ONONDAGA LAKE
CAPPING CALIBRATION WORK PLAN

Prepared For:

Honeywell

301 Plainfield Road, Suite 330
Syracuse, NY 13212

Prepared By:

PARSONS

301 Plainfield Road, Suite 350
Syracuse, NY 13212
Phone: 315.451.9560
Fax: 315.451.9570

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LIST OF ACRONYMS

CQAP	Construction Quality Assurance Plan Onondaga Lake – Capping, Dredging, and Habitat
CY	cubic yards
GAC	granular activated carbon
HDPE	high-density polyethylene
NYSDEC	New York State Department of Environmental Conservation
OD	over dose
QA	Quality Assurance
QC	Quality Control
RTK GPS	Real-time Kinematic Global Positioning System
SES	Sevenson Environmental Services
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

The Onondaga Lake (lake) remediation plan, which was selected by the New York State Department of Environmental Conservation (NYSDEC) and the United States Environmental Protection Agency (USEPA), includes dredging of approximately 2 million cubic yards (CY) of contaminated sediments and capping of over 450 acres of the lake bottom. Consistent with the approved Final Design (Parsons and Anchor QEA, 2012a), the chemical isolation layer of the cap in portions of the lake will include the addition of siderite to provide pH buffering capacity and granular activated carbon (GAC) to promote long-term chemical isolation. The calibration phase of capping for 2012 described in this Work Plan will be completed to provide additional construction-related information pertaining to placement of the siderite and GAC-amended chemical isolation layers, and allow transition into full-scale capping construction.

The work described in this document will build on the successful results from the Capping Field Demonstration that occurred in the fall of 2011. The results of the Capping Field Demonstration, described in detail in the *Draft Capping Field Demonstration Summary Report* (Parsons, 2012), showed that minimal loss, if any, of GAC occurred in the water column, and that the amount of GAC mixed with sand on shore was approximately equal to the amount of GAC in the cap. The field demonstration also showed uniformity of GAC placement following operational modifications, which will be further optimized during the calibration phase. The field demonstration indicated that visual observations of *in situ* samples may also be used to verify the presence and vertical distribution of GAC.

The purpose of the calibration phase is to further improve system performance and dosing correlations in areas where cap amendments (i.e., GAC and/or siderite) are required for the chemical isolation layer, and to confirm that the capping methods consistently achieve the layer thickness and *in situ* composition of the amended cap layer consistent with the design requirements. Based on the results of the sampling and testing conducted during this period, adjustments to amendment amounts (e.g., overdosing requirements) and other operational methods and parameters will be made, if necessary, for subsequent cap material placements. The calibration phase will consist of a more intense sampling and testing program of the chemical isolation layer over an area sufficient to prove out the accuracy of the means, methods, controls and QA/QC methods employed.

The calibration phase is anticipated to last for approximately one week, but is subject to change based on QA/QC results. It is anticipated that capping operations will transition from the calibration phase to full-scale operations, in consultation with NYSDEC, following achieving chemical isolation layer thickness and amendment application rate goals, as detailed in the CQAP, for five consecutive lanes.

2.0 FIELD ACTIVITIES

2.1 Overview

The field work for the capping calibration phase will consist of the following components:

- **Full-scale Cap Mixing System Construction** – Storage, feed and measuring systems will be installed for the sand, siderite and GAC materials. These will be the systems

used for full-scale construction. Once each feed material has been measured, it will be blended to meet the required sand and amendment feed rates based on the design application rates for each cap area. Water from the lake will be used to create a slurry to be pumped out to the capping barge. The slurry will be pumped through a high-density polyethylene (HDPE) pipeline and a booster pump to the hydraulic spreader barge. The inclined discharge plate of the spreader barge will deliver the slurry to the water column and the material will settle through the water column to the bottom of the lake. Details pertaining to the full-scale capping system equipment and operations are provided in the Final Design (Parsons and Anchor QEA, 2012a) and Construction Quality Assurance Plan (CQAP) (Parsons and Anchor QEA, 2012b).

- **Cap Placement Calibration Phase** – This will include placement of capping materials in a series of parallel predetermined lanes. System monitoring and data collection will be conducted to verify consistent placement of the specified thickness and amendment application rates for sand, sand/siderite or sand/GAC materials.

With oversight by Parsons, Sevenson Environmental Services (SES) will be responsible for the implementation of the capping calibration phase prior to the start of full-scale operations. Parsons and SES will share responsibilities for the Quality Control (QC), and Anchor QEA will be responsible for the independent Quality Assurance (QA) during the capping calibration phase as well as during full-scale operations.

A hydraulic capping system will be used for the placement of capping materials during the calibration phase as well as during full-scale operations in the phases to follow. SES will mobilize both water-based and land-based support equipment, install and assemble the systems, and perform the placement of the cap. The equipment used in 2011 during the Capping Field Demonstration will make up a portion of the equipment used during the capping calibration phase, with modifications as required to develop the full-scale capping equipment.

2.2 Location

The location of the capping calibration phase will be in Cap Model Area C3 in a relatively deep water area that does not require dredging, but requires both a siderite and GAC amended cap, as shown in Figure 1. Relative to shallow water capping areas, deep water capping areas have greater tolerance ranges for the post-cap water depth requirements. This allows for additional amended cap placement during the calibration phase if needed to achieve the designed chemical isolation layer thickness and amendment dosing consistently while remaining within the range of designed water depths. The cap in this area consists of a chemical isolation layer that includes a minimum of 0.5 ft of sand/siderite and 0.75 ft of sand/GAC, and a habitat/erosion protection layer that consists of a minimum of 1 ft of sand. The materials for the cap will be staged on the Wastebed B site as proposed for full-scale cap operations.

2.3 Cap Placement

As detailed in the final design and CQAP, the full-scale equipment to be used during the calibration phase and full-scale operations includes significant additional monitoring and control equipment from what was used during the 2011 field demonstration. In addition, a static in-line mixer has been installed within the cap material slurry pipe on the barge just prior to the four

distribution pipe headers to improve uniform cap material distribution across the diffuser plate. Prior to initiating and/or during the initial stages of cap material placement, capping system components will be calibrated as appropriate, including mass flow meters and density sensors, gravimetric weigh-belts, volumetric feeders, and the Real-time Kinematic Global Positioning System (RTK GPS).

During the capping calibration phase, the capping materials will be placed in a series of parallel lanes that are approximately 20 ft. wide, which is consistent with the 2011 capping field demonstration and the planned full-scale operations. This will result in an overlap with each subsequent cap lane of approximately two feet. The cap placement will commence at one end of a lane and progress along the remainder of the lane at a specified rate. The rates will be determined by the cap material flow rate and the desired target lift thickness for the capping material. In order to achieve the required cap thicknesses and minimize the separation of coarse and fine materials, a minimum of two lifts will be employed, with the capping barge placing material while moving in both directions along the lane. Each of the two lifts will be approximately half of the required layer thickness. For example, each lift will be approximately 4.5 inches thick during placement of a 9-inch GAC-ammended chemical isolation layer. During the initial runs, it is anticipated that the cap material will consist of sand only and will be placed in an area where no remediation is required.

The calibration phase cap will be constructed in cap model area C3, which has a minimum GAC application rate of 0.24 lbs/sf. The minimum siderite application rate in this area is 1.31 lbs/sf, which equates to a minimum siderite ore application rate of 1.77 lbs/sf based on the minimum specified siderite content in the ore of 74%. The initial over dosage (OD) will be 20% (by weight) for the calibration phase, resulting in GAC and siderite ore application rates of 0.29 lbs/sf and 2.1 lbs/sf, respectively. In combination with the anticipated thickness overplacements, this results in significantly more amendment addition than the required minimum. For example, when considered in combination with the anticipated average 3 in. of chemical isolation layer overplacement, this results in placement of approximately 60% more GAC than is required based on minimum dose requirements. These over-dosage rates may be revised as the calibration and subsequent full-scale capping operations progress based on QA/QC results, in consultation with and approval by NYSDEC.

The calibration phase is anticipated to last for approximately one week, but is subject to change based on QA/QC results. It is anticipated that capping operations will transition from the calibration phase to full-scale operations, in consultation with NYSDEC, following achieving chemical isolation layer thickness and amendment application rate goals, as detailed in the CQAP, for five consecutive lanes. The capping completion metrics specified in the CQAP will be evaluated for the cumulative data from all five lanes. For example, the CQAP specifies that the sand/siderite layer minimum thickness will be met in at least 90 percent of the in situ thickness measurements, and the remaining measurements will be 90 percent or greater of the design target thickness. Attainment of this criteria will be evaluated based on consideration of all of the data collected over the five consecutive lanes. The lane length in this area will be approximately 150 ft, and each lane will be approximately 20 ft wide. Therefore, the 5-lane approval area will be approximately 0.34 acres.

The chemical isolation and habitat/erosion protection layers in this area are the same grainsize, therefore placement of the habitat/erosion protection layer is not critical in ensuring the chemical isolation layer remains in place. Placement of the habitat/erosion protection layer in this area is anticipated within 2 to 4 weeks from completion of the calibration phase chemical isolation layer placement.

2.4 Cap Thickness and Material Gradation Verification

The primary method that will be used for cap layer thickness and uniform gradation verification during the calibration phase and full-scale operations will be the placement and recovery of 2 ft. x 2 ft. steel catch pans. Three to five catch pans will be collected per capping lane during the calibration phase. The proposed catch pan design is relatively wide and shallow to avoid the edge and shadowing effects that were noted during the capping field demonstration. The height of the catch pans will be approximately 2 inch taller than the minimum cap layer thickness in any particular capping area. Thus, the heights of the catch pans will vary depending on the area and cap layer that is being placed at a given time; see examples below:

- Catch pan height of 8 inches required for 6-inch siderite-amended chemical isolation layer
- Catch pan height of 11 inches required for 9-inch GAC-amended chemical isolation layer

To provide verification that the catch pans provide representative information pertaining to thickness and material gradation, additional QA/QC measures will be implemented during the calibration phase. This will include grade stakes and cores. The grade stakes will consist of a flat metal plate or grate with a protruding graduated rod. These will be placed on top of the sand/siderite layer prior to placement of the sand/GAC layer rather than on the lake bottom to avoid potential concerns regarding settlement into underlying soft sediment or uneven placement due to vegetation or debris. The thickness will be verified using an underwater video camera following placement of the sand/GAC layer. The ability to clearly view the graduated rod under actual conditions will be demonstrated as part of the calibration phase. It is anticipated that grade stakes and cores will be co-located with 50% to 100% of the catch pan locations during at least the initial stages of cap placement.

The cores will also provide visual verification that GAC is distributed vertically throughout the sand/GAC layer, and there is not significant separation of grain sizes resulting in significant layers of coarser cap material. In addition, cores will be collected from within the catch pans following catch pan retrieval for visual inspection and photo documentation. These cores will be collected away from the pan edges to provide a more representative sample of the *in situ* cap material. Honeywell will work closely with NYSDEC during the calibration phase as well, as throughout the entire capping operations, to optimize cap placement and minimize separation of coarse and fine materials for uniform distribution of the grain sizes.

2.5 Amendment Verification

As detailed in the CQAP, the QA/QC procedures associated with verification of amendment application rates will include precise monitoring, control and documentation of the amendment

supply rates, as well as low-level alarms and interlocks. Procedures related to this as detailed in the CQAP will be implemented during the calibration phase.

In addition to the accurately calibrated additive program QA/QC procedures, *in situ* sampling will be performed to verify placement of the GAC. A square foot subsample will be taken from the center of each of the 2-ft. x 2-ft. catch pans after thickness observations are made as detailed in Section 2.4. These subsamples will be subject to GAC laboratory analysis using the thermal method detailed in the CQAP.

QA/QC procedures associated with *in situ* siderite content will also be implemented. Siderite grain size and particle density are relatively similar to sand, therefore uniform horizontal distribution of siderite is anticipated. There are no commercially available methods for quantifying the relatively low levels of siderite within the placed sand/siderite layer. However, as detailed in the CQAP, a chemical staining technique has been identified and demonstrated which will provide a qualitative field visual method for verifying the presence of siderite within the sand/siderite mixture. This visualization will be completed on a subsample from each of the test pans collected from the sand/siderite layer during the calibration phase.

2.6 Water Quality Monitoring

Water quality monitoring will be completed during the calibration phase consistent with the procedures provided in the Final Water Quality Management and Monitoring Plan for Onondaga Lake, dated May 2012.

3.0 REPORTING

Honeywell will provide data as it becomes available and coordinate closely with NYSDEC during the calibration phase in order to achieve mutual consensus that the capping system and QA/QC procedures are sufficiently developed to allow transition into full-scale capping operations. Any recommended changes to the CQAP based on the results and observations from the calibration phase will be submitted in writing and subject to NSYDEC approval. This will allow transition into full-scale capping operations to proceed in a timely manner without requiring formal submittal and approval of a calibration phase report. All data gathered during the calibration phase will be formally provided to NYSDEC in the Cap Management Unit Completion form for that includes the area capped during the calibration phase.

4.0 REFERENCES

Parsons and Anchor QEA, 2012a. Onondaga Lake Capping, Dredging, Habitat and Profundal Zone (Sediment Management Unit 8) Final Design. Prepared for Honeywell. March 2012.

Parsons and Anchor QEA, 2012b. Construction Quality Assurance Plan Onondaga Lake – Capping, Dredging, and Habitat. Prepared for Honeywell. June 2012.

Parsons, 2012. Draft Onondaga Lake Capping Field Demonstration Summary Report. February, 2012.

SMU 8

SMU 2

APPROXIMATE LOCATION OF CAP MATERIAL PLACEMENT DURING THE CALIBRATION PHASE

LEGEND:

REMEDIATION AREA BOUNDARY

CAP MODEL BOUNDARY

EXISTING SHORELINE

ESTIMATED POST CAP WATER DEPTHS:

0–4 FT OF WATER

4–10 FT OF WATER

10–30 FT OF WATER

320

325

330

340

345

350

355

360

100 50 0 100 200

SCALE: 1"=100'

FIGURE 1

Honeywell

ONONDAGA LAKE
SYRACUSE, NY

2012 CAPPING CALIBRATION PHASE LOCATION

PARSONS
301 PLAINFIELD ROAD * SUITE 350 * SYRACUSE, NY 13212 * 315/451-9560
OFFICES IN PRINCIPAL CITIES

FILE NAME: P:\HONEYWELL –SYR\446934 OLCONSTR MOBILIZATION\09 REPORTS\9.1 OL MOBILIZATION 2012\CAD\446934–CAP CALIBRATION PHASE.DWG
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