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September 15, 2011

To: Diane Carlton, NYSDEC, Region 7 (1 CD)
Holly Sammon, Onondaga County Public Library (1 bound)
Samuel Sage, Atlantic States Legal Foundation (1 bound)
Joseph J. Heath, Esq., Onondaga Nation (cover letter)
Cara Burton, Solvay Public Library (1 bound)

Re: Letter of Transmittal – Wastebeds 1-8 Site Repository Addition

The below document has been approved by the New York State Department of Environmental Conservation (NYSDEC) and is enclosed for your document holdings:

- Wastebeds 1-8 Integrated IRM Work Plan dated August 2011

Sincerely,

John P. McAuliffe by CCC

John P. McAuliffe, P.E.
Program Director, Syracuse

Enc.

cc: Tracy A. Smith- Project Manager

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau D, 12th Floor
625 Broadway, Albany, New York 12233-7013
Phone: (518) 402-9676 • **Fax:** (518) 402-9020
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Joe Martens
Commissioner

September 13, 2011

Mr. John P. McAuliffe, P.E.
Honeywell International, Inc.
301 Plainfield Road
Suite 330
Syracuse, NY 13212

Re: Wastebeds 1-8 Integrated IRM Work Plan

Dear Mr. McAuliffe:

The New York State Department of Environmental Conservation has reviewed the "Wastebeds 1-8 Integrated IRM Work Plan" (work plan) dated August 2011 (submitted with your letter dated August 31, 2011). Based on our review, the work plan is approved. If you have any questions, please contact me at 518-402-9796.

Sincerely,

Tracy A. Smith

Tracy A. Smith
Project Manager

ecc: J. Gregg, NYSDEC
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August 31, 2011

Mr. Tracy A. Smith
Project Manager
NYSDEC Div. of Environmental Remediation
Remedial Bureau D
625 Broadway, 12th Floor
Albany, NY 12233-7016

RE: Wastebeds 1-8 Integrated IRM Work Plan
Town of Geddes, Onondaga County, New York
Order on Consent: Index # D-7-0002-02-08

Dear Mr. Smith:

Attached please find the following documents:

- Responses to NYSDEC July 6, 2011 comment letter on the *Wastebeds 1-8 Integrated IRM Work Plan,* dated May 2011
- Revised final copy of the *Wastebeds 1-8 Integrated IRM Work Plan,* dated August 2011.

Please contact Doug Crawford at O'Brien & Gere (315-956-6442) or me should you have any questions regarding the information presented herein.

Sincerely,

John P. McAuliffe by CCC

John P. McAuliffe, P.E.
Program Director, Syracuse

Enc. (2 copies, 1 CD)

cc:	Mr. Robert Nunes	USEPA (1 copy, 2 CDs)
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O'BRIEN & GERE

August 31, 2011

Mr. John P. McAuliffe, PE
Program Director, Syracuse
Honeywell Inc.
301 Plainfield Road
Suite 330
Syracuse, New York 13212

RE: Integrated IRM, Mitigation Wetland, and Remediation Area A Hydraulic Control System Work Plan, Wastebeds 1-8

FILE: 1163.45082 Docs

Dear John:

This letter provides responses to the Department's July 6, 2011 comment letter on the May 2011 Integrated IRM, Mitigation Wetland, and Remediation Area A Hydraulic Control System Work Plan (IRM Work Plan). For ease of review, the Department's comments have been reproduced followed by the response in bold text.

GENERAL COMMENTS

Comment 1. *Page 7, Paragraph 1, Section 2.3.5. Since the intent of the low permeability material discussed here is to provide an isolation barrier between Ditch A water and the underlying Solvay Waste substrate, the term "isolation barrier" should be used in lieu of "low permeability cover" which connotes an isolation cap. This would avoid confusion and be consistent with terminology used for remediation of ditches at other sites (e.g. Upper Harbor Brook IRM). Please make this revision where applicable.*

Response 1. "Isolation barrier" shall replace "low permeability cover" when referencing the material between Ditch A water and the underlying Solvay waste.

Comment 2. *Page 10, Paragraph 3, Section 3.1.5. It is stated here that an annotated outline of the OM&M Plan will be submitted as part of the 50% Design. The outline, however, is not in the 50% Design but is provided in Section 3.2.5 of the Work Plan. Please revise accordingly.*

Response 2. Section 3.1.5 Annotated Outline for Operations, Maintenance & Monitoring Plan will be deleted.

Comment 3. *Page 12, Section 3.2.5. The Citizens Participation Plan should not be part of the Operations, Maintenance and Monitoring Plan and should be a separate document. Please revise.*

Response 3. The reference to the Citizen Participation Plan will be deleted from Section 3.2.5 and incorporated into Section 3.1.

Comment 4. *Page 16, Section 7. The Project Schedule needs to be revised (e.g., the submittal date of the 95% RD needs to be earlier). In addition, the construction work plan needs to be included on the schedule. I will contact you to discuss the dates.*

Response 4. Comment noted.

Comment 5. *Figure 5. The figure name should be revised to delete "IRM Alternative 3." Also, inset map B does not match the figure (the wetlands are in different locations). Please revise.*

Response 5. Upon consideration of the comment and review of Figure 5, the figure was deleted from the Work Plan.

Please contact me if you have any questions regarding this matter.

Very truly yours,
O'BRIEN & GERE ENGINEERS, INC.

Douglas M. Crawford, P.E.
Vice President

cc:	Mr. Alfred J. Labuz	Honeywell (ltr only)
	Mr. Steve Miller	Parsons (ec)
	Mr. Bradley Kubiak	O'Brien & Gere (ec)
	Mr. Christopher C. Calkins	O'Brien & Gere (ec)

REVISED FINAL WORK PLAN

Integrated IRM, Mitigation Wetlands, and Remediation Area A Hydraulic Control System Work Plan

Honeywell

August 2011

O'BRIEN & GERE

1163 | 45082

Integrated IRM, Mitigation Wetlands, and Remediation Area A Hydraulic Control System Work Plan

Prepared for:

Honeywell

DOUGLAS M. CRAWFORD, P.E., VP
O'BRIEN & GERE ENGINEERS, INC.

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1. INTRODUCTION

This Integrated Interim Remedial Measure (IRM), Mitigation Wetlands, and Remediation Area A Hydraulic Control System Work Plan (Work Plan) for the Wastebeds 1-8 Site has been prepared in accordance with the requirements of the Administrative Consent Order (ACO) D7-0002-02-08 entered into by Honeywell International, Inc. (Honeywell), and the New York State Department of Environmental Conservation (NYSDEC) dated January 22, 2004.

The objective of the IRM is to mitigate the discharge of contaminants in groundwater and seeps to Onondaga Lake and Ninemile Creek (NMC), and erosion of exposed Solvay waste from the Site to Onondaga Lake. The IRM was presented in the *Focused Feasibility Study (FFS) Report, Wastebeds 1 through 8, Geddes, New York* (O'Brien & Gere 2010a), and the NYSDEC's Preliminary Remedial Action Document (PRAD, NYSDEC, 2010).

In addition to the remedial elements of the IRM, mitigation wetlands and a hydraulic control system adjacent to Onondaga Lake Remediation Area A will be designed and constructed. The objective of the mitigation wetlands is to compensate for the loss of wetland functions and values from locations on and off site by providing a diverse wetland complex comprising aquatic habitat connected to Onondaga Lake as well as inland wetlands. The objective for the hydraulic control of groundwater adjacent to Remediation Area A is to reduce groundwater upwelling velocities that may impact the cap to be placed in Remediation Area A area in Onondaga Lake.

Collectively referred to as the Integrated IRM, these measures will address contaminant discharge and groundwater upwelling from the Site to Onondaga Lake and NMC, mitigate erosion of exposed Solvay waste, and enhance the habitat along the Onondaga Lake shoreline.

This document describes the project overview, deliverables, and schedule associated with the design of the Integrated IRM. Background information is presented in Section 1 of this Work Plan. The project overview and description of the key elements of the design are described in Section 2. Section 3 presents the submittals that will be provided to document the design as it progresses. Regulatory and permit requirements, project organization, reporting, and schedule considerations are provided in sections 4, 5, 6, and 7, respectively.

1.1 SITE BACKGROUND

The Wastebeds 1-8 Site (Site) is located along the southwestern shore of Onondaga Lake as shown in **Figure 1.** A Site plan of Wastebeds 1-8 is included as **Figure 2**. The irregularly shaped wastebeds extend approximately 1.5 miles along the shoreline, with a maximum width of 0.5 mile, and include approximately 315 acres. The Site, in its entirety, and inclusive of the wastebeds, includes approximately 404 acres. The Site elevation ranges from approximately 363 to 430 ft above mean sea level. Ninemile Creek (NMC) borders the Site along the northwest side to where it flows into Onondaga Lake.

The wastebeds were constructed over the Geddes Marsh, which resulted from the lowering of the lake level in 1822 to the same level as the Seneca River (Blasland, Bouck & Lee [BBL] 1989). The wastebeds are composed primarily of Solvay waste consisting of particles of insoluble residues, hydroxides, calcium carbonate, gypsum, sodium chloride (salt), and calcium chloride. These wastes were generated at the former 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 (90 to 95% water and 5 to 10% solid material).

Chlorinated benzene production at the 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 (O'Brien & Gere 1990). The Benzol plant operated from as early as 1903. 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. (There is an apparent discrepancy regarding the dates of operation of the coke plant in the referenced

Onondaga Lake RI/FS Site History Report (PTI 1992); page 54 of the report states that the coke plant was operational from 1892 to 1923, and page 47 of the report states that coke ovens were used through 1924, although the 1924 map on page 14 of the report denotes "coke ovens not present.") A phenol production plant operated from 1942 to 1946 (PTI 1992). 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 indicate this occurred.

Wastebeds 1 through 6 were in use before 1926, although no definitive construction date is available. Wastebeds 7 and 8 were not utilized until after 1939 and remained in use with Wastebeds 1 through 6 until 1943 (BBL 1989). Wastebeds 1-8 were closed in 1943. The location of each wastebed is presented on **Figure 2**. A dike along Wastebed 7 failed on Thursday, November 25, 1943, and an area along State Fair Boulevard was flooded with Solvay waste. This led to the closure of Wastebeds 1-8.

Subsequent uses of the Site included construction of I-690 prior to 1958, construction of the I-690 and NYS Route 695 interchange between 1973 and 1978, and the operation of a landfill on a portion of Wastebed 5 by Crucible Specialty Metals (Crucible) from 1973 to 1988 (Calcerinos & Spina [C&S] 1986). The Crucible Landfill covers an area of approximately 20 acres and contains an estimated volume of 225,100 cubic yards (cy) of non-hazardous and hazardous wastes (C&S 1986). The NYSDEC approved the revised 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 used a portion of the wastebeds from 1925 to 1978 for sewage sludge disposal; however, the nature, volume, and exact boundaries of this are unknown.

The Site is owned by the State of New York and Onondaga County. **Figure 2** depicts the approximate Site and property boundaries. The New York State Fair uses a portion of the Site for parking. The remainder of the Site is vegetated to varying degrees, except for the wastebed slopes along the shore of Onondaga Lake and east of the mouth of NMC where Solvay waste is exposed and minimal vegetation exists. The Onondaga County Deed requires that this property be maintained as parkland or for other public use.

1.2 SITE GEOLOGY AND HYDROGEOLOGY

The Site's geology and hydrogeology were characterized and documented in the *Wastebeds 1-8 Remedial Investigation Report* (O'Brien & Gere 2008, draft). At the Site, up to 250 ft of both anthropogenic and natural unconsolidated deposits overlie the Silurian Age Vernon Shale bedrock. The overburden deposits occupy a bedrock channel scoured by glacial meltwater. This channel intersects with the Onondaga Lake bedrock channel near the current extent of Onondaga Lake.

The overburden deposits, from the bedrock surface upward to the land surface, consist of till, basal sand and gravel, fine sand and silt, glaciolacustrine silt and clay confining layer, marl, and anthropogenic fill. Because this IRM focuses on shallow and intermediate groundwater in areas proximate to the Onondaga Lake shore and NMC, this document concentrates on shallow and intermediate hydrogeology associated with these portions of Site. Four hydrogeologic units define the shallow and intermediate groundwater unites at the Site:

- A shallow zone composed of anthropogenic fill and Solvay waste
- An intermediate zone composed of marl/peat
- NMC deltaic deposit
- A confining layer composed of the silt and clay that forms the base of the intermediate groundwater unit

Shallow Zone

The shallow groundwater zone consists of the anthropogenic fill and Solvay waste. Wastebeds 1-8 form a fill layer above the natural sediments throughout the entire Site. Thickness of the anthropogenic fill and Solvay waste typically ranges between 60 and 70 ft, but is thinner between the toe of the wastebeds and the lake. Permeability tests showed horizontal hydraulic conductivity values in the 10^{-3} to 10^{-5} cm/sec range and a mean

vertical hydraulic conductivity of 8 x 10^{-6} cm/sec. The lower vertical hydraulic conductivity is due to the layered nature of the hydraulically-placed waste.

Intermediate Zone

The intermediate groundwater zone consists of fine-grained marl/peat immediately underlying the anthropogenic fill and Solvay waste at the Site. The marl is characterized by plentiful shells and carbonate deposition with decreasing grain size downward from sand to clayey silt. Where present, the unit ranges from 3 to 40 ft thick and forms the native base for the wastebeds. While peat is encountered at various locations on the Site, the general trend is that the marl pinches out to a thin peat layer going from north to south across the site.

The hydraulic conductivity of the marl varies depending upon the proportion of sand, silt, and clay. Permeability testing showed horizontal hydraulic conductivity values in the 10^{-4} to 10^{-6} cm/sec range and a mean vertical hydraulic conductivity of 7 x 10^{-5} cm/sec.

Deltaic Deposits (formerly NMC Sand and Gravel Unit)

On the portion of the Site near NMC, localized deltaic deposits related to former NMC channels, were found within the marl. These deltaic deposits are a combination of sand, gravel, silt, and clay. They range in thickness from 5 to 18 ft and increase in thickness in the vicinity of where the former creek channels entered Onondaga Lake. Permeability testing yielded hydraulic conductivity values in the 10^{-4} to 10^{-6} cm/sec range.

Silt and Clay Confining Layer

Beneath the intermediate groundwater zone is the glaciolacustrine silt and clay layer. In general, the glaciolacustrine clay/silt units is thickest toward the axis of Onondaga Lake and thinnest where bedrock and till elevations increase to the south. This lower permeability unit acts as a confining layer below the intermediate groundwater zone.

The wastebeds are a topographic high and recharge from precipitation forms the source of the groundwater in the shallow and intermediate groundwater zones. The recharge and topographic high of the wastebeds create a mounding effect as shallow and intermediate groundwater flows outward from the wastebeds toward Onondaga Lake, NMC, and other surface water bodies, such as drainage ditches.

1.3 REGULATORY BACKGROUND

1.3.1 Previous Investigations

Several investigations have been undertaken at or adjacent to the Site and are documented in the following:

- Crucible applications for NYSDEC Part 360 and 364 permits and landfill closure, including supporting documents*: Phase II Geotechnical Investigations, Crucible Inc., Solid Waste Management Facilities and Phase I Hydrogeological Investigations, Crucible Inc., Solid Waste Management Facilities* (Thomsen, 1982a; Thomsen, 1982b), and the *Revised Landfill Closure Plan Volumes 1 & 2* (C&S 1986)
- *Hydrogeologic Assessment of the Allied Waste Beds in the Syracuse Area* (BBL 1989)
- *Onondaga Lake Project Waste Beds Investigation Report* (TAMS 1995)
- *Geddes Brook/Ninemile Creek Remedial Investigation* (NYSDEC 2003a)
- *Ninemile Creek Supplemental Sampling Program* (O'Brien & Gere 2002)
- *Onondaga Lake Remedial Investigation (RI) Report* (NYSDEC 2002)
- *Onondaga Lake Project Waste Beds Investigation Report, Supplemental Wastebeds 1 through 8 Seeps, Sediment, and Water Sampling conducted by NYSDEC* (NYSDEC 2003b)
- *Geddes Brook/Ninemile Creek Feasibility Study Report* (Exponent 2005)
- *Wastebeds 1 through 8 Preliminary Site Assessment (PSA) Data Summary* (O'Brien & Gere 2005a)
- *Environmental Sampling along the Proposed Onondaga Canalways Trail Section 1* (Parsons 2004)

- *Wastebeds 1 through 8 Focused Remedial Investigation (FRI) Report* (O'Brien & Gere 2005b)
- *Wastebeds 1 through 8 Remedial Investigation Report* (O'Brien & Gere 2008 draft)
- *Wastebeds 1 through 8 Speciated Chromium Investigation* which was included as part of the *Wastebeds 1 – 8, Town of Geddes, Onondaga County, New York Human Health Risk Assessment Interim Deliverable* (McAuliffe 2008a)
- *Wetland Delineation and Floodplain Assessment Wastebeds 1 through 8 Site, Geddes, New York* (O'Brien & Gere 2009).

1.3.2 Remedial Investigation

The Remedial Investigation (RI) field activities were performed from January 2007 through August 2007 in accordance with the *Revised Remedial Investigation/Feasibility Study Work Plan* (O'Brien and Gere, 2006a) and the *Revised Remedial Investigation/Feasibility Study Quality Assurance Project Plan* (O'Brien and Gere, 2006b). The RI field program was completed in August 2007. Supplemental Remedial Investigation (SRI) (Honeywell, 2009a) field work was conducted to further assess activities that were performed as part of the RI.

Collectively, the PSA, revised FRI, the RI, the SRI data collected is summarized within the *Wastebeds 1 through 8 Remedial Investigation Report* (O'Brien & Gere 2008 draft). As a part of these activities, site reconnaissance identified sampling locations. Soil borings and test pit excavations were used to characterize the surface and subsurface Site conditions.

During these various investigations, samples of site soil, groundwater, seeps, surface water and sediment were collected and analyzed. The results of these investigations are summarized in the *Wastebeds 1 through 8 Remedial Investigation Report* (O'Brien & Gere 2008 draft). The draft RI Report is currently being revised.

The conceptual site model (CSM) was presented to NYSDEC on June 16, 2009. Currently, NYSDEC is reviewing the CSM deliverable submitted on November 23, 2009 (Honeywell, 2009d). The Revised RI Report will incorporate NYSDEC comments regarding the CSM interim deliverable.

In accordance with the 2006 RI/FS Work Plan (O'Brien & Gere, 2006a) for the Site, risk assessment activities have also been initiated. The following ecological risk assessment documents were submitted to NYSDEC:

- *Problem Formulation Document* (O'Brien & Gere 2007a)
- *Baseline Ecological Risk Assessment Work Plan* (O'Brien & Gere 2007b)
- *Revised Baseline Ecological Risk Assessment Work Plan* (O'Brien & Gere 2007c).
- *Baseline Ecological Risk Assessment Report* (O'Brien & Gere 2011a).

The following human health risk assessment documents have been submitted to the NYSDEC:

- *Human Health Risk Assessment* (O'Brien & Gere 2011b).

Both assessments incorporate the data recently collected as part of the SRI.

1.3.3 Focused Feasibility Study

A focused feasibility study (FFS) was conducted to develop and evaluate alternatives to address potential impacts to the Onondaga Lake and NMC remedies from the Site. As part of the FFS, four IRM alternatives were identified. The FFS report (O'Brien & Gere 2010a) was accepted by NYSDEC on June 30, 2010.

1.3.4 Cultural Resources Survey (CRS)

Pratt & Pratt (2003) conducted a Stage 1A cultural resources survey (CRS) for all Honeywell sites in the area of Onondaga Lake. Public Archaeology Facility (PAF) conducted a subsequent Stage 1A CRS (PAF 2004) for a portion of the Honeywell sites, which included Onondaga Lake and some of the surrounding areas including Wastebed B and Wastebed 1-8, and the LCP site.

PAF developed a Phase 1B Work Plan (PAF and Parsons 2010) and Addendum (PAF 2010), which included a shoreline survey at Wastebeds 1-8. The results of these investigations will be documented in a separate report and submitted to NYSDEC for review.

2. INTEGRATED IRM, MITIGATION WETLANDS, AND REMEDIATION AREA A HYDRAULIC CONTROL OVERVIEW

Major elements of the IRM, Mitigation Wetlands, and Remediation Area A Hydraulic Control System design are discussed in further detail in this section. They include:

- Pre-Design Investigation and Addendum
- IRM Objectives and Scope
- Mitigation Wetland Objective and Scope
- Remediation Area A Hydraulic Control System Objective and Scope
- Integration with other Remedies

2.1 PRE-DESIGN INVESTIGATION

The *Pre-Design Investigation (PDI) Work Plan*, dated November 2009 (Honeywell, 2009c) documented the scope of work and procedures for field activities. The components of the scope of work for field activities included the following:

- Geotechnical Borings
- Geotechnical Testing
- Compatibility Testing
- Hydrogeologic Investigation
- Mitigation Wetland Water Quality Evaluation
- CCTV Inspection
- Topographic Survey

Field activities were completed in May 2010. Summaries of each of the components of the PDI investigation are presented in the Integrated IRM, Mitigation Wetlands, and Remediation Area A Hydraulic Control System 50% Design (50% Design) Report (O'Brien & Gere, 2011c).

2.2 PRE-DESIGN INVESTIGATION ADDENDUM

The *Pre-Design Investigation (PDI) Work Plan Addendum*, dated August 2010 (Honeywell, 2010) documented the scope of work and procedures for field activities. The field activities were completed to aid in the design of a hydraulic control system for the Site area bordering Remediation Area A. The components of the scope of work for field activities included geotechnical borings and testing, and hydraulic conductivity evaluation.

Field activities were completed in December 2010. Results from the PDI Addendum will be submitted to NYSDEC in a data summary report.

2.3 IRM OBJECTIVES AND SCOPE

In accordance with the PRAD, the IRM objectives are to eliminate, to the extent practicable, within the scope of the IRM:

- Direct contact with and ingestion of exposed Solvay waste along the eastern shore
- Discharge of deltaic deposit and eastern shore groundwater to Onondaga Lake and NMC
- Discharge of shallow and intermediate groundwater to Ditch A
- Discharge of selected NMC, eastern and northern shore seep water to Onondaga Lake and NMC

- Erosion of Solvay waste from the eastern shore to Onondaga Lake
- Erosion of Solvay waste along the surf zone of SMU 4 due to wind and wave action
- Erosion of Solvay waste substrate from the lower reach of Ditch A to Onondaga Lake
- Discharge of seep water from the upper reach of Ditch A to NMC

IRM objectives will be met through the use of hydraulic control, treatment, containment, excavation/disposal, and stabilization. Components of the IRM scope include:

- Shoreline Stabilization
- Cover Systems
- Groundwater and Seep Collection
- Ditch A Stabilization

2.3.1 Shoreline Stabilization

Bioengineering techniques will be used to stabilize the shallow and steep shoreline in SMU 3 and SMU 4 and provide a transition between the Wastebed 1-8 IRM and in-lake remediation. These techniques, which combine vegetation, stone, and geotextiles, may include: vegetated riprap, vegetated revetments, vegetated geocells, vegetated gabions, and cellular confinement systems (CCS).

The lake design will include the shallow slope stabilization within the lake and extending up to an elevation of 365, in both SMU 3 and SMU 4, due to the consistency of stabilization and restoration approach from the lake shore up to this elevation. Live stone revetments and other bioengineering techniques are being considered as potential steep slope embankment stabilization approaches within SMU 3 and SMU 4. This stabilization approach will be used to mitigate future bank erosion and provide habitat enhancement along the northern shoreline. The design will also incorporate habitat features identified in the *Onondaga Lake Remedial Design Elements for Habitat Restoration* (Parsons 2009). The stabilization design in steep slope embankment areas will be presented in the 50% Design Report.

2.3.2 Cover Systems

Surface restoration of the area inboard of the proposed groundwater collection system that will not be used for wetland mitigation will consist of a vegetative cover designed to enhance habitat and limit direct contact and erosion of Solvay waste.

2.3.3 Groundwater and Seeps Collection and Conveyance

The hydraulic control system will be designed to intercept and collect shallow and intermediate groundwater and seep water. Collection of groundwater will be achieved through the installation of passive wells in combination with a collection trench. Collection of seep water will be achieved through the installation of a collection trench and seep drainage apron. Both trenches will convey collected water to a pump station that will be constructed in the vicinity of the eastern shoreline. Collected groundwater and seep water will be pumped to the Willis-Semet Groundwater Treatment Plant (GWTP).

Groundwater and seep collection and conveyance design will be based on the hydrogeology, geotechnical testing, alignment borings data, and modeling as part of the various investigations conducted at the Site. Results from compatibility testing will also be used to evaluate material selection of the construction materials used for the conveyance design. Observed groundwater seeps locations are shown on **Figure 3**.

2.3.4 Weir Boxes and Pipe Seeps

Remnants of collapsed weir boxes and associated pipes, shown on **Figure 4**, have been encountered at various locations at the Site. Weir boxes were constructed to allow water to decant from the wastebeds. Decanted water was conveyed using metal pipes through the perimeter berms. In some cases, water continues to seep intermittently from these pipes. The weir boxes will be filled with flowable fill or other suitable material and the pipes will be plugged to minimize potential discharge.

2.3.5 Ditch A

The existing substrate of the lower reach of Ditch A, approximately 380 ft spanning from the I-690 culvert to the confluence with Onondaga Lake, consists mostly of Solvay waste and accumulated sediments. As part of the IRM, the existing substrate will be removed such that an isolation barrier can be placed. The isolation barrier will form a barrier between Ditch A water and the underlying Solvay waste substrate, prevent erosion of underlying Solvay waste substrate, and provide a suitable habitat layer area for plants and wildlife. After placement of the isolation barrier, the ditch will be restored with a clean habitat layer. In addition, the existing culverts under I-690 and the access road to the state fair parking area will be cleaned, as necessary, to remove potentially impacted sediments.

At the upper reach of Ditch A, an approximately 350 linear ft existing drainage pipe conveys stormwater from Ditch A to NMC. Based on the observations from the PDI, slip-lining and other pipe rehabilitation technologies will be considered to address seepage and groundwater infiltration in this 350 linear ft section of pipe.

2.4 MITIGATION WETLAND OBJECTIVE AND SCOPE

The objective of the mitigation wetlands is to compensate for the loss of wetland functions and values from locations on and off site by providing a diverse wetland complex comprising aquatic habitat connected to Onondaga Lake as well as inland wetlands. This will be accomplished by creating aquatic/wetland habitats consisting of deep and shallow emergent and wet meadow communities. These wetland communities will be complemented by woody species communities established on the adjacent berms and vegetative cover system.

The requirements for the Wastebed B/Harbor Brook IRM and Wastebeds 1-8 Integrated IRM mitigation activities were defined at an August 10, 2009 meeting between representatives of NYSDEC, EPA, and Honeywell. Based on the current Wastebed B/Harbor Brook barrier wall alignment, as shown on **Exhibit A**, the design will provide inland wetlands along the eastern shoreline of the Wastebeds 1-8 Site. Wetlands along the eastern shoreline of the Wastebeds 1-8 Site will also be impacted by the Wastebeds 1-8 Integrated IRM. As such, additional inland wetlands will be included in the wetland complex. Wetland mitigation requirements are also described in Section 3.4 of the *Onondaga Lake Remedial Design Elements for Habitat Restoration* (Parsons 2009).

A preliminary design for the 2.3 acres of open water connected wetland was submitted to NYSDEC on November 21, 2008 (Honeywell, 2008b). The revised interim design for a 7.7 acre wetland complex (2.3 acres of connected wetland and 5.4 acres of inland wetland) was submitted to NYSDEC on October 1, 2009 (Honeywell, 2009b). Comments on the revised interim design were received from NYSDEC on July 2, 2010 (Hessler 2010), and are incorporated into this 50% design.

The 50% design will reflect the preliminary design for 2.3 acres of connected wetland and will include approximately 7 acres of inland wetlands to account for adjustments to the Wastebed B/Harbor Brook barrier wall. The final acreage of the inland wetlands will be consistent with that reflected in the outboard area portion of the Onondaga Lake design.

2.5 REMEDIATION AREA A HYDRAULIC CONTROL SYSTEM OBJECTIVE AND SCOPE

Based on recent pre-design investigations associated with the Lake Capping and Dredging Design, an isolation cap may be placed within Onondaga Lake Remediation Area A in locations near the Site. Due to the proximity of the cap material to the Site, there is the potential for groundwater upwelling velocities to affect the integrity of the cap. To mitigate the potentially unacceptable upwelling velocities, on-Site hydraulic control of groundwater in the vicinity of Remediation Area A is being considered.

2.6 INTEGRATION WITH OTHER REMEDIES

Components of the Onondaga Lake remedy that are adjacent to the Site are those in-lake remedial elements to be completed in Onondaga Lake Site SMU 3 and SMU 4 (**Exhibit A)**. As described in the July 2005 Record of Decision (NYSDEC and USEPA 2005) these consist of:

- Targeted dredging and capping in SMU 3 and SMU 4

- Habitat enhancement to stabilize calcite deposits and oncolites and promote submerged macrophyte growth along 1.5 miles of SMU 3 shore (*i.e.,* shoreline stabilization)

An illustrative summary of the proposed remedial approach for SMU 3 and SMU 4 is provided as **Exhibit B** to this Work Plan (NYSDEC and USEPA 2005).

Components of the NMC Operational Unit 2 (NMC OU2) remedy that are adjacent to the Site are those in-creek remedial elements to be completed in the lower reach of NMC (reach AB) and in the floodplain along NMC reach AB. The location of NMC reach AB is depicted on **Figure 2**. The remedy for the NMC reach AB as described in the October 1, 2009 *Record of Decision for Operable Unit 2 of the Geddes Brook/Ninemile Creek Site* (NYSDEC 2009) includes:

- Soil and sediment removal within NMC channel and NMC floodplain
- Restoration of NMC channel and NMC floodplain

An illustrative summary of the remedial approach for OU-2 is provided as **Exhibit C** to this Work Plan (NYSDEC 2009).

3. DESIGN SUBMITTALS

The design process will include the following document submittals to NYSDEC and USEPA.

3.1 50% DESIGN SUBMITTAL

The 50% design submittal will include a Pre-Design Investigation Summary Report, Remedial Design Report, preliminary design drawings, and specifications list. In accordance with the requirements of the Consent Order, the 50% design submittal will discuss permit requirements and health and safety. Citizen participation will be as described in the Citizen Participation Plan (O'Brien and Gere, 2007d) for the Wastebeds 1-8 Site. The 50% design submittal will be submitted to NYSDEC for review. Comments on the 50% design submittal will be addressed and incorporated in the 95% design submittal (Section 3.3).

3.1.1 Pre-Design Investigation Summary Report

The PDI Summary Report will document the activities conducted as part of the PDI along with the results of the PDI.

3.1.2 Remedial Design

The Remedial Design will document the Basis of Design (BOD). The BOD will present the manner in which the proposed design meets the Integrated IRM objectives. Data utilized and calculations performed to develop the BOD will be presented as appendices to the report.

3.1.3 50% Design Drawings

Design drawings will be developed to show existing site conditions and the general location of activities associated with the Integrated IRM, Mitigation Wetlands, and Remediation Area A hydraulic control system including excavation areas, staging areas, wetland restoration areas, and preliminary grading requirements. It is anticipated that the 50% design drawings will include the following:

- Title sheet
- General notes, legend and abbreviations
- General Site and key plan
- General Site layout plans, which may include:
  - Eastern shoreline groundwater collection trench alignment
  - Eastern shoreline seep collection trench and apron alignment
  - NMC seep collection trench and apron alignment
  - Northern shoreline stabilization alignment
  - Northern shoreline hydraulic control system alignment
  - Ditch A excavation and grading plan
  - Force main alignment
  - Access road alignment
  - Connected and inland wetland grading and planting plans
- Miscellaneous typical details, which may include:
  - Access road cross-section
  - Wetlands cross-section
  - Force main detail

  - Collection trench detail
- Miscellaneous details

The 50% design drawings will be sufficiently detailed to convey the intent of the design.

3.1.4 50% Design Specifications

To implement the design, it is anticipated that the following technical specifications will be required:

- Geomembrane
- Select Fill
- Topsoil and Seeding
- HDPE Pipe
- Clearing and Grubbing
- Earthwork
- Structural Excavation, Backfill and Compaction
- Trenching, Backfilling and Compacting
- Sediment Excavation, Handling, and Disposal
- Wetland Mitigation
- Restoration of Surfaces
- Pipeline Installation
- Leakage Tests
- Weir Box and Pipe Plugging and Abandonment
- Paint and Coatings

This list of technical specifications will be refined and submitted as part of the 50% design. Where possible, information will be provided on the design drawings, in lieu of technical specifications.

3.2 95% DESIGN SUBMITTAL

The 95% design task will expand the design drawings presented in the 50% design to a level commensurate with 95% completion. Additional drawings may be added to the 95% design set, as necessary, to meet additional design criteria and address comments provided by NYSDEC. In addition, interim design deliverables may be developed and submitted to NYSDEC, as necessary, prior to submission of the 95% design submittal.

In addition to the 95% design drawings, the following documents will be submitted to NYSDEC, as part of the 95% design submittal:

- Technical Specifications
- Construction Quality Assurance Project Plan (CQAPP)
- Community Air Monitoring Plan (CAMP)
- Stormwater Pollution Prevention Plan (SWPPP)
- OM&M Plan

3.2.1 Technical Specifications

The technical specifications will be provided in CSI format. Additional specifications identified as a result of progression of the design will be developed. The specifications will describe the conditions under which the work is to be conducted, including the materials to be incorporated into the work, and the standards for

acceptance of the components of construction. Where possible, information will be provided on the design drawings, in lieu of technical specifications.

3.2.2 Construction Quality Assurance Project Plan (CQAPP)

A CQAPP will be developed to address quality control and assurance activities during construction.

The CQAPP will include the following:

- Introduction – Describes the purpose of the plan and what it includes.
- Responsibility and authority – Discusses the organizations involved in the work (NYSDEC, Honeywell, engineer, contractor and construction quality assurance personnel) and presents the responsibility of each. Lines of communication and anticipated meetings will also be addressed.
- Quality control and quality assurance – Presents procedures and criteria to be used during construction activities (*e.g.*, during excavation activities, installation of the collection trench, installation of pump stations and associated mechanical equipment, and restoration activities).
- Documentation – Describes recordkeeping to be used to document the CQA activities performed during the work. Documentation will comprise daily reporting, inspection data sheets, meeting minutes, photographs, problem identification and corrective measures reports, record drawings, final documentation reports and storage and disposition of records.

3.2.3 Community Air Monitoring Plan (CAMP)

A CAMP will be developed to describe the air monitoring program to address potential project air emissions into the off-site community.

The CAMP will describe the following components of the project air monitoring program:

- Objectives and needs
- Community receptors
- Approach and duration
- Parameters, methods, and action limits
- Quality assurance and quality control
- Data management and reporting

The air monitoring program will be designed using the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (gCAMP) (NYSDOH 2000) guidance for evaluation of potential airborne contaminant releases as a direct result of investigative and remedial work activities. The air monitoring program will generally consist of monitoring upwind and downwind, either at or within the remedial worksite perimeter for dust, total volatile organic compounds (TVOCs) and odors; however, depending upon the contaminants of interest, the air monitoring program may include other parameters and/or test methods including analytical sampling for speciated volatile organic compounds.

3.2.4 Stormwater Pollution Prevention Plan and Erosion and Sedimentation Control

A stormwater pollution prevention plan (SWPPP) will be prepared and submitted with the 95% Design Report. The SWPPP will discuss and describe actions to be taken as part of NYSDEC's State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activities, Permit No. GP-0-10-001 and accepted engineering practices.

The SWPPP will describe the erosion and sedimentation control (E&SC) practices that will be used to minimize sediment in stormwater discharges during construction activities, offer protective measures to minimize sediment transport, and identify potential sources of sediment that may affect the quality of stormwater discharges.

3.2.5 Operations, Maintenance and Monitoring Plan

The OM&M plan will provide anticipated tasks to properly operate, maintain, and monitor the Site and will describe, in detail, the work tasks including: inspections, maintenance activities, monitoring activities, and data interpretation necessary to protect human health and the environment. Contents of the OM&M plan will likely include:

- Site Description
- Site Remedial Actions
- Site Monitoring
- Site Maintenance
- Documentation
- Reporting Requirements
- Staffing Requirements
- Health & Safety

Performance monitoring standards will be established as part of the OM&M plan to assess whether the project is achieving its objectives. Performance standards will be used to objectively evaluate if the design is achieving the expected result. A monitoring plan will be developed to outline the tasks to be included in post-construction monitoring and maintenance activities. An adaptive management plan will also be developed to address unforeseen changes in site conditions or other components of the design

3.3 CONSTRUCTION WORK PLAN

The Construction Work Plan will include a description of the means and methods expected to be used to construct the design. In addition, the details regarding the following may also be included:

- Project Directory
- Organization chart with names and authority levels
- Wet Weather Contingency Plan (CP)
- Health and Safety Plan (HASP)
- Dust Control
- Materials Handling
- Construction Water Management
- Spill and Discharge Control
- Traffic Control
- Bypass pumping

In addition, comments or revisions to the 95% design submittals (*i.e.,* design drawings) that are provided by NYSDEC will be incorporated into the Construction Work Plan submittal.

4. REGULATORY/PERMIT REQUIREMENTS

Consistent with 6 NYCRR § 375-1.7 (Permitting Remedial Activities) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), O'Brien & Gere will prepare the design to substantively comply with regulatory requirements. Potentially applicable regulatory programs, including substantive requirements, will be summarized in the 50% design report.

5. PROJECT ORGANIZATION

The project team includes Honeywell and O'Brien & Gere with oversight from the NYSDEC, the NYSDOH, and the USEPA.

Honeywell is the potentially responsible party (PRP), and has entered into a Consent Order with NYSDEC for the Site. John P. McAuliffe, P.E. serves as the program director for Honeywell.

NYSDEC is the regulatory agency overseeing the Integrated IRM, Mitigation Wetlands, and Remediation Area A hydraulic control system design. Tracy Smith is the project manager for NYSDEC. NYSDEC will communicate directly with Honeywell, NYSDOH, and USEPA.

NYSDOH will provide review with respect to public health issues. Mark Sergott is the NYSDOH contact. NYSDOH will communicate with NYSDEC.

USEPA is the regulatory agency that provides review for Onondaga Lake sub-sites. Robert Nunes is USEPA's project manager. USEPA will communicate with NYSDEC.

O'Brien & Gere will act as the consulting engineer responsible for the design and developing the final engineering report, and the contractor responsible for construction. The O'Brien & Gere program manager in charge of overall administration and technical execution of Honeywell projects is Christopher C. Calkins. The project manager and assistant project manager for the Integrated IRM design are Douglas M. Crawford, P.E. and Bradley A. Kubiak, P.E., respectively.

6. REPORTING

In accordance with the Consent Order, monthly progress reports will be submitted to NYSDEC by Honeywell throughout design and construction of the Integrated IRM, Mitigation Wetlands, and Remediation Area A Hydraulic Control System. Progress reports will include descriptions of actions taken, data collected, status of deliverables, status of schedule, work plan modifications, and citizen participation activities.

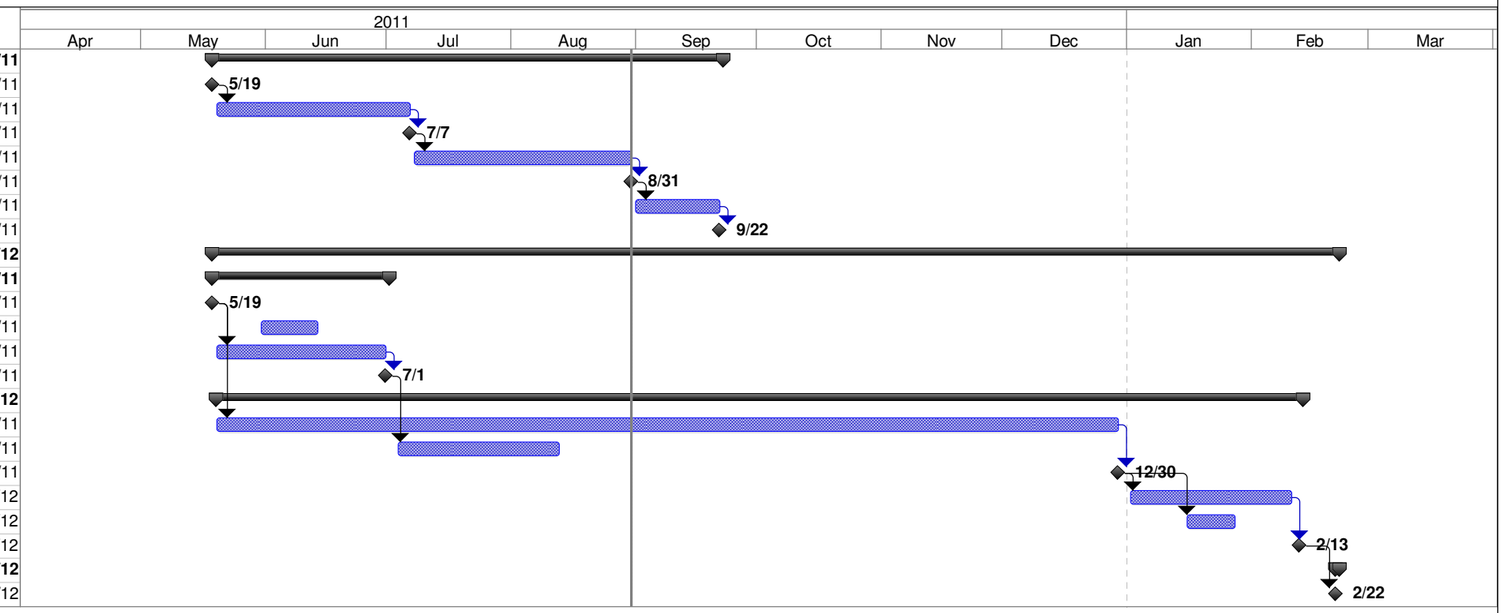
As required by the Consent Order, a Final Integrated IRM, Mitigation Wetlands, and Remediation Area A Hydraulic Control System Engineering Report and Certification, signed by a professional engineer, will be prepared to document that the Integrated IRM, Mitigation Wetlands, and Remediation Area A Hydraulic Control System was constructed in accordance with the Work Plan and the IRM Design.

7. SCHEDULE

A project schedule is included on the following page.

Wastebeds 1-8
Integrated IRM
Project Schedule

ID	Task Name	Duration	Start	Finish
1	**Integrated IRM Work Plan**	**91 days**	**Thu 5/19/11**	**Thu 9/22/11**
2	Submit Integrated IRM WP to NYSDEC	1 day	Thu 5/19/11	Thu 5/19/11
3	NYSDEC Review of WP	34 days	Fri 5/20/11	Wed 7/6/11
4	NYSDEC submit comments on WP	1 day	Thu 7/7/11	Thu 7/7/11
5	Revise WP	38 days	Fri 7/8/11	Tue 8/30/11
6	Submit revised WP to NYSDEC	1 day	Wed 8/31/11	Wed 8/31/11
7	NYSDEC review of revised WP	15 days	Thu 9/1/11	Wed 9/21/11
8	NYSDEC issue Approval of WP	1 day	Thu 9/22/11	Thu 9/22/11
9	**IRM Design**	**200 days**	**Thu 5/19/11**	**Wed 2/22/12**
10	**50% Design**	**32 days**	**Thu 5/19/11**	**Fri 7/1/11**
11	Submit 50% Design to NYSDEC	1 day	Thu 5/19/11	Thu 5/19/11
12	Meeting to discuss 50% Design	10 days	Tue 5/31/11	Mon 6/13/11
13	NYSDEC Review of 50% Design	30 days	Fri 5/20/11	Thu 6/30/11
14	NYSDEC submit comments on 50% Design	1 day	Fri 7/1/11	Fri 7/1/11
15	**95% Design**	**192 days**	**Fri 5/20/11**	**Mon 2/13/12**
16	Develop 95% Design	160 days	Fri 5/20/11	Thu 12/29/11
17	Incorporate NYSDEC 50% Design comments	30 days	Mon 7/4/11	Fri 8/12/11
18	Submit 95% Design to NYSDEC	1 day	Fri 12/30/11	Fri 12/30/11
19	NYSDEC Review of 95% Design	30 days	Mon 1/2/12	Fri 2/10/12
20	Meeting to discuss 95% Design	10 days	Mon 1/16/12	Fri 1/27/12
21	NYSDEC issues 95% Design Comments	1 day	Mon 2/13/12	Mon 2/13/12
22	**Construction Phase**	**1 day**	**Wed 2/22/12**	**Wed 2/22/12**
23	Initiate Construction Phase	1 day	Wed 2/22/12	Wed 2/22/12



Project: WB 1-8 project schedule_rev2
Date: Wed 8/31/11

Task Milestone Summary

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