contaminant hotspot areas may not be fully delineated and opined that the disposal history of the Subsite does not support the conclusion that

the contaminants in one area of the Subsite may be different from or less toxic than what is found elsewhere on the Subsite.

Response #18: Contaminant hotspot areas on the Subsite have been delineated, but additional samples will need to be collected during the design to determine where the cover areas that rely on SCOs (*e.g.*, parking lots, ecological use areas) are needed. Based on the existing investigation results, and what is known about the history of the Subsite, there are areas of the Subsite that have known issues. For example, stained soils with elevated concentrations of contaminants have been found in Wastebeds 1-4, but are not present in Wastebeds 5-8. We also know that biosolids were disposed on the surface of Wastebeds 1 and 2 and Crucible operated a landfill on Wastebed 5. With the exception of locations where material was placed after the initial disposal of the Solvay waste (*e.g.*, biosolids, landfill), most areas of elevated contaminant concentrations are located at depth or within the low lying areas along the lakeshore and are being addressed by the ongoing IRM.

**Soil Cleanup Objectives**

Comment #19: A commenter opined that NYSDEC and the EPA justify the protective covers proposed in Alternatives 2 and 3 in part by the assertion that there are no documented exceedances of soil cleanup objectives (SCOs) for contaminants of concern on Wastebed 6, the location proposed by Onondaga County for the Lakeview Amphitheater. However, as noted in the prior comment, this may be a result of an insufficient number and spatial coverage of samples in this area, and that available information about disposal practices at the Subsite does not indicate that the type and extent of contamination in Wastebeds 5 and 6 should be different from or less toxic than what is found elsewhere on the Subsite.

Response #19: As noted in Responses #6 and 18, NYSDEC and EPA believe that sufficient sampling was conducted to adequately characterize the nature and extent of contamination at the Subsite. Sample results in the Wastebed 6 area, for which the anticipated future land use includes active and passive recreational activities, did not exceed commercial or restricted-residential SCOs. Based on the intended recreational use of this area, the selected remedy provides adequate cover to prevent contact with the underlying waste. The remedy also provides for modifications to the cover as needed, in accordance with the SMP, to account for any changes in Subsite use which may occur to ensure that the remedy remains protective of public health and the environment. In addition, the SMP will provide for long-term inspection, maintenance, repair and modification/enhancement of the Subsite cover system, as appropriate, to ensure that the cover is adequate and maintained.

**Soil Cover**

Comment #20: A commenter stated that the Proposed Plan notes that the soil cover will be repaired, as necessary, and additional cover may be required if unanticipated areas of heavy use are identified. The commenter opined that this appears to be a proposal to wait and see where the

crowd-selected areas of heavy use (and potential exposure) arise and that a more active and protective position is required.

Response #20: Areas of heavy use can be identified with reasonable certainty based on any given development plan. The proposed type and thickness of cover system placed on any given area of the Subsite will be compatible with, and protective of, the specific type of use. If there is any change in Subsite use in the future, additional cover thickness can be added, as applicable. Also, see Response #19.

Comment #21: A commenter opined that NYSDEC and the EPA should recognize that the future uses of this Subsite are uncertain, expressing the following concerns relative to the soil cover:

- If the proposed amphitheater construction moves forward, the complex will directly incorporate most of Wastebed 5 and increase pedestrian traffic across the northern portions of Wastebed 4. Wastebed 4, in particular, includes several contaminant hot spots. While the Proposed Plan indicates that two-foot covers will be installed over small areas clearly identified as hot spots, the RI did not delineate the edges of these contaminated areas.

- While the lawn seating area may be the only place where direct and extended contact with soil is planned, the amphitheater site will include nature trails, festival grounds and picnic areas that may also invite close contact with the soil. In addition, the entire Subsite will be open to the ticketed audience during concerts and to the general public at other times. The Subsite will be largely unpoliced, meaning that "active uses" may occur in other areas. The County has proposed, "wayfinding tools" (*i.e.*, signs) and landscaping design to entice visitors to remain in spaces intended for intensive public use. The amphitheater plan includes no discussion of fencing, barricades, warning signs or other institutional controls that might effectively keep visitors from unprotected areas of the Subsite or preclude active uses of less protected areas on the Subsite.

- If an amphitheater is not constructed, the West Shore Trail Extension is likely to draw additional users to the Subsite. Even if most users remain on the trail, this extension may increase human contact with the entire Subsite. Any future development is likely to increase this risk, since direct contact activities may be compatible with the use of the Subsite for "park purposes." The arbitrary boundaries between active and passive uses of the Subsite indicated in the Proposed Plan do not reflect this.

Response #21: NYSDEC, the EPA and NYSDOH plan to work with Onondaga County to ensure that there are adequate controls in place so any concerns regarding the potential for exposure are addressed. Also, see Responses #18 and 20.

**Supplemental Human Health Risk Evaluation**

Comment #22: A commenter noted that the 2014 Supplemental Human Health Risk Evaluation (HHRE) does not consider soil exposure risks for children up to the age of six–it simply draws on

the analysis performed for a 2009 HHRA drafted to evaluate exposures related to the West Trail Extension. The commenter noted that the earlier assessment did not consider exposures for young children, because they were not considered likely to stray off the trail. The commenter stated further that while there was an assessment of residential exposures in the 2011 HHRA, this analysis focused on exposure to groundwater (in showers or as drinking water), not soil. The commenter opined that the current amphitheater proposal and potential future park uses are far more likely to draw young children to the site, particularly given the additional amenities proposed for the amphitheater complex (nature area, interior hiking trails, picnic area and small community theater). If NYSDEC and the EPA rely on the Wastebeds 1-8 Lakeview Amphitheater Supplemental Human Health Risk Evaluation (Supplemental HHRE) in the remedy selection process, opined the commenter, it must be amended to explicitly consider exposure potential and health risks to young children.

Response #22: The Supplemental HHRE did not evaluate soil exposure risks for young children because this population was not considered representative of those with the greatest potential to visit the amphitheater. However, in order to present risks to all populations with potential to access the site, cancer risks and non-cancer hazards were estimated for children up to six years. This evaluation, which is contained in an addendum to the Supplemental HHRE, is available in the site repositories and at http://www.epa.gov/r02earth/superfund/npl/onondagalake/docs.html. The addendum to the Supplemental HHRE, which is based on current site conditions prior to the proposed remedial action, indicates that both the cancer risk and non-cancer hazard for a "Young Child" receptor are within the EPA's acceptable levels.

Comment #23: A commenter noted that the Supplemental HHRE does not effectively consider cumulative exposure to the Subsite in that if the proposed amphitheater complex and associated amenities are built, individuals may well be drawn to the Subsite both for concerts, for which potential risks appear to have been considered in the Supplemental HHRE, and trail-related activities, which were considered in the bike trail HHRA. Thus, opines the commenter, cumulative exposure should include the exposure assumed in the bike trail HHRA in combination with the concert-related exposures assumed in the Supplemental HHRE.

Response #23: The cumulative exposure to populations that spend time in more than one area was not included in the Supplemental HHRE as noted by the commenter. Each of the risk assessment reports–the baseline HHRA, bike trail HHRA and Supplemental HHRE–evaluated exposures to those areas, based on exposure scenarios that represent the reasonable maximum exposure (RME), including the number of hours per day, days per year and years that are anticipated for exposure, but they did not evaluate risks based on potential exposures beyond these timeframes. For example, while it may be reasonable to assume that, over a one year period, a population could spend time on the bike trail and spend time at the amphitheater, it would not be appropriate to add the risk estimates for the RME timeframes developed from individual studies to estimate total risks, as doing so would likely overestimate potential risks.

To further illustrate this point, in the bike trail HHRA, it was assumed that receptors would visit the bike trail two days per week during the fall and spring when the daily maximum temperature is at least 50°F, and five days per week in the summer (assuming 10 weeks of summer). Using

data from the National Weather Service, there are roughly 22 weeks in the spring and fall when the temperature is above 50°F. Therefore, the bike trail rider was assumed to spend 50 days in the summer and 44 days in the spring and fall, for a total of 94 days per year on the Subsite. The exposure duration for bike trail riders was assumed to be four hours per day, which is consistent with other EPA assessments for recreational receptors and was utilized in the baseline HHRA for the site. The RME timeframe for the bike trail rider is 376 hours per year. In the Supplemental HHRE, an amphitheater attendee was anticipated to spend 25 days/year and three hours per day at the site for a total RME timeframe of 75 hours per year at the site. Adding the exposure timeframes for a bike rider and an amphitheater event attendee would amount to a population spending a total of 451 hours per year at the site, which may exceed an RME timeframe. Moreover, the exposures associated with an amphitheater attendee were determined to be similar to exposures to the "Older Child Transient Trespasser" and "Lunchtime Trespasser" evaluated in the baseline HHRA. Risks associated with these receptors were well within acceptable risk ranges and targets, so risks to an amphitheater attendee are also expected to be well within acceptable risk ranges and targets. Therefore, adding the risks associated with the amphitheater attendee to those of a bike rider would not significantly increase the total risk for a population that accesses the Subsite.

It is also important to note that unacceptable human health risks were already established in the baseline HHRA for individuals that ride ATVs on the Subsite and that the determination of unacceptable risks supports the basis for taking an action to mitigate those risks. Implementation of the selected remedy will effectively eliminate this exposure pathway to ATV receptors and for all other human activities that may occur on the site. Therefore, there will be no unacceptable exposures or risks to any populations that access the site once the remedy is fully implemented.

Comment #24: A commenter noted that in order to calculate exposure and health risks to maintenance workers for the proposed amphitheater, the Supplemental HHRE relied on analyses performed in the original HHRA for commercial or industrial workers on the site. However, states the commenter, the commercial/industrial worker category represents workers within industrial facilities that might be developed on Wastebeds 1-8 in the future. These workers were assumed to spend most of their time indoors at facilities built on-site. Amphitheater maintenance workers, on the other hand, are likely to spend a significant portion of their day outdoors, working on landscaping, nature trails and event clean-up. The commenter opined that the Supplemental HHRE should be revised to reflect more realistic exposure assumptions for this group. If, stated the commenter, the EPA relies on data from the original HHRA, amphitheater maintenance workers are more comparable to utility and construction workers, who also work outside and have more direct contact with the soil.

Response #24: The HHRA, in its consideration of the commercial/industrial worker, assumed a soil ingestion rate of 100 milligrams per day (mg/day) and an exposure frequency of 250 days/year. These values were selected because the type of work that will be performed is unknown at this time, and could include either workers who spend much of their time indoors or workers who spend significant time outdoors, performing such activities as unloading trucks or performing other outside duties. According to the recently-released OSWER Directive 9200.1-120 "Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors," the appropriate ingestion rate for outdoor workers is 100 mg/day for the RME scenario; the exposure

scenario developed for the HHRA to assess the commercial/industrial worker conservatively assumed that the worker would be an outdoor worker. Based on this information, evaluating the amphitheater maintenance worker by comparing this exposure to the commercial/industrial worker is appropriate.

Comment #25: A commenter noted that the HHRA is being cited by some as evidence that the proposed amphitheater will be perfectly safe for the range of potential visitors. The commenter opined that this is an inappropriate use of the HHRA. The commenter noted that the intent of the HHRA is solely to determine if there is sufficient risk posed by the un-remediated site to justify additional cleanup actions; it should not purport to be a complete assessment of the risks posed by the site or an evaluation of appropriate or safe uses of that site. The commenter opined that NYSDEC and the EPA should caution the public and public officials regarding the limitations of the HHRA and the appropriate uses of this document.

Response #25: The HHRA was conducted in accordance with EPA Superfund guidance and policy for conducting baseline HHRAs in order to establish whether there is a risk basis for implementing a remedial action on the Wastebeds 1-8 site. For this reason, and because the HHRA was finalized prior to the development of plans to build an amphitheater on the site, the Supplemental HHRE was developed so as to consider potential human health risks to specific populations, such as amphitheater event attendees and maintenance workers. The Supplemental HHRE considered potential exposures to site-related chemicals and risks to people that may access the amphitheater for events, assuming no remediation, no access or use controls, such as fencing or signage, and an exposure duration for up to 30 years. Based on that evaluation, one can conclude that no unacceptable cancer or non-cancer human health risks would be expected for people accessing or conducting maintenance activities at the site under RME scenarios and assumptions, which represent the highest levels of exposure that would be expected to occur. As noted in the Supplemental HHRE, the current remedial schedule for the Subsite calls for remedial activities to be implemented within the vicinity of planned amphitheater prior to or concurrent with construction of the proposed amphitheater and related facilities. The remedial activities will include measures which will further limit and reduce potential exposures to humans and wildlife. Once these remedial measures and controls are implemented, there will be reduced potential for human and wildlife exposure to site contaminants relative to the conditions which were assumed in risk assessments.

As was noted by the commenter, the HHRA process only takes into account potential human health impacts relating to exposures to specific chemical contaminants on the site. The process does not take into account other considerations, such as potential acute hazards. For example, unweathered Solvay waste, which may be present in subsurface soil, may be highly caustic, so if there were exposures to unweathered Solvay waste via dermal contact, ingestion or inhalation, such exposures could result in adverse acute health effects. (While this potential exposure was not evaluated for any receptors in the HHRA and supplemental studies, the placement of one-foot and two-foot thick cover material in all passive and active recreational areas, respectively, under the selected remedy will eliminate this potential exposure pathway for amphitheater event attendees and maintenance workers. It should also be noted that the pH [an indicator of how acidic or basic a substance is] of weathered [surface] Solvay waste was measured in March 2014 and was close to neutral [pH range

of 7.71 to 8.46].) The risk assessments also do not consider physical hazards, such as the presence of steep grades and cliffs, which can present areas where potential injury could occur if people were allowed unrestricted access to these areas. For these reasons, it is acknowledged that public officials should recognize the limitations of the HHRA and supplemental studies and that appropriate measures should be incorporated into site development plans to ensure public and worker safety. See also, Responses #22 through 24.

# OPERABLE UNIT 1 OF THE SOLVAY WASTBEDS 1-8 SUBSITE OF THE ONONDAGA LAKE SUPERFUND SITE RECORD OF DECISION

## APPENDIX V-a

## SEPTEMBER 2014 PROPOSED PLAN

# Operable Unit 1 of the Solvay Wastebeds 1-8 Site

## Subsite of the Onondaga Lake Superfund Site

Geddes, Onondaga County, New York

NYSDEC

*September 2014*

EPA *Region 2*

***PURPOSE OF THIS DOCUMENT***

This Proposed Plan describes the remedial alternatives considered for Operable Unit (OU) 1 (soil/fill materials/Solvay waste) of the Solvay Wastebeds 1-8 Site (Site) and identifies the preferred remedial alternative with the rationale for this preference.

This Proposed Plan was developed by the New York State Department of Environmental Conservation (NYSDEC) and the U.S. Environmental Protection Agency (EPA) in consultation with the New York State Department of Health (NYSDOH). NYSDEC and EPA are issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, and Sections 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), as well as the New York State Environmental Conservation Law (ECL) and Title 6 New York Code of Rules and Regulations (NYCRR) Part 375. The nature and extent of the contamination at the OU1 of the Site and the remedial alternatives summarized in this Proposed Plan are described in *Revised Remedial Investigation Wastebeds 1 through 8 Site* and the *Feasibility Study Report Operable Unit 1 Wastebeds 1 through 8*, contained in the Administrative Record file for OU1. NYSDEC and EPA encourage the public to review these documents to gain a more comprehensive understanding of OU1 and the Site and the Superfund activities that have been conducted at the Site.

This Proposed Plan is being provided as a supplement to the reports listed above to inform the public of NYSDEC and EPA's preferred remedy and to solicit public comments pertaining to all of the remedial alternatives evaluated, including the preferred alternative.

NYSDEC and EPA's preferred remedy consists of a cover system that would be protective for current and/or reasonably anticipated future land uses (e.g., active and passive recreational uses). In general, the remedy consists of a two-foot thick soil cover over areas where active recreation is planned or where appropriate to protect ecological resources and a one-foot thick soil cover where passive recreation is planned. Other areas of the site, such as in heavily wooded or steeply sloped areas, would be covered with a vegetation enhancement layer to promote growth of vegetation.

A Site Management Plan and institutional controls would also be included.

The remedy described in this Proposed Plan is the preferred remedy for OU1 of the Site. Changes to the preferred remedy, or a change from the preferred remedy to another remedy, may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after NYSDEC and EPA have taken into consideration all public comments. NYSDEC and EPA are soliciting public comment on all of the alternatives considered in the Proposed Plan and in the detailed analysis section of the *Feasibility Study* report because NYSDEC and EPA may select a remedy other than the preferred remedy.

**MARK YOUR CALENDAR**

***September 17, 2014 – October 17, 2014****: Public comment period on the Proposed Plan.*

***Public Meeting***

*September 30, 2014 at 6:00 P.M.: Martha Eddy Room in the Art and Home Center at the New York State Fairgrounds*

***Public Availability Session***

*September 30, 2014 from 5:00 -6:00 P.M.: Martha Eddy Room in the Art and Home Center at the New York State Fairgrounds*

### *Community Role in the Selection Process*

NYSDEC and EPA rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, this Proposed Plan has been made available to the public for a public comment period which begins on September 17, 2014 and concludes on October 17, 2014.

As noted above, a public meeting and a public availability session will be held during the comment period to elaborate on the reasons for recommending the preferred remedy, to answer questions, and to receive public comments. The public meetings will include a formal presentation by NYSDEC of the preferred

remedy and other cleanup options which have been considered for OU1. The availability sessions will be less formal, and provide the public a chance to receive printed information and discuss the cleanup options with NYSDEC and EPA representatives on a one-on-one basis.

Comments received at the public meetings, as well as written comments, will be documented in the Responsiveness Summary Section of the Record of Decision (ROD), the document that formalizes the selection of the remedy.

Written comments on this Proposed Plan should be addressed to:

Tracy A. Smith
NYS Department of Environmental Conservation
625 Broadway
Albany, NY 12233
E-mail: tracy.smith@dec.ny.gov

**INFORMATION REPOSITORIES**

The administrative record file, which contains copies of the Proposed Plan and supporting documentation are available at the following locations:

*Onondaga County Public Library*
*Syracuse Branch at the Galleries*
*447 South Salina Street*
*Syracuse, NY 13204*
*315-435-1800*

*Solvay Public Library*
*615 Woods Road*
*Solvay, NY 13209*
*315-468-2441*

*Atlantic States Legal Foundation*
*658 West Onondaga Street*
*Syracuse, NY 13204*
*315-475-1170*

*New York State Department of Environmental Conservation*
*615 Erie Boulevard, West*
*Syracuse, NY 13204*
*315-426-7400*

*New York State Department of Environmental Conservation*
*Attn.: Tracy A. Smith*
*625 Broadway*
*Albany, NY 12233*
*518-402-9676*
*(tracy.smith@dec.ny.gov)*

***SITE BACKGROUND***

On June 23, 1989, the Onondaga Lake site was added to the New York State Registry of Inactive Hazardous Waste Disposal Sites. On December 16, 1994, Onondaga Lake, its tributaries, and the upland hazardous waste sites which have contributed or are contributing contamination to the lake (subsites) were added to 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.

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

The Site, which is a subsite to the Onondaga Lake NPL site, consists of two operable units--OU1, which addresses the Solvay waste and contaminated soil/fill materials and is the subject of this proposed remedy, and OU2, which will address the groundwater and impacted media in a surface water drainage ditch, Ditch A. A Feasibility Study (FS) is currently underway for OU2. A Proposed Plan for OU2 will be released following the development of the FS for OU2.

**Site Description and History**

Location: The Site, which is located on the southwestern shore of Onondaga Lake in Geddes, New York, is situated between the New York State (NYS) Fairgrounds and the shoreline of Onondaga Lake. The outlet of Ninemile Creek defines the westernmost boundary of the Site, while the eastern end of the Site is generally bounded by roadways. See Figure 1, Site Location.

Site Features: The 404-acre Site includes eight irregularly shaped wastebeds that extend roughly 1.5 miles along the shore, with a maximum width of 0.5 miles. The wastebeds consist primarily of inorganic waste materials (Solvay waste) from the production of soda ash (sodium carbonate) using the Solvay process. Other contaminants (*e.g.,* benzene, toluene,

ethylbenzene, and xylenes [BTEX], naphthalene and assorted polycyclic aromatic hydrocarbons [PAHs], phenolic compounds, polychlorinated biphenyls [PCBs] pesticides, and inorganics), which are not related to soda ash production, are also present at the Site. A surface water drainage feature, Ditch A, runs along the southern and eastern Site boundaries and discharges stormwater from roads, parking areas and the overland surface flow from the Site to Ninemile Creek and Onondaga Lake. Site elevations range from approximately 363 feet above mean sea level (MSL) at the shores of Onondaga Lake, to 430 feet above MSL. A Site Plan is included as Figure 2.

Interstate 690 (I-690) and interchanges associated with NYS Route 695 (NY-695), NYS Fairgrounds parking lots, access roads for the parking lots, and foot bridges are present and in use at the Site. The NYS Fairgrounds parking lots (approximately 77 acres) consist of over two feet of gravel and fill material placed over the Site's soil/fill/Solvay waste material. Other infrastructure and development present include the approximate 2.5-mile Onondaga County West Shore Trail Extension (public recreation trail) and a 20-acre permitted, closed landfill formerly operated by Crucible Specialty Metals (Crucible). An approximate 17-acre Biosolids Area used by the City of Syracuse and Onondaga County for sewage sludge disposal is located near the southeastern end of the Site over portions of Wastebeds 1 and 2. Lakeview Point, which generally comprises Wastebed 6, forms one of the Site's more prominent features--a peninsula that extends into Onondaga Lake near the northern end of the Site.

The portion of the property that is developed as parking lots and roadways is, in general, owned by NYS and there are property easements for highway and stormwater drainage features. The remaining portion of the Site is owned by Onondaga County. The County-owned portion is largely undeveloped, characterized by varying degrees of vegetation ranging from sparsely vegetated areas to stands of mature trees. The County-owned property is deed restricted to "park purposes" use. Figure 2 depicts the approximate property boundaries.

Site Geology and Hydrogeology: The Site geology consists of seven distinct layers including fill/Solvay waste, marl/peat, silt and clay, silt and fine-grained sand, basal sand and gravel, basal till, and bedrock (Vernon Shale). The Site hydrogeology consists of an Upper Groundwater System and a Lower Groundwater System separated by a confining silt and clay layer which is present across much of the site.

The Upper Groundwater System consists of the anthropogenic fill/Solvay waste and the native marl/peat, as well as deltaic deposits associated with the former, buried Ninemile Creek channel in a portion of the site. The Lower Groundwater System consists of the silt and fine grained sand deposits, the basal sand and gravel deposits, and a bedrock zone. The water table is typically 20 to 35 feet below ground surface (bgs) on top of the upper wastebed tiers, and 10 to 18 feet bgs on the lower wastebed tiers adjacent to Ninemile Creek. As mentioned above, Site groundwater will be addressed under a subsequent OU-2 FS.

Shallow groundwater generally flows radially from the wastebeds toward Onondaga Lake, Ninemile Creek, and drainage ditches. Some groundwater flows along the buried, former Ninemile Creek channel deltaic deposits toward Onondaga Lake and Ninemile Creek.

History of the Site: The lowering of the lake level in 1822 to the same level as the Seneca River resulted in the formation of Geddes Marsh. The wastebeds were constructed and operated over the Geddes Marsh by a series of companies, of which Honeywell International Inc. is the successor. The Site is composed primarily of Solvay waste, a material consisting largely of calcium carbonate, calcium silicate, and magnesium hydroxide and which in an unweathered state has elevated pH levels. These wastes were generated at the former Solvay Process Main Plant as part of soda ash production using the Solvay process. Soda ash production began in 1884 and continued until 1986. The Solvay waste was hydraulically placed in the wastebeds in slurry form.

In addition to wastes generated from soda ash production, waste materials from other nearby manufacturing facilities were likely disposed of at the Site. Chlorinated benzene production at the nearby Willis Avenue plant occurred between 1918 and 1977. Additional operations reportedly took place at the Willis Avenue plant from 1918 to 1977, including production of hydrochloric acid, caustic soda, caustic potash, and chlorine gas. The Benzol plant operated from 1915 to 1970. This plant produced benzene, toluene, xylenes, and naphthalene by the fractional distillation of coke "light oil". The Solvay Process Company operated a coke plant from 1892 through 1923. A phenol production plant operated from 1942 to 1946. Materials associated with these operations may have been disposed of in Wastebeds 1-8 with the Solvay waste slurry or by alternative means, although there are no records or reports to confirm this.

Wastebeds 1-6 were in use before 1926 and may have become operational as early as 1916, although no definitive construction date is available. Ninemile Creek was rerouted to the north to permit the construction of Wastebeds 5 and 6, and the former creek channel was buried. Wastebeds 7 and 8 were not utilized until after 1939 and remained in use with Wastebeds 1-6 until 1943. The location of each wastebed is included on Figure 2.

Subsequent uses of the Site included construction of a 1.2-mile stretch of I-690 prior to 1958, construction of the I-690 and NY-695 interchange between 1973 and 1978, and the operation of a landfill on a portion of Wastebed 5 by Crucible Specialty Metals from 1973 to 1988. The Crucible Landfill covers an area of approximately 20 acres and contains an estimated 225,100 cubic yards (CY) of non-hazardous and hazardous wastes. NYSDEC approved the Crucible Landfill closure plan in 1986, and the landfill was closed with a cap in 1988. Long-term monitoring of the Crucible Landfill is performed annually consistent with the landfill closure requirements. The City of Syracuse and Onondaga County utilized a portion of the wastebeds as a biosolids disposal area from 1925 to 1978 for municipal sewage sludge.

The New York State Fair started using a portion of the Site for parking over 50 years ago, and this use continues to the present day. While the parking lots are not paved, they have received gravel and fill over the years, and currently over 2 feet of gravel and fill overlay the Solvay waste in these areas.

In 2004, Honeywell and NYSDEC entered into an Order on Consent (Index #D-7-0002-02-08) to conduct a Preliminary Site Assessment and RI/FS.

Interim Remedial Measure: An Interim Remedial Measure (IRM)[1] is being implemented at the Site in order to prevent the continued migration of contaminants into Ninemile Creek and Onondaga Lake. The basis for the IRM was supported by a Streamlined Risk Evaluation (SRE) conducted as part of a 2010 Focused Feasibility Study (FFS). The FFS evaluated areas of the Site where contaminant migration was documented or likely to occur, and the SRE provided a concise evaluation of potential risks to human and ecological receptors from those limited areas of the Site. Specifically, it was determined in the SRE and the FFS that there is a potential threat to human health and the environment from contaminant migration from eastern shore shallow and intermediate groundwater, as well as from seeps, surface Solvay waste along the eastern shore, and surface water/sediment/Solvay waste in the lower reach of Ditch A (NYSDEC and EPA, 2011). It was concluded, therefore, that an IRM was needed to address migration of contaminants from these media via several measures discussed in more detail below.

Coincident with the planning for the IRM, several additional response elements were identified and added to the scope of the IRM. Specifically, a wetlands mitigation project, a hydraulic groundwater control system along the northern shoreline, and restoration and cleaning in the middle reach of Ditch A were incorporated into the IRM design. The objective of the mitigation wetlands is to compensate for the loss of wetland functions and values related to actions at the Site and the nearby Wastebed B/Harbor Brook subsite, and for the loss of lake surface area resulting from placement of a barrier wall and light weight fill off-shore of the nearby Willis Avenue subsite. An objective for the hydraulic control of groundwater in the area of Onondaga Lake adjacent to the northern shoreline of the Site is to reduce groundwater upwelling velocities that may impact the isolation cap to be placed in that area of the lake as part of the Lake Bottom remedy selected for Onondaga Lake. The objective of sediment removal and maintenance of the Middle Reach of Ditch A is to mitigate transport of soil/fill material substrate and sediment to Onondaga Lake and to Ninemile Creek.

Construction of the IRM began in 2011 and is anticipated to be completed in November 2014. The IRM includes:

- Shoreline stabilization system (*i.e.,* vegetated on-shore revetment) – A shoreline stabilization system was installed along a portion of the Northern and Eastern Shorelines. A vegetated on-shore revetment was installed along the steep cliffs to reduce erosion from wind-wave and ice action, and to provide habitat enhancement.

- Groundwater and seep collection trenches, including pump stations and associated forcemain piping – Groundwater trenches (including passive wells) and seep collection trenches were installed throughout the Site along Ninemile Creek and the Eastern and Northern shorelines. Upon collection, the groundwater and seep water are conveyed to the Willis Avenue Groundwater Treatment Plant (GWTP).

- Ditch A – Work associated with Lower Ditch A included culvert installation, substrate excavation, and installation of a low permeability habitat layer. Additional work within Ditch A included culvert rehabilitation in the upper reach of Ditch A and sediment removal and maintenance in the middle reach of Ditch A.

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[1] The use of the term "Interim Remedial Measure" throughout this document is not intended to mean that this removal action is a "remedial action" as that term is defined in the federal law, CERCLA. An IRM is an activity that is necessary to address either emergency or non-emergency site conditions, which in the short-term need to be undertaken to prevent, mitigate, or remedy environmental damage or the consequences of environmental damage attributable to a site. An IRM is equivalent to a non-time critical removal under the CERCLA removal program pursuant to 40 C.F.R. i 300.415(b)(2).

- Mitigation wetlands establishment consisting of aquatic habitat connected to Onondaga Lake and inland wetlands - 9.5 acres of mitigation wetlands are being constructed, of which 2.3 acres will be connected wetlands and 7.2 acres will be inland wetlands, within the low-lying Eastern Shoreline.

- Vegetative Cover - A vegetative cover system is being constructed on the Eastern Shoreline in areas not occupied by other elements of the IRM (*i.e.*, mitigation wetlands, stormwater features, berms, and access pathways).

IRM-related monitoring will be performed to document that success criteria (e.g., vegetation establishment, wildlife observations) are being met and to identify the need for corrective action(s), as warranted. Corrective actions for cover types/zones may consist of repair of cover cross-sections in areas of disturbance or re-application of vegetation in areas of non-survivorship. Maintenance of IRM-related access roadways will also be included in the cover system maintenance.

Current Zoning and Land Use: The Site is zoned for industrial use and is bounded by commercial and industrial properties to the south and west, which include the NYS Fairgrounds, the Crucible Specialty Metals facility, and State Fair Boulevard. Current uses of the State-owned lands include overflow parking lots for the NYS Fairgrounds, venues for outdoor events, such as recreational vehicle vendor shows, the approximate 1.2-mile stretch of I-690, and interchanges associated with I-690 and NY-695. County lands feature a public recreation trail and the closed Crucible Landfill. The current and reasonably anticipated future land uses for the Site are commercial and recreational, and to provide areas which are protective of and which can sustain valuable ecological resources.

The anticipated future use of the portion of the Site owned by Onondaga County includes the existing public recreation trail and a proposed amphitheater on the northwestern portion of the Site, near Lakeview Point that, in early 2014, Onondaga County announced it plans to construct. The remainder of the property owned by Onondaga County may be subject to future development as opportunities become available. The anticipated future use for NYS lands is not anticipated to change at this time.

**Summary of Existing Soil Covers and Infrastructure**

Approximately 254 acres of the Site have cover materials or infrastructure located on it. These areas are:

- Approximately 90 acres of vegetated covers and road beds associated with the I-690/NY-695 corridor and other Site roads/infrastructure.
- Approximately 77 acres used as parking lots associated with the NYS Fairgrounds, are already covered with an estimated 2 to 7 feet of imported fill, including at least 1 foot of gravel/fill at the surface.
- Approximately 58 acres of soil/fill/Solvay waste material in the lake shoreline areas where the IRM is being implemented exhibit contaminant concentrations above New York State's 6 NYCRR 375 soil cleanup objectives (SCOs) for the protection of ecological resources. Vegetated covers, seep aprons, shoreline stabilization and constructed wetlands are elements of the IRM. Vegetated covers and constructed wetlands incorporate soil covers and/or liner thicknesses that are 2 feet thick. Seep aprons consist of a total thickness of 18 inches of material (rock and soil), and a liner, which are considered adequate barriers to ecological receptors. This also includes the clean fill staging areas that currently support the IRM, Ninemile Creek, and Onondaga Lake site remediation, and that were constructed using a minimum of 6 inches of crushed stone.
- Approximately 20 acres occupied by the Crucible Landfill, which is a permitted landfill that was closed with a Part 360 cap in 1988. Long-term monitoring is performed annually consistent with the landfill closure requirements.
- Approximately 9 acres of the Onondaga County West Shore Trail Extension (public recreation trail), which is a paved walking and biking trail.

## *RESULTS OF THE REMEDIAL INVESTIGATION*

For the purpose of identifying areas to be addressed and to support the development and evaluation of remedial alternatives, analytical results from the RI sampling were compared to the respective SCOs applicable to each land use type including restricted residential use SCOs (which includes active recreational uses such as lawn seating areas and playing fields), the commercial use SCOs (which includes passive recreational uses, such as walking trails), the SCOs for the protection of ecological resources, and the SCOs for unrestricted use. The unrestricted use SCOs represent the concentration of a contaminant in soil which, when achieved at a site, are sufficiently low so that no use restrictions are required on the site for the protection of public health, groundwater, and ecological resources notwithstanding the presence of contaminants in the soil.

**Surface Soil/Fill Material/Solvay Waste (0 to 2 feet bgs)**

Volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, PCBs and inorganics were detected in surface soil/fill material/Solvay waste at OU1.

VOCs detected above unrestricted SCOs in surface soil included acetone, methylene chloride, and xylenes. Detected levels of these VOCs ranged from 2.5 to 400 micrograms per kilogram (µg/kg). SVOCs detected above unrestricted SCOs included benzo(a)pyrene, benzo(a)anthracene, benzo(b)flouranthene, benzo(k)flouranthene, chrysene, dibenzofuran, dibenzo(a,h)anthracene, hexachlorobenzene, indeno(1,2,3-CD)pyrene, and napthalene. Detected levels of these SVOCs ranged from 36 to 25,000 µg/kg. Pesticides detected above unrestricted SCOs included 4,4'-DDT, 4,4'-DDE, 4,4'-DDD, alpha-chlordane, and dieldrin. Detected levels of these pesticides ranged from 0.40 to 1,600 µg/kg. PCBs were detected at concentrations above the unrestricted SCO in the upland and lakeshore areas. Detected levels of PCBs ranged from 1.6 to 33,000 µg/kg. The highest levels of PCBs were detected in the Biosolids Area. PCBs were not detected at levels above the SCO for PCBs in the parking lot area. Inorganic contaminants detected above unrestricted SCOs included arsenic, barium, cadmium, chromium, copper, hexavalent chromium, lead, manganese, mercury, nickel, selenium, silver, and zinc. Detected levels of these inorganic contaminants ranged from 0.01 to 14,000 milligrams per kilogram (mg/kg). There is no evident distribution pattern of inorganic or organic constituents in surface soil within the parking area, the upland area or the lakeshore area of OU1 with the exception of higher concentrations of chromium, nickel, and selenium in the western half of the upper parking lot area adjacent to the Crucible Landfill and higher levels of metals and PCBs in the Biosolids Area relative to other parts of the upland area.

In existing or planned commercial use areas of OU1 (*e.g.,* walking trails, parking lots), data were compared to the SCOs for commercial use (which includes passive recreational use). A total of approximately 24 acres of existing or planned commercial use areas at OU1 exceed commercial use SCOs in the top 2 feet.

In areas of OU1 that include proposed development (*e.g.*, lawn seating areas within the amphitheater footprint), data were compared to the SCOs for restricted residential use (which includes active recreational use). Based on information provided by the County, the amphitheater may be constructed within/proximal to the Lakeview Point portion of OU1. Because the exact location of the amphitheater is unknown, samples within the footprint of Wastebed 6 and areas extending to the shoreline of Onondaga Lake around Wastebed 6 were evaluated using these more stringent SCOs. There were no contaminants of potential concern (COPCs) in surface soils which exceeded the restricted residential use SCOs (applicable for active recreational use) in this area.

In areas of OU1 that are heavily wooded, steeply sloped, or not planned for active or passive uses, surface soil data (within the top 2 feet) were compared to the SCOs for protection of ecological resources. The locations of the majority of ecological protection SCO exceedances, which consisted of metals, pesticides, PCBs and SVOCs, are located within the footprint of the Biosolids Area and within the footprint of the IRM (eastern shoreline, staging areas, and clean fill staging area near the upper parking lot). Approximately 30 acres of the Site that are heavily wooded, steeply sloped, or not planned for active or passive recreational uses exceed ecological use SCOs in surface soil in these areas.

**Subsurface Soil/Fill Material/Solvay Waste (at depths greater than 2 feet bgs)**

During the RI, subsurface soil samples (deeper than 2 feet) were collected from soil borings and test pits. Based on Site data, VOCs, SVOCs, pesticides, PCBs and/or inorganics were detected in subsurface soil/fill materials/Solvay waste throughout OU1 at levels above the relevant SCOs for unrestricted use. VOCs detected above unrestricted SCOs in subsurface soil included 2-butanone, acetone, benzene, ethylbenzene, methylene chloride, toluene, and xylenes. Detected levels of these VOCs ranged from 0.35 to 500,000 µg/kg. The highest VOC concentrations were found at depths of over 70 feet bgs. SVOCs detected above unrestricted SCOs included 2-methylphenol, 4-methylphenol, benzo(a)pyrene, benzo(a)anthracene, benzo(b)flouranthene, benzo(k)flouranthene, chrysene, dibenzofuran, fluorene, indeno(1,2,3-CD)pyrene, naphthalene, and phenol. Detected levels of these SVOCs ranged from 0.74 to 1,700,000 µg/kg. The location and depth of SVOCs vary by individual compound; however, in general, the higher concentrations of SVOCs found at OU1 were located in excess of 40 feet bgs. The samples that exhibit the highest concentrations of organic contaminants are found within a layer of stained Solvay waste that is located within the footprints of Wastebeds 1-4. This stained Solvay waste was typically encountered in a defined layer of orange-brown to dark brown colored Solvay waste, below the white to medium gray unstained Solvay waste. The thickness of the stained material ranges from 3 to 17 feet, and it is located above native material at a depth range of approximately 40 to 70 feet bgs. Pesticides detected above unrestricted SCOs included 4,4'-DDD, alpha-chlordane, and dieldrin. Detected levels of these pesticides ranged from 0.33 to 240 µg/kg. PCBs were detected at concentrations above the unrestricted SCO for PCBs. Detected levels of PCBs ranged from 9.4 to 4,300 µg/kg. Inorganic contaminants detected above unrestricted SCOs included arsenic, barium, cadmium, chromium, copper, hexavalent chromium, cyanide, lead, manganese, mercury, nickel, selenium, silver, and zinc. Detected levels of these inorganics ranged from 0.004 to 7,110 mg/kg.

**Transport of Constituents From Soil to Groundwater**

Analytical results obtained during the RI and prior investigations suggest that certain constituents are being leached from the soil. Compounds detected in soils and groundwater at the greatest frequency included BTEX, phenolic compounds, PAHs, dieldrin and DDT, and inorganic constituents (*e.g.,* arsenic, barium, chloride, lead, manganese, mercury, selenium, sodium, and sulfate). BTEX, naphthalene and assorted PAHs, phenolic compounds, pesticides, and inorganics (*e.g.,* arsenic, barium, chromium, mercury, and nickel) have been detected at levels in Site groundwater above applicable standards and/or guidance values.

**Transport of Constituents From Soil to Surface Water Bodies Via Surface Water**

Transport of constituents from soils to surface water bodies via surface water runoff may have occurred from areas in close proximity to Onondaga Lake, Ninemile Creek, and the drainage ditches. Transport potentially occurred in areas where surface water bodies and Site ditches are adjacent to steeply sloped berms with poor vegetative cover, which allowed for runoff down slope to the adjacent Ninemile Creek, Onondaga Lake, and Site ditches. Berms with established vegetation, terraced construction, or both potentially reduced this soil erosion and limited the transport of soils to surface water. Onondaga Lake potentially received soil via runoff from the sparsely vegetated portions of the berms along Wastebeds 3, 4, and 6, with some transport also potentially occurring along the northern berms of Wastebeds 1 and 2. This surface runoff has been addressed by the IRM and is not considered a current transport pathway in these areas. Minimal surface water runoff is expected from the central areas of the Site and areas of flat relief along the wastebed berms because of vegetation and little topographic relief, which reduces runoff and promotes evapotranspiration. Also, the porous fill material associated with the parking lots limits the scouring of soils and promotes infiltration rather than overland flow.

**IRM Staging Areas**

Excavation spoils (materials excavated from groundwater collection trenches, regrading, etc.) were staged in three designated staging areas on the Site during construction of the IRM. Staging Areas A, B, and C are situated near the northern shoreline, Ninemile Creek shoreline, and within the former County Biosolids area, respectively (see Figure 3). Staging Areas A and B are each approximately 2 acres in size and contain approximately 5,000 and 9,000 CY, respectively, and Staging Area C is approximately 6 acres in size and contains approximately 20,000 CY. Characterization sampling and analysis were performed during the placement of materials within the staging areas to document that materials being placed within these footprints did not exhibit hazardous waste characteristics, as per the IRM design, so that it could potentially be managed consistent with the material below and adjacent to it. Soil/fill material/Solvay waste that was placed within Staging Areas A, B and C contained contaminant concentrations that exceeded the SCOs for protection of ecological resources. These areas are included in the approximately 30 acres of OU1 that exceed the ecological use SCOs in the areas described above.

As addressed above in the discussion of IRMs, Honeywell is constructing a 2.3-acre lake-connected wetland at the Wastebeds 1-8 site. The construction includes the hydraulic dredging of materials from the lakeshore area (see Figure 3). Materials that are hydraulically dredged will be managed at the Sediment Consolidation Area as part of the Onondaga Lake remedy. As needed, materials that cannot be hydraulically dredged (estimated to be approximately 17,500 CY) will be excavated and consolidated in an upland area of the site and a 2-foot vegetated soil cover will be installed. Consistent with what was done under the IRM, prior to covering, characterization sampling and analysis will be performed to ensure that materials that exhibit hazardous waste characteristics are not left on-site. If any materials are determined to be hazardous, they will be disposed of at an off-site permitted facility.

**Conclusions**

Based on the RI, the following conclusions have been drawn:

- Contaminants include BTEX, naphthalene and other assorted PAHs, PCBs, phenolic compounds, pesticides, and inorganics (*e.g.,* arsenic, barium, chromium, mercury, nickel).

- Two areas of stained materials, which contain organic compounds (e.g. benzene, naphthalene) and have odors, are present along the lakeshore on the eastern side of Lakeview Point and along the southeastern lakeshore of the Site. The stained materials vary in thickness and are generally found within 12 feet of the ground surface. Concentrations of benzene and naphthalene in these materials were reported as high as 20,000 µg/kg and 180,000 µg/kg, respectively. It is important to note that the stained materials are not necessarily representative of the highest contaminant concentrations present in the lakeshore area.

- A layer of stained Solvay waste (described above) is present at the base of Wastebeds 1-4 approximately 60 feet bgs. This deep layer may be the source of BTEX, naphthalene, other PAHs, and phenol concentrations along the lakeshore and southeastern portions of the Site.

- Contaminated soil/fill/Solvay waste, groundwater and surface water from the Site have the potential to directly impact sediment, surface water and fish in the lake.

***SCOPE AND ROLE OF ACTION***

This Site is one of 11 subsites that, along with a remedy for the Lake itself, need to be addressed as part of the Onondaga Lake NPL site. The scope of this action, OU1 of the Site, is to address the Solvay waste and contaminated soil/fill materials. The ongoing IRM partially addresses these materials. NYSDEC and EPA expect this OU1 remedy to be a final, comprehensive remedy for Solvay waste, soil, and fill material at OU1, either by supplementing the IRM with additional remedial actions, or by selecting an action that supersedes the IRM. Groundwater will be addressed in a separate operable unit, OU2. OU2 is expected to be the final operable unit for this area of the Site.

**Summary of Quantitative Site Risk Assessments**

As part of the RI process, baseline quantitative risk assessments were conducted for the Site to estimate the risks to human health and the environment (see "What is Risk and How is it Calculated?" box below). Baseline risk assessments, consisting of a human health risk assessment (HHRA), which evaluates potential risks to people, and a baseline ecological risk assessment (BERA), which evaluates potential risks to the environment, analyze the potential for adverse effects caused by hazardous substance releases from a site assuming no further actions to control or mitigate exposure to these hazardous substances are taken.

The HHRA and BERA are applicable to both OU1 and OU2 because the designation of these as two separate operable units, which was done after the completion of the RI and risk assessments, are based on similar cleanup strategies and criteria for the protection of human health and the environment at this one geographic area.

***Human Health Risk Assessment***

The baseline HHRA considered a number of current and future exposure scenarios for different receptors, including a transient trespasser, lunchtime trespasser, utility worker, commercial worker, all-terrain-vehicle (ATV) rider, construction worker, state fair attendee, ditch maintenance worker, fisherperson, and resident. Exposure media considered in both current and future scenarios include soil, sediment (seep and ditch sediment), surface water (including seep water), groundwater, and ambient air. As discussed previously, fill material and Solvay waste are found throughout the Site; the risk assessment also considered exposure to these materials. Receptors that may be exposed to surface soils (0-2 feet bgs) include trespassers, commercial/industrial workers, state fairgrounds maintenance workers, and state fairgrounds attendees. Construction workers, commercial/industrial workers, and utility/sewer workers may contact upper soils (0-10 feet bgs). Trespassers, utility/sewer workers, construction workers, and ditch maintenance workers may be exposed to surface sediment (0-1 foot bgs). Trespassers, utility workers, construction workers, and ditch maintenance workers may be exposed to surface water. Construction workers, utility/sewer workers, and commercial/industrial workers may contact shallow ground water (0-10 feet bgs).

Potential unacceptable risks related to human exposures to soil/fill material/Solvay waste were limited to non-cancer risks driven by inhalation of metals in dust.

It should be noted that the HHRA found no unacceptable risks for most site visitors and exposure scenarios (e.g., transient trespasser, lunchtime trespasser, State Fair attendee, or fisherperson/trespasser). For site visitors, the only receptors and exposure scenarios for which risks or hazards were potentially unacceptable were for recreational receptors engaging in specific activities (e.g., ATV recreators), or receptors that would be involved in intrusive work such as a construction worker. Specifically, the reasonable maximum exposure (RME) non-cancer human health hazard indices (HIs) are 7 and 2 for the older child trespasser/ATV recreator and young adult trespasser/ATV recreator, respectively. For both receptors, the hazard was primarily driven by inhalation exposure to nickel and manganese in particulate matter in outdoor air.

RME non-cancer hazards exceeded the acceptable threshold for construction workers, with an HI of 4 associated with inhalation of manganese and nickel in dust.

**WHAT IS RISK AND HOW IS IT CALCULATED?**

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

*Hazard Identification:* In this step, the COPCs at the site in various media (*i.e.*, soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

*Exposure Assessment:* In this step, the different exposure pathways through which people might be exposed to the contaminants in air, water, soil, etc. identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil and ingestion of and dermal contact with contaminated groundwater. Factors relating to the exposure assessment include, but are not limited to, the concentrations in specific media that people might be exposed to and the frequency and duration of that exposure. Using these factors, a "reasonable maximum exposure" (RME) scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

*Toxicity Assessment:* In this step, the types of adverse health effects associated with chemical exposures and the relationship between magnitude of exposure (dose) and severity of adverse effects (response) are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health hazards, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health hazards.

*Risk Characterization:* This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks for all COPCs. 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 identified in the Exposure Assessment. Current Superfund regulations for exposures identify the range for determining whether remedial action is necessary as an individual excess lifetime cancer risk of $10^{-4}$ to $10^{-6}$, corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk. For non-cancer health effects, a "hazard index" (HI) is calculated. An HI represents the sum of the individual exposure levels compared to their corresponding reference doses (RfDs). The key concept for a non-cancer HI is that a threshold (measured as an HI of less than or equal to 1) exists below which non-cancer health hazards are not expected to occur. The goal of protection is $10^{-6}$ for cancer risk and an HI of 1 for a non-cancer health hazard. Chemicals that exceed a $10^{-4}$ cancer risk or an HI of 1 are typically those that will require remedial action at the site and are referred to as COCs in the ROD.

Also, a 2009 EPA human health risk assessment which examined potential risks associated with the bike trail indicated that risks and hazards to receptors using the bike trail as intended were within acceptable regulatory limits, and a 2014 Supplemental Human Health Risk Evaluation conducted by EPA found that risks and hazards associated with amphitheater attendees and maintenance workers were within acceptable risk ranges and targets.

The vapor intrusion pathway was evaluated qualitatively in the HHRA for the commercial/industrial worker. Screening for the indoor air exposure was conducted in one of two ways. First, concentrations of volatile constituents in shallow groundwater were compared to EPA groundwater-to-indoor air criteria to determine if these constituents in groundwater could pose a risk attributable to indoor air vapor intrusion. The maximum concentration of five constituents exceeded screening levels. The ratios of the five retained constituents to the selected screening value are: bis(2-ethylhexyl)phthalate (1016), naphthalene (39), benzene (2800), toluene (6), and vinyl chloride (1). The secondary qualitative line-of-evidence used to assess potential risk to the commercial/industrial worker from the indoor air pathway was to screen the available soil vapor data consistent with EPA Region 2 screening guidance for indoor air. Soil vapor data from the Site suggested the potential for exceedences of the $10^{-6}$ risk threshold for benzene, carbon tetrachloride, chloroform, tetrachloroethene, and trichloroethene. Based on the vapor intrusion screening and the high vapor pressure of many of the compounds detected, a vapor intrusion evaluation is warranted prior to the construction of occupied buildings at the Site. Based on the results of the vapor intrusion evaluation, preventative measures may be warranted in the design and construction of buildings at the Site to mitigate the risk of exposure to soil gas. Such measures may include the use of a vapor barrier or the installation of a venting system.

A full discussion of the HHRA evaluation and conclusions is presented in the HHRA Report, the Wastebeds 1-8 Bike Trail Risk Assessment, and the Wastebeds 1-8 Lakeview Amphitheater Supplemental Human Health Risk Evaluation.

***Ecological Risk Assessment***

The majority of estimated ecological risk at this Site is associated with terrestrial exposure. Potential unacceptable risks to terrestrial ecological receptors (American robin, shrew, Red-tailed hawk and fox) were associated with potential exposures

to metals (*e.g.,* chromium, cadmium, vanadium, thallium, and mercury), pesticides, SVOCs, and PCBs in soil/fill/Solvay waste material. The calculated risk estimates (*i.e.,* ecological hazard quotients [HQs]) for ecological receptors were based on both the no-observed-adverse-effect level (NOAEL), representing the highest chemical of concern (COC) concentration at which no adverse effects are seen, and the lowest-observed-adverse-effect level (LOAEL), representing the lowest COC concentration shown to produce adverse effects. Food chain calculations yielded 56 NOAEL-based ecological HQs and 32 LOAEL-based ecological HQs that were greater than or equal to one, which is the threshold value below which adverse ecological effects would not be anticipated. The majority of the metals contamination is associated with the Biosolids Area. To a lesser extent than metals, organic constituents including BTEX compounds, naphthalene, phenols, and several other compounds detected at low frequencies but retained for their bioaccumulative properties presented potential risk to terrestrial ecological receptors exposed to soil/fill/Solvay waste.

A full discussion of the BERA evaluation and conclusions is presented in the 2011 BERA Report.

### *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 established using the risk assessments. The following RAOs have been established for OU1:

- Prevent, ingestion/direct contact with soil/fill material/Solvay waste in surface and subsurface soil above levels that would result in unacceptable human exposure.
- Prevent or minimize, inhalation of or exposure to contaminants volatilizing from contaminated soil/fill material/Solvay waste that would result in unacceptable human exposure. In the event that buildings are constructed, mitigate impacts to public health resulting from existing, or potential for, soil vapor intrusion into those buildings.
- Prevent or minimize, adverse ecological impacts to biota from ingestion/direct contact with soil/fill material/Solvay waste causing toxicity or impacts from bioaccumulation through the terrestrial food chain.
- Prevent or minimize, the further migration of contaminants that would result in groundwater, sediment, or surface water contamination.

NYSDEC's SCOs have been identified as remediation goals to help address these RAOs. SCOs are risk-based criteria which are protective of human health, ecological exposure or groundwater depending upon the existing and anticipated future use of a site. While the land use of the subsite has historically been industrial/commercial, current and anticipated future Site uses of some areas are recreational, and several areas include valuable ecological resources. Thus, the restricted-residential use, commercial use, and the protection of ecological resources SCOs have been identified to help address the direct-contact RAOs, and the protection of groundwater SCOs have been identified to address the migration RAO.

## SUMMARY OF REMEDIAL 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, cost-effective, and utilize permanent solutions and 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).

Based on anticipated future development of the Site, assumptions of the reasonably anticipated land use, as described above**,** were considered in the FS to facilitate the development and evaluation of remedial alternatives. The remedial alternatives are:

**Alternative 1 - No Action**

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. The no-action remedial alternative does not include any physical remedial measures that address the problem of soil and sediment contamination at OU1.

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| Capital Cost: | $0 |
| Annual Operation and Maintenance (O&M) Cost: | $0 |
| Present-Worth Cost: | $0 |
| Construction Time: | 0 years |

**Alternative 2 - Cover System**

This alternative was developed to be integrated with the IRM actions which address soil, sediment, fill, and Solvay waste in the areas of the Site where the IRM is being implemented (*e.g.*, shoreline stabilization, mitigation wetlands establishment, and associated vegetative cover) and relies on existing cover material where it provides adequate protection on portions of the Site. These IRM actions address direct-contact exposure at 58 acres of the Site. The IRM also addresses the potential for contaminant migration at perimeter boundaries of the Site. Because the potential for contaminant migration is primarily being addressed by the IRM, and protective cover materials which provide adequate protection are already present on other areas of the Site, the additional measures below focus primarily on direct-contact exposures associated with the remaining 171 acres of the Site which were not addressed under the IRM and which presently do not have adequate cover material, and potential vapor intrusion.

Solvay wastes, soils, and fill material (to as deep as 70 feet bgs) would be managed in place.

This alternative includes the placement of several types of vegetated cover systems in discrete areas. The specific cover type for a given area is based on remediation goals (SCOs) in surface soil, and current and reasonably anticipated future land uses at the given Site area. The cover systems would be applied over 171 acres of the Site in areas which do not have existing covers or infrastructure located on them and other areas which need additional cover material, (*e.g.,* the upland staging areas associated with the IRM and a portion of the parking lot areas). The extent and type of covers included in this alternative are shown on Figure 4 and are described below**:**

**Cover Types**

*1 foot thick Vegetated Soil Cover (where commercial use SCOs in surface soil are exceeded) - approximately 5 acres:* In areas of anticipated passive recreational use (for OU1 these activities could potentially include walking trails or buffer zones along trails and parking areas) where SCOs for commercial use are exceeded.

*2 foot thick Vegetated Soil Cover (where restricted residential use or ecological SCOs in surface soil are exceeded) - approximately 20 acres:* In areas of anticipated active recreational use (for OU1 these activities could potentially include lawn seating areas and playing fields) where SCOs for restricted residential use are exceeded or where SCOs for protection of ecological resources would apply and are exceeded.

*1.5 foot thick Vegetated Soil Cover (where ecological SCOs in surface soil are exceeded) - approximately 10 acres:* Additional soil cover would be applied to the three upland staging areas associated with the IRM. Restoration of these areas under the IRM currently consists of a 6-inch topsoil cover. The additional 1.5 feet of cover material would provide for a 2 foot cover over this area where protection of ecological resources SCOs are exceeded.

*1 foot thick Vegetated Structural Fill Cover (where commercial use SCOs in surface soil are exceeded) - approximately 19 acres:* This cover would be applied to areas of anticipated NYS Fairgrounds overflow parking (passive recreational use) where SCOs for commercial use are exceeded. The structural fill cover would consist of a compacted mixture of aggregate and soil. This cover would be placed directly over existing soil/fill/Solvay waste to support vehicle traffic and provide water holding capacity, rooting volume and growing conditions to support vegetation. While the thickness of the structural fill layer is assumed (for cost estimate purposes) to be 1 foot, the actual thickness and locations where it will be placed would be determined during remedial design.

*Vegetation Enhancement Cover (where surface soil SCOs are not exceeded) - approximately 117 acres:* This cover would consist of wood fiber mulch/compost and fertilizer mixed with seeds and would be applied to areas where surface soil concentrations are below applicable SCOs. While the thickness of the mulch and seed application is assumed (for cost estimate purposes) to be approximately 4 inches, the actual thickness and locations would be determined during remedial design. The placement of a vegetation enhancement cover would help to stabilize surface soil and reduce the potential for erosion which may result in potential exposure to contaminants in subsurface soil. Based on Site data, VOCs, SVOCs, pesticides, PCBs and/or inorganics were detected in subsurface soil/fill materials/Solvay waste throughout the Site at levels above SCOs for unrestricted use.

Any fill material brought to the Site would need to meet the requirements for the identified site use as set forth in 6 NYCRR Part 375-6.7(d). Native species would be used for the vegetative component of covers. For the purpose of developing cost estimates, the seed application is anticipated to consist of a grassland seed mix native to NYS and selected for its ability to attain relatively high growth rates and ecological function.

Structures, such as buildings, pavement, and sidewalks which may be developed would serve as acceptable substitutes for any of the vegetated soil cover types described above.

Approximately 58 acres (where SCOs for protection of commercial use are not exceeded in surface soil) of the 77 acres of the Site used as parking lots associated with the New York State Fairgrounds are already covered with an estimated 2 to 7 feet of imported fill, including at least 1 foot of gravel/fill at the surface. The existing cover thickness would be confirmed during remedial design, and additional cover would be placed, if needed, to provide for at least a one foot thickness. Existing parking lot surfaces and areas of established vegetation (*e.g.*, I-690/NY-695 corridor) would also be maintained.

Clean fill staging areas, which support the IRM, Ninemile Creek, and Onondaga Lake Site remediation, were constructed using a minimum of 6 inches of crushed stone. Restoration for these areas would consist of placement of 6 inches of vegetated, clean fill over the top of the crushed stone in order to provide for a 1 foot cover over these areas.

Institutional controls in the form of an environmental easement would be used to ensure that any intrusive activities in areas where contamination remains are in accordance with a NYSDEC-approved Site Management Plan, which would include the following:

- Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for OU1 and details the steps and media-specific requirements necessary to ensure the following institutional and engineering controls remain in place and effective:
    - environmental easements and/or restrictive covenants described above;
    - Site cover systems described above;
    - excavation plan which details the provisions for management of future excavations in areas of remaining contamination;
    - descriptions of the provisions of the institutional controls including any land use restrictions;
    - provision that future on-Site construction should include either vapor intrusion sampling and/or installation of mitigation measures, if necessary;
    - provisions for the management and inspection of the identified engineering controls;
    - maintaining Site access controls and Department notification; and
    - steps necessary for periodic reviews and certification of the institutional and/or engineering controls.
- Monitoring Plan to assess the performance and effectiveness of the remedy. The plan would include, but may not be limited to, monitoring for vapor intrusion for any buildings developed on the Site, as may be required by the Institutional and Engineering Control Plan discussed above.

The alternative includes continued monitoring and maintenance associated with IRM elements which pertain to the shoreline stabilization system, mitigation wetlands, the vegetative cover, and Site access roads constructed to support the IRM. Maintenance and monitoring for the IRM mitigation wetlands and cover systems would include monitoring to document that success criteria are met and to identify the need for corrective action(s), as warranted. Corrective actions for cover types/zones may consist of cover repair in areas of disturbance or re-application of vegetation in areas of non-survivorship.

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

The estimated construction time for this alternative is 6 years.

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| Capital Cost: | $14,300,000 |
| Annual O&M Cost (years 1-5): | $129,000[2] |
| Annual O&M Cost (years 6-30): | $99,000 |
| Present-Worth Cost: | $16,600,000 |

**Alternative 3 - Enhanced Cover System**

This alternative is identical to Alternative 2, except: (a) in areas where the current or planned use is active recreation (*e.g.,* lawn seating areas and playing fields), a 2-foot thick vegetated soil cover would be installed regardless of whether the restricted residential SCOs are exceeded in surface soil or not, and (b) in areas where current or planned use is passive recreation (*e.g.,* walking trails or buffer zones along trails and parking areas) a 1-foot thick vegetated soil cover would be installed, regardless of whether the commercial use SCOs are exceeded in surface soil or not. In active recreation areas where SCOs are not exceeded, the 2-foot cover replaces the vegetated enhancement cover that would be provided under Alternative 2 in these areas and in passive recreation areas where SCOs are not exceeded, the 1-foot cover replaces the vegetated enhancement cover that would have been provided under Alternative 2 in these areas. The thicker covers in these recreational areas where SCOs are not exceeded in surface soil would further reduce potential human exposure to contamination in subsurface soil. The estimated acreages corresponding to the respective cover types are listed below and shown on Figure 5.

*1 foot thick Vegetated Soil Cover (for passive recreation areas) - approximately 39 acres:* In areas of anticipated passive recreational use (regardless of whether the commercial use SCOs are exceeded or not), a 1 foot thick vegetated soil cover would be installed.

*2 foot thick Vegetated Soil Cover (for active recreation areas or where ecological SCOs in surface soil are exceeded) - approximately 27 acres:* In areas of anticipated active recreational use (regardless of whether the restricted residential SCOs are exceeded or not) and also where SCOs for protection of ecological resources would apply and are exceeded, a 2 foot thick vegetated soil cover would be installed.

*1.5 foot thick Vegetated Soil Cover (where ecological SCOs in surface soil are exceeded) - approximately 10 acres:* Additional soil cover would be applied to the three upland staging areas associated with the IRM. Restoration of these areas under the IRM consisted of a 6-inch topsoil cover. The additional 1.5-feet of cover material would provide for a 2-foot cover over this area where protection of ecological resources SCOs are exceeded.

*1 foot thick Vegetated Structural Fill Cover (where commercial use SCOs in surface soil are exceeded) - approximately 19 acres:* This cover would be applied to areas of anticipated NYS Fairgrounds overflow parking (passive recreational use) where SCOs for commercial use are exceeded. The structural fill cover would consist of a compacted mixture of aggregate and soil. This cover would be placed directly over existing soil/fill to support vehicle traffic and provide water holding capacity, rooting volume and growing conditions to support vegetation. While the thickness of the structural fill layer is assumed (for cost estimate purposes) to be 1 foot, the actual thickness and locations where it will be placed would be determined during remedial design.

*Vegetation Enhancement Cover (over the remaining areas) - approximately 76 acres:* This cover would consist of wood fiber mulch/compost and fertilizer mixed with seeds. While the thickness of the mulch and seed application is assumed (for cost estimate purposes) to be approximately 4 inches, the actual thickness and locations would be determined during remedial design.

[2] The annual O&M cost estimates associated with monitoring of the vegetative cover for the first five year period following completion of the IRM were included in the cost estimates developed for the IRM. The annual O&M cost estimates associated with monitoring of the vegetative cover between years 6 to 30, for maintenance of the vegetative cover, and for monitoring and maintenance of the other IRM elements cited here are included in the cost estimates for this alternative.

The estimated construction time for this alternative is 8 years.

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|---|---|
| Capital Cost: | $17,800,000 |
| Annual O&M Cost (years 1-5): | $128,000 |
| Annual O&M Cost (years 6-30): | $98,000 |
| Present-Worth Cost: | $20,000,000 |

**Alternative 4A – Excavation and Off-Site Disposal/Treatment/Reuse (Full Removal)**

Under this alternative, the Site would be restored to pre-disposal conditions through the excavation of all soil/fill/Solvay waste. This would include removal of the portions of I-690 and interchanges associated with NY-695 that traverse the Site in order to access the underlying material.

The estimated volume of soil/fill/Solvay waste that would be excavated is approximately 26 million CY, representing fill material placed on the former Geddes Marsh and deeper contaminated soil, with estimated excavation depths of 5 to 70 feet bgs. It is assumed that a portion of the excavated soil/fill/Solvay waste would require stabilization prior to off-site transport for disposal or beneficial reuse; therefore, the estimated volume of material that would require off-site management is 26.6 million CY. Potential beneficial reuses might include fill material, landfill cover, or as aggregate. Additionally, it is assumed that 1.7 million CY of stained material (indicative of elevated concentrations of VOCs) would require *ex-situ* thermal treatment prior to disposal at an existing non-hazardous waste disposal facility or reuse.

In addition to the 26 million CY of soil/fill/Solvay waste material to be excavated, approximately 70,000 CY of construction and demolition (C&D) material associated with demolition of the existing highways and exchanges would require removal and off-site disposal at a C&D landfill.

The excavated areas would be backfilled and restored as a marsh along Onondaga Lake. This would require the use of an estimated 1.9 million CY of clean backfill soils. The removed portions of I-690 and interchanges associated with NY-695 would be replaced. Long-term maintenance of vegetated areas would be included in this option.

The estimated construction time of this alternative is 30 years.

| | |
|---|---|
| Capital Cost: | $6,135,000,000 |
| Annual O&M Costs (year 1-5): | $1,360,000 |
| Annual O&M Costs (year 6-30): | $170,000 |
| Present-Worth Cost: | $6,142,000,000 |

**Alternative 4B – Partial Excavation and Off-Site Disposal/Treatment/Reuse (Partial Removal)**

Under this alternative, the Site would be restored to pre-disposal conditions through the excavation of all soil/fill/Solvay waste with the exception of the areas underlying the portions of I-690 and interchanges associated with NY-695 that traverse the Site and, as determined by geotechnical analysis, immediately adjacent areas where excavation would result in conditions which would potentially undermine the stability of the roadways. Any immediately adjacent areas which may not be excavated because of stability concerns would receive a cover of suitable type and thickness, as may be appropriate, consistent with surface and subsurface soil conditions and the current and future anticipated land use of the adjacent areas.[3]

The estimated volume of soil/fill/Solvay waste that would be excavated is approximately 23 million CY. It is assumed that a portion of the excavated soil/fill/Solvay waste would require stabilization prior to off-site transport for disposal or beneficial reuse; therefore, the estimated volume of material that would require off-site management is 23.5 million CY. Potential beneficial reuses might include fill material, landfill cover, or as aggregate. Additionally, it is assumed that 1.7 million CY of

[3] The cost estimate for this alternative assumes that excavation would occur in areas up to the roadways.

stained soil (indicative of elevated concentrations of VOCs), would require *ex-situ* thermal treatment prior to disposal at an existing non-hazardous waste disposal facility or reuse.

A Site Management Plan, periodic reviews, and institutional controls would be included in this alternative.

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

The estimated construction time of this alternative is 27 years.

| | |
|---|---|
| Capital Cost: | $5,124,000,000 |
| Annual O&M Costs (year 1-5): | $1,172,000 |
| Annual O&M Costs (year 6-30): | $157,000 |
| Present-Worth Cost: | $5,130,000,000 |

## COMPARATIVE ANALYSIS OF ALTERNATIVES

The detailed analysis consists of an assessment of the individual alternatives against each of the nine evaluation criteria (see box below) and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

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

| NINE EVALUATION CRITERIA FOR SUPERFUND REMEDIAL ALTERNATIVES |
|---|
| **Overall protection of human health and the environment** determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment. |
| **Compliance with ARARs** evaluates whether the alternative would meet all of the applicable or relevant and appropriate requirements of federal and state environmental statutes and other requirements that pertain to the site, or provide grounds for invoking a waiver. |
| **Long-term effectiveness and permanence** considers the ability of an alternative to maintain protection of human health and the environment over time. |
| **Reduction of toxicity, mobility, or volume through treatment** is the anticipated performance of the treatment technologies an alternative may employ. |
| **Short-term effectiveness** considers the period of time needed to implement an alternative and the risks the alternative may pose to workers, residents, and the environment during implementation. |
| **Implementability** is the technical and administrative feasibility of implementing the alternative, including the availability of materials and services. |
| **Cost** includes estimated capital and annual operation and maintenance costs, as well as 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. |
| **State acceptance** considers whether New York State concurs with, opposes, or has no comments on the preferred remedy. |
| **Community acceptance** will be assessed in the ROD and refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports. Comments received on the Proposed Plan are an important indicator of community acceptance. |

### Overall Protection of Human Health and the Environment

Alternative 1 would not provide protection of human health and the environment, whereas Alternatives 2, 3, 4A and 4B would each be protective of human health and the environment. Alternative 4A provides protectiveness through full removal of the soil/fill/Solvay waste and Alternative 4B provides protectiveness through a combination of removal and site management of remaining soil/fill/Solvay waste. Alternatives 2 and 3 provide protectiveness through covering the soil/fill/Solvay waste and site management in order to prevent exposures/reduce risks.

Alternative 1 does not meet the RAOs. Alternatives 2, 3, 4A, and 4B meet the RAOs. Alternative 3 provides added protectiveness as compared to Alternative 2 through added thickness of vegetated covers for areas of OU1 reasonably anticipated to be used for active or passive recreational uses.

**Compliance with ARARS**

Chemical-, location-, and action-specific ARARs/TBCs identified for consideration are summarized in Table 3-1 of the FS report. Alternative 1 does not achieve chemical-specific ARARs/TBCs (SCOs). Exposures to soil/fill/Solvay waste exceeding chemical-specific ARARs/TBCs would be managed through the cover systems and institutional controls in Alternatives 2 and 3. Under Alternatives 4A and 4B, exposures to soil/fill/Solvay waste exceeding chemical-specific ARARs/TBCs would be managed through excavation of soil/fill/Solvay waste or partial excavation in conjunction with a Site Management Plan and institutional controls. The substantive requirements of Title 6 NYCRR Part 360 that would apply to Alternatives 2 and 3 would be met by the cover systems. The more robust cover system under Alternative 3 (in areas where the reasonably anticipated land uses are active or passive recreation) would more reliably contain and prevent exposure to the underlying Solvay waste.

Construction methods would be implemented to adhere to the location- and action-specific ARARs/TBCs identified for Alternatives 2, 3, 4A and 4B. No action- or location-specific ARARs/TBCs were identified for Alternative 1, the no action alternative. Alternatives 2, 3, and 4B would comply with the action-specific ARARs/TBCs. Specifically, institutional controls would be implemented under Alternatives 2, 3, and 4B in conformance with NYSDEC's guidance DER-33, *Institutional Controls: A Guide to Drafting and Recording Institutional Controls*. Additionally, the cover systems in Alternatives 2 and 3 would prevent erosion and exposure to soil/fill/Solvay waste. Cover systems would be implemented in conformance with NYSDEC's guidance DER-10, *Technical Guidance for Site Investigation and Remediation*. Construction and O&M activities in Alternatives 2, 3, 4A and 4B would be conducted in compliance with Occupational Safety and Health Administration requirements.

**Long-Term Effectiveness and Permanence**

Alternative 1 would not provide long-term effectiveness and permanence, whereas Alternatives 2, 3, 4A and 4B would. Alternative 4A provides for the most reliable long-term effectiveness and permanence through removal of soil/fill/Solvay waste. Alternative 4B provides a similar degree of long term effectiveness and permanence except that the soil/fill/Solvay waste that would not be excavated would rely upon site management and the institutional controls in order to ensure effectiveness and permanence for the soil/fill/Solvay waste that would not be excavated. Alternatives 2 and 3 also rely on site management and institutional controls to ensure long-term effectiveness, but the less robust cover provided under Alternative 2 in areas where the reasonably anticipated uses are active or passive recreation would be expected to need repair/replacement more frequently over the long term compared to Alternative 3.

**Reduction in Toxicity, Mobility, or Volume Through Treatment**

There would be no reduction in toxicity, mobility, or volume provided in Alternative 1. Alternatives 2 and 3 would reduce mobility associated with erosion and infiltration of contaminants in soil/fill/Solvay waste through vegetated cover systems but involve no treatment. Alternative 3 does not include treatment but would provide for greater reduction in mobility of soil/fill/Solvay waste constituents as compared to Alternative 2 because of placement of a cover in portions of OU1 where only vegetation enhancement is included in Alternative 2. Alternatives 4A and 4B would reduce toxicity, mobility, and volume of contaminants in soil/fill/Solvay waste through the excavation, treatment (of a portion of the excavated materials) and off-site management of materials.

**Short-Term Effectiveness**

Alternative 1 does not include any physical measures in any areas of contamination and, therefore, would not present any potential adverse impacts to remediation workers or the community as a result of its implementation. Alternatives 2, 3, 4A and 4B would be constructed using proper protective equipment to manage potential risks to on-site workers, and proper precautions and monitoring would be utilized to be protective of the general public and the environment. Alternatives 2 and 3 would meet the RAOs related to preventing direct contact exposures once the cover is placed. Placement of cover materials over the entire Site under Alternative 2 is estimated to take 6 years and for Alternative 3, placement of cover materials is estimated to take 8 years. Alternatives 4A and 4B would require a significantly longer timeframe to implement as excavation is estimated to take place over approximately 30 and 27 years, respectively. Because of the volume of soil/fill/Solvay waste requiring excavation and off-site management and the estimated construction duration, Alternatives 4A and 4B would result in substantially greater impacts to the community and the environment associated with transporting, via truck, excavated materials for off-site disposal and/or beneficial reuse, and there would be significant adverse traffic impacts related to temporary relocations and restrictions of the impacted section of I-690 and interchanges associated with NY-695.

Impacts to the community resulting from the construction of Alternatives 2, 3, 4A and 4B would primarily be due to

increased truck traffic and noise for the duration of construction. Because of the increased quantity of materials and enhanced cover associated with Alternative 3, there could be slightly increased impacts to the community relative to truck traffic and noise during the construction of Alternative 3 as compared to Alternative 2. Construction of Alternative 4A and 4B would result in substantial, long-term community impacts because of construction-related noise, odors, dust, and most notably traffic. As it relates to traffic, transportation of excavated materials under Alternatives 4A and 4B is anticipated to require 1.3 to 1.5 million truck trips over 27 to 30 years to and from the Site as compared to 9,000 to 12,000 large trucks necessary for construction of Alternatives 2 and 3. The increased traffic associated with Alternatives 4A and 4B would present a more significant risk to worker and community safety than would Alternatives 2 and 3.

Dust, emissions and surface water runoff controls would be implemented during construction phase activities associated with each of the active remedial alternatives. Only limited clearing and grubbing would be required under Alternative 2, while Alternative 3 would some require additional clearing and grubbing of existing vegetation to support the implementation of the soil cover systems. Comparatively, Alternatives 4A and 4B would require clearing and grubbing of existing vegetation for nearly the entire Site to support excavation activities. Installation of cover systems in Alternatives 2 and 3 and replacement of the pre-existing marshes (that existed prior to the creation of Wastebeds 1-8) in Alternatives 4A and 4B, would result in enhancements to existing ecological habitats.

Short-term environmental impacts resulting from construction of Alternatives 2 and 3 would be minimal; however, because of the increased quantity of materials and increased acreage of surfaces requiring clearing under Alternative 3, there is a slightly increased environmental footprint associated with Alternative 3 as compared to Alternative 2. Substantial negative short-term environmental impacts would result from soil/fill/Solvay waste excavation, transportation and off-site management activities associated with Alternatives 4A and 4B, compared to cover system construction activities associated with Alternatives 2 and 3. Alternative 4A would result in a greater environmental impact as compared to Alternative 4B because of the additional removals and reconstruction of portions of I-690 and NYS Route 695.

The cover system included in Alternatives 2 and 3 would be consistent with current and reasonably anticipated future land use of the Site. Alternatives 1, 4A and 4B would not be consistent with the current and reasonably anticipated future land use. Alternatives 4A and 4B would require removal of land mass at the location of the existing NYS Fairgrounds parking lots and public recreation trail and at the site of the proposed amphitheater and related facilities.

While the excavation and removal of soil/fill/Solvay waste included in Alternatives 4A and 4B would attain RAOs, the impacts to the community and environment, current and anticipated future land use, and the duration of these alternatives as compared to Alternatives 2 and 3 render them highly disadvantageous in relation to short-term impacts.

**Implementability**

Alternatives 2 and 3 can be readily constructed and operated and the materials necessary for their construction are reasonably available. The cover systems in Alternatives 2 and 3 would incorporate constructible and reliable technologies. Monitoring the effectiveness of Alternatives 2 and 3 would be accomplished through cover system inspections and maintenance to verify continued cover integrity, visual signs of erosion, and condition of the cover.

The excavation and off-site management of 23 to 26 million CY of soil/fill/Solvay waste associated with Alternatives 4A and 4B would be much more difficult to implement than Alternatives 2 and 3. Specifically, there are significant implementability limitations associated with excavation, transportation, disposal, and reuse capacity of this volume of material. These include:

- Excavation of anticipated volumes would be very difficult. Excavation considerations that limit the implementability of Alternatives 4A and 4B includes construction water management, air quality concerns, and odors. Construction water management is anticipated to be significant during the excavation of the approximately 5 to 70-foot thick area of 280 to 340 acres (including excavation below the groundwater table) anticipated in Alternatives 4A and 4B. The treatment capacity is assumed to be available through repurposing of the Lake Bottom Sediment Containment Area treatment plant. However, the viability of this option would require further evaluation. Air quality and odors would be controlled during construction. However, given the elevated concentrations of VOCs in the stained material, volatilization of VOCs and generation of odors may hinder productivity and, thus, may result in significant delays to the implementation timeframe of this alternative.

- Transportation of anticipated volumes presents significant hazards and disruption to the community. Transportation considerations that severely limit the implementability of Alternatives 4A and 4B include significantly increased traffic, fuel usage and adverse effects on air quality and community safety. It is estimated that approximately 896,000 CY of material would be shipped off-site each year in 50,000 truckloads (180 truckloads per day). During an 8-hour work day, this would equate to approximately 1 truck entering or leaving the Site every 3 minutes. In

addition to the potentially significant effects on local air quality and community traffic patterns, traffic of this magnitude is anticipated to result in significant effects on conditions of roadways.

- Sufficient capacity for the disposal of the anticipated volumes of waste may not exist. Because of the volume anticipated to be excavated, off-site disposal capacity for excavated materials would be a critical factor and may significantly limit the implementability of this alternative. An estimated 26.6 and 23.4 million CY (estimated to be approximately 32.0 and 28.1 million tons) would require off-site disposal. Given the magnitude of this volume, multiple commercial landfill facilities would be necessary. While disposal within 200 miles of the Site has been assumed for cost estimation purposes, given the timeframe of approximately 30 and 27 years to implement Alternatives 4A and 4B, respectively, it is not possible to reliably predict that disposal capacity for this volume of material would exist within the assumed distance from the Site. Lack of landfill capacity would result in significant delays to the implementation timeframe of this alternative.

- Because of the volume anticipated to be excavated, reuse opportunities for excavated materials are anticipated to be a critical factor for Alternatives 4A and 4B and may significantly limit their implementability. It should be noted that the physical and geotechnical characteristics of this material would restrict potential options for its reuse. Notwithstanding these limitations based on physical characteristics and given the magnitude of this volume, it is anticipated that multiple end-use facilities would be necessary. While reuse within 400 miles of the Site has been assumed for cost estimation purposes, it is unlikely that reuse capacity for this volume of material would exist given the timeframe of approximately 27 to 30 years to implement these alternatives. Lack of reuse capacity may result in an even longer timeframe for implementation of this alternative.

Each alternative would require coordination with other agencies, including NYSDOH, New York State Department of Transportation, New York State Department of Agriculture and Markets (NYS Fairgrounds), Onondaga County, and the Town of Geddes. The necessary equipment and specialists would be available for each alternative. Cover system construction materials are anticipated to be available; however, material sources and availability of cover system materials would be further evaluated during the design. Because of the temporary relocations and restrictions of the existing highways and interchanges, Alternative 4A would be even more difficult to implement than Alternative 4B.

**Cost**

The present-worth costs were calculated using a discount rate of seven percent and a thirty-year time interval for post-construction monitoring and maintenance period.

The estimated capital, annual O&M, and present-worth costs for each of the alternatives are presented in the table below. The estimated costs for the action alternatives are directly related to the given alternative's corresponding total volumes of soil and sediments to be excavated.

| **Alternatives** | **Capital** | **Annual O&M[4]** | **Total Present Worth** |
|---|---|---|---|
| 1 – No Action | $0 | $0 | $0 |
| 2 – Cover System | $14.3 Million | $99,000-$129,000 | $16.6 Million |
| 3 – Enhanced Cover System | $17.8 Million | $98,000-$128,000 | $20 Million |
| 4A – Full Removal | $6,135 Million (6.1 Billion) | $170,000-$1,362,000 | $6,142 Million (6.1 Billion) |
| 4B – Partial Excavation | $5,124 Million (5.1 Billion) | $157,000-$1,172,000 | $5,130 Million (5.1 Billion) |

**Support Agency Acceptance**

NYSDOH has reviewed this Proposed Plan and concurs with the preferred alternative.

**Community Acceptance**

Community acceptance of the preferred alternative will be evaluated in the ROD following review of the public comments received on this Proposed Plan.

[4] The higher end of the range of Annual O&M cost estimates represent the cost estimates in years 1-5, and the lower end of the range of Annual O&M cost estimates represent the cost estimates in years 6-30.

**PREFERRED REMEDY**

Based upon an evaluation of the various alternatives, NYSDEC and EPA recommend Alternative 3 - Enhanced Cover System as the preferred alternative. The preferred alternative includes several types of vegetated cover systems. The specific cover type for a given area will be based on the current and reasonably anticipated future land use, and corresponding SCOs. The cover systems would be applied over 171 acres of the Site. The estimated acreages corresponding to the respective cover types are described below and shown on Figure 6.

*1 foot thick Vegetated Soil Cover (for passive recreation areas) - approximately 39 acres:* In areas of anticipated passive recreational use (regardless of whether the commercial use SCOs are exceeded or not), a 1 foot thick vegetated soil cover would be installed.

*2 foot thick Vegetated Soil Cover (for active recreation areas or where ecological SCOs in surface soil are exceeded) - approximately 27 acres:* In areas of anticipated active recreational use (regardless of whether the restricted residential SCOs are exceeded or not) and also where SCOs for protection of ecological resources would apply and are exceeded, a 2 foot thick vegetated soil cover would be installed.

*1.5 foot thick Vegetated Soil Cover (where ecological SCOs in surface soil are exceeded) - approximately 10 acres:* Additional soil cover would be applied to the three upland staging areas associated with the IRM. Restoration of these areas under the IRM consisted of a 6-inch topsoil cover. The additional 1.5-foot of cover material would provide for a 2-foot cover over this area where protection of ecological resources SCOs are exceeded

*1 foot thick Vegetated Structural Fill Cover (where commercial use SCOs in surface soil are exceeded) - approximately 19 acres:* This cover would be applied to areas of anticipated NYS Fairgrounds overflow parking (passive recreational use) where SCOs for commercial use are exceeded. The structural fill cover would consist of a compacted mixture of aggregate and soil. This cover would be placed directly over existing soil/fill to support vehicle traffic and provide water holding capacity, rooting volume and growing conditions to support vegetation. While the thickness of the structural fill layer is assumed (for cost estimate purposes) to be 1 foot, the actual thickness and locations where it will be placed would be determined during remedial design.

*Vegetation Enhancement Cover (over the remaining areas) - approximately 76 acres:* This cover would consist of wood fiber mulch/compost and fertilizer mixed with seeds and would be applied to areas where surface soil concentrations are below applicable SCOs. While the thickness of the mulch and seed application is assumed (for cost estimate purposes) to be approximately 4 inches, the actual thickness and locations would be determined during remedial design.

Any fill material brought to the Site would need to meet the requirements for the identified site use as set forth in 6 NYCRR Part 375-6.7(d). Native species would be used for the vegetative component of covers. For the purpose of developing cost estimates, the seed application is anticipated to consist of a grassland seed mix native to NYS and selected for its ability to attain relatively high growth rates and ecological function.

Structures, such as buildings, pavement, or sidewalks, as part of the future development at OU1 could serve as acceptable substitutes for any of the vegetated cover types described above.

Approximately 58 acres (where SCOs for protection of commercial use are not exceeded in surface soil) of the 77 acres of the Site used as parking lots associated with the New York State Fairgrounds are already covered with an estimated 2 to 7 feet of imported fill, including at least 1 foot of gravel/fill at the surface. The existing cover thickness would be confirmed during remedial design and additional cover would be placed, if needed, to provide for at least a one foot thickness. Existing parking lot surfaces and areas of established vegetation (*e.g.*, I-690/NY-695 corridor) would also be maintained under the preferred alternative.

Clean fill staging areas, which support the IRM, Ninemile Creek, and Onondaga Lake site remediations, were constructed using a minimum of 6 inches of crushed stone. Restoration of the clean fill staging areas would consist of placement of 6 inches of vegetated, clean fill over the top of the crushed stone in order to provide for a 1 foot cover over these areas.

Institutional controls in the form of an environmental easements would be used to ensure that any intrusive activities in areas where contamination remains are in accordance with a NYSDEC-approved Site Management Plan, which would include the following:

- Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the remedy

and details the steps and media-specific requirements necessary to ensure the following institutional and engineering controls remain in place and effective:

- o environmental easements and/or restrictive covenants described above;
- o Site cover systems described above;
- o excavation plan which details the provisions for management of future excavations in areas of remaining contamination;
- o descriptions of the provisions of the institutional controls including any land use restrictions;
- o provision that future on-Site construction should include either vapor intrusion sampling and/or installation of mitigation measures, if necessary;
- o provisions for the management and inspection of the identified engineering controls;
- o maintaining site access controls and Department notification; and
- o steps necessary for periodic reviews and certification of the institutional and/or engineering controls.

- Monitoring Plan to assess the performance and effectiveness of the remedy. The plan would include, but may not be limited to, monitoring for vapor intrusion for any buildings developed on the Site, as may be required by the Institutional and Engineering Control Plan discussed above.

The preferred remedy includes continued monitoring and maintenance associated with the IRM components relating to soil, sediment, fill, and Solvay waste (*e.g.*, shoreline stabilization system, mitigation wetlands, the vegetative cover, and access roads constructed to support the IRM). Maintenance and monitoring for the IRM mitigation wetlands and cover systems would include monitoring to document that success criteria are met and to identify the need for corrective action(s), as warranted. Corrective actions for cover types/zones may include repair of cover cross-sections in areas of disturbance or re-application of vegetation in areas of non-survivorship.

A remedial design program would be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. The need for a demarcation layer would be evaluated during design.

Green remediation techniques, as detailed in NYSDEC's Green Remediation Program Policy - DER-31,[5] and EPA Region 2's Clean and Green policy[6] would be considered for the preferred alternative to reduce short-term environmental impacts. Green remediation best practices such as the following may be considered:

- Use of renewable energy and/or purchase of renewable energy credits to power energy needs during construction and/or operation and maintenance of the remedy.
- Reduction in vehicle idling, including both on and off road vehicles and construction equipment during construction and/or operation and maintenance of the remedy.
- Design of cover systems, to the extent possible, to be usable for alternate uses, require minimal maintenance (*e.g.*, less mowing), allow for infiltration of storm water and/or be integrated with the planned use of the property. For example, the use of vegetated structural fill to create parkable surfaces as identified in both Alternatives 2 and 3, would address storm water management in these areas, while resulting in a surface usable for current and intended land use in these areas.
- Beneficial reuse of material that would otherwise be considered a waste.
- Use of Ultra Low Sulfur Diesel (ULSD).

Because this alternative would result in contaminants remaining above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the remedy be reviewed at least once every five years. If justified by the review, remedial actions may be evaluated to remove, treat, or contain the contaminated soils remaining at OU1.

**BASIS FOR PREFERRED REMEDY**

Alternatives 2, 3, 4A, and 4B (the action alternatives) would each be protective of human health and the environment and would address the RAOs. However, Alternatives 4A and 4B would be extremely difficult to implement, present significant short-term impacts to the surrounding community during the lengthy construction phase, result in substantial environmental impacts, would not be consistent with current and reasonably anticipated future land uses, and would take significantly

[5] See http://www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf

[6] See http://epa.gov/region2/superfund/green_remediation

longer to implement as compared to Alternatives 2 and 3. Alternatives 4A and 4B would also be less sustainable than would Alternatives 2 and 3 because of the long-term consumption of fuel (and associated emissions) associated with excavation, management, and transportation of extremely large volumes of soil/fill/Solvay waste.

While Alternatives 2 and 3 would both achieve protectiveness of human health and the environment and achieve the RAOs, and are consistent with current and reasonably anticipated future use of the Site, Alternative 3 would provide increased cover thicknesses relative to Alternative 2 in approximately 41 acres of the Site where visitors would attend events at the planned amphitheater facilities and/or engage in other recreational activities. The additional cover thicknesses prescribed under Alternative 3 in these areas would provide added protectiveness relative to that offered by the cover system associated with Alternative 2 by further reducing potential human exposure to contamination in subsurface soil. Based on information currently available, the NYSDEC and EPA believe that the Preferred Alternative meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The NYSDEC and EPA expect the Preferred Alternative to satisfy the following statutory requirements of CERCLA §121(b): 1) be protective of human health and the environment; 2) comply with ARARs; 3) be cost-effective; 4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and 5) satisfy the preference for treatment as a principal element (or justify not meeting the preference).

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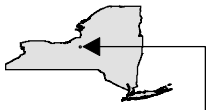
ADAPTED FROM: SYRACUSE WEST, NY USGS QUADRANGLE.

HONEYWELL
WASTEBEDS 1 - 8
OU-1 FEASIBILITY STUDY
WASTEBEDS 1-8
GEDDES, NEW YORK



QUADRANGLE LOCATION

N

## SITE LOCATION

0 1,000 2,000 4,000 6,000 8,000

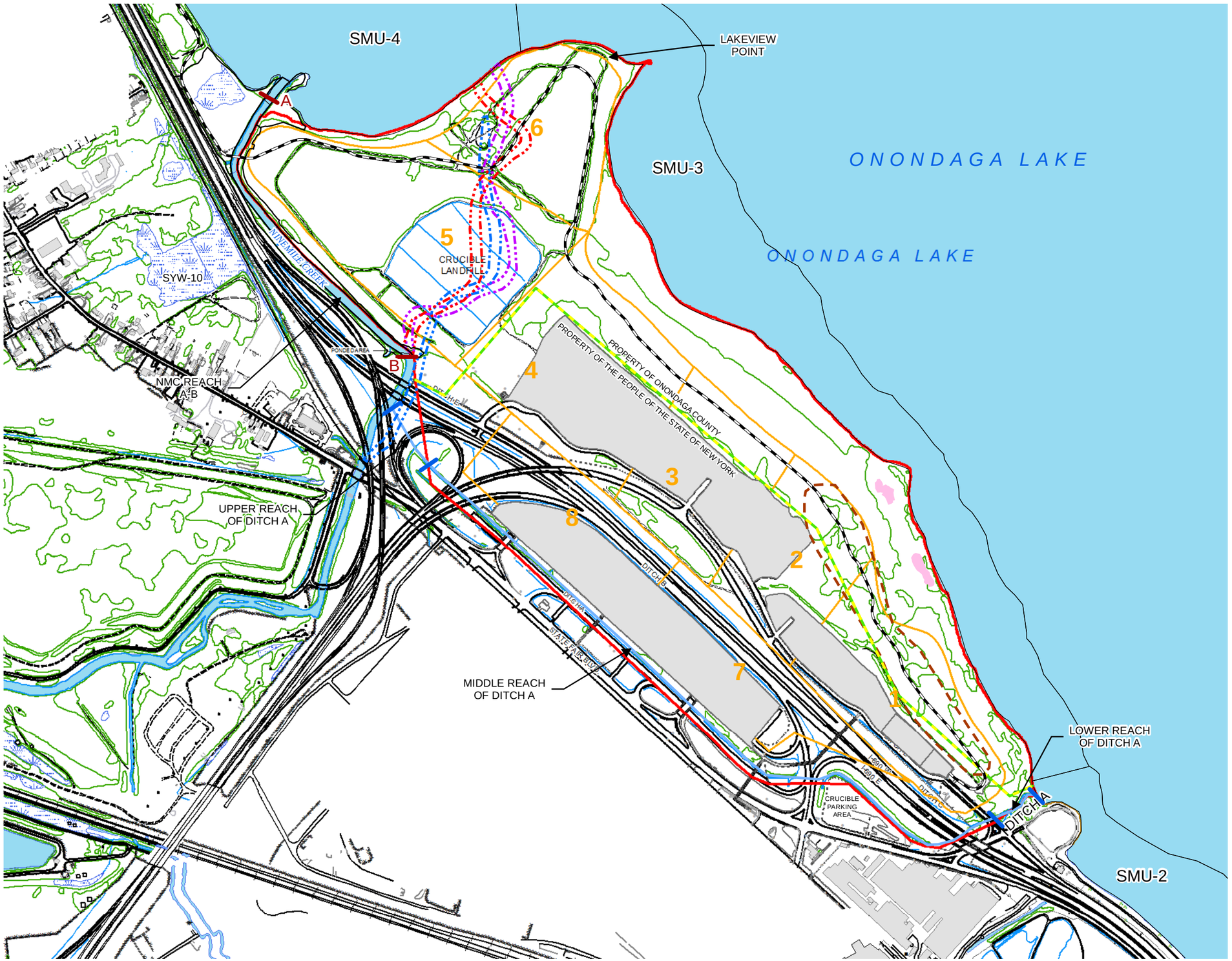
Feet

1:24,000

JULY 2014
1163.45176

O'BRIEN & GERE

# FIGURE 2

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## LEGEND

- ONONDAGA COUNTY WEST SHORE TRAIL
- SMU-2 ONONDAGA LAKE SEDIMENT MANAGEMENT UNIT BOUNDARY
- DELINEATED WETLANDS
- PARKING LOT
- WASTEBEDS 1-8 PROPERTY BOUNDARY (PEOPLE OF THE STATE OF NY AND ONONDAGA COUNTY)
- APPROXIMATE WASTEBED BOUNDARY
- WASTEBEDS 1-8 SITE
- BIOSOLIDS AREA FOOTPRINT

**FORMER NINEMILE CREEK CHANNEL**

- USGS TOPO MAP 1898
- THOMSEN ASSOCIATES 1982
- ALLIED DRAWING 1937

HONEYWELL INTERNATIONAL INC.
OU-1 FEASIBILITY STUDY
WASTEBEDS 1- 8
GEDDES, NEW YORK

## SITE PLAN

0 400 800 1,600
Feet

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# FIGURE 3

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## LEGEND

- SEEP COLLECTION TRENCH
- GROUNDWATER COLLECTION TRENCH
- DITCH A
- ACCESS PATHWAYS
- REVETMENT
- SEEP APRON
- VEGETATIVE COVER / RESTORED AREA / SHORELINE STABILIZATION / WET SWALE
- MITIGATION WETLAND
- BIOSOLIDS
- WASTEBEDS 1-8 SITE

HONEYWELL INTERNATIONAL INC.
OU-1 FEASIBILITY STUDY
WASTEBEDS 1- 8
GEDDES, NEW YORK

## INTEGRATED IRM COMPONENTS

0 350 700 1,400
Feet

AUGUST 2014
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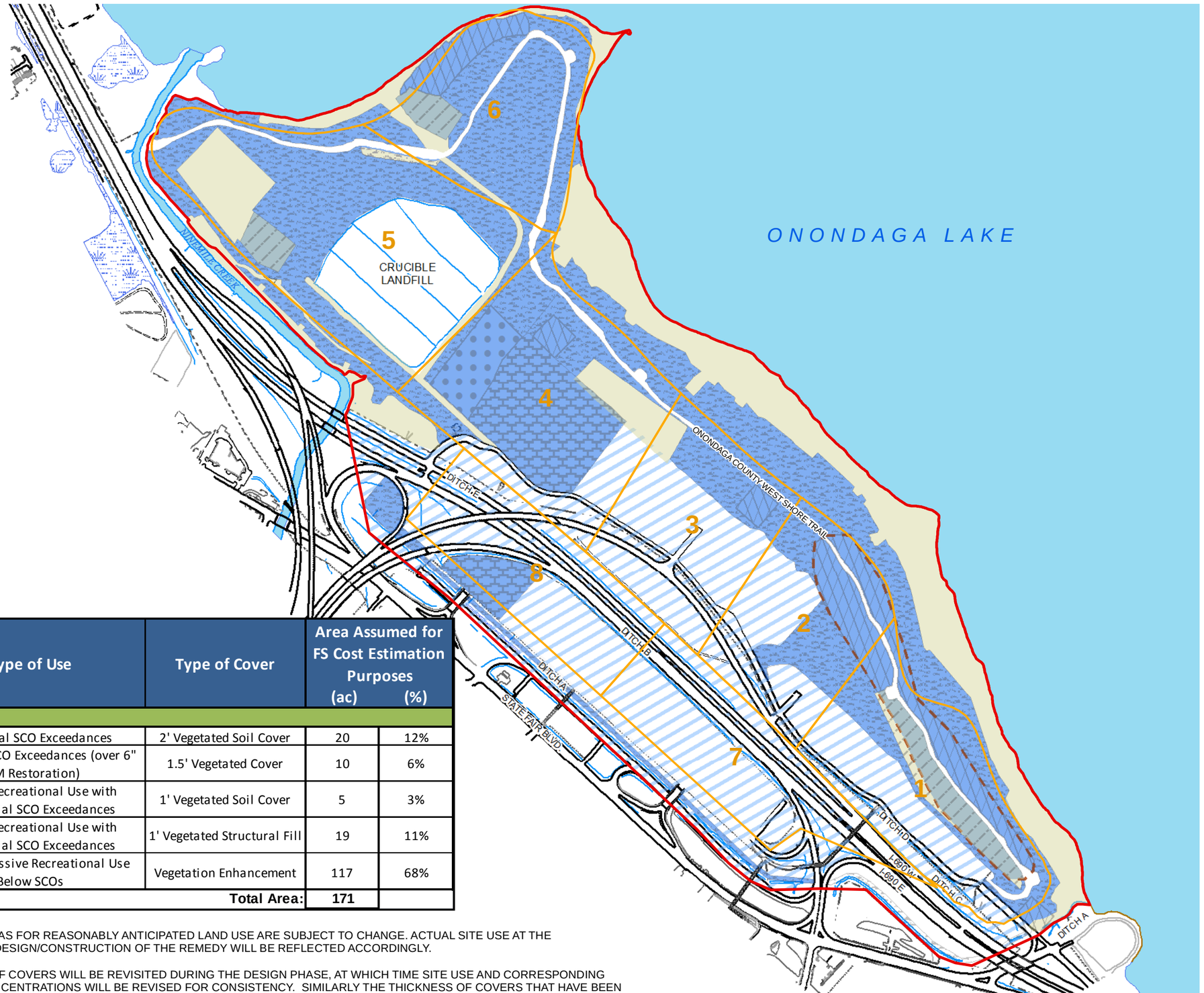
# FIGURE 4




| Type of Use | Type of Cover | Area Assumed for FS Cost Estimation Purposes (ac) | (%) |
|---|---|---|---|
| | | | |
| Ecological SCO Exceedances | 2' Vegetated Soil Cover | 20 | 12% |
| Ecological SCO Exceedances (over 6" IRM Restoration) | 1.5' Vegetated Cover | 10 | 6% |
| Passive Recreational Use with Commercial SCO Exceedances | 1' Vegetated Soil Cover | 5 | 3% |
| Passive Recreational Use with Commercial SCO Exceedances | 1' Vegetated Structural Fill | 19 | 11% |
| Active or Passive Recreational Use Below SCOs | Vegetation Enhancement | 117 | 68% |
| | **Total Area:** | **171** | |

[1] ASSUMED AREAS FOR REASONABLY ANTICIPATED LAND USE ARE SUBJECT TO CHANGE. ACTUAL SITE USE AT THE TIME OF THE DESIGN/CONSTRUCTION OF THE REMEDY WILL BE REFLECTED ACCORDINGLY.

[2] THE EXTENT OF COVERS WILL BE REVISITED DURING THE DESIGN PHASE, AT WHICH TIME SITE USE AND CORRESPONDING SURFACE CONCENTRATIONS WILL BE REVISED FOR CONSISTENCY. SIMILARLY THE THICKNESS OF COVERS THAT HAVE BEEN ASSUMED WILL BE REVISITED DURING DESIGN SUCH THAT FACTORS INCLUDING LAND USE CAN BE CONSIDERED WHERE APPROPRIATE.

N

## LEGEND

- NO FURTHER ACTION AREAS (EXISTING FILL) TO BE CONFIRMED AS PART OF OU-1 FS DESIGN[2] (118 ac)
- ALTERNATIVE 2 FOOTPRINT (171 ac)
- AREAS ADDRESSED AS PART OF INTEGRATED IRM (71 ac)
- STAGING AREAS ADDRESSED AS PART OF INTEGRATED IRM AND OU-1 FS
- EXISTING VEGETATION ENHANCEMENT
- BIOSOLIDS AREA FOOTPRINT
- APPROXIMATE WASTEBED BOUNDARY
- WASTEBEDS 1-8 SITE

**TYPE OF COVER[1,2]**

- 1' VEGETATED SOIL COVER[1,2]
- 1' VEGETATED STRUCTURAL FILL[1,2]
- 1.5' VEGETATED SOIL COVER[1,2]
- 2' VEGETATED SOIL COVER[1,2]
- VEGETATION ENHANCEMENT[1,2]

HONEYWELL INTERNATIONAL INC.
OU-1 FEASIBILITY STUDY
WASTEBEDS 1- 8
GEDDES, NEW YORK

## ALTERNATIVE 2 - VEGETATED COVER SYSTEM

0 350 700 1,400
Feet

SEPTEMBER 2014
1163.45176

O'BRIEN & GERE

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I:\Honeywell.1163\45176.Wb-1-8-Site-Wide\Docs\DWG\MXD\FS 2014\FS 2014 Rev\Institutional_Controls_2_Cover_Rev.mxd

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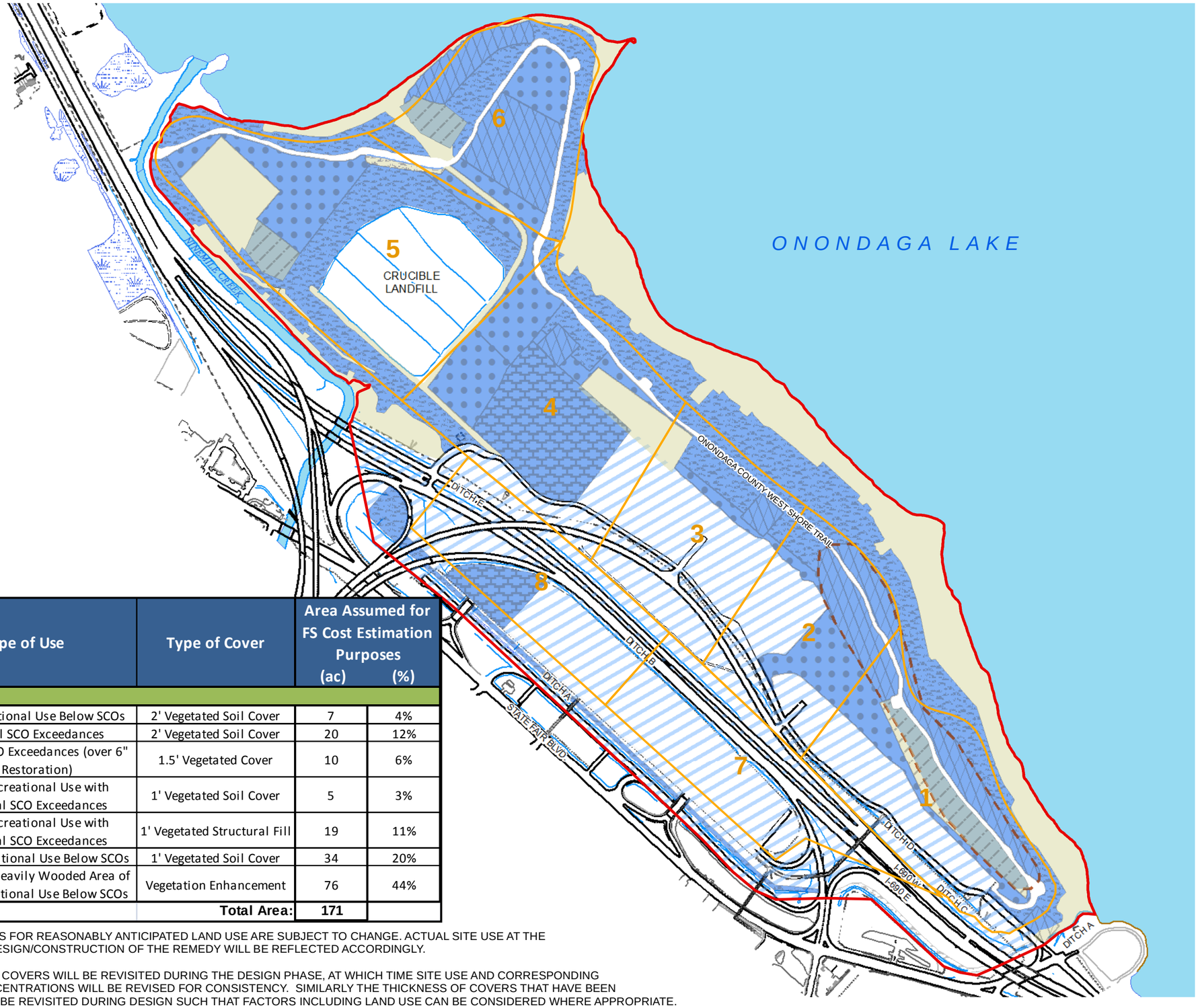
# FIGURE 5




| Type of Use | Type of Cover | Area Assumed for FS Cost Estimation Purposes (ac) | (%) |
|---|---|---|---|
| Active Recreational Use Below SCOs | 2' Vegetated Soil Cover | 7 | 4% |
| Ecological SCO Exceedances | 2' Vegetated Soil Cover | 20 | 12% |
| Ecological SCO Exceedances (over 6" IRM Restoration) | 1.5' Vegetated Cover | 10 | 6% |
| Passive Recreational Use with Commercial SCO Exceedances | 1' Vegetated Soil Cover | 5 | 3% |
| Passive Recreational Use with Commercial SCO Exceedances | 1' Vegetated Structural Fill | 19 | 11% |
| Passive Recreational Use Below SCOs | 1' Vegetated Soil Cover | 34 | 20% |
| Steep Slopes/Heavily Wooded Area of Limited Recreational Use Below SCOs | Vegetation Enhancement | 76 | 44% |
| | **Total Area:** | **171** | |

[1] ASSUMED AREAS FOR REASONABLY ANTICIPATED LAND USE ARE SUBJECT TO CHANGE. ACTUAL SITE USE AT THE TIME OF THE DESIGN/CONSTRUCTION OF THE REMEDY WILL BE REFLECTED ACCORDINGLY.

[2] THE EXTENT OF COVERS WILL BE REVISITED DURING THE DESIGN PHASE, AT WHICH TIME SITE USE AND CORRESPONDING SURFACE CONCENTRATIONS WILL BE REVISED FOR CONSISTENCY. SIMILARLY THE THICKNESS OF COVERS THAT HAVE BEEN ASSUMED WILL BE REVISITED DURING DESIGN SUCH THAT FACTORS INCLUDING LAND USE CAN BE CONSIDERED WHERE APPROPRIATE.

N

## LEGEND

- NO FURTHER ACTION AREAS (EXISTING FILL) TO BE CONFIRMED AS PART OF OU-1 FS DESIGN[2] (118 ac)
- ALTERNATIVE 2 FOOTPRINT (171 ac)
- AREAS RESTORED AS PART OF INTEGRATED IRM (71 ac)
- STAGING AREAS ADDRESSED AS PART OF INTEGRATED IRM AND OU-1 FS
- EXISTING VEGETATION ENHANCEMENT
- BIOSOLIDS AREA FOOTPRINT
- APPROXIMATE WASTEBED BOUNDARY
- WASTEBEDS 1-8 SITE

**TYPE OF COVER[1,2]**

- 1' VEGETATED SOIL COVER[1,2]
- 1' VEGETATED STRUCTURAL FILL[1,2]
- 1.5' VEGETATED SOIL COVER[1,2]
- 2' VEGETATED SOIL COVER[1,2]
- VEGETATION ENHANCEMENT[1,2]

HONEYWELL INTERNATIONAL INC.
OU-1 FEASIBILITY STUDY
WASTEBEDS 1- 8
GEDDES, NEW YORK

## ALTERNATIVE 3 - ENHANCED VEGETATED COVER SYSTEM

0 350 700 1,400
Feet

SEPTEMBER 2014
1163.45176

O'BRIEN & GERE

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**OPERABLE UNIT 1 OF THE SOLVAY WASTBEDS 1-8 SUBSITE**
**OF THE ONONDAGA LAKE SUPERFUND SITE**
**RECORD OF DECISION**

**APPENDIX V-b**

**PUBLIC NOTICE PUBLISHED IN THE**
***SYRACUSE POST STANDARD***
**ON SEPTEMBER 18, 2014**

**THE** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION INVITES PUBLIC COMMENT ON THE PROPOSED PLAN FOR OPERABLE UNIT 1 OF THE SOLVAY WASTEBEDS 1-8 SITE The New York State Department of Environmental Conservation (NYSDEC) and the U.S. Environmental Protection Agency (EPA) will hold a public meeting at 6:00 PM and open house from 5:00 - 6:00 PM on September 30, 2014 at the Martha Eddy Room in the Art and Home Center at the New York State Fairgrounds, Syracuse, New York to discuss the Proposed Plan for Operable Unit 1 (OU1) of the Solvay Wastebeds 1-8 site. The Wastebeds 1-8 site is a subsite of the Onondaga Lake Superfund Site. OU1, which addresses the Solvay waste and contaminated soil/fill materials, is the subject of this Proposed Plan. The Proposed Plan describes the remedial alternatives evaluated for OU1, including the preferred alternative. OU2, which will address the groundwater and impacted media in a surface water drainage ditch, Ditch A, will be addressed in a future remedy. The Proposed Plan provides a summary of the findings of the Remedial Investigation and OU1 Feasibility Study conducted to determine the nature and extent of the contamination at the Site, to determine whether this contami-

nation poses a threat to public health and the environment, and to identify and evaluate remedial alternatives. The Proposed Plan also identifies the preferred remedy for OU1. The NYSDEC and EPA are issuing the Proposed Plan to encourage and receive input and comments from the public. The primary objectives of this action are to minimize the migration of contaminants and minimize any current and potential future human health and environmental impacts. The main features of the preferred remedy include the placement of cover systems that would be protective for current and/or reasonably anticipated future land uses (e.g., active and passive recreational uses). The types of cover systems that would be applied at the site include a one-foot thick soil cover, a two-foot thick soil cover, a one-foot thick vegetated structural fill cover, and a vegetation enhancement cover. The type of cover system applied to a given area of the site would be based on the contaminant levels, the current and/or reasonably anticipated future land uses (e.g., active and passive recreational uses) and the extent of existing cover materials in that area. Native species would be used for the vegetative component of covers. The cover systems would be applied over 171 acres of the Site where covers are not present.

The remedy described in the Proposed Plan is the NYSDEC's and EPA's preferred remedy for the Site. Changes to the preferred remedy or a change from the preferred remedy to another remedy may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after the NYSDEC and EPA have taken into consideration all public comments. The NYSDEC is soliciting public comment on the alternatives considered in the detailed analysis of the FS because NYSDEC and EPA may select a remedy other than the preferred remedy. The Proposed Plan, Remedial Investigation, and Feasibility Study are available at the following locations. Information is also available on DEC's website at www.dec.ny.gov/chemical/37558.html. Onondaga County Public Library 447 South Salina Street Syracuse, New York 13202 315 435 1800 Solvay Public Library 615 Woods Road Solvay, NY 13209 Phone: (315) 468-2441 Atlantic States Legal Foundation 658 West Onondaga Street Syracuse, New York 13204 315 475 1170 NYSDEC 615 Erie Boulevard, West Syracuse, New York 13204 2400 315 426 7400 Please call for an appointment NYSDEC, DER 625 Broadway, 12th Floor Albany, New

**OPERABLE UNIT 1 OF THE SOLVAY WASTBEDS 1-8 SUBSITE**
**OF THE ONONDAGA LAKE SUPERFUND SITE**
**RECORD OF DECISION**

**APPENDIX V-c**

**PUBLIC MEETING SIGN-IN SHEETS**

(1)

# NYS Department of Environmental Conservation
## Public Meeting

**Topic** Wastebeds 1-8 PRAP
**Date** 9/30/14

| Name | Affiliation, if any | Contact Information | Formal public comment? Y/N |
|---|---|---|---|
| ✓→ 1. RUB PAPWORTH | TRUSTEE NATURE CONSERVANCY | 471 0914 RPPWRTH@VERIZON | Y |
| 2. Clare Leary | OBG | | N |
| 3. Jennifer Reymond | OBG | | N |
| 4. THOMAS F BLAKE | FRIENDS OF SOLWAY LIBRARY | 315 468-3994 | N |
| 5. Joseph M. Solon | Friends of Solvay Library | solon1616@gmail.com | N |
| 6. Colleen O'Mara | PHG | colleen@pinckneyhugo.com | N |
| ✓→ 7. David Simmons | OCFSC | president@federationofsportsmen | Y |
| 8. Chris Calkins | OBG | christopher.calkins@obg.com | N |
| 9. Kellie Cowan | WSTM / WTVH | | N |
| 10. Tom Conklin | OBG | Tom.Conklin@OBG.com | N |
| 11. Graham Bradley | SUNY Oswego | graham.bradley@oswego.edu | N |
| 12. DAVE SCHEUING | AECOM | DAVID.SCHEUING@AECOM.COM | N |
| 13. JERRY Plewniak | Modern Environmental | jerry@modern-corp.com | N |
| 14. Steve Miller | Parsons | Steve.Miller@Parsons.com | N |
| 15. Jack Ramsden | CPWG | | N |

(2)

# NYS Department of Environmental Conservation
## Public Meeting

**Topic** Wastebeds 1-8 PRAP
**Date** 9/30/14

| Name | Affiliation, if any | Contact Information | Formal public comment? Y/N |
|---|---|---|---|
| ✓ → 1. Lloyd Withers | Onondaga Shoreline | LWITHERS@TWCNY.RR.COM | Y |
| 2. James Murphy | PACE ANALYTICAL | James.Murphy@Pacelabs.com | N |
| 3. Doug Crawford | O'Brien & Gere | doug.crawford@obg.com | N |
| 4. Doug Porter | | dporter@syr.edu | N |
| 5. Will Hackett | | William_Hackett@gmail.com | ~ |
| 6. Steve McCoy | DMA & HGRE | | N |
| 7. David Coburn | Onon. Co. | No way! | N |
| 8. Ben Brazell | EDR | BBRAZELL@EDRDPC.com | N |
| 9. Bob Duclos | CES | BDUCLUS@CSCOS.COM | N |
| 10. Bob Palladino | C&S | bpalladino@cscos.com | N |
| 11. Mary Vulcan | Gilberti law | mev@gilbertilaw.com | N |
| 12. Mike Plochocki (Elected Official) | Onon. City. Leg. | mikeplochocki@hotmail.com | Y |
| 13. Mary Beth Primo | Onon County Exec Office | MPrimo@ongov.com | N |
| 14. | | | |
| 15. | | | |

# NYS Department of Environmental Conservation
## Public Meeting

**Topic** _____

**Date** _____

| Name | Affiliation, if any | Contact Information | Formal public comment? Y/N |
|---|---|---|---|
| 1. Bethany Macera | | Macerabm@Lemoyne.edu | |
| 2. | | | |
| 3. | | | |
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**OPERABLE UNIT 1 OF THE SOLVAY WASTBEDS 1-8 SUBSITE**
**OF THE ONONDAGA LAKE SUPERFUND SITE**
**RECORD OF DECISION**

**APPENDIX V-d**

**SEPTEMBER 30, 2014 PUBLIC MEETING TRANSCRIPT**

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**IN THE MATTER OF:**

Remedy Proposed for Operable Unit 1

of the Solvay Wastebeds 1-8 Site

a Subsite of the Onondaga Lake Superfund Site

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Public Meeting

September 30, 2014

6:00 p.m.

Martha Eddy Room
New York State Fairgrounds
Syracuse, New York

*Eileen McDonough, RPR, CRR*
*Official United States Court Reporter*
*P.O. Box 7367*
*Syracuse, New York 13261*
*(315)234-8546*

(6:00 p.m.)

MR. KEN LYNCH: Good evening, everyone. Nobody wants to sit in the front. That's why we have the mic. My name is Ken Lynch. I'm the Regional Director for DEC here for Region 7, Syracuse area. Before I get started I want to introduce your head table here. We'll start with the Department of Health, Maureen Schuck and Mark Sergott. And from the U.S. EPA we have Bob Nunes. And our DEC project managers are Don Hesler and Tracy Smith.

I also want to recognize Diane Carlton and Stephanie Webb. How are you, Stephanie? I'm sure you all know the two of them. They do a fine job setting up all of our public meetings, and thank them for setting up.

I will say before we get started, when we do the public speaking part of the presentation, we're going to take speakers in the order of sign-in. If you did want to speak and didn't sign in, you can do so at any time during the meeting. And if we don't get to you or if you decide in the middle of the meeting that you want to speak, we'll have time at the end for anyone who didn't sign in. Looks like we don't have a huge list so we should be able to accommodate everyone with no problems.

The format of the meeting is we're going to start off with the presentation explaining the proposed plan, and then we're going to do a brief question and answer period,

and then we'll start the formal public comment period where people can come up and make their public comments on the proposed plan.

Before we get into the presentation -- Tracy Smith will be giving the technical presentation. Before he starts I just want to make a brief statement about the relationship of this proposed remedial plan and the county's proposed amphitheater at the site. I know many of you are interested in that proposal also. This plan, the remedial plan, is a separate and distinct action that's required regardless of any future use of the site. The investigation, the review of the alternatives, and ultimately the proposed plan and the final plan is required whether or not the amphitheater was or is going to be built.

That being said, we haven't developed this plan in a vacuum. The DEC, EPA and the Department of Health are very aware of the county's plan of proposed development and we're taking that into consideration as part of the remedial process. There has been a lot of coordination between DEC and the county, including DEC's participation in the county's SEQR process. In the end the plan must be protective of the environment and human health. Knowing the end uses helps us in coming up with and guides us in assuring that the proposed plan will be protective.

As you'll see during the presentation, we looked at

a lot of potential or existing uses at the site, including parking lots, the existing trail, the proposed amphitheater, and any other potential future recreational uses that we might see. The plan is flexible to address a number of different potential uses at the site. So in the end, as I stated, this is a separate process but we don't do it in a vacuum. We consider not only the amphitheater, but other existing and potential uses at the site.

So moving on, I want to introduce Tracy Smith. Tracy is going to give you a brief overview and a PowerPoint presentation of the plan itself.

MR. TRACY SMITH: Thank you, Ken. As Ken said, I'm Tracy Smith. I'm the project manager for the wastebeds 1-8 site. For the presentation I will discuss some background, the alternatives evaluated, preferred remedy, and then the next steps that will go forward in the process.

The site, which is a subsite to the Onondaga Lake NPL site, as you probably know, is located across the street here between State Fair Boulevard and Onondaga Lake and it covers approximately 400 acres.

For some history, Solvay waste was disposed in wastebeds 1-8 from approximately 1916 to 1943. Solvay waste was generated in the production of soda ash. Soda ash is used to make glass, chemicals, and as a water softener. Solvay waste itself is an inorganic waste mainly consisting

of calcium carbonate, which is a main component of limestone and marine shells, calcium silicate, which is used in roads, insulation, table salt and antacids. And then magnesium hydroxide, which is used in milk of magnesia.

This picture is from 1938 when the wastebeds were in operation. The waste was pumped here, the slurry and solids would drop out in water, evaporated, and were discharged into Onondaga Lake. This is a picture from 1948. This would have been after the wastebeds were -- waste stopped being pumped to the beds. I believe this view is from the southeast side of the wastebed looking west from near where the Honeywell visitor center here currently is. This map shows the site boundary and the site owners.

The site is owned by Onondaga County, which includes the recently open west shore trail. They mainly own the site adjacent to the lake here. The other half is owned by New York State, which includes the State Fair parking areas and Route I-690 and Route 695, and of course Fairground parking. Crucible Landfill is also located on the site. That's a capped and closed landfill. I'll talk more about that later.

Also there is presently a lot of material that's been placed on the landfills or on the wastebeds, covers already placed, such as the landfill, the roads have been placed, the highways, and gravel that's been placed in the

1 parking lot. I'll discuss that a little more later also.
2 So some investigations have been performed on the
3 site. The main one of which was remedial investigation.
4 Various risk assessments have been performed on the site
5 also. These include the Human Health Risk Assessment, or
6 HHRA, west shore trail HHRA, and assessments and supplemental
7 HHRA for the county's proposed amphitheater. These risk
8 assessments indicate potentially unacceptable risks to ATV
9 riders and construction workers but no other site visitors.
10 Risk to construction workers can be mitigated using proper
11 controls during construction also.
12 Ecological assessment was also performed that
13 identified potential unacceptable risks to terrestrial
14 receptors such as robins, red tail hawks and foxes. Site
15 contaminants include benzene, naphthalene, metals and others
16 listed here. Mercury is not a major contaminant of the site.
17 Besides Solvay waste other byproducts were also disposed
18 here, such as benzene. It appears that some of the
19 co-disposal waste occurred during the early operations of the
20 wastebeds since visibly contaminated materials are present at
21 the site. This includes stained Solvay waste, sometimes a
22 brown-orange color. Solvay waste is usually white or gray.
23 These contain high levels of volatile contaminants. These
24 materials are usually present in depths of over 40 feet deep
25 and primarily located on the eastern half of the site of the

wastebeds. I'll show the next picture here. That would be mainly this half of the wastebeds. Those were the first wastebeds in operation which contain that material.

Also note the sites have been separated into two operable units. These address distinct portions of the site. Operable Unit 1 addresses the Solvay waste and contaminated soil and fill materials and is the subject of this proposed plan and the presentation I'm doing today.

Operable Unit 2 will address the groundwater and the impacted sediment in the surface water drainage ditch, called Ditch A. Proposed plan for OU2 will be released following the development of FS for OU2, which will be done in the future.

Moving forward I would like to discuss the IRM, or Interim Remedial Measure. This work was started in 2011. An IRM is an action that can be performed in emergency and nonemergency situations. The main purpose of the IRM was to shut off sources of contaminants into Ninemile Creek and Onondaga Lake. It includes multiple components. To prevent contaminated groundwater from discharging into Ninemile Creek over here and Onondaga Lake. The groundwater collection system consisting of trenches and wells, pump stations and associated force main piping were installed along Ninemile Creek approximately here. The north shoreline, approximately up here, between the point and Ninemile Creek, and along the

eastern shoreline in here.

The water that is collected is conveyed to Honeywell's Willis Avenue groundwater treatment plant for treatment. In total there is approximately 10,000 feet of collection trenches, or almost 2 miles. In addition to cover exposed Solvay waste, the cover system was constructed along the eastern shoreline. That's basically in this area also. This included a total of nine and a half acres of mitigation wetlands, which two and a half, about 2.3 acres will be a lake connected wetlands and 7.2 acres will be inland wetlands. These wetlands were constructed to make up for wetland losses from this and other Honeywell work around Onondaga Lake.

In areas where there is not wetlands on the eastern shoreline here, there are storm water ditches, access pathways and other vegetative cover systems that are being constructed. Stabilize the shoreline, prevent wind and wave erosion along the northern shore of the site, essentially on the point here, most of the point. Where the white cliffs used to be present, revetment, which is essentially a sloped retaining wall to prevent erosion, was installed using large stone. Work has also been performed in Ditch A, which is present along the sort of southwestern edge of the site and discharges into the lake here and also a portion of the discharge to Nine Mile creek. Sediment removal and culvert

cleaning and repair work was done as part the IRM also. Additional work in Ditch A will be performed in future under Operable Unit 2.

I would like to show you the pictures of some of the IRM work that's been done just to give you an idea of the scope of it. This is the installation of the groundwater collection system along Ninemile Creek. You can see how close it was to the creek to cut off the contamination going into there. This is the north shoreline system between the point and Ninemile Creek that I showed. This is the eastern shoreline seep collection system, which is basically a shallow French drain type system. And this is the eastern shoreline groundwater collection system which was installed along Onondaga Lake.

This picture here shows the eastern shoreline area before the IRM started along the eastern shoreline. You can see all the exposed Solvay waste. This is a picture that I took last week. Work's ongoing but you can see the majority of the Solvay waste has been covered and you can see that the wetland that's been constructed here, it's been planted, seeds installed, and it's starting to take shape nicely. You can see a lot of this work from the west shore trail if you take a walk along there. It's pretty impressive.

Groundwater collection system is present along here. Basically present along the lake shore reaching back

in the background there, and there is also the seep collection system which runs essentially along here toward the base of the wastebeds along this road.

Here is some pictures before and after the deep cliff areas where the revetment was installed. You can see the steep cliffs of Solvay waste where the erosion was occurring, the revetment was constructed with large stone, shrubs and small trees have been planted within the stone. There is still additional work to be done. The road along the lake will be removed and additional stuff like that.

Based on the focused feasibility study that was performed before the IRM, the cost for this IRM, the estimate would be approximately $24 million, just to give you an idea of the scope of the work that's been performed there. I don't have to read this whole slide but these are the objectives for the Operable Unit 1 remediation. These bullets are a summary of the site's remedial action objectives. I'm not going to read through them all, like I said, but the main purpose is to prevent unacceptable human exposure and ecological impacts. At a minimum the remedy shall eliminate or mitigate all significant threats to public health and the environment presented by the contamination.

These alternatives, these are the list of alternatives that were considered based on the remedial action objectives that I just described to address the

contamination identified for Operable Unit 1. Alternative 1 is a no-action alternative. We're required to evaluate this alternative for all of our remedies as a baseline or a basis for comparison to the other potential alternatives. This alternative leaves the site in its present condition and does not provide any additional protection to public health or the environment.

Alternatives 2 and 3 have similar components. They include cover systems to prevent exposure to Solvay waste and the contaminated soil. The cover systems would be placed on soil cleanup objectives, or SCOs, or current or future use of the site. For the site the uses include commercial or passive recreational use, such as parking areas, walking trails; restricted residential or active recreational use, such as lawn seeded areas for the amphitheater or playing fields, and ecological use.

Alternatives 4A and 4B are removal alternatives. 4A includes full removal of the Solvay wastebeds, wastebeds 1-8, including the highways. While alternative 4B will remove a significant portion of the wastebeds but will keep the highways in place and cover any remaining Solvay waste.

Alternative 2 includes 1 to 2 feet of soil cover placed in areas that exceed the cleanup objectives. Approximately 24 acres would need a 1 foot soil cover based on passive recreational use cleanup objectives, and

approximately 30 acres will need a 2 foot soil cover based on ecological cleanup objectives.

There is no anticipated areas where active recreational use cleanup objectives are currently exceeded. Over remaining areas, which there are approximately 117 acres of vegetation enhancement cover, which consist of a wooden mulch, compost mix and fertilizing mixed with seeds would be applied. This would help promote growth of vegetation, stabilize soil and prevent erosion on the site. This will be applied on areas such as steep slopes, wooded areas and areas where cleanup objectives are not exceeded. The estimated time to implement this alternative is six years.

Alternative 3 is similar to Alternative 2 except that areas where passive and active recreational use is anticipated, regardless of cleanup objectives exceeds, is 1 or 2 foot soil cover be placed. These additional cover areas would further reduce potential exposure to Solvay waste and contaminated soil. This results in it being placed in at least 40 additional acres compared to Alternative 2.

With the remaining area, which is approximately 76 acres, vegetation enhancement cover would be applied. This includes the steep slopes again, wooded areas and areas where use by the public in not anticipated. The estimated time for working on this alternative is eight years.

The cover systems for Alternative 2 and 3 in total

1 would cover approximately 171 acres on the site. Cover on
2 all the approximately 400 acres of the site is not included
3 under these alternatives because there is already cover
4 present in some places, as I discussed before. These include
5 areas associated with the roads and highways, basically
6 I-690, 695, that's the associated grass medians and shoulders
7 of those highways. That's approximately 90 acres of area.
8 There is State Fair parking lot areas, the upper parking or
9 orange parking lot here and the lower parking lot here
10 beneath, between State Fair Boulevard and I-690. They've had
11 gravel placed on them previously. The investigations show
12 approximately 2 to 7 feet of gravel has been placed in those
13 areas. That's approximately 58 acres.
14 There is also the areas that have been addressed by
15 the IRM that I just discussed, along the lake shore, along
16 the other shorelines, some staging areas that have been
17 placed, which would be covered over. That's approximately
18 60 acres. And then there is also the Crucible landfill
19 present here, of course, which was a permitted landfill that
20 was closed with a cap in 1988. That's approximately 20 acres
21 in size. And, finally, we have the western shore trail,
22 which has been paved, covered over with multiple feet of
23 soil. That's approximately 9 acres in size.
24 Going on to Alternatives 4A and 4B, the removal
25 alternatives. As I discussed before, Alternative 4A includes

full removal of the wastebeds, including removal and replacement of I-690 and Route 695. Alternative 4B is a partial removal alternative, includes removing the wastebed except for the areas occupied by the highways. These alternatives would remove approximately 23 to 27 million cubic yards of Solvay waste from the soil of the site, equivalent to approximately 7,000 Olympic-sized swimming pools. Construction would be estimated to take 27 to 30 years for these alternatives. That's based on an estimate of 1.3 to 1.5 million truck trips over 27 to 30 years, based on a ten month construction period, shutdown for winter, and an eight hour workday. That's equivalent to a truck entering or leaving the site every three minutes. So a lot of truck driving. These alternatives would be very difficult to implement based on the volumes present at the site, the size of the site, finding places to reuse or capacity to dispose of material.

To evaluate the remedial alternatives we use these criteria. Remedial alternatives, other than no action alternative. Undergoing the detailed evaluation must meet the first two criteria, which are the protection of human health and the environment and compliance with federal and state regulations. Other criteria include long-term effects, short-term effects, how easy or difficult a remedy is to implement and how the remedy is accepted by the community.

1 This table shows the cost for the various remedial
2 alternatives. Alternative 1, no action, by definition is
3 zero. Alternative 2 has a cost of around 16 and a half
4 million. And alternative 3 is approximately $20 million.
5 Alternative 4, full removal, is the highest with a cost of
6 over $6 billion. The cost of partial removal under
7 Alternative 4B is over $5 billion. These costs don't include
8 the IRM costs of approximately $24 million that I already
9 discussed, so that's additional work and that has been done
10 at a separate cost.
11 Getting into the preferred remedy for the DEC and EPA,
12 the preferred remedy is Alternative 3. As I discussed
13 earlier, this includes placing a 1 or 2 foot soil cover over
14 approximately 95 acres of the site and vegetation enhancement
15 cover over the remaining 76 acres, which presently has
16 insufficient vegetation.
17 The areas in tan here are where the IRM work has been
18 performed, so no additional work is needed there. The
19 preferred remedy includes continued monitoring maintenance
20 associated with the cover typed components of the IRM. Areas
21 in white are where existing covers I discussed earlier are
22 present, such as the Crucible landfill, the highways, parking
23 lots. Green are areas that have -- that will have 2 feet of
24 soil cover placed. These are estimated areas based on
25 potential site use. This can change in the future, of

course. But there is some site areas where ecological uses are anticipated, such as here and I think over here.

Then the orange areas are areas where 1 foot of cover is anticipated to be placed. This includes structural fill in the parking lot areas here, and that's where cleanup criteria are exceeded in the parking lots, and then there is other anticipated areas of 1 foot of cover placed.

Blue is where the vegetation enhancement would be placed as necessary. The covers would be designed in accordance with the future site uses, as I mentioned. Depends on what the site use will be in the future. Of course, depending on the county and other uses. Cover locations, areas, and as necessary thickness of the covers will be determined during the design.

Here is some pictures that show the vegetation enhancement that was placed as part of a pilot study before the application in 2011. You can see the exposed Solvay waste that is present. A little vegetation is also present. Mulch and seed were then placed in 2011. That is a month after the previous slide, you can see the mulch present. The third photo here shows the areas in the summer of 2013, so you can see how thick the vegetation has grown in after two growing seasons, filled in the exposed areas. This last picture is from this summer, a few months ago. Note that this area is also -- this pilot study was also placed on a

steep area of the wastebed. It's held up very well. There has been no additional erosion. Vegetation is growing in. And also this pilot study there was only 1 inch layer of the mulch compost that was used for the preferred remedy. A thicker layer of up to 4 inches is proposed in Alternatives 2 and 3, but the final mulch layer thickness, the optimal thickness will be determined during design.

I discussed structural fill earlier. Here is some pictures that show the structural fill that was placed as part of the pilot study, as part of another pilot study. This material is essentially a mixture of gravel and soil mulch that contains seed. This was placed late last year and located on State Fair parking lot areas. You can see how over three months how much vegetation growth there was. Lots of flowers present. This was during the State Fair on August 25th. You can see it was used for parking during the fair. And then after the fair the cover held up pretty well, no exposure of underlying materials. One foot cover is proposed for the parking lot areas. This 1 foot structural fill cover is proposed for the parking lot area because it holds up very well to traffic and it will support vegetation, instead of paving the areas or some other remedy like that.

The preferred remedy also includes institutional controls and a site management plan. Institution controls would further reduce the potential for exposures at this site

by controls such as restricting the site's futures use. The site management plan would include maintenance and monitoring or inspection of the covers and would address any future changes in use of the site. For example, if additional public use areas such as soccer fields were proposed to be built at the site where sufficient cover is not present, then additional cover to address this use would need to be added.

Alternative 3 is being proposed because it protects public health and the environment, and provides the best balance of the alternatives in the evaluation, the remedial alternatives, would achieve the remediation goals for the site and the covering the Solvay waste and contaminated soils. The time to implement this alternative is eight years. This is for all the cover areas of the site. This work could be done in phases so cover systems could be completed in a certain area each year, not just all at once. So as site uses are anticipated, they could place the cover in one area without placing covers in other areas, essentially.

That's basically most of the presentation I have. Public comment period is anticipated to close on October 17th. Comments will be accepted by that date. You can either mail, e-mail, write comments on a card at this meeting, come up here and speak. Following the public comment period the record of decision which selects the final

remedy for this operable unit will be drafted and a remedial design will proceed with construction anticipated to start next year. Go on to questions. I'm sure there is some clarifications or anybody has questions on the remedy, the IRM, anything like that, I would be more than happy to answer them.

MR. KEN LYNCH: I just wanted to note, I know there is a lot of information that we went over really quickly. We're going to try to get this PowerPoint on line if we can do that on our website soon after this meeting so you'll have the photos and the narratives so that you can take a closer look at it. Take advantage of our poster boards. A lot of the slides you saw on the presentation are up on our poster boards and we will be around after the meeting for any detailed technical questions you might have.

At this time we'll take some general questions before we move into the formal presentation. Lloyd, I see you're raising your hand.

MR. LLOYD WITHERS: For reuse of Solvay waste, what investigation was done for that, further investigation?

MR. TRACY SMITH: There had been uses looked at during the FS. Those are described some in there. I don't know if I really -- I wouldn't say reuse. I think previously even before this as part of previous meetings we looked at landfill covers use as an aggregate. I just don't think we

1 ever found a really appropriate reuse for this material,
2 especially in the volume that's present there. I'm sure we
3 can look into that more and more description or more analysis
4 of that in the Responsiveness Summary.
5 MR. LLOYD WITHERS: Has O'Brien & Gere done that?
6 MR. TRACY SMITH: O'Brien & Gere did look at a lot
7 of that.
8 MR. LLOYD WITHERS: Is it being reused anywhere
9 around the world?
10 MR. TRACY SMITH: I have not heard of any use of it
11 but that's something we can check into. But I do not know of
12 any use. I mean, there are multiple Solvay wastebeds around
13 the world, but I have not heard of any reuse of it.
14 MR. BOB NUNES: It's also important to note that
15 the Solvay waste also is mixed with other contaminants that
16 Tracy noted in the slides, so there would be a need to try to
17 address or to treat that waste material in addition to the
18 Solvay waste. So there would be a number of challenges
19 because of treating the material because of the mixture of
20 other contaminants and also because of the enormous volume of
21 material we're looking at here.
22 MR. LLOYD WITHERS: How much groundwater will leach
23 into the lake post your chosen alternative?
24 MR. TRACY SMITH: That's going to be probably more
25 looked as part of the separate operable unit for the

1 groundwater. I don't think we have those numbers right now.
2 That will definitely be something that's looked at in the
3 future. Since right now we're just addressing the Solvay
4 waste and the soils that are present at the site.
5 MR. LLOYD WITHERS: Would have to be protective of
6 the lake environment and certainly water leaching from the
7 site groundwater is a variable that is important in our
8 climate. It would seem a major component of this that
9 stopping groundwater from reaching the lake would have to be
10 a requirement for this alternative.
11 MR. DONALD HESLER: And it has been. Tracy was
12 talking before about the IRM work. A lot of the IRM work was
13 focused on addressing shallow intermediate depth groundwater,
14 that's those collection systems that go roughly about
15 10,000 feet around the site.
16 MR. LLOYD WITHERS: I did notice that, but I also
17 notice a large portion of the site is not being treated with
18 that IRM.
19 MR. DONALD HESLER: There is a couple of areas over
20 by lake-view point wrapping around toward the lake where we
21 don't have collection systems. For the IRM we didn't see a
22 need for that. We will be revisiting that during the
23 Operable Unit 2 evaluation. And that would look at do we
24 need to do any more shallow intermediate depth groundwater
25 collection. Beyond that OU2 we'll also look at do we need to

address deep water. It's definitely on the radar. The point I'm trying to make is that an awful lot of work has been going on to address discharges into Onondaga Lake.

MR. TRACY SMITH: Anybody else? Go ahead, Lloyd.

MR. LLOYD WITHERS: I heard both people talk about vaporization of some of the volatiles within the waste. How does adding the cover treat that?

MR. TRACY SMITH: That was addressed in the proposed plan. I didn't really touch on it here. But there was vapor intrusion evaluations done as part of the investigations. I don't think a lot of stuff showed up in that but that would have to be considered during any buildings that would be constructed. There may be a vapor barrier or mitigation system installed just to be safe, but that would definitely be addressed during the design.

MR. KEN LYNCH: Yes, sir?

MR. MIKE PLOCHOCKI: Hi, Ken. How are you?

MR. KEN LYNCH: Good. How are you?

MR. MIKE PLOCHOCKI: Good. Ken knows who I am. For anybody who doesn't, my name is Mike Plochocki. I'm the legislator and the chair of the environmental protection committee. I say that because I want my questions to be viewed in light of that.

Debatably some or all of these maybe are comments that should be submitted in writing as well, but I guess what

I'm really interested in right now is to the extent that there are any answers that you may have.

As you know, we're right now in the midst of making a huge decision with regards to this site and with the placement possibly of an amphitheater there. Yesterday we just had a long series of hearings about this. Something that came up at the hearings, which I opined about actually, I would like to ask you guys directly, is whether or not an amphitheater was built at this site, is the DEC's proposed remedy, preferred remedy the same? In other words, does that change like if tomorrow a decision was made not to build the amphitheater, would there be a different presentation or vice versa? Is there an answer?

MR. KEN LYNCH: You missed my opening. I anticipated this question.

MR. MIKE PLOCHOCKI: I apologize. I came a few minutes late.

MR. KEN LYNCH: That's fine. Basically this plan, the remediation of this site is required regardless of any future use on the site. It's a listed state Superfund site so we're required to go through the process of investigation, reviewing alternatives, and coming up with a proposed plan and eventually implementing a remediation plan.

It's a separate process but it hasn't been done in a vacuum. We are very aware of the county's plan. We have

coordinated with the county staff during the SEQR review process and during our development investigation of this site. So there is coordination but it's a separate plan.

If an amphitheater or future uses weren't put on this site, we would still move forward with the proposed plan. However, the plan is also flexible enough to not only account for the amphitheater but account for other potential uses on the site. So it's a unique site in that you have a responsible party in Honeywell, different than the actual site owner, the majority of the site owner, the county, but we're very aware that it is a county park. We're aware already that a trail is there. The construction of the trail was based, in part designed based on the contamination we had there. The work being done along the shore is based on future park use of the property. And the overall remedial plan is designed to allow for park use including the amphitheater if that moves forward.

MR. MIKE PLOCHOCKI: Okay. So even if -- again, I don't mean to beat a dead horse to death, but I've been asked many questions on this because there seems to be a belief among some that if the amphitheater were not to be built and instead general park uses, trails, normal recreation, those sorts of things were to be the Plan B, I understand we don't know that that would be Plan B, in theory anything could happen, and I appreciate the flexibility you guys have

1 entered into, but if the Plan B was essentially more of a
2 standard park, there are some who are saying, no, this would
3 change, what the DEC's recommending here, they would have a
4 different remediation. And it's my understanding that there
5 is no reason to think that there would be a different
6 remediation. Is that correct?
7 MR. KEN LYNCH: Generally, no. Specifically for
8 specific uses and specific sites, the plan might change.
9 It's flexible enough to change to address those specific
10 uses. But if the amphitheater wasn't going there, we would
11 still have this proposed cover system on the site.
12 MR. MIKE PLOCHOCKI: And that's really the key,
13 that without the amphitheater, again, the potential
14 amphitheater, I should say, is not changing the excavation as
15 an option from what you said?
16 MR. KEN LYNCH: Correct.
17 MR. MIKE PLOCHOCKI: Secondly, I've been asked by
18 many people, there are many who are of the belief that we
19 don't know a lot of what we don't know. And more precisely
20 that, in addition to the chemicals that you've listed, that
21 there may be chemicals within the ground that we're not sure
22 of what they are. And because of that, as you can imagine,
23 that can feed into paranoia of people saying, well, how can
24 we remedy if we really don't know exactly what's there.
25 Now if I can venture a guess, and I'll probably

1 regret doing this, but what I said is I can't believe the DEC
2 wouldn't have anticipated that and I would imagine that if
3 this is your proposed remedy, that you're taking into account
4 that there could be chemicals that you may not realize. But
5 the kind of remedy that you're offering is a remedy that is
6 all inclusive, even understanding there may be some
7 uncertainties. Would that be fair to say?
8 MR. KEN LYNCH: I think two important things. One
9 is we have a very good idea what the contaminants are because
10 we did thorough investigation on the site. We're very
11 familiar with Solvay waste and what could be in there. We've
12 dealt with it not only on this site but many other Honeywell
13 sites in the area. We're familiar with the history of the
14 processes that Allied used. So we have a very good idea of
15 what the chemicals could be. But, more importantly, what
16 they actually are because of the actual investigation that we
17 did on the site.
18 On top of that, I think we -- this would be with
19 this site or any other site. Our remedies are very
20 conservative to be on the protective side. To make some
21 assumptions that, well, what if you didn't? What if there
22 are some areas that might have some contaminants that we
23 missed because we didn't put a hole in every single spot on
24 the site? Our remedy is conservative enough to make sure
25 that the cap is protective even if there are some additional

1 contaminants in those areas. Especially in the areas of the
2 active use. That's why you have the thicker cover system
3 proposed in the plan.
4 MR. MIKE PLOCHOCKI: Thank you. And lastly, under
5 the Alternative 3 method, as you've termed it, that is the
6 preferred remediation. If I remember correctly in the slide
7 it said that approximately that would take eight years as a
8 rough estimate. I understand that's the entire site you're
9 speaking of, that would be eight years. A concern that -- I
10 didn't know that eight years was the estimate, but I knew it
11 is more than one year that was being suggested. Concerns
12 that have been raised to me are that if the amphitheater is
13 built, the plan is for the amphitheater to be built in a
14 relatively short amount of time, approximately 12 months or
15 less. Obviously that's a lot less than eight years. At
16 least for those areas where the amphitheater would be built,
17 is the plan flexible enough that it can be implemented at
18 least in those critical areas in time for an amphitheater to
19 be built in a year?
20 MR. KEN LYNCH: Yeah. Tracy mentioned briefly that
21 it's designed to be phased because it is a very large site
22 and we could certainly focus on the areas of most active use
23 initially. And if that specifically is the amphitheater
24 site, that would be our first phase one and we would time it
25 with the construction activity related to that site.

1 MR. MIKE PLOCHOCKI: Thank you.
2 MR. KEN LYNCH: Okay. Any other questions? Okay,
3 we will move into our public comment period. I think we have
4 a few people anyways that signed up. Just to be clear, any
5 statements you make tonight will be recorded by a
6 stenographer. If you don't want to make a statement tonight,
7 we give equal weight to written comments. You can submit
8 written comments either tonight or later on, via the contact
9 information that Tracy provided. So you don't have to make a
10 statement tonight if you don't want to. You have until
11 October 17th to do so in writing. And we will take the
12 three -- I think we had three. Stephanie, was there any
13 more? Four people that signed up to speak.
14 MR. MIKE PLOCHOCKI: Excuse me. If I'm the fourth,
15 I've been answered. Thank you.
16 MR. KEN LYNCH: Well, if you're not interested in
17 speaking and you signed up, you can pass. And vice versa, if
18 you didn't sign up and you want to speak, we'll give you an
19 opportunity when we get through with the speakers.
20 First we have Bob Papworth. If you can come up
21 here so everybody can hear you. Let me just say that we
22 would like to -- it looks like we'll have plenty of time to
23 take comments, but for courtesy of others we would like to
24 try to keep -- we won't be timing you, but please try to keep
25 your comments within a five minute or so time frame.

1 MR. BOB PAPWORTH: Thank you. I've been in
2 Syracuse all my life, except for a few years in the Army and
3 working in New York after college. My father worked at
4 Solvay Process for 20 years, so I recall very thoroughly the
5 factory, having gone through it as a boy in the 1950s. So it
6 seems like I've been hearing about this wastebed for a long
7 time.
8 This summer reading the article in the Post
9 Standard about this project it specified a $6 billion cost in
10 thirty years, and I thought that was so extraordinary and
11 basically unthinkable that I decided to plunge in and see
12 what I could learn about it. And what I discovered in just a
13 few weeks' time was that thermal treatments for these waste
14 sites have not been considered apparently at any point. I'm
15 talking about all 12 of the subsites, not only the wastebed
16 1-8 situation.
17 And moreover, that the most intense thermal
18 treatment is called plasma gasification, and it pertains to a
19 treatment that operates at 10- to 15,000 degrees Fahrenheit
20 and has the intention of destroying chemicals. What the
21 process does, as it tears chemicals apart, removes the atoms
22 from molecules and the result plunges down into a bath or a
23 pool, which then is quenched and vitrified with the result
24 that you wind up with a very dense and heavy rock-like
25 material which is chemically inactive and can be used, it can

1 be crushed and used as a construction aggregate.
2 I've actually held one of these things in my hand.
3 It's very dense. It's like concrete. But the key point is
4 that it's not reactive with the environment and therefore
5 it's apparently entirely safe from the standpoint of the
6 environmental health or human health.
7 Well, I looked all over the internet for some
8 examples of plasma gasification vendors and it turns out
9 there are dozens of them all over the world. I'm just going
10 to name four of them here very quickly. One is a company
11 called Tetronics, which is located in England. It has
12 worldwide installations and on its website it has discussion
13 of, for example, the destruction of radioactive wastes,
14 that's one example.
15 Another company called Phoenix is based in the
16 United States, actually in Minneapolis. When I talked to the
17 gentleman there, he mentioned the use of the process to
18 destroy silos full of asbestos.
19 There is another company based in Madison,
20 Pennsylvania, outside of Pittsburgh. The company is called
21 Westinghouse. It appears to have the largest installed base
22 of plasma gasification systems in the world, all over Asia,
23 China, Japan, South Asian, and as well in England and other
24 places in Europe.
25 Finally a company called Peat, P-E-A-T, also based

1 in the United States, Northbrook, Illinois.
2 These are four major players. Easily accessible
3 information all over the place about them on the internet.
4 As I say, there are many, many others.
5 Now, in thinking about something so complicated, I
6 think one of the best models is the OCRRA model using the
7 incinerator. They have a contract with Covanta, which is a
8 turnkey contract by which Covanta supplies the operating
9 people and the maintenance for the system. It's been
10 operating like that for twenty years very successfully.
11 That's exactly what you want to do with a plasma gasification
12 system as well. You have a guaranteed up time in the
13 contract and assurance of skilled use of the system.
14 So the question then becomes why are we confronted
15 with this situation here tonight when there is actually no
16 options? Nobody in their right mind is going to go for a
17 5 billion or $6 billion option. That's unthinkable,
18 outlandish. We need an option which is available for a small
19 fraction of those kind of numbers but which would actually
20 clean up the stuff, excavate it and destroy it.
21 And that's why I'm proposing this plasma
22 gasification alternative. I don't know why this has been so
23 overlooked. It seemed like an obvious possibility to me. I
24 cannot believe that Governor Cuomo wants to leave pollutants
25 in the land and water. I don't believe he has ever been

1 briefed on the possibility of removing and destroying these
2 chemicals. I think the same can be said for the county
3 officials as well.
4 So I think that pretty much wraps up what I want to
5 say about it. I've got an awful lot of detailed information
6 that I have accumulated. I would be glad to share it with
7 anybody. I noticed recently that the new SUNY ESF president
8 has just taken office and in his inaugural address this
9 summer, as quoted in the newspaper, he made the following
10 statement, quote, "Society's response to environmental
11 destruction is sorely inadequate. Neither our society at
12 large, nor the scientific community, are responding in the
13 ways necessary or on a scale sufficient to these challenges.
14 What is missing is institutional leadership, institutions of
15 vision and courage, willing to risk breaking from the herd."
16 Very good statement.
17 I did chat with a professor of chemistry up there
18 concerning the use of plasma gasification. He did confirm to
19 me that he believes that the process will destroy any of
20 these chemicals. I thank you.
21 MR. KEN LYNCH: Thank you. Next is David Simmons.
22 MR. DAVID SIMMONS: Hi. I'm David Simmons. I'm
23 the president of the Onondaga County Federation of Sportmen's
24 Clubs. And the Onondaga County Federation of Sportmen's
25 Clubs, representing nearly forty clubs and 5,000 plus total

individual members, would like to take this opportunity to reiterate our belief that the remediation plan 3 offered by New York State DEC for the Solvay wastebed site 1-8 will create and/or restore habitat which will be conducive to the support of increasing populations of various shore birds, water fowl, other wetland species, bats, reptiles, amphibians, as well as their food and cover resources. And also will create, improve or restore habitat for various specious of fish and their food and cover resources.

We further believe that this plan will be considerably more environmentally safe than other much costlier, more time consuming proposed alternatives which would create astronomical costs, take decades to complete, and in the end only transfer waste to another location.

MR. KEN LYNCH: Thank you. Lloyd Withers.

MR. LLOYD WITHERS: My name is Lloyd Withers. I'm part of a small group called Onondaga Shoreline, taking a special interest in Onondaga Lake and seeing it be cleaned up and restored to its pre-pollution days.

I wanted to comment tonight, I don't have lengthy comments, by I did want to comment on some of the assumptions that were put forth in this remedial investigation and the selective remedies.

First, I don't understand why there are only four alternatives and that the differences between them, I'll call

the three, do nothing. Cover versus excavate are so extreme. No hybrid solution is offered. And as we heard earlier, a great portion of this has already been addressed in some cover. So when the alternative of excavation is being discussed or weighed in the study, it only -- excuse me, it calls on removing those vast amounts of acreage that already has been treated. So roughly half of the property I believe is county property and there is no plan to excavate any of that that's being presented. So I would suggest that more alternatives be offered that include some blend of covering and excavating.

Also would like to say that I think that the excavation alternatives are vastly inflated, the costs associated with them. Some of the problems I note in the plan is that it seems that only trucks are utilized in the removal of the material. There is no comment about using railways or barges or anything else. And as I asked earlier, there is nothing about reuse of the Solvay waste. It only talks about trucks over the course of 27 years, which seems to me extreme. Again as the presentation showed less than a mile of area to be excavated and needing 27 years.

The Erie Canal, for what it's worth, was started in 1817, and those 330 some odd miles were excavated and that was done with steam shovels -- excuse me, with shovels, manpower, mules, ropes. There were no trucks. There were no

1 equipment that we have today. And that was done in eight
2 years. The entire Erie canal in eight years.
3 But we're told that this less than 1 mile area
4 would take 27 years to remove. It seems outrageous to me
5 that that's the case. The same goes for the cover time, six
6 to eight years to cover such a relatively small area. Again
7 I think it is an inflated figure.
8 But those are just the offhand comments I wanted to
9 make tonight. I don't think that people in our area of
10 Central New York should stand for leaving this industrial
11 waste in place. There is no need to do that. This
12 multi-national corporation has the means to remove this. I
13 think sending the right message to polluters is that if you
14 pollute, you have to clean it up, you can't just leave it.
15 It's the wrong message to say that it's cheaper to leave it
16 in place and treat it than to have it removed. Thank you.
17 MR. KEN LYNCH: Okay. Thank you. Mike Plochocki,
18 still passing?
19 MR. MIKE PLOCHOCKI: Still passing. Thank you.
20 MR. TRACY SMITH: Anybody else want to comment
21 tonight? If not, I will remind you that you can submit your
22 written comments to us through October 17th. And we will
23 stick around. Take a look at our poster boards. If you have
24 any questions of any of us, we will be available for a little
25 while afterwards. I want to thank you all for coming and

thank you for showing your interest in this project. Have a good night.

(7:00 p.m.)

* * *

C E R T I F I C A T I O N

I, EILEEN MCDONOUGH, RPR, CRR, Court Reporter, do hereby certify that the foregoing is a true and correct transcript of the stenographically reported proceedings held in the above-entitled matter.

EILEEN MCDONOUGH, RPR, CRR

**OPERABLE UNIT 1 OF THE SOLVAY WASTBEDS 1-8 SUBSITE**
**OF THE ONONDAGA LAKE SUPERFUND SITE**
**RECORD OF DECISION**

**APPENDIX V-e**

**WRITTEN COMMENTS RECEIVED DURING THE COMMENT PERIOD**

**Smith, Tracy (DEC)**

**From:** House, Mike <JMHouse@sevenson.com>
**Sent:** Wednesday, September 24, 2014 9:53 AM
**To:** Smith, Tracy (DEC)
**Subject:** RE: Operable Unit 1 of the Solvay Waste Beds 1-8 Site & other

**Good morning Tracy:**

**Can you please help me to try and understand the correlation between this proposed remedy and the construction of the amphitheater project??**
**Are these 2 projects linked in some way???**
**It is my understanding that the amphitheater project is on a fast track and portions of that facility are to be built over areas within these waste bed areas???**
**I have been told that the construction of the amphitheater is to commence b4 the end of this yr??**

**Will you be at the public meeting on Tues the 30TH of Sept???**

**Any guidance you can provide me is greatly appreciated.**

**Respectfully,**

**J. Michael House**
**Business Development**

**Sevenson Environmental Services, Inc.**
**2749 Lockport Road**
**Niagara Falls, NY 14305**

**Phone: 716-284-0431 ext. 143**
**Cell: 799-4313**
**Fax: 284-1796**
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jheath@atsny.com

October 16, 2014 **VIA ELECTRONIC and FIRST CLASS MAIL**

Tracy Alan Smith
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233

**Re: Onondaga Nation Comments on Draft Proposed Plan for Operable Unit 1 of Solvay Wastebeds 1-8 Site**

Dear Mr. Smith:

On behalf of the Onondaga Nation, I am writing to provide comments on the Proposed Plan for Operable Unit 1 of the Solvay Wastebeds 1-8 ("the Proposed Plan"). The Nation supports the full removal of contaminated materials from the shoreline of Onondaga Lake, which would allow the restoration of this area to a natural state and would respect the fact that the Lake and its adjacent shoreline are sacred to the Nation. If full removal is not the chosen remedy, the Nation supports a remediation strategy that provides uniform protection for all visitors and for all reasonably foreseeable future uses. The narrowly drawn remedies discussed in the Proposed Plan do neither.

First and foremost, we are disappointed at the proposal to permanently maintain an industrial waste dump on the shores of Onondaga Lake. The Onondaga Nation is the Firekeeper or central council fire of the Haudenosaunee, which is composed of the Mohawk, Oneida, Onondaga, Cayuga, Seneca, and Tuscarora Nations. Onondaga Lake is sacred to the Onondaga and Haudenosaunee people. It was on the shores of the Lake that, over 1000 years ago, the Peacemaker brought together the then Five Nations to form the Haudenosaunee Confederacy under the Great Law of Peace. The Lake is also the birthplace of western democracy.

Historically, Onondaga Lake was central to the Nation's way of life, providing material goods such as fish, food and medicinal plants, and salt. "Clean up" proposals centered on covering the tons of industrial waste dumped on this site simply transform an active landfill into a closed landfill. Continuing to treat this sacred Lake as a waste dump

is deeply disrespectful and disturbing to the Nation.

The Proposed Plan includes two removal alternatives in its review: Alternatives 4A and 4B. However, the possible costs of these alternatives appear to be inflated, while its benefits, particularly in terms of long-term effectiveness and reduction of the residual risk posed by the untreated wastes that will remain on-site, are ignored. In addition, the comparison of Alternatives 4A and 4B to Alternatives 2 and 3 is incommensurate in some areas and lacks clarity in others. This framing allows the New York State Department of Environmental Conservation (NYSDEC) and the United States Environmental Protection Agency (USEPA) to readily dismiss both full removal options. With a more complete and balanced review, we believe that the removal options would not only remain viable, but would emerge as preferred alternatives.

The Nation recognizes that the immediate costs of Alternatives 4A and 4B, as well as the time required to complete this remedy, are greater than the cost and remediation time associated with simply covering over the contamination, as proposed in Alternatives 2 and 3. However, the solutions provided by Alternatives 4A and 4B eliminate potential sources of contamination to Onondaga Lake, including continuing contamination of groundwater from wastes left in place and the potential for contaminated seeps to emerge from the "waste cliffs" and discharge into Onondaga Lake. This greatly reduces, if not eliminates, the need for long-term monitoring and management of the Wastebeds. In addition, the long-term benefits of the full removal alternatives are significantly greater, given both the potential ecological uses of the site and its potential importance to the Onondaga Nation.

When choosing among potential remedies that meet threshold requirements, NYSDEC and EPA must balance five factors: (1) long-term effectiveness and permanence of the proposed remedy, (2) reduction of toxicity, mobility, or volume of the wastes involved, (3) short-term effectiveness of the remedy in light of implementation impacts, implementability, and (5) cost. 40 C.F.R. § 300.430(e)(9)(iii). Long-term effectiveness is defined as the magnitude of "residual risk" remaining from untreated waste left on-site or the degree to which these materials remain hazardous. 40 C.F.R. § 300.430(e)(9)(iii). Specifically, NYSDEC and EPA must select a remedy that is cost-effective, meaning that it appropriately balances costs against the chosen remedy's long-term effectiveness, short-term effectiveness, and reduction of toxicity, mobility, or volume of hazardous wastes. 40 C.F.R. § 300.430(f)(1)(i)(B). Cost-effectiveness does not imply that the lest expensive remedy should be chosen. *Franklin County Convention Facilities Authority v. American Premium Underwriters*, 240 F.3d 534, 546 (6th Cir. 2001). Rather, additional environmental benefits created by a potential remedy must be

considered as well. *Id.*

In this case, the additional environmental benefits and long-term effectiveness of the complete removal alternatives justify their additional cost. The Wastebeds 1-8 site is part of the last undeveloped or developed minimally area on or around Onondaga Lake. This broader undeveloped area, including Nine Mile Creek, Geddes Brook and associated wetlands to the north and a proposed set of mitigation wetlands to the south, provides important habitat for birds and other wildlife. Its value would be greatly enhanced by elimination of the contaminant threat created by a cover-up remedy. There would be no potential for wildlife drawn to the area to be harmed from ingesting or otherwise coming into contact with the buried wastes. The value of this habitat would only be enhanced by removing the artificial cliffs created from industrial wastes and returning the area to its natural wetlands state.

In addition, full removal of industrial wastes from this portion of the lake shore might allow the Nation to reclaim some traditional uses of the shoreline. These traditional uses, including hunting, fishing and gathering of medicinal plants, have essentially been taken from the Nation by the pervasive and on-going contamination of Onondaga Lake and its shorelines. The benefits of restoring such uses, translated into monetary terms, are certainly enormous. In addition, while the cover-up alternatives (Alternatives 2 and 3) may reduce the risk to casual users, neither the Proposed Plan nor any of the underlying documents consider the residual risk to traditional or subsistence users of the site under these alternatives. A full removal alternative, on the other hand, will eliminate contaminant-related risks created by practicing traditional uses at the site. At minimum, the Proposed Plan should acknowledge and make some effort to quantify or balance these benefits against the costs of the removal actions.

Finally, full removal would recognize and respect the Onondaga Nation's relationship to Onondaga Lake. Rescuing this sacred site from being relegated to a series of closed landfills has enormous value. Again, the Proposed Plan fails to mention or attempt to quantify this benefit.

The Proposed Plan asserts that Alternatives 4A and 4B are not "consistent with current or anticipated future uses of the site," while Alternatives 2 and 3 are. In part, this assessment relies on the proposed Lakeview Amphitheater, which is predicated on the commanding views created by the 40 to 80 foot mounds of industrial waste piled onto the lakeshore. However, the "consistency with current or anticipated future land use" factor is derived from a state guidance document, not federal law, and may not be an appropriate factor to consider in this federal remediation project.

Assuming that the Guidance Policy is applicable, the factors to be considered are consistency with actual development trends, established zoning laws, and formally adopted land use plans. The proposal for development of a portion of Wastebeds 1-8 as amphitheater or events complex is nothing more than a proposal at this point. The proposal has not approved or included in any formal land use management plan. Onondaga County is still struggling to find the funding and other support necessary for this project. There has been limited public engagement on this issue and public support is questionable at best. There is absolutely no basis for NYSDEC and EPA to presume that the site will be used as an amphitheater or events complex. Rather than blindly accepting the proposed land uses put forward by one branch of County government, NYSDEC and EPA should focus on actual development, established law and formal land use plans. Relying on these factors, the sole land use restriction to be considered for the site is the deed restriction that limits its use to park or park purposes. Removal options are fully consistent with the formally mandated use of this site. No other considerations should be included in the Proposed Plan.

The Proposed Plan is also inconsistent in its assessments of costs and benefits across alternatives. For example, the Proposed Plan notes that Alternatives 2 and 3 would provide benefits through carbon sequestration due to the vegetation established on-site, but fails to consider the sequestration benefits provided by Alternatives 4A and 4B, which would presumably also be restored as wetlands or other natural areas. In addition, the Plan makes a broad brush comparison of air emissions from truck traffic under Alternatives 4A/4B and Alternatives 2/3, but fails to separate local emissions(that is, those generated on or near Wastebeds 1-8) from more distant emissions (that is, those generated at or near final disposal sites). In addition, the carbon emissions for Alternative 4A, in particular, is calculated for the entire life of the project. The carbon emission calculation for Alternatives 2 and 3, on the other hand, only includes active construction periods and ignores the site maintenance and vegetative cover repair that will be required in perpetuity.

If the New York State Department of Environmental Conservation (NYSDEC) and the United States Environmental Protection Agency (USEPA) choose to go forward with the preferred Alternative 3, we believe that changes are necessary. In particular, the division between “active use” and “passive use” areas within Alternatives 2 and 3 is meaningless. This entire area covered by Wastebeds 1-8 is formally designated for use as a park or for park purposes. This designation suggests largely unrestricted access and potential active uses across the entire site. If the County’s proposal for an amphitheater project were to go forward on this site, hundreds, if not thousands, of users would be invited onto Wastebeds 5 and 6 on a regular basis. Given the unpoliced nature of the site,

these visitors can be expected to wander across the entire area and to engage in "active" use of areas across the site. At minimum, Alternative 3 should be revised to include the more protective 2-foot vegetated cover across all areas of the site where installation would not require the removal of mature, densely packed forest stands or disruption of steep, unstable slopes.

The NYSDEC and USEPA justify the tiered approach in Alternative 3, as well as the less protective covers proposed in Alternative 2, in part by the assertion that there were no documented exceedances of soil clean-up objectives (SCOs) for contaminants of concern (COCs) on Wastebed 6, which is location proposed by Onondaga County for the Lakeview Amphitheater. This is unpersuasive for several reasons.

First, despite the lengthy investigation of this site, only one surface soil sample (SS-11) taken in the interior of Wastebed 6 was tested for the full range of contaminants. (According to the Revised Remedial Investigation, SS-48 and SS-49 were tested only for chromium variants.) The bulk of testing on the northern portion of Wastebeds 1-8 focused on the shoreline area adjacent to the West Shore Trail Extension, soil borings at the edges of the Crucible Landfill, and areas adjacent to the northern-most parking lots. The contaminated "hot spots" identified on Wastebed 4 just south of Wastebeds 5 and 6 and just north and east of the northern-most parking lot (located by SS-18 and SS-19, 19A, 19B, 19C, 19D, 55 and 56) could easily fit into the untested portions of Wastebed 6. The lack of exceedances, therefore, may just as easily be related to the lack of investigation as to the lack of contamination. In addition, the Wastebed 4 hot spots – in particular, the hot spot associated with SS-18 – do not appear to have been fully delineated and might extend into Wastebed 5 or 6.

Second, the history of the site provides no support for the idea that the contaminants in the Solvay and co-disposed wastes deposited in Wastebeds 5 and 6 should be different from or less toxic than those found elsewhere on the site. According to the Proposed Plan, from 1916 through 1943, Allied Chemicals and/or its predecessor produced benzene, xylene, toluene, naphthalene, and phenol – all contaminants found on the site – as well as hydrochloric acid, chlorine gas, caustic potash, and caustic soda. Since these pollutants should not otherwise be present in Solvay Waste, the Proposed Plan and other site investigation reports have assumed that BTEX, phenols, naphthalene, and other contaminants came from industrial wastes co-disposed with Solvay Waste. The Proposed Plan notes that there are no records to "confirm" this fact. However, a lack of records provides no basis for supposing that co-disposal did not occur, since the laws requiring careful record-keeping and management of toxic pollutants weren't enacted until decades after the active use of these wastebeds ended. Many of these contaminants

were found in levels exceeding relevant SCOs in several other areas of the site. Given that Wastebeds 5 and 6 were in active use during the same period as the wastebed where exceedances were found, there is absolutely no reason to presume that Wastebeds 5 or 6 would be any cleaner than other portions of the site.

The tiered approach described in Alternative 3 also relies on a clean division between areas of the site that are proposed for "active" uses and areas that are proposed for "passive" uses. However, the reality of the situation makes this distinction entirely irrelevant and unpersuasive. Areas of "active use" within an unpoliced park are difficult to anticipate. In response, the Proposed Plan notes that the soil cover will be repaired as necessary and additional cover may be required if unanticipated areas of heavy use are identified. additional capping. This appears to be a proposal to wait and see where the crowd-selected areas of heavy use (and potential exposure) arise. The Nation believe a more active and protective stance is required.

First, the NYSDEC and USEPA should recognize that the future uses of this site are uncertain. For instance, if the proposed amphitheater moves forward, the complex will directly incorporate most of Wastebed 5 and increase pedestrian traffic across the northern portions of Wastebed 4. Wastebed 4, in particular, includes several contaminant hot spots. While the Proposed Plan indicates that the two-foot covers will be installed over small areas clearly identified as hot spots, the soil investigation conducted doesn't cleanly delineate the edges of these contaminated areas. The placement of these small protected areas represents a guess at best.

Second, while the lawn seating area may be the only place where direct and extended contact with soil is planned, the amphitheater site will include nature trails, festival grounds, and picnic areas that may also invite close contact with the soil. In addition, the entire site will be open to the ticketed audience during concerts and to the general public at other times and will be largely unpoliced, meaning that "active uses" may occur anywhere. The County has proposed, at most, clear "wayfinding tools" (one presumes this means signs) and landscaping design to entice visitors to remain in spaces intended for intensive public use. The amphitheater plan includes no discussion of fencing, barricades, warning signs, or other institutional controls that might effectively keep visitors from unprotected areas of the site or preclude active uses of less protected areas on the site.

Third, whether or not the amphitheater project is approved, the West Shore Extension Trail is likely draw additional users to the shoreline areas of Wastebeds 1-8 and in close proximity to the entire site. Even if most users remain on the trail, this extension

will certainly increase human contact with the entire site. Any future development is likely to increase this risk, since direct contact activities are perfectly compatible with the use of the site for "park purposes," as mandated in the County's deed. The arbitrary boundaries between active and passive uses of the site indicated in the Proposed Plan do not reflect this reality.

As a result, the Proposed Plan leaves large sections of the site under a simple "vegetation enhancement" cover. These minimally protected areas include sections of Wastebed 5 directly adjacent to a proposed "Festival Area," which is likely to draw significant foot traffic, picnickers, and visitors simply resting or relaxing directly on the ground. Similarly, areas within Wastebed 6 adjacent to the proposed lawn seating – and which may well be used by "spillover" concert attendees – are designated as requiring only a "vegetation enhancement" and areas within or immediately adjacent to a proposed hiking trail/picnic area are designated as "passive use" areas, requiring a less protective one-foot deep soil cover. Finally, several sections immediately adjacent to the West Shore Trail Extension are also proposed as requiring only a minimal cover, despite the likelihood that trail users will trespass onto this area.

For all these reasons, if a soil cover is the selected remedy, the entire site should receive the same level of protection. At minimum, Alternative 3 should be amended to include the most protective two-foot vegetated soil cover across all areas of the site with the possible exception of mature, dense forest stands and unstable, steep slopes.

Finally, the Nation has concerns about the Human Health Risk Assessment provided by the USEPA (USEPA HHRA). This assessment is inadequate for several reasons and should be significantly revised if it continue to be cited in the Proposed Plan.

First, the USEPA HHRA does not consider exposure soil exposure risks for young children – that is, children between the ages of 0 and 6. The most recent HHRA simply draws on the analysis done for a prior HHRA drafted to account for exposures related to the West Trail Extension. That earlier assessment did not consider exposures for young children, because they were not considered likely to stray off-trail. While there was assessment of residential exposures, this analysis focused on exposure to groundwater (in showers or as drinking water), not soil. The current amphitheater proposal and potential future park uses are far more likely to draw young children to the site, particularly given the additional amenities proposed for the amphitheater complex (nature area, interior hiking trails, picnic area and small community theater). If NYSDEC and USEPA continue to rely on the USEPA HHRA in the Proposed Plan, it must be amended to explicitly consider exposure potential and health risks to young children.

In addition, to calculate exposure and health risks to maintenance workers for the proposed amphitheater, the USEPA HHRA relied on analyses done in the original HHRA for commercial or industrial workers on the site. However, the commercial/industrial worker category represented workers within industrial facilities that might be developed on Wastebed 1-8 in the future. These workers were assumed to spend most of their time indoors at facilities built on-site. Amphitheater maintenance workers, on the other hand, are likely to spend a significant portion of their day outdoors, working on landscaping, nature trails, and event clean-up. The exposures related to these job categories are incommensurate and the USEPA HHRA should be revised to reflect more realistic exposure assumptions for this group. If the USEPA continue to rely on data from the original HHRA, amphitheater maintenance workers are more comparable to utility and construction workers, who also work outside and have more direct contact with the soil.

The USEPA HHRA does not effectively consider cumulative exposure to the site. If the proposed amphitheater complex and associated amenities are built, individuals may well be drawn to the site both for concerts, which appears to be considered in the USEPA HHRA, and for trail-related activities. Thus, cumulative exposure should include the exposure time assumed in the original HHRA in addition to the concert-related exposures assumed in the USEPA HHRA. At minimum, the USEPA HHRA should assume an increased, if not doubled, cumulative exposure to reflect both concert-related and trail-related exposures.

Finally, the HHRA is being cited by some as evidence that the proposed amphitheater will be perfectly safe for the range of potential visitors. Even without the gaps and flaws in assessment described above, this is an inappropriate use of the HHRA. The HHRA was designed solely to determine if there is sufficient risk created by the unremediated site to justify additional clean-up action. The HHRA does not purport to be and should not be held out as a complete assessment of the risks posed by the site or an evaluation of appropriate or safe uses of that site. NYSDEC and USEPA should caution the public and public officials regarding the limitations of the HHRA and the appropriate uses of this document.

In conclusion, the Nation strongly supports the full removal options described in Alternatives 4A and 4B. If the NYSDEC and USEPA account for the full benefits of removal, including the diminished site management costs, the removal of potential for on-going groundwater and surface water contamination, the more limited wildlife exposures, and the recognition of the sacred nature of Onondaga Lake to the Nation, we believe that the costs of removal would be justified. However, if the NYSDEC and USEPA continues to pursue a cover-up option, we believe that an amended version of Alternative 3, that

provides uniformly protective two foot cover across the entire site, should be preferred.

Sincerely,

*Joseph J. Heath*
Joseph J. Heath

cc: Onondaga Nation Council of Chiefs