

**APPENDIX E  
POST-CLOSURE CARE PLAN (PCCP)**

# Honeywell

*Prepared for*

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**POST-CLOSURE CARE PLAN**  
**ONONDAGA LAKE SEDIMENT CONSOLIDATION AREA**  
**(SCA) FINAL COVER DESIGN SUBMITTAL**  
**Camillus, New York**

# PARSONS

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**TABLE OF CONTENTS**

1. INTRODUCTION ..... 1  
 1.1 Project Background ..... 1  
 1.2 Purpose of Post-Closure Care Plan..... 1  
 1.3 Plan Organization ..... 2  
 1.4 Administrative Requirements ..... 3

2. FINAL COVER ..... 3  
 2.1 Introduction ..... 3  
 2.2 Inspection Interval and Procedures..... 4  
 2.3 Maintenance Interval and Procedures..... 4

3. SURFACE WATER MANAGEMENT, SOIL EROSION, AND SEDIMENT CONTROL ..... 7  
 3.1 Introduction ..... 7  
 3.2 Inspection Interval and Procedures..... 7  
 3.3 Maintenance Interval and Procedures..... 8

4. LIQUID MANAGEMENT SYSTEM (LMS) ..... 8  
 4.1 Introduction ..... 8  
 4.2 LMS Operation ..... 8  
 4.3 Inspection Interval and Procedures..... 9  
 4.4 Maintenance Interval and Procedures..... 10

5. RECORDKEEPING AND REPORTING ..... 11  
 5.1 Recordkeeping and Record Retention Requirements..... 11  
 5.2 Reporting Requirements and Procedures ..... 11

6. DOCUMENTATION ..... 11  
 6.1 Inspection, Operation, and Maintenance Forms ..... 11  
 6.2 Annual Reports ..... 12  
 6.3 Five-Year Review Report..... 13

7. OPERATION, MONITORING, & MAINTENANCE (OM&M) STAFFING REQUIREMENTS ..... 13

**TABLE OF CONTENTS (Continued)**

7.1 Manpower Requirements..... 13  
7.2 Responsibilities and Duties ..... 13  
7.3 Qualifications and Training..... 14  
8. CITIZEN PARTICIPATION..... 14  
9. HEALTH AND SAFETY..... 15  
10. GROUNDWATER AND ENVIRONMENTAL MONITORING ..... 16  
11. GEOTECHNICAL MONITORING..... 18  
12. ACCESS CONTROL ..... 18  
13. POST-CLOSURE SITE USE ..... 18  
14. REFERENCES ..... 18

ATTACHMENT 1: Inspection, Operation, and Maintenance Schedule

## **1. INTRODUCTION**

### **1.1 Project Background**

Onondaga Lake is a 4.6 square mile (3,000 acre) lake located in Central New York State immediately northwest of the City of Syracuse. The Onondaga Lake Bottom Site is on the New York State Registry of Inactive Hazardous Waste Sites and is part of the Onondaga Lake National Priorities List Site. Honeywell entered into a Consent Decree (CD) (United States District Court, Northern District of New York, 2007) (89-CV-815) with the New York State Department of Environmental Conservation (NYSDEC) to implement the selected remedy for Onondaga Lake as outlined in the Record of Decision (ROD) issued on July 1, 2005 (NYSDEC, 2005). The following documents are appended to the Consent Decree: ROD, Explanation of Significant Differences, Statement of Work (SOW), and Environmental Easement. As specified in the ROD, a component of the selected lake remedy includes the dredging and onsite consolidation of sediments removed from the lake. Based on an evaluation of potential locations for building and operating a Sediment Consolidation Area (SCA) to contain sediment dredged from Onondaga Lake, the SCA was constructed on Wastebed 13. The Onondaga Lake SCA Civil and Geotechnical Final Design Report (Parsons and Geosyntec, 2011) presents the design of the liner system and perimeter berms of the SCA, which was constructed in 2010, 2011, and 2012. The SCA construction was completed in 2012. Dredging operations at the SCA site began in 2012 and were completed in November 2014. The Onondaga Lake SCA Final Cover Design (Cover Design) Report (Parsons and Beech and Bonaparte, 2016) presents the design of the SCA final cover system. Construction of the cover system began in 2015 and will be completed in 2017.

### **1.2 Purpose of Post-Closure Care Plan**

This Post-Closure Care Plan (PCCP) was prepared in accordance with: (i) the requirements set forth in the ROD and SOW for “*Implementation of a long-term operation, maintenance, and monitoring program to monitor and maintain the effectiveness of the remedy*”; and (ii) the New York State Department of Environmental Conservation (NYSDEC) Regulation Section 360-2.15 (k) (7) that states “*A comprehensive post-closure monitoring and maintenance operations manual is required.*”

The overall objective of the PCCP is to maintain and verify the integrity and effectiveness of the SCA facility including final cover system, surface water management system, the liquid management system (LMS), and the SCA perimeter berm. The overall objective will be achieved by regular inspections and maintenance activities. The specific objectives of the PCCP are:

- to provide a routine inspection program that allows for assessment of conditions at the site;
- to provide a maintenance program for the site that will facilitate the long-term and continual performance of the SCA facility;
- to provide, if necessary, guidance and protocols for the repair and/or restoration of deficiencies in the SCA facility; and
- to provide a standardized procedure for notice to project parties (Honeywell and NYSDEC) regarding inspections, the conditions of the SCA, and annual reporting.

The NYSDEC Project Manager will be notified at least two weeks prior to major inspections (i.e., quarterly) and significant maintenance activities. More frequent minor inspections may be performed on a regular basis to monitor the status of the final cover. In addition, the NYSDEC will be notified immediately in the unlikely event of an action or occurrence which causes or threatens to cause a release of hazardous substances, pollutants, or contaminants on, at, or from the SCA, or which may create a danger to public health, welfare, or the environment.

Per NYSDEC regulations, the minimum post-closure care period is 30 years. Elements of the post-closure care activities may be discontinued sooner, as approved by NYSDEC, based on inspection and monitoring results.

### **1.3 Plan Organization**

The remainder of the report is organized as follows:

- Section 2 contains the inspection and maintenance programs for the final cover system;
- Section 3 contains the inspection and maintenance programs for the surface water management, soil erosion, and sediment control;
- Section 4 contains the operation requirements and inspection and maintenance programs for the LMS;

- Section 5 describes the recordkeeping and reporting requirements;
- Section 6 presents the documentation requirements;
- Section 7 contains the operation, monitoring, & maintenance (OM&M) staffing requirements;
- Section 8 describes the citizen participation program;
- Section 9 contains the health and safety requirements;
- Section 10 contains the groundwater and environmental monitoring requirements;
- Section 11 describes the geotechnical monitoring;
- Section 12 contains the access control requirements;
- Section 13 presents the post-closure site use; and
- Section 14 contains the references.

Attachment 1, which is an Inspection, Operation, and Maintenance Schedule, is also included as part of this PCCP.

#### **1.4 Administrative Requirements**

Honeywell will appoint a Facility Supervisor for the SCA. This Facility Supervisor will serve as the contact person for the SCA. Pursuant to the requirements set forth in Paragraph 100 of the CD, Honeywell will provide a written notice and a copy of the CD to each contractor and subcontractor hired to perform any portion of the work required by this PCCP.

## **2. FINAL COVER**

### **2.1 Introduction**

The SCA final cover system must be periodically inspected and maintained. The subsequent sections discuss in more detail the requirements, procedures, protocols, and schedules of the inspection and maintenance activities for the final cover system. General post-closure care requirements for vegetation are presented herein. Any additional requirements related to the selected vegetation will be added to this PCCP at the completion of construction of the final cover.

## **2.2 Inspection Interval and Procedures**

Visual inspection of the final cover system will be completed quarterly throughout the post-closure period. Honeywell may petition NYSDEC to modify the quarterly inspection to annual inspection as part of the five-year remedy review.

The objective of the final cover system inspection is to detect any observable issues or conditions that would prevent the final cover system from continuing to preclude direct contact with the underlying materials and off-site transport of contaminated media. During the inspections, the final cover system will be visually examined for the following:

- evidence of subsidence or settling that results in low points or depressions;
- evidence of burrowing animals;
- evidence of trespassing or unauthorized use of the final cover area;
- presence of any erosion rills;
- condition of vegetation (e.g., grass);
- observable irregularities such as bulges, bumps, slumps, or cracks;
- evidence of ponded water;
- condition of gas vents;
- condition of drainage pipe outlets;
- condition of any access roads (i.e., erosion, aggregate washout, exposed geotextile, and debris on the road);
- condition of SCA perimeter berm;
- condition of areas near anchor trenches; and
- any other irregularities.

In addition, visual inspections will be conducted as soon as practical after major storm events (i.e., 5-year storms per Part 360-2.15(k)(8)), possible flooding events, or other events that may result in damage to the final cover system, but only at such time as the safety and health of inspection personnel can be assured.

## **2.3 Maintenance Interval and Procedures**

The following maintenance activities must be performed on the final cover system soil as needed and in consultation with NYSDEC, unless otherwise indicated:



- Erosion rills on the final cover system will be repaired by packing straw mulch into the void areas or by other alternate methods, to prevent further erosion and allow the cap vegetation to take root in the area, stabilizing the rill. If rills reach 4 to 6 inches in depth, additional soil material will be added and the area will be re-compacted, re-seeded or re-planted with native grassland species, fertilized, and mulched. Materials equivalent to those already in place will be used.
- Depressions caused by erosion, settlement, or subsidence that are observed to hold water will be repaired by placing additional soil in the depression and re-seeding or re-planting with native grassland species as soon as possible. Materials equivalent to those already in place will be used.
- If an area has less than 25 percent vegetative coverage at the end of the first growing season or at the mid-point of the growing season (July) thereafter, the area will be reworked, as necessary, and re-seeded and/or re-planted with native grassland species. High quality agricultural fertilizer or other amendments may be applied at the rate suggested by the manufacturer to promote the re-establishment of a self-sustaining vegetative cover.
- The herbaceous vegetative cover will be maintained by mowing on a regular schedule, except for the area within a 10-ft radius of the gas vents that will not be mowed. The plants near the gas vents were specifically selected so that they would not be woody (i.e., they are grasses) and grow tall enough to hide the vents. Trimming of the area around the gas vents will be performed by hand if the vegetation is interfering with gas vent operations. The mowing schedule for the remainder of the cover is intended to limit the growth of weeds or rooting of unplanned woody species. During the first growing season, it is anticipated that vegetation will be mowed in mid-May and mid-June to a height of 6 to 8 inches, and to a height of 10 to 15 inches in mid-August. This mowing regime will reduce competition for sunlight and moisture, prevent unwanted species from producing seed during the first growing season, and allow warm season grasses that are developing their root systems to establish. Prior to each scheduled mowing event during the first growing season, a site inspection will be performed to determine the extent and type of mowing that is needed. In the second and third growing seasons, vegetation will be mowed to a height of 10 to 15 inches before April 15<sup>th</sup> and after September 15<sup>th</sup>. If field conditions prior to April 15<sup>th</sup> do not allow for mowing to occur without potentially damaging the cover system, the vegetation will only be mowed after September 15<sup>th</sup>. Following the third growing season,

mowing will occur on a three-year rotating cycle with one-third of the vegetative cover area (approximately 17 acres) mowed once each year after October 1<sup>st</sup> to a height of 10 to 15 inches (i.e., each one-third area will be mowed once every three years). In addition, to prevent damaging the cover system, mowing equipment should not be used on the perimeter channels when they are wet/soft. If necessary, alternative methods for maintaining this area will be used. Safe mowing procedures will also be developed to prevent overturning of equipment on steep perimeter slopes.

- Animal burrows will be filled following inspection and seeded or planted with native grassland species to prevent creation of erosion rills. Honeywell will manage the animals present on the site before the burrows are sealed.
- Additional aggregate will be placed on access roads as needed to avoid exposed sub-base or potholes so that the access roads remain in drivable condition.
- Any penetrations through the soil cover will be repaired by locally reconstructing the soil cover similar to the surrounding cover and then seeded or planted with native grassland species. Penetrations through geosynthetic components will be temporarily covered with a tarp or other impervious cover and repaired as soon as practical by a geosynthetics installer using materials equivalent to those used to construct the final cover system in accordance with the requirements of the SCA Final Cover Project Technical Specifications. The geosynthetics installer shall meet the project qualification requirements and shall be approved by Honeywell prior to commencing the repair.
- If damage to soil mounds around the gas vent pipes used to divert surface water is identified, it will be repaired as soon as possible by placing additional soil and re-seeding or re-planting with native grassland species. Materials equivalent to those already in place will be used. If there is significant movement around the gas vent pipe, then a portion of the pipe will be excavated and the geomembrane boot will be adjusted to accommodate additional movement. The gas vent pipes will be maintained in a stable and upright position. Any objects obstructing the flow of gas at the gas vents will be removed.
- Debris or any other objects obstructing the flow of the drainage pipes (i.e., at pipe outlets) will be removed. Detection of areas that are too wet or boggy to support vegetation growth on the cover system may require repair or replacement of the existing drainage pipe with additional gravel and geotextile wrap.

- Routine maintenance will take place throughout the year and at such times as necessary based upon the results of the site inspections. Maintenance to repair the final cover system will be conducted on an as-needed basis.

### **3. SURFACE WATER MANAGEMENT, SOIL EROSION, AND SEDIMENT CONTROL**

#### **3.1 Introduction**

The SCA final cover system was designed with permanent diversion berms, interception berms, and perimeter drainage channels, as shown on the SCA Final Cover Design Drawings. These permanent surface water management structures will be inspected per the Post-Closure Care Plan. Temporary erosion control measures, such as erosion mats, silt fences, woodchips, etc., installed as part of the SCA operations and closure construction are intended to be removed once the final cover vegetation is established, and hence are not addressed herein. These temporary erosion control structures will be inspected in accordance with the SCA Final Cover Project Technical Specifications. The current use of the East and West Basins will continue at least until an end use is determined for these areas. The basins are addressed in this plan.

#### **3.2 Inspection Interval and Procedures**

The inspection of the surface water management, soil erosion, and sediment control structures at the SCA facility includes visually examining and evaluating the integrity and proper functioning of the following items, as applicable:

- diversion berms;
- interception berms;
- drainage channels; and
- East and West Basins (including temporary pumps and pipes).

The surface water management, soil erosion, and sediment control structures will be inspected quarterly unless otherwise specified. Honeywell may petition NYSDEC to modify the quarterly inspection to an annual inspection as a part of the five-year remedy review.

### **3.3 Maintenance Interval and Procedures**

The maintenance activities associated with the surface water management, and soil erosion and sediment control structures at the SCA facility include the following items:

- removal of debris or any other objects obstructing the flow in drainage channels;
- repair, as needed, of any damaged stormwater, erosion, and sediment control structures;
- cleaning of clogged riprap (by removal and replacement, as needed) and the East and West Basins; and
- calibration, operation, maintenance, and service of mechanical and electrical equipment including the pump, pressure transducers, and flow meters in accordance with the manufacturer's instructions.

## **4. LIQUID MANAGEMENT SYSTEM (LMS)**

### **4.1 Introduction**

This section of the PCCP establishes operating, inspection, and maintenance guidelines to be followed to achieve proper performance of the SCA LMS, which includes a liquid transmission system (LTS) and two sump areas for collecting and removing liquid through two vertical risers in each area. The LTS will transfer the collected liquid to the designated water treatment facility to properly manage the liquid.

### **4.2 LMS Operation**

The LMS is designed to function automatically. Liquid will enter the risers via sumps by gravity flow. The riser pumps are designed to turn on and off automatically based on the liquid levels within the risers. The sump pump will be operated in the automatic mode, but only when the SCA water treatment plant operation staff is onsite. This is especially true in the winter months, when the system should be checked for leaks and all drain lines verified to be closed prior to restarting the sump pumps. The level alarms will alert the Facility Supervisor or representative if a high level occurs while the plant is unstaffed, and staff will be called in to re-start the sump pump operations. Pumping systems shall include monitoring devices to measure the total amount of liquid pumped from the sumps. The total amount of liquid at the treatment facility shall also be recorded.

### **4.3 Inspection Interval and Procedures**

When liquid is present in the sump in pumpable quantities, the individual components of the LMS must be inspected monthly for the first year and quarterly thereafter to:

- ensure that the automatic controls of the LMS pumps are in operation when the water treatment plant staff is onsite and ready to operate the pumps;
- examine the condition of instrumentation and/or valves (e.g., note sticking or jammed devices, corrosion, leaks, and misalignments), or if liquid removal processes from the SCA facility are not functioning properly;
- verify that the operating conditions of the LMS are specified so that the liquid depth in the sump does not exceed 6 feet in order to achieve the design goal of the liquid head on the liner not exceeding 1 foot;
- verify that liquid is flowing from the sumps during pumping, either by using a remote monitoring system or direct inspection of the flow gauges;
- record the flow rate and volume of liquids flowing from the sumps, either by using a remote monitoring system or direct inspection of the flow gauges;
- confirm that the pumps are operating and high level alarm conditions are not reached, either by using a remote monitoring system or direct inspection of the flow gauges;
- examine the condition of the aboveground piping and the insulation around the pipes when pumping activities occur. The aboveground pipes include pipes at the top of riser as well as the LTS piping;
- verify appropriate warning signs are clearly visible (e.g., buried live electric line, liquid transmission pipe);
- examine the condition of any mechanical and electrical instrumentation devices in winter prior to starting up the automatic mode of the system. This examination prior to re-start shall include the verification that the heaters of the appropriate devices are in working order and the drains of the sump pump discharge piping are closed; and
- examine the condition of the sump riser covers to prevent any potential fall-into-riser accident.

It is recommended that if remote monitoring systems are used that they be equipped with automatic call options for alarm conditions. Additional inspections shall be conducted in the event a remote monitoring system becomes inoperable.

When there is no liquid in the sump risers or the liquid is present in an un-pumpable amount for a long time (i.e., several months), Honeywell may petition NYSDEC to modify the frequency of various inspections mentioned above for the LMS to semi-annually (i.e., twice per year) or annually, as a part of the five-year remedy review.

#### **4.4 Maintenance Interval and Procedures**

The following maintenance activities must be performed on the LMS in order to ensure proper functioning of the SCA facility:

- if an alarm is activated, an auto dialer will notify the Facility Supervisor or a representative who shall respond as soon as practical (i.e., 24 hours or less) to assess the reasons for the alarm sounding and to take corrective actions;
- the Facility Supervisor or a representative must remedy any problems identified during the inspection as soon as practicable;
- mechanical and electrical equipment including the pump, pressure transducers, and flow meters shall be calibrated, operated, maintained, and serviced in accordance with the manufacturer's instructions. The minimum frequency for the calibration of the equipment will be consistent with requirements specified by the manufacturers;
- any warning signs that are damaged to the point where the sign no longer is legible will be repaired/replaced;
- if an inspection indicates that a LTS pipe or a force main is obstructed, the pipe shall be cleared or flushed by pumping fresh water from a water truck through a hose inserted in the pipe cleanout. If flushing does not remove the obstruction, other methods shall be used to clean the pipe. Other methods may include blowing the obstruction out with air, vacuuming, rodding, or inserting a snake, fish tape, or other suitable devices. If air or water pressure is used, the working pressure inside the LTS pipe or the force main shall not exceed the pressure rating of those pipes; and
- any damage to the sump riser covers that threatens the integrity of this structure will be repaired.

## **5. RECORDKEEPING AND REPORTING**

### **5.1 Recordkeeping and Record Retention Requirements**

Recordkeeping procedures will be followed for post-closure care of the SCA facility including final cover system, surface water management system, LMS, and the SCA perimeter berm at the site. The records to be maintained include, at a minimum:

- a summary of the findings of inspections;
- a description of maintenance performed;
- a detailed description of any emergencies that occurred and the measures taken to address them;
- a detailed description of the issues encountered and the actions taken to correct them;
- the daily flow rates and volumes of liquids pumped from the LMS;
- the overall monthly average of the daily flow rates (gallons per acre per day or gpad) for each LMS sump; and
- a detailed description (what, when, where, and how much) of the information and/or documents provided to NYSDEC.

Records and files for post-closure care will be kept by Honeywell. Records will be preserved to document information relating to post-closure care inspection and maintenance activities for the most recent six years. Honeywell will provide the originals or copies of the documents to NYSDEC at the end of the six-year period. NYSDEC may keep these documents in perpetuity, if it is determined to be necessary.

### **5.2 Reporting Requirements and Procedures**

Honeywell will follow all reporting requirements provided in the CD. Annual and Five-Year Post-Closure Care Reports will be submitted as described in Section 6.

## **6. DOCUMENTATION**

### **6.1 Inspection, Operation, and Maintenance Forms**

The information gathered during each inspection, operation, and maintenance event will be legibly recorded in Inspection, Operation, and Maintenance Forms listed in section 5.1. Data to be recorded on the Inspection, Operation, and Maintenance Form include:

- date and time of the inspection or maintenance;
- weather condition during inspection or maintenance;
- the name(s) of the personnel conducting the inspection or maintenance;
- a written description of the observation made;
- nature of any remedial actions to be taken;
- recommendation for corrective measures; and
- documentation of any repair/maintenance activities.

Photographs taken during inspection or maintenance activities will be recorded in Photographic Logs. The data to be recorded on the Inspection, Operation, and Maintenance Form will be consistent with the records to be maintained as listed in Section 5.1.

## **6.2 Annual Reports**

The Annual Post-Closure Care Report will summarize the quarterly and other significant inspection, maintenance, and monitoring activities. The detailed logs for each inspection, maintenance, and monitoring event will be kept at the site and provided electronically in each annual report. The Annual Post-Closure Care Report will include:

- a description of the site, site location, historical site background, and responsible project parties;
- a narrative summary of inspections conducted at the site over the past year;
- a narrative summary of maintenance conducted at the site over the past year;
- a narrative summary detailing resolution of outstanding inspection or maintenance issues from the prior year, or in the event that resolution has not been reached, a descriptive summary of the outstanding issues and “go-forward” strategy;
- the Inspection, Operation, and Maintenance form for each quarterly inspection and the detailed logs for each inspection, maintenance, and monitoring event; and
- recommendations for modifications to this PCCP, if necessary.

The Annual Post-Closure Care Reports will be submitted to the NYSDEC within the first quarter of the following year and used as the basis to develop the Five-Year Post-Closure Care Report, which is also required for submittal to NYSDEC.



### **6.3 Five-Year Review Report**

The inspection and maintenance program will be performed as described above for a minimum of five years. If the final cover system has stabilized, an abbreviated inspection and maintenance program will be presented to NYSDEC for approval. The final cover system shall be considered as stabilized when no significant erosion, settlement, or subsidence areas have been observed within two consecutive calendar years. The abbreviated inspection and maintenance program will consist of semi-annual or annual inspection, operation, and maintenance for the final cover system, surface water management, soil erosion and sediment control, and LMS. The Five-Year Post-Closure Care Report will be submitted as part of the closure and post-closure registration renewal for the site and will be developed based on the Annual Post-Closure Care Reports.

## **7. OPERATION, MONITORING, & MAINTENANCE (OM&M) STAFFING REQUIREMENTS**

### **7.1 Manpower Requirements**

The OM&M Contractor is responsible for providing sufficient manpower for executing this plan. Honeywell will have a representative that can communicate between the OM&M Contractor and NYSDEC in terms of documentation, reviews, and agency inspections.

### **7.2 Responsibilities and Duties**

#### ***OM&M Contractor***

The OM&M Contractor will be responsible for conducting site inspections, maintenance of the site, sampling, field documentation of the OM&M activities, and report preparation. The OM&M Contractor is responsible for site health and safety during OM&M activities.

#### ***Honeywell***

Honeywell is ultimately responsible for implementing the OM&M program in accordance with the CD. Honeywell is financially responsible for the OM&M program and must contract for OM&M services. Honeywell will submit required documentation to NYSDEC and participate in five-year meetings, if requested by NYSDEC.

## ***NYSDEC***

The NYSDEC is responsible for enforcing the CD. The NYSDEC will review reports including the Five-Year Post-Closure Care Report and will participate in the five-year review meeting, as needed, to make decisions regarding the long-term OM&M program.

### **7.3 Qualifications and Training**

Qualifications and training for OM&M personnel will be provided in a health and safety plan that will be submitted to the NYSDEC for informational purposes both initially and upon future modification.

## **8. CITIZEN PARTICIPATION**

Honeywell is committed to cooperating with NYSDEC to inform the public during the OM&M period. Honeywell will conduct the OM&M with NYSDEC oversight, review, and approval. NYSDEC will implement the citizen participation activities with Honeywell's assistance. As discussed in Section 6.2, the detailed logs for each inspection, maintenance, and monitoring event will be included in the Annual Report, which will be provided to the document repositories. The community hotline will remain available as directed by NYSDEC.

For additional information, the public is encouraged to contact any of the following project staff:

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**9. HEALTH AND SAFETY**

Upon completion of the SCA Final Cover, impacted materials will have been contained in compliance with the approved plans and specifications. The OM&M Contractor will be responsible for preparing and submitting an OM&M Health and Safety Plan.

## **10. GROUNDWATER AND ENVIRONMENTAL MONITORING**

Groundwater and environmental monitoring, except for vent odor monitoring described herein, are being addressed as part of the Wastebeds 9 through 15 Closure; therefore, they are not addressed herein. Specifically, groundwater and environmental monitoring are being addressed under the SCA Environmental Monitoring Plan (O'Brien and Gere, 2014) and quarterly monitoring reports.

Air quality monitoring that was conducted during SCA operations (2012-2014) and installation of the leveling layer (2015) demonstrated no exceedances of the project's air quality criteria for VOCs, mercury, and hydrogen sulfide. Dust monitoring was conducted during SCA operations and closure construction, and the results were provided to the NYSDEC in Daily Air Monitoring Reports. To estimate the potential of detectable odors from the cover vents, emissions modeling was conducted to estimate the emissions from the vents relative to emissions that were estimated for the SCA operations. Off-site odor monitoring results during operations indicated that odor levels, when detected, were usually less than 2 odor units (OUs) and did not exceed 2 OUs. Odors are typically considered just detectable at 1 OU, which corresponds to an order of magnitude reduction of mass<sup>1</sup> from 2 OUs, or a greater than 90 percent reduction in emissions as compared to emissions during SCA operations.

The same model that was used in 2010 to estimate air emissions from the SCA operations<sup>2</sup> was used to estimate emission potential from the cover vents. The model derived emission potential from the vents as the diffusion of compounds from the sediment pore spaces within the geotextile tubes toward the tube's fabric and into the leveling layer where they can be carried out to the atmosphere through the vents as a consequence of the SCA-generated gas flow. This is distinctly different from the SCA operations scenario, which involved several active sources of emissions (i.e., the debris screen, geotextile tube filling, inter-tube flow streams and cascades, flow through the gravel bed and perimeter channels, the holding ponds, and the water treatment plant). Although the sources of volatile losses to the atmosphere are different, the model is still applicable since it uses environmental chemodynamic equations developed by Dr. Louis Thibodeaux

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<sup>1</sup> A liter of odorous air at 2 OUs needs to be diluted by a liter of odor-free air to be just detectable (i.e., 1 OU), which corresponds to an order of magnitude reduction of mass.

<sup>2</sup> Three memoranda to Tim Larson of NYSDEC from Honeywell contractors dated June 3, June 29, and October 28, 2010.

and others at Louisiana State University. Dr. Thibodeaux was consulted for both modeling efforts. The model used literature based mass transfer coefficients and Henry's Law constants for each modeled compound, as well as site-specific sediment concentrations, partitioning coefficients, fraction organic content, and dry bulk density.

The model predicted mass emission rates for each compound. When summed, the modeled vent emission rate is 97 percent less than the emission rate from the SCA operations model. Since the model indicates a greater than 90 percent reduction in emissions, detection of cover vent odors off-site is unlikely. However, the following odor monitoring approach and contingent odor control approach have been developed in the event that off-site odors do occur.

Vent odor monitoring will be conducted starting in 2017 following approval by NYSDEC. It will involve odor observations at the locations of the eight air monitoring stations along the SCA workzone perimeter road. Odor monitoring will be performed with the nose of a qualified individual who has experience with site-related odors. Odor observations will be conducted once per work day from the start of SCA cover construction in 2017 until the construction of the final cover is completed. At that time, the frequency of odor monitoring may be reduced to weekly odor observations or less, if acceptable to NYSDEC. Odor monitoring will continue until NYSDEC allows the monitoring to cease.

If vent odors are detected at any one or more of the eight air monitoring stations, odor levels will be measured at each vent using a field olfactometer to determine which vent(s) is(are) the source of the detected odor, and perimeter road monitoring will be conducted once per work day as appropriate. Carbon treatment, which will be located onsite for immediate installation on vent pipes if necessary, will be applied at the odor emitting vents to control odor emissions. Odor levels at the exhaust of the controlled vents will be checked at an appropriate frequency to confirm proper control. Periodically, the carbon treatment may be removed from the vent(s) to determine if the respective vent(s) is(are) still a source of odors. If the respective vent is determined to continue to be an odor source, then the carbon treatment will be reinstalled on the respective vent(s). Perimeter odor monitoring will continue until carbon treatment is no longer needed and the NYSDEC allows the monitoring to cease.

## **11. GEOTECHNICAL MONITORING**

Geotechnical monitoring will be continued for 6 months after final cover construction is complete. The monitoring data will be reported at a frequency of every 3 months (i.e., quarterly). The geotechnical instrumentation system may be abandoned at the end of the 6-month monitoring period, which is estimated to be the end of November 2017, as long as the settlement data curves indicate that settlement has flattened out. The rates of measured settlement have been decreasing since the winter shutdown in 2016/2017. The measured settlement curves are expected to have flattened out by the time the geotechnical instrumentation system is abandoned, since limited final cover construction activities are planned for the 2017 construction season. The geotechnical monitoring data will be provided in the final geotechnical data summary report.

## **12. ACCESS CONTROL**

Control of site access is being addressed as part of the Wastebeds 9 through 15 Closure; therefore, it is not addressed herein. Specifically, site access is currently handled in Section 3.2 of the approved Closure Investigation Work Plan (O'Brien and Gere, 2011).

## **13. POST-CLOSURE SITE USE**

A schedule for addressing post-closure site use has not been developed yet and may not be completed prior to completion of the SCA final cover construction in 2017. The current use of the East and West Basins, the sediment processing area, and the water treatment plant will continue at least until an end use is determined for these areas. At that time, and if necessary depending on the end use, Honeywell will petition the NYSDEC for required changes.

## **14. REFERENCES**

New York State Department of Environmental Conservation and United States Environmental Protection Agency Region 2. 2005. Record of Decision. *Onondaga Lake Bottom Subsite of the Onondaga Lake Superfund Site*. July 2005.

O'Brien and Gere. 2011. Wastebeds 9 through 15 Closure Investigation Work Plan. September 2011.

- O'Brien and Gere. 2014. Sediment Consolidation Area (SCA) Environmental Monitoring Plan. December 2014.
- Parsons and Beech and Bonaparte. 2016. Onondaga Lake Sediment Consolidation Area Final Cover Design. May 2016.
- Parsons and Geosyntec. 2011. Onondaga Lake Sediment Consolidation Area (SCA) Civil and Geotechnical Final Design. April 2011.
- United States District Court, Northern District of New York. 2007. State of New York and Denise M. Sheehan against Honeywell International, Inc. Consent Decree Between the State of New York and Honeywell International, Inc. Senior Judge Scullin. Dated October 11, 2006. File January 4, 2007.

# ATTACHMENT 1

## Inspection, Operation, and Maintenance Schedule



## Inspection, Operation, Maintenance, and Monitoring Schedule

SCA Component/ Activity	Items to Inspect/Monitor/Maintain	Minimum Frequency									
		Daily	Weekly	Monthly	Quarterly	Semi-annually	Annually	Every Five Years	Other		
Final Cover <sup>4</sup>	<b>Physical Inspection:</b> <ul style="list-style-type: none"> <li>evidence of trespassing or unauthorized use of the final cover area</li> <li>evidence of subsidence or settling that results in low spots</li> <li>evidence of burrowing animals</li> <li>condition of vegetation</li> <li>observable irregularities such as bulges, bumps, slumps, or cracks</li> <li>evidence of ponded water</li> <li>condition of gas vents</li> <li>condition of drainage pipe outlets</li> <li>condition of any access roads (i.e. erosion, aggregate washout, exposed geotextile, and debris on the road)</li> <li>condition of SCA perimeter berm</li> <li>condition of areas near anchor trenches</li> <li>any other irregularities.</li> </ul> <b>Routine Maintenance:</b> <ul style="list-style-type: none"> <li>repairs</li> <li>mowing</li> <li>re-seeding of vegetative cover (including additional irrigation or placement of amendments)</li> </ul>			X <sup>2</sup>	X					as needed Note 6 as needed	
Surface Water Management, Soil Erosion, and Sediment Control	<b>Physical Inspection:</b> <ul style="list-style-type: none"> <li>stormwater control berms</li> <li>drainage channels</li> <li>east and west basins (including temporary pumps and pipes)</li> </ul> <b>Routine Maintenance:</b> <ul style="list-style-type: none"> <li>removal of debris or any other objects obstructing the flow in drainage channels</li> <li>repair of damaged erosion and sediment control structures</li> <li>cleaning of clogged riprap by removal and replacement</li> <li>cleaning of the basins</li> <li>calibration, operation, maintenance, and servicing of mechanical and electrical equipments including the pump and flow meters</li> </ul>				X					as needed as needed as needed per manufacturer recommendations	
Liquid Management System	<b>Monitoring/Recording:</b> <ul style="list-style-type: none"> <li>flow rate and volume of liquids flowing from the sumps</li> <li>high level liquid alarm for each sump</li> </ul> <b>Physical Inspection:</b> <ul style="list-style-type: none"> <li>verify that the automatic controls of the LMS pumps are on</li> <li>examine the condition of instrumentation and/or valves</li> <li>verify that the operating conditions of the LMS are specified so that the liquid depth in the sump does not exceed 6 feet</li> <li>examine the condition of the aboveground piping and the insulation around the pipes when pumping activities occur</li> <li>verify appropriate warning signs are clearly visible</li> <li>examine the condition of any mechanical and electrical instrumentation devices in winter when the temperature fall below equipment-specific operating ranges</li> <li>examine the condition of the sump riser covers to prevent any potential fall-into-riser accident</li> </ul> <b>Routine Maintenance:</b> <ul style="list-style-type: none"> <li>calibration, operation, maintenance, and servicing of mechanical and electrical equipments including the pump and flow meters</li> <li>repair of warning signs</li> <li>cleaning of LTS and forcemain pipes</li> <li>other repairs</li> </ul>	R								maintain spreadsheet as needed as needed per manufacturer recommendations as needed as needed	
Environmental Monitoring	<ul style="list-style-type: none"> <li>groundwater monitoring</li> <li>leachate monitoring</li> <li>surface water monitoring</li> <li>odor monitoring</li> </ul>				X					per December 2014 EMP <sup>7</sup> per December 2014 EMP <sup>7</sup> per December 2014 EMP <sup>7</sup> Until reduced frequency approved by NYSDEC	
Reports	<ul style="list-style-type: none"> <li>Inspection logs</li> <li>Annual report</li> <li>5-year Report – Regulatory submittal</li> </ul> Incident Report for any action or occurrence which causes or threatens to cause an additional release of hazardous substances, pollutants, or contaminants on, at, or from the SCA, or which may create a danger to public health, welfare, or the environment.			X <sup>2</sup>					X	X	For each event Immediately after each occurrence

**Notes:**

1. "X" indicates onsite physical inspection, monitoring, or repair work.
2. "R" indicates remote monitoring can be used in lieu of site visit and direct inspection or monitoring.
3. Based on the monitoring and inspection results obtained, Honeywell can petition NYSDEC for a reduced monitoring frequency for different items.
4. Visual inspections will also be conducted as soon as practical after 5-year storm events.
5. Inspections will be performed monthly for the first year and quarterly thereafter.
6. Specific guidelines for mowing are provided in Section 2.3 of the Post-Closure Care Plan.
7. SCA Environmental Monitoring Plan (EMP) prepared for Honeywell by O'Brien and Gere in December 2014.
8. Daily refers to once per work day.