PHASE 1 DREDGING CONSTRUCTION QUALITY CONTROL/QUALITY ASSURANCE PLAN

Appendix A

to

Remedial Action Work Plan for Phase 1 Dredging and Facility Operations

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ACRONYMS AND ABBREVIATIONS

CD	Consent Decree
CM	Construction Manager
COC	chain-of-custody
CQAO	Construction Quality Assurance Officer
CQAP	Construction Quality Control and Quality Assurance Plan
CQCP	Contractor Quality Control Plan
CU	Certification Unit
D&FO	Dredging and Facility Operations
DQAP	Phase 1 Dredging Construction Quality Control/Quality Assurance Plan
DSR	Data Summary Report
EIT	Engineer-in-Training
EPA	United States Environmental Protection Agency
FDR	Final Design Report
FE	Field Engineer
FI	Field Inspector
GE	General Electric Company
GPS	global positioning system
HDR	HDR Engineering, Inc.
PFOC	Processing Facility Operations Contractor
HCC	Habitat Construction Contractor
RYOC	Rail Yard Operations Contractor
NCR	noncompliance report
NICET	National Institute for Certification in Engineering Technologies
Parsons	Parsons Engineering of New York, Inc.
PCB	polychlorinated biphenyl
PSCP	Phase 1 Performance Standards Compliance Plan
QA	quality assurance
QC	quality control

ACRONYMS AND ABBREVIATIONS (CONTINUED)

QC/QA	quality control and quality assurance
QCM	QC Systems Manager
QMP	*Quality Management Plan*
QoLPS	quality of life performance standards
RA	remedial action
RAM QAPP	*Remedial Action Monitoring Quality Assurance Project Plan*
RAWP	Remedial Action Work Plan
RAWP #3	*Remedial Action Work Plan for Phase 1 Dredging and Facility Operations*
RD AOC	Administrative Order on Consent for Hudson River Remedial Design and Cost Recovery
ROD	Record of Decision
RTK DGPS	real time kinematic differential global positioning system
SAV	submerged (and floating) aquatic vegetation
SM	Site Manager
SOP	standard operating procedure
SOW	Statement of Work
USDA	U.S. Department of Agriculture

SECTION 1

INTRODUCTION

On October 6, 2005, a Consent Decree (CD) for the Remedial Action (RA) in the Upper Hudson River, executed by the General Electric Company (GE) and the U.S. Environmental Protection Agency (EPA), was filed in federal district court (Civil Action No. 1:05-CV-1270; EPA/GE, 2005). After an extensive public review and comment period, the court approved and entered the RA CD as a final judgment on November 2, 2006, when it went into effect.

GE prepared the *Phase 1 Final Design Report* (FDR) (Blasland, Bouck & Lee, Inc., 2006) and submitted it to EPA on March 21, 2006. On May 31, 2006, EPA approved the portion of the Phase 1 FDR that included the civil site work and rail yard construction (Contracts 1 and 2). On September 14, 2006, EPA approved the portions of the Phase 1 FDR that included construction and operation of the sediment processing facility (Contracts 3A and 3B) and rail yard operations (Contract 6). Subsequently, based on numerous discussions between GE and EPA, the Phase 1 FDR was modified, especially in regard to dredging operations (Contract 4) and habitat construction (Contract 5), through numerous revised plans and specifications and other documents reflecting the parties' agreements. On January 25, 2008, EPA approved all remaining portions of the Phase 1 FDR, so that that plan was approved in its entirety.

This *Phase 1 Dredging Construction Quality Control/Quality Assurance Plan* (DQAP) has been developed in accordance with Section 2.3.2.2.1 of the Statement of Work (SOW) for Remedial Action and Operations, Maintenance and Monitoring, which is Appendix B to the CD. This Phase 1 DQAP is an appendix to and part of the *Remedial Action Work Plan for Phase 1 Dredging and Facility Operations* (RAWP #3). It describes the quality control and quality assurance systems that will be established and followed to verify compliance with the approved technical specifications included in the Phase 1 FDR as approved by EPA.

This Phase 1 DQAP covers the following activities to be performed during Phase 1: (a) operation of the sediment processing facility, to be performed pursuant to Contact 3B by the Processing Facility Operations Contractor (PFOC); (b) dredging, transport of dredged material to the processing facility, backfilling/capping, and related in-river operations, to be performed pursuant to Contract 4 by the Dredging Contractor; (c) habitat construction activities, to be performed pursuant to Contract 5 by the Habitat Construction Contractor (HCC); and (d) operation of the rail yard, including the loading of dredged materials into rail cars for off-site transport, to be performed pursuant to Contract 6 by the Rail Yard Operations Contractor (RYOC). These activities are sometimes jointly referred to herein as Dredging and Facility Operations (D&FO).

The term *construction* is used throughout the DQAP and refers to both the RA construction and the RA operations required by the CD.

1.1 QUALITY PROGRAM OVERVIEW

GE's approach to management of the quality of the RA implementation includes an integrated system of quality control (QC) by its contractors and quality assurance (QA) by its Construction Manager (CM). The DQAP details the QC and QA systems and controls that GE has put in place so that the quality of the project will meet the requirements specified in the Phase 1 FDR. GE provides definition and overall management of the quality approach to be followed by its contractors and consultants. GE's CM is responsible for the day-to-day coordination of QA and QC measures in the field.

This DQAP is Appendix A and a companion document to RAWP #3. It establishes project procedures and general responsibilities for the QC/QA program to verify that the Phase 1 dredging operations, facility operations, and habitat construction will be executed in accordance with the relevant portions of the Phase 1 FDR.

The contractors are responsible for constructing the work in accordance with the plans and specifications. Each contractor is also responsible for controlling the quality of its work to meet contract plans, specifications, and related requirements. The contractor's QC is the systematic implementation of a program of inspections, tests, and production controls to attain the required standards of quality and to preclude problems resulting from noncompliance. Pursuant to Technical Specification Section 01450 (Quality Control), each contractor will establish an independent QC program and prepare a Contractor Quality Control Plan (CQCP). Each contractor's CQCP will provide for tests and inspections pursuant to various technical specifications. It will define QC and QA procedures to be implemented so that activities affecting quality are properly documented and accomplished in accordance with contract documents; written instructions; and industry standards, codes and procedures. Furthermore, the CQCP will define methods for documenting that activities affecting quality will be accomplished under controlled conditions.

Independently of the contractors, the CM will provide QA through daily monitoring and scheduled inspections to verify the effectiveness of the contractor's QC program and confirm that the quality and contract requirements are met by the contractors. The CM will confirm that the contractors' QC systems are working effectively and that the resultant construction/operation activities comply with the quality requirements established by the contracts.

1.2 DQAP OBJECTIVES

The objectives of this DQAP are to:

- Describe the quality program and organization to be implemented to verify that the project is constructed in accordance with the contract requirements and industry standards;
- Describe guidelines for inspection and documentation of construction/operational activities;

- Provide approaches and methods to confirm that the completed work will meet or exceed the requirements of the construction drawings and specifications; and
- Establish a process for detecting, documenting and addressing unexpected changes or conditions that could affect the construction/operation quality during Phase 1.

The Phase 1 activities covered by this DQAP include the following:

- Placement of in water resuspension controls before and during dredging;
- Removal of in-river debris and trim/remove shoreline vegetation to facilitate dredging;
- Dredging, loading, and barge transport of sediments to the processing facility;
- Backfilling or capping as required in dredged areas;
- Habitat construction as required in dredged areas;
- Dredged material offloading and dewatering for shipment;
- Treatment and discharge of water separated from sediment;
- Loading of dewatered sediment and debris onto rail cars for transport and disposal; and
- Operation of the rail yard for loading and preparation for shipment.

Specifications for the above-listed operations are provided in four separate contracts (3B, 4, 5, and 6) that have been described in Section 1.2 of the RAWP #3.

1.3 QUALITY MANAGEMENT PLAN

As GE's managing contractor, Parsons Engineering of New York, Inc. (Parsons) has been retained as Construction Manager (CM) for this project. Parsons will carry out work on this project in accordance with the *Parsons Quality Management Plan (QMP)* (Parsons, 2005), which was submitted to EPA on November 1, 2005.

1.4 DQAP ORGANIZATION

Consistent with the requirements in Section 2.3.2.2.1 of the SOW, this Phase 1 DQAP is organized into eleven sections, as follows:

- **Section 1 - Introduction:** provides an overview of the Phase 1 QC/QA program and the objectives and organization of this DQAP.
- **Section 2 - Project Dredging QC/QA Organization:** presents the organizations and key personnel involved in the performance of the RA, their responsibilities and authorities, the structure of the QC/QA organization, and the minimum training and experience of the CM's Construction Quality Assurance Officer (CQAO) and QC/QA personnel.
- **Section 3 - Submittals:** presents the procedures for processing submittals from Phase 1 contractors.

- **Section 4 - Performance Monitoring Requirements**: addresses performance monitoring requirements to demonstrate that the Phase 1 D&FO activities are implemented in accordance with the Phase 1 FDR and RAWP # 3.
- **Section 5 - Inspection and Verification Activities:** describes the QC/QA inspection and testing activities to be conducted to monitor performance of the Phase 1 D&FO, as well as construction acceptance criteria, construction audits, and other construction monitoring.
- **Section 6 - Construction Deficiencies:** describes the procedures for tracking construction deficiencies from identification through acceptable corrective action.
- **Section 7 - Documentation:** describes the procedures for the project documents that will be managed through a combination of a secure document filing and storage system and computerized Document Tracking System.
- **Section 8 - EPA Approvals for Certification Units:** describes the process for obtaining EPA approvals and certifications of completion for individual Certification Units (CUs), consistent with the SOW.
- **Section 9 - Field Changes:** describes handling of quality plan changes to verify that QC/QA objectives are met.
- **Section 10 - Final QA/QC Reporting:** describes the QC/QA documentation for Phase 1 D&FO to be submitted to EPA in the Phase 1 Construction Report.
- **Section 11 - References:** provides bibliographic references to key documents referred to in the body of the plan.

Table 1-2 (below) provides a cross-index showing where each of the elements specified in Section 2.3.2.2.1 of the SOW is addressed in this Phase 1 DQAP.

It should also be noted that, in addition to this Phase 1 DQAP, GE has prepared a number of other submittals that address the actions that will be taken during Phase 1 to meet the applicable requirements set forth in the CD, the SOW, and the Phase 1 FDR. These submittals include RAWP #3 itself, other appendices to RAWP #3 (including the *Phase 1 Performance Standards Compliance Plan* (PSCP), the *Phase 1 Facility Operations and Maintenance Plan*, and the *Phase 1 Transportation and Disposal Plan*), the *Phase 1 Remedial Action Monitoring Quality Assurance Project Plan* (RAM QAPP), and the *Phase 1 Remedial Action Community Health and Safety Plan* (CHASP) (Parsons, 2009). These additional submittals are referenced herein where applicable.

Table 1-2. CD SOW / DQAP Cross-Reference Table

Citation	SOW Requirement	Location in DQAP
CD SOW, Section 2.3.2.2.1, Page 2-14	Responsibilities and authorities of all organizations and key personnel involved in construction of the RA	Section 2.1
CD SOW, Section 2.3.2.2.1, Page 2-14	Establish training and experience of the CQA Officer and supporting inspection personnel assigned a Phase 1 DQAP function	Section 2.3
CD SOW, Section 2.3.2.2.1, Page 2-14	Phase 1 DQAP QC Organization – describe QC personnel, roles and relationships	Sections 2.2 and 2.3
CD SOW, Section 2.3.2.2.1, Page 2-14	Submittals – provide procedures for processing and managing submittals for the various parties	Section 3
CD SOW, Section 2.3.2.2.1, Page 2-14	Performance Monitoring Requirements – present performance monitoring requirements to demonstrate that activities are implemented according to Phase 1 FDR and RAWP for D&FO	Section 4
CD SOW, Section 2.3.2.2.1, Page 2-14	Inspection and Verification Activities – describe inspections and tests to measure compliance with Phase 1 FDR and RAWP for D&FO	Section 5
CD SOW, Section 2.3.2.2.1, Page 2-15	Construction Deficiencies – provide procedures for tracking and correcting deficiencies	Section 6
CD SOW, Section 2.3.2.2.1, Page 2-15	Documentation – define reporting requirements and records management and storage	Section 7
CD SOW, Section 2.3.2.2.1, Page 2-15	EPA Approvals – provide procedures for obtaining EPA approvals and certifications of completion for individual CUs	Section 8
CD SOW, Section 2.3.2.2.1, Page 2-15	Field Changes – describe procedures for processing changes and securing EPA approval	Section 9
CD SOW, Section 2.3.2.2.1, Page 2-15	Final Reporting – identify all final Phase 1 CQAP documentation to be submitted in Phase 1 Construction Completion Report or other deliverables	Section 10

SECTION 2

PROJECT QC/QA ORGANIZATION

This section presents the responsibilities and authorities of organizations and key personnel involved in the Phase 1 D&FO, the structure of the QC/QA organization, the minimum qualifications, training, and experience of the CQA personnel, and the QC/QA training given to on-site workers.

2.1 RESPONSIBILITIES AND AUTHORITIES OF ORGANIZATIONS

The organizations involved in the Phase 1 D&FO and their QC/QA roles and responsibilities are as follows.

2.1.1 Environmental Protection Agency

EPA is the lead agency responsible for observing and monitoring the progress of the Phase 1 D&FO in accordance with the CD. As such, EPA exercises approval authority for RAWP #3 and this DQAP.

2.1.2 General Electric Company

GE is responsible for implementing the RA in accordance with the CD and for requiring that its contractors and subcontractors perform RA construction in accordance with the CD.

The DQAP details the systems that GE has put in place in order that its responsibilities for quality are met. GE is responsible for verifying that the CM implements and manages the systems detailed in the DQAP. GE is also responsible for formal communications with and submittals to EPA.

2.1.3 Engineer of Record

The Engineers of Record are independent, duly qualified, licensed design professionals, retained directly by GE to provide design and engineering services in connection with the project. This definition includes all subcontractors to the Engineers of Record.

ARCADIS is the Engineer of Record for Phase 1 except for the rail yard operations. HDR Engineering, Inc. (HDR) is the Engineer of Record for rail yard operations. ARCADIS will provide submittal review and resolution of design issues that may arise during dredging and processing facility operations and habitat construction. HDR will provide submittal review and resolution of any design issues that may arise during rail yard operations.

2.1.4 Construction Manager

The CM is a duly qualified entity retained by GE to provide professional construction management and related services in connection with the project. The CM is responsible for implementation of this DQAP. The CM will manage construction contractors on behalf of GE

and serve as the primary point of contact for communications to and from the contractors. The CM will provide QA and monitor the day-by-day construction quality control activities performed by construction contractors to verify compliance with the contract plans and specifications. The CM will also manage, coordinate, and administer QC/QA activities and requirements, including those of subcontractors to the CM. Additionally, the CM may be assigned management of any third party QA inspection and testing firms retained by GE.

2.1.5 Construction Contractors

The construction contractors (i.e., the PFOC, the Dredging Contractor, the HCC, and the RYOC) have been retained by GE to provide the labor, materials, and equipment required to construct the project in accordance with the contract documents. Construction contractors will be responsible for the quality control of their constructed work product as well as the necessary inspections and tests required to ensure that their work complies with the contract documents. They will exercise authority over their workforce, including QC personnel and their third-party QC support services.

Pursuant to Specifications Section 01450, each contractor will submit a QC organization chart developed to show QC personnel and how these personnel will integrate with other management, production and construction functions and personnel. QC staff members will be subject to acceptance by GE. The requirements for the QC organization include a QC Systems Manager and a sufficient number of additional qualified personnel to verify contract compliance. The contractor is to provide a QC organization that is represented on the site at all times during progress of the work and provided authority to take any action necessary in order to be compliant with the contract requirements.

2.2 STRUCTURE OF QC/QA ORGANIZATION

The QC and QA functions of the project organizations are functionally integrated although contractually separate. Figure 2.1 is an organizational chart that shows the functional structure of the project QC/QA team. Note that for sake of simplicity, the positions in Figure 2.1 are referred to generically, but the qualifications and responsibilities for each position will vary according to the specific technical requirements of each contract. Differentiation of those responsibilities based upon the type of contract activity is provided below.

2.3 RESPONSIBILITIES AND AUTHORITIES OF KEY PERSONNEL

Key personnel involved in the Phase 1 D&FO and their QC/QA roles and responsibilities are described below in Section 2.3.1 and Section 2.3.2. Pursuant to Section 2.3.2.2.1 of the SOW, names of QC/QA personnel assigned DQAP functions are to be communicated to EPA; these personnel are the CQAO and CM Field Inspectors. Since personnel assignments are subject to change over time, the CM will maintain a DQAP staffing list of DQAP personnel assignments including each person's role and organization. This DQAP Staffing List is initially provided in Attachment 1 together with resumes of current DQAP personnel. To the extent the

personnel have not been identified and as personnel changes occur, GE will add supplemental names and qualifications to the staffing list and will make it available to EPA upon request.

2.3.1 Construction Manager's Quality Assurance Personnel

Construction Manager

The CM will be the primary point of contact for GE on all construction/operation management issues on all contracts. The CM will be responsible for the overall management of activities related to the construction program, including the implementation of the DQAP and the health and safety program. As such, the CM will work directly with GE to exercise approval authority over contractor submittals including the CQCPs. The CQCPs will include the names and qualifications of contractor's QC personnel pursuant to Section 2.3.2 below.

Site Managers

The Site Manager (SM) will monitor and work with GE to approve each contractor's quality and progress submittals to verify that the project is meeting the contract requirements. The SM will manage the field implementation of the DQAP at the project sites under control of the senior Field Engineer (FE) and the CQAO. Due to the distinct nature of the on-river operations vs. on-shore facilities operations, two Site Managers will oversee activities of Contracts 4 & 5, and 3B & 6, respectively.

The SM for River Operations (via Contracts 4 & 5) will be referred to as the River Operations Manager. The River Operations Manager will have a number of overall responsibilities for dredging (Contract 4) and habitat construction (Contract 5) work, as well as implementation of the associated QC/QA program. These responsibilities include:

- Directing the overall planning, scheduling, and coordination of QA procedures for dredging, habitat construction, and other river-related activities;
- Overseeing work by river contractors to confirm QC (thoroughness, technical acceptance, contract compliance and timeliness);
- Delegating assignments to FEs, dredging inspectors, and other in-river inspectors for various work areas of river operations, monitoring performance and recommending corrective action as necessary; and
- Maintaining communications with the CQAO, Contractor Project Manager, CM, and senior FEs for quality issues during the execution of work.

A separate SM, or Facility Manager, will be appointed for implementation of the DQAP during operation of the processing facility (Contract 3B) and rail yard operations (Contract 6). The SM for those contracts may also function as the Senior FE. The Facility Manager will have responsibilities covering operation of the on-shore facilities as well as implementation of the associated QC/QA program. These responsibilities include:

- Directing the overall planning, scheduling, and coordination of QA procedures for processing facility operations, rail yard operations, and other facility-related activities;
- Overseeing work by facility contractors to confirm QC (thoroughness, technical acceptance, contract compliance and timeliness);
- Delegating assignments to FEs and facility inspectors for various work areas of facility and rail yard operations, monitoring performance, and recommending corrective action as necessary; and
- Maintaining communications with the CQAO, Contractor Project Manager, CM, and senior FEs for quality issues during the execution of the work.

Construction Quality Assurance Officer

The CQAO will be a full-time employee of the CM and will be targeted to have a minimum of five years of experience in related construction as well as prior QA experience on a project of comparable size and scope to this project. Additional qualifications for the CQAO include one or more of the following requirements (or alternative requirements if acceptable to GE):

- Professional Engineer (PE) with at least one year of related experience in QA of dredging/dewatering or similar operations acceptable to GE;
- Engineer in Training (EIT) with a minimum of two years of related dredging/ dewatering or comparable experience acceptable to GE;
- Three years of related dredging/dewatering or comparable experience acceptable to GE with a Bachelor of Science Degree in civil engineering, civil engineering technology, or construction; and/or
- Construction materials technician certified at Level III by National Institute for Certification in Engineering Technologies (NICET) with more than three years of experience on dredging/dewatering or similar operations.

The CQAO will report directly to the CM. The CQAO will have full authority delegated by the CM and GE to institute actions necessary for the successful implementation of the QC/QA program to achieve compliance with the contract plans and technical specifications (including stop-work authority). The CQAO will be assigned to the project on a full-time basis during active construction.

The CQAO will work with GE to administer and oversee implementation of the DQAP. This includes controlling this DQAP, making revisions as necessary, and implementing systematic actions to verify compliance with the plan. The CQAO will coordinate activities with the various SMs to confirm that the FE, inspection staff, third-party inspection and testing firms, and contractor QC staff carry out the requirements of the DQAP.

The CQAO will be supported by the CM's QA staff, which will provide expertise, on an as-needed or as-requested basis, in the investigation and handling of significant or unique quality issues.

The CQAO will track and report non-conformances to the CM, SM, and after notification to the CM, to contractor management and contractor QC staff. The contract specifications provide GE full authority to obtain direct access to contractor QC files at any time, and GE will assign that authority to the CQAO. Other CQAO responsibilities include:

- Reviewing contractor QC reports, tests, and inspection results;
- Facilitating the implementation of the four-phase inspection program (see Section 5.1.1) and participating in the required inspections; and
- Working with FEs to ensure that QA personnel conducting inspections are adequately trained and understand assignments, limits, and time frames.

Senior Field Engineer

The Senior FE will administer the contract requirements, including the CQCP submittals by contractors, and document that each contractor consistently conforms to its approved CQCP. The FE will oversee inspection efforts, provide technical advice, and coordinate support from engineering, administration, inspection services, third-party survey contractor, third-party testing/lab personnel, safety, and other team members.

The FE will review plans and specifications for assigned projects and estimate the type and number of QA tests that should be accomplished for each specification section. The FE will meet with third-party testing and inspection firms to review test requirements and coordinate testing and inspection services. The FE will review QC and QA testing documentation with third-party survey contractors, third-party testing/lab personnel, engineers, and inspectors, and relay the information regarding compliance with requirements to the contractors. In incidences of non-compliance, the FE will record the requirements for re-work and order the re-test, re-survey, or re-inspection when the contractor indicates corrections have been made.

The FE will coordinate resolution of unsatisfactory work items with contractors through final acceptance. The FE will verify that open noncompliance report (NCR) items are completed and accepted in a timely fashion. Acting in concert with GE, the SM, and the CQAO, the FE has the authority to require changes to the contractor's QC organization and plan as required to address apparent trends, to mitigate future NCRs, and to obtain the quality specified in the contract documents.

Due to the multiple operations of dredging, dredged material processing, rail yard operations, and habitat construction, as well as 24-hour-a-day, 6-day-per-week operations, it is anticipated that there may be more than one Senior FE to oversee all of these activities.

Field Inspectors

Field Inspectors (FIs) are responsible to the FE and support the FE in overseeing dredging, backfill/capping, processing operations, rail yard operations, and habitat construction. Although the credentials for each FI will vary, it is expected that each will hold a Bachelor's Degree in engineering or related field and have at least three years construction experience in the type of

work or the type of processing operations being performed on this project or similar construction work, or have at least five years of related experience and hold the construction materials technician certified at Level III by the NICET, or have comparable experience acceptable to GE. The qualifications of inspection personnel will be preferably focused toward, but not limited to, experience with similar work. Additional experience and training may be substituted for educational requirements, subject to GE's approval.

FIs will monitor the day-to-day activities of the contractor. This includes documenting that contractors comply with the plans and specifications, applicable construction standards, good workmanship, and the QC requirements of the contract. As part of this effort, FIs will conduct independent inspections to verify the quality of the work, participate in contractor four phase inspections, review test and inspection reports, and check that the required documentation is submitted. The FIs must be alert to detect, record, and report any deviation from the contract documents, including calling any deficient item to the attention of the FE, the contractor's superintendent, and / or other representative. The FIs must keep accurate and detailed records of the contractor's performance and progress, delivery of materials, and other pertinent matters, including the daily inspection report. FIs will also produce other specific reports as required by the FE as well as daily reports on labor, equipment, and material used for change work.

Observations and documentation by the FI may be used in conjunction with results from third-party survey contractor and monitoring teams to help verify that the contractor meets performance standards.

Third-Party QC/QA Surveyor

Hydrographic surveys will be performed during dredging operations and habitat construction by an independent third-party hydrographic survey contractor, on behalf of GE, to confirm completion of work to the required limits and tolerances in each CU. The third-party survey contractor will provide labor, materials, and equipment required to prepare hydrographic drawings and provide x,y,z survey data (easting, northing, elevation) using multi-beam and single-beam sonar equipment.

Land surveys will be performed during dredging operations and habitat construction by an independent third-party survey contractor or by the third-party hydrographic survey contractor, on behalf of GE, to establish the location of the 119' shoreline and to confirm completion of work in CU limits. The third-party surveyor will provide labor, materials, and equipment required to prepare drawings and provide survey data (easting, northing, elevation) using standard land survey equipment.

The primary quality assurance role of the third-party survey contractor(s) is to verify that the Dredging Contractor and HCC have performed their work in accordance with the contract requirements with respect to elevations and limits, as well as to independently record the contours and coverage of the completed construction. Their work will be reviewed by the appropriate FE and used to verify if requirements are met or otherwise to inform the contractor

that additional work is required. The third-party survey contractor documentation will also be available for review by the EPA representative as described in Section 8 of this DQAP and to verify contractor-provided record drawings as discussed below in Section 7.

Third-Party Construction QC/QA Testing and Lab Services

The third-party construction QC/QA testing and lab services contractor will be responsible for QC/QA oversight of analytical procedures and laboratory data package production. QC/QA responsibilities include:

- Checking overall quality of laboratory operations;
- Performing internal audits of laboratory procedures and reporting results and any corrective action to QC/QA Program Manager;
- Reviewing chain-of-custody (COC) documentation;
- Verifying that sample holding times and analytical standard operating procedures (SOPs) are strictly adhered to; and
- Reviewing laboratory data packages for completeness, consistency, and accuracy.

2.3.2 Contractor's Quality Control Personnel

QC Systems Manager

The QC Systems Manager (QCM) will be a full-time employee of the contractor, or a consultant engaged by the contractor. The QCM for each contract will have a minimum of five years of experience in dredging/dewatering operations, rail yard operations, and habitat construction or related landscape construction, and have prior QC experience on a project of comparable size and scope as this project. Additional qualifications for the QCM include at least one of the following requirements:

- PE with one year of related construction experience acceptable to GE and the CM;
- EIT with two years of related construction experience acceptable to GE and the CM;
- Three years of related experience acceptable to GE and the CM, with a Bachelor of Science Degree in civil engineering, civil engineering technology, or construction; and/or
- Construction materials technician certified at Level III by NICET or multiple years of related experience that by interview and trial performance is acceptable to GE and the CM.

The QCM will have full authority to institute any and all actions necessary for the successful implementation of the QC program to provide compliance with the contract plans and technical specifications. The QCM will report directly to a responsible officer of the construction firm. The QCM is required to be assigned to this project full time.

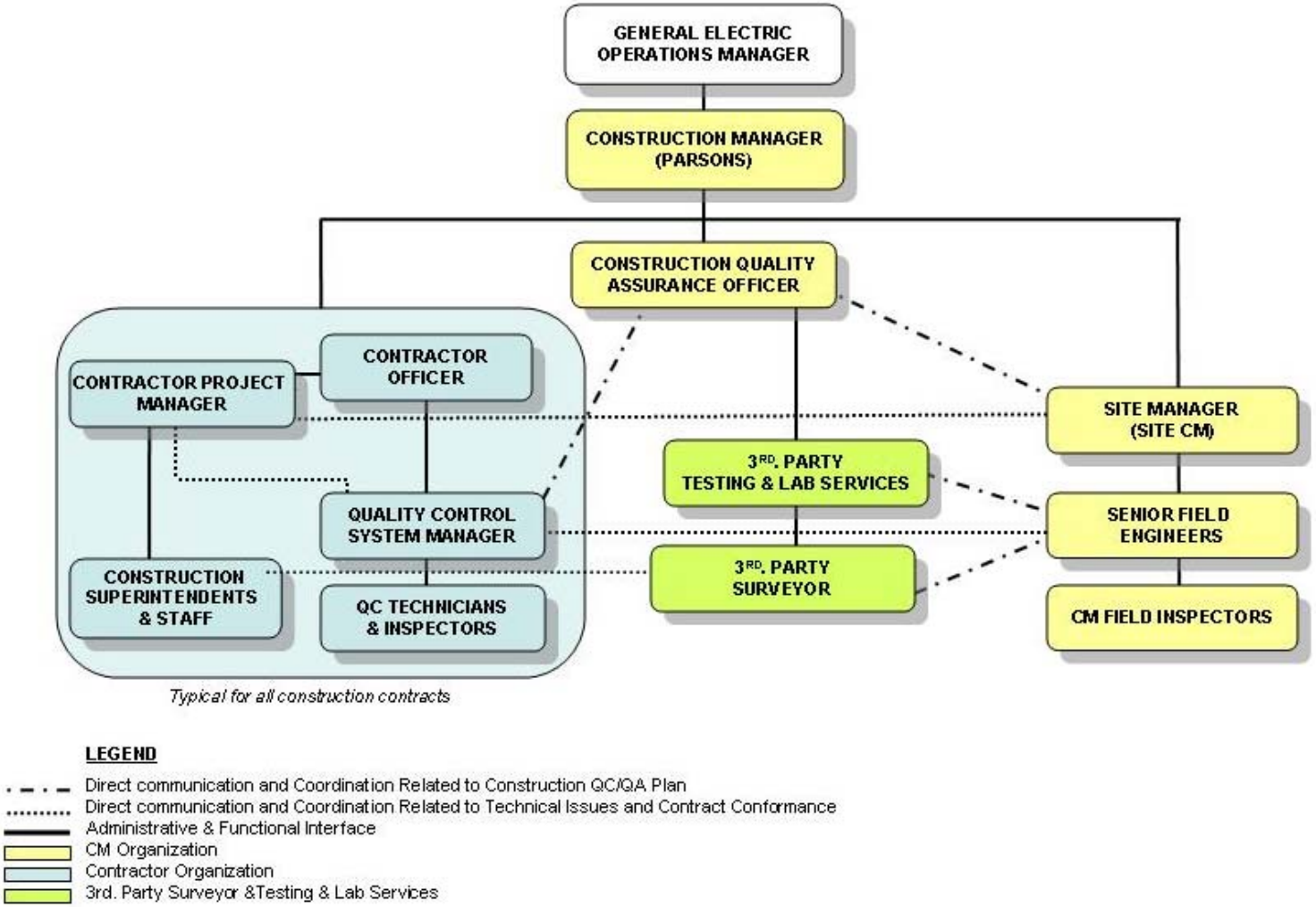
QC Technicians

The contractors' QC Technicians will perform the following functions:

- Inspect all materials, construction, plants, and equipment for conformance with the technical specifications; and
- Perform all QC tests as required by the technical specifications.

Contractor QC technicians and inspectors will be engineers, engineering technicians, or experienced craftsmen with qualifications in the appropriate field equivalent to NICET Level II (or higher) construction materials technician, and will have a minimum of two years of experience in their area of expertise. Certification at an equivalent level by a state or nationally recognized organization will be acceptable in lieu of NICET certification. Additional experience and training may be substituted for educational requirements, subject to GE's approval.

Figure 2.1
Dredging Quality Control/Quality Assurance Organization



SECTION 3

SUBMITTALS

This section describes the procedures for CM processing of submittals from various project contractors and suppliers (collectively referred to as contractors). The CM will administer and control the processing of submittals. After being reviewed for completeness, submittal documents will be transmitted to the relevant project staff for review and verification for compliance with contract requirements. The submittal's disposition will be noted on the submittal, which will be signed, dated and returned to the contractor. If required, the contractor will revise the submittal, incorporating the comments and will resubmit it for review and verification for compliance. Submittals will be logged and copies will be retained in the project files.

Contractor submittals will be received from:

- Subcontractors, such as dive safety manuals from commercial diving companies;
- Off-site fabricators, such as certifications for silt curtains;
- Suppliers, such as test results of materials to be installed;
- Designers of record, such as change order drawings;
- Consultants, such as staff medical monitoring results;
- Architects/engineers, such as design revision request drawings;
- Purchasing agents, such as invoices for time and material payments;
- Dewatered sediment transporters, such as rail car manifests; and
- Disposal facilities, such as dewatered sediment disposal documentation.

3.1 SUBMITTAL SCHEDULE

Each contractor will submit and maintain a submittal schedule. The CM will review and, after consulting GE, will approve the submittal schedule. The CM will work with the contractor to prioritize and sequence submittals so that the most critical submittals are received and processed first. The submittal schedule will become the baseline against which receipt of all required submittals will be compared. The approved submittal schedule will be forwarded to the Engineer of Record for resource availability planning.

3.2 PROCESS, REVIEW, AND ACCEPTANCE

Submittals will be managed as follows:

1. Contractors will number and certify the completeness of all submittals before submitting to the CM.

2. Contractors will also complete submittal transmittal forms and submit six paper copies and one electronic copy of all required submittals to the CM's document manager (the submittal transmittal form will always accompany each submittal package to and from the contractor, the CM and the Engineer of Record).
3. Upon receiving the submittal, the CM will log the submittal and provide a review to ascertain whether the package is complete. If the submittal is incomplete the submittal will be returned to the contractor.
4. The original submittal transmittal and all copied attachments will be logged into the document tracking system. The CM will then forward submittals to the appropriate reviewers.
5. If the CM provides a submittal to the Engineer of Record for review, the Engineer of Record will review it for general conformance with contract design documents, will coordinate concurrent discipline reviews within the design team, will coordinate concurrent reviews by owner and other entities, and consolidate responses into a single coordinated action.
6. After reviewing the submittal, the Engineer of Record (or other designated reviewer) will make the appropriate notations and action taken on the submitted documents and returns the submittal to the CM.
7. The CM will return a minimum of one copy of the submittal to the contractor with an original stamp of the action required.
8. The six actions that may be taken for each submittal are:
   - Approved – Submittal meets contract requirements. No additional copies will be required of the contractor.
   - Approved As Noted – Submittal meets contract requirements with minor corrections noted. Re-submittal is not required. Contractor must incorporate the required corrections into the work in the field. No additional copies will be required of the contractor.
   - Revise and Resubmit – Submittal has some selected areas that do not meet requirements. These areas can be revised to meet requirements, and the entire submittal must be re-submitted for review and approval. No work will begin in the field until the revised submittal has been approved.
   - Rejected – Submittal is inadequate and does not meet contract requirements. Revise the complete submittal and resubmit for approval. No work will begin in the field until the revised submittal has been approved.
   - For Information Only – Submitted for information only; no response action required.

– Received, No Action Taken – Receipt of submittal is noted; no further action required.

9. When a submittal is to be revised and resubmitted, the contractor will revise the submittal and indicate this revision by incrementing the revision number. The contractor's submittal process will then be repeated.

The CM is responsible for tracking the submittal package during the entire review process and advising all concerned of any schedule impacts to confirm that the review process timeframe is adhered to. The CM will retain copies of all submittal documents and revisions and make sure that an accurate file is available for ready retrieval during the life of the project. The CM will maintain all submittal files. These files will be filed by numeric sequence. Each submittal file will contain a complete submittal copy of the submittal before and after the review process.

3.3 STORAGE

The CM will maintain all submittal files in accordance with the project document control procedure. Project documents will be managed through a combination of a secure document filling and storage system and a computerized document tracking system.

SECTION 4

PERFORMANCE MONITORING REQUIREMENTS

The CM will oversee the dredging operations, the habitat construction activities, and the processing facility and rail yard operations to confirm that they are implemented in accordance with the Phase 1 FDR and RAWP #3. The specific monitoring, inspection, and testing activities to be conducted during Phase 1 for that purpose are described in Section 5.

In addition, the monitoring that will be performed to assess achievement of the Resuspension and Residuals Performance Standards, the Quality of Life Performance Standards (QoLPS) for air quality, odor, noise, and lighting, and the substantive water quality requirements issued by EPA for constituents not subject to Performance Standards and for discharges from the processing facility are described in the Remedial Action Monitoring Scope (Attachment B to the SOW) and the Phase 1 RAM QAPP. Further, the actions that GE will take during Phase 1 to implement the Engineering Performance Standards, the QoLPS, and the substantive water quality requirements are set forth in the Performance Standards Compliance Plan (PSCP) Scope (Attachment C to the SOW) and the Phase 1 PSCP (Appendix D to RAWP #3).

SECTION 5

INSPECTION AND VERIFICATION ACTIVITIES

The contractor QC control, verification, and acceptance testing plans set out the QC inspections and testing for implementation of each technical specification applicable to the contractor's scope of work for each of the four contracts included under this DQAP. The contractor's CQCPs will cover the type, test standard, frequency, control requirements, and assigned responsibility for inspections and tests. The CM will review and approve these CQCP submittals. After being approved by the CM, the contractor CQCPs will be available to EPA upon request.

Ongoing QA monitoring and oversight of contractor QC inspections and testing will be performed by the CM. In this manner, the inspections and tests required to measure compliance with the relevant portions of the Phase 1 Final Design for Contracts 3B, 4, 5, and 6 will be established and carried out.

GE will also require QC plans to be provided by the third-party survey contractor and third-party testing and lab service contractors to include their processes to verify quality control. Equipment calibration procedures, data validation processes, and other relevant procedures will be included as part of those third-party QC plans, which will be reviewed and approved by the CQAO before third-party contractors are allowed to proceed.

5.1 GENERAL INSPECTION AND VERIFICATION REQUIREMENTS

Contractors will perform, as part of their QC programs, the inspections and tests prescribed in the technical specifications for Contracts 3B, 4, 5, and 6. QA review of contractors' CQCP data and limited independent inspection and testing will be used to verify the adequacy and effectiveness of each contractor's QC program. The QA inspection and testing frequency will be at the discretion of the CQAO based on results of QC tests, evaluation of daily reports, audits of the QC program, and verification work conducted by the CM and GE's third-party survey and testing firms. Should information become available that indicates a potential problem, the CQAO will review in detail all pertinent information and order additional verification testing if necessary.

Contractor QC implementation, verification, and acceptance testing plans set out the contractor's specific QC testing and inspection pursuant to Specification 01450 1.03 B and the relevant design specification. Attachment 2 provides a comprehensive set of tables that list the QC/QA inspections and tests as required in the specifications for each respective contract – Table A2-1 for Contract 3B, Table A2-2 for Contract 4, Table A2-3 for Contract 5, and Table A2-4 for Contract 6. These tables include the applicable parameter, the specification reference for the requirement, the inspection or test method, the proposed frequency, and the acceptance criteria. QC inspection and tests are the primary responsibility of the respective

contractor. For QA oversight, the CM will typically perform confirmatory inspections and tests for 5% to 10% of the contractor inspections and tests as determined by the CQAO.

5.1.1 Inspections

Each contractor will establish a program for inspection of activities affecting quality and will cover all pertinent on-site and off-site operations. Inspections will be performed to verify compliance with documented instructions, drawings, procedures, and specifications as required by the applicable contract. All inspections will be documented by the contractor and CM staff per Specification 01450 Section 3.05.

A four-phase inspection program will be followed for all definitive features. The four phases of inspection are:

1. Preparatory Inspection

Each contractor and the CM will perform preparatory inspections prior to beginning any work on any definable feature of the contract. This inspection will:

- Include a review of contract requirements;
- Check that all materials and/or equipment have been tested, submitted, and approved;
- Verify that provisions have been made to provide required testing;
- Examine the work area to ascertain that all preliminary work has been completed;
- Examine materials, equipment, and samples to make sure that they conform to approved shop drawings or submittal data, that all materials and/or equipment are on hand, and that all equipment is properly calibrated and in proper working condition; and
- Be documented in the contractor's QC documentation as required by Specification 01450 Section 3.05.

2. Initial Inspection

Each contractor and the CM will perform an initial inspection as soon as a representative portion of the particular feature of work has been accomplished. This inspection will:

- Examine the quality of workmanship;
- Review control testing for compliance with contract requirements;
- Review dimensional aspects of the work; and
- Be documented in the contractor's QC documentation as required by Specification 01450 Section 3.05.

3. Follow-Up Inspection

Each contractor and the CM will perform follow-up inspections daily. These inspections will:

- Verify continuing compliance with contract requirements;
- Verify continuing compliance with control testing until completion of particular feature of work; and
- Be documented by the contractor CQM in daily QC reports and by the CM inspection staff in their daily inspection report.

Final follow-up inspections will be conducted and deficiencies will be corrected prior to the addition of new features of work.

4. Completion Inspection

Each contractor and CM will perform a completion inspection of the work. Specifically, they will:

- Develop a "punch list" of items that do not conform to the approved plans and specifications;
- Include the punch list in the construction QC documentation, including, as required by Specification 01450, Section 3.05, the estimated date by which the deficiencies will be corrected; and
- Perform a second completion inspection after punch list items have been completed and the contractor has notified the CM.

The daily inspection reports will identify inspections conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective action taken or proposed.

Additional QA inspections may include inspection of third-party lab testing facilities, fabrication facilities, and suppliers. Other inspections outside of the four-phase program described above will be ordered or performed by the CM as required.

When deficiencies are discovered during the four-phase or other inspection processes, focused inspections will be considered by the CQAO. When material, performed work, or installation is found on the basis of focused inspections to be deficient and/or does not meet the project specifications, the CQAO will confirm that deficiency correction is implemented, as discussed in Section 6.

5.1.2 QC Testing

As required by the contract specifications, each contractor will establish a QC Plan to verify that the contractor's required testing is properly identified, planned, documented and performed under controlled and suitable environmental conditions. Testing will be performed in accordance with written test procedures in the CQCP. Such test procedures will incorporate or

reference the requirements as contained in the contract technical specifications, codes, and industry standards. In accordance with the CQCP, the contractor will submit the test procedures to the CQAO for review and acceptance prior to their implementation.

The contractor will be responsible for establishing a system of daily test reports that will record all QC test results. Test results from each day's work period will be submitted to the CQAO prior to the start of the next day's work period. When required by the technical specifications, the contractor will maintain statistical QC charts. The contractor's responsible technician and the QCM will sign the daily test reports. The CQAO will review test results on a daily basis and identify any nonconforming test results for discussion with the contractor regarding potential corrective action.

5.1.3 QA Testing

The CQAO will be responsible for the QA materials sampling and testing program – that is, QA testing of any materials that will be permanently incorporated into the project. QA testing will be performed for verification of the adequacy and effectiveness of the contractor's QC testing. QA testing will be performed by the CQAO independent of and in addition to QC testing performed by contractors. QA testing may be performed on a pre-established schedule or as directed by the CQAO. QA testing will be performed by or under supervision of the QA staff to validate the contractor's QC sampling and testing. Such testing may be performed by third party testing services. The typical test frequency will be one (1) QA test for every ten (10) to twenty (20) of the contractor's QC tests. More frequent testing during initial startup may be necessary to verify the process is under control and complies with the technical specifications of the construction contracts. In lieu of performing independent tests the CQAO may choose to witness QC testing or conduct tests on split samples from QC testing. When QA and QC test results do not compare or have wide variances, additional testing may be needed to validate the results. Additional tests to be performed by FIs or the third-party testing services will be at the direction of the CQAO. The need for QA testing will be based on the following considerations:

- Importance of the item as to its reliability, etc.;
- Need to perform quality checks for work sequences not available for inspection at completion; and
- Deficiencies are discovered.

QA testing will be performed in accordance with the following:

- The CQAO will develop a weekly quality test and inspection schedule using the construction activity forecast as a guide. The schedule will:
  - Identify the QA test activities.
  - Identify the hold points.
- The weekly quality test schedule will be distributed to the CM and CM field staff; and
- The contractor will be provided a one-day advance notice of impending hold points.

Field Inspectors conducting the quality tests and inspections will complete the Daily Construction Report included in Attachment 3. The Daily Construction Report will be distributed to the CQAO, FE, CM Site Manager, GE managers, contractor PM and/or QC Systems Manager. The CQAO will review QA tests and maintain files for all field QA documentation.

5.2 ACCEPTANCE CRITERIA

Acceptance criteria for materials qualifications, inspection, and testing are established by the approved technical specifications and are summarized in Tables A2-1 through A2-4. Criteria for materials and equipment have been set by the Engineers of Record in accordance with applicable requirements to perform as they are intended in the design documents. Contractor material submittals and test documents are required in order to document conformance with acceptance criteria as detailed in their CQCP.

5.3 CONSTRUCTION AUDITS

Each contractor will establish and document an auditing system to verify its (or its subcontractors') implementation of and conformance to the CQCP and contract technical specification requirements. The auditing system will be used to make a determination regarding the effectiveness of the QC system.

The contractor's auditing will be planned, performed and documented in accordance with written instructions, procedures or checks to be included in the CQCP. The audit scope, frequency and methods will be defined in the CQCP. Audits will be performed by qualified and properly trained personnel who are familiar with the QC system, auditing procedures and techniques. Selection of auditors and the conduct of audits will ensure the objectivity and impartiality of the audit process. Auditors will not audit their own work. The auditing system will cover all the quality-affecting activities for construction, as well as laboratories and will be applicable to the onsite and offsite locations, including all subcontractors. The results of the audits will be documented and reported to the CM. All non-conformance conditions identified during the audit will be re-audited to verify the corrective actions taken by the appropriate organization were effective.

5.4 COMPLIANCE WITH HANDLING, STORAGE, PACKAGING, PRESERVATION, AND DELIVERY REQUIREMENTS

CM field staff will inspect the contractors' activities to verify technical compliance in identification, handling, storage, packaging, preservation, and delivery of materials, parts, assemblies, and end products. Related quality records and documents will be maintained and controlled in accordance with the procedures provided in Section 7 of this DQAP.

5.5 MATERIAL IDENTIFICATION AND TRACEABILITY

CM field staff will monitor the tracking logs provided by each contractor to confirm that identification and traceability requirements are met. Products and materials will be identified from receipt through all interim project stages to final installation. Documentation such as project control checklists, material receipts, material tracking forms, procedures, sample and test documentation, and reports will ensure that the applicable material item traceability is maintained. Project specifications and/or procedures define product identification and traceability requirements, which generally include the following:

- Materials or equipment intended for use on the project will be identified and segregated until inspection confirms that they conform to technical and quality requirements; and
- Materials will be traceable to documents attesting to their conformance with technical requirements as stated in specifications or drawings. Testing of materials will be conducted as necessary to verify conformance with material specifications.

5.6 CONSTRUCTION SURVEY PROCEDURES

As discussed above, multi-beam hydrographic surveys will be performed during dredging operations activities by an independent third-party survey contractor to verify dredging removal limits and tolerances; and backfill/cap placement limits and tolerances. Single-beam hydrographic surveys will be performed by an independent third-party survey contractor before habitat construction activities begin to confirm the submerged (and floating) aquatic vegetation (SAV) planting locations. In very shallow water areas where the comparative advantage of using a multi-beam transducer over a single beam transducer is reduced the third party survey contractor may elect to use a single-beam transducer. In addition, land surveys will be performed during the Phase 1 D&FO activities by an independent third-party survey contractor as necessary to confirm certain shoreline elevations, to verify completion of CU work according to required limits in areas where water depth or similar restriction prevents the collection of hydrographic data and to confirm shoreline and riverine fringing wetland (RFW) planting locations. The Dredging Contractor and HCC may perform their own surveys to verify that required elevations or limits have been achieved.

The methods and procedures to be used for the hydrographic surveys that will be performed by the third-party survey contractor are described in the Standard Operating Procedure (SOP) provided in Attachment 5. Land surveys will be carried out in accordance with standard survey methods.

SECTION 6

CONSTRUCTION DEFICIENCIES

This section provides procedures for tracking construction deficiencies (noncompliance) from identification through acceptable corrective action. It defines the controls and related responsibilities and authorities for dealing with noncompliant products or services

6.1 DEFICIENCY IDENTIFICATION

A deficiency occurs when a material, performed work, installation or contracted operational process does not meet the plans and/or specifications for the project.

6.2 CONTRACTOR QC DEFICIENCY IDENTIFICATION AND CONTROL

When material, performed work, an installation or an operational process is found deficient, the CQAO (or designee) will take action so the nonconforming material, work, installation or operational process is identified and controlled to prevent use or delivery of an unacceptable product or nonconformance with a standard. The CM will promptly notify the contractor of any noncompliance with any of the project requirements and notify other necessary parties as appropriate. The contractor will, after receipt of such notice, immediately take corrective action and notify the CM when the corrective action has occurred. Steps taken in this deficiency identification and control process are outlined below.

Minor deficiencies noted during tests, observations or inspections will be verbally reported to the contractor's representative and noted on the Daily Construction Report. Minor deficiencies are items that do not require significant rework or repair work to correct, and will not result in significant deviations from required quality standard if corrected immediately.

Control and disposition of such deficiencies will be by the originator of the Daily Construction Report and the contractor's supervisor responsible for the work and do not require formal action by the contractor's QC System Manager or the CM. Ideally, such minor deficiencies can be corrected on the spot by agreement with the contractor's supervisory personnel.

Non-conformances are major deviations from the contract requirement and/or accepted standard of quality, which will be formally documented for corrective action by CM field staff or the third party testing group. Failure by a contractor to correct a minor deficiency after having been put on notice will also result in a non-conformance if it is not corrected within 5 days of notification. Non-conformances will be formally documented on the example NCR form shown in Attachment 3. A log will be maintained for all NCRs in accordance with the example form shown in Attachment 3.

The NCR will be distributed to the contractor QCM, CM, SM, CQAO and GE representative.

The CQAO will follow up on the NCR as required to verify that corrective action has been completed. The CM or a designated FE will verify and accept the corrected work by actual inspection.

6.3 NON-CONFORMANCE REPORT

The NCR is a formal notification to the contractor that work or an operational process does not meet the plans or the specifications for the project. Any item of work found to be deficient – i.e., out of conformance with the construction drawings and/or specifications – will be identified by the inspector on the non-conformance report as described in this section. Non-conformance reports will be included on the non-conformance log and tracked through verification that the non-conformance has been corrected.

6.4 CONTRACTOR QC DEFICIENCY CORRECTION

When material, performed work, installation or an operational process is found to be deficient and/or does not meet the project specifications, the CQAO will assure that the deficiency is corrected. The CQAO designee will take steps to see that the non-conforming material, work, installation or operational process is identified and controlled to prevent unintended use or negative consequences. Where the non-conforming issue is a material or item, it will be tagged and segregated by the contractor, when practical, from conforming material or items to preclude their inadvertent use. If segregation is impractical or impossible because of the physical characteristics of the item or other reasons, the non-conformance tag will be displayed prominently to preclude inadvertent use or tacit acceptance. A non-conforming operational process or product that cannot be tagged will be recorded, with notice transmitted to appropriate parties. The CQAO will be responsible for documenting the non-conformance in a NCR as specified in Section 6.3.

Each contractor will implement corrective actions to remedy work that is not in accordance with the drawings and specifications. The corrective actions will include removal and replacement of deficient work, re-work, modification of work procedures or separate corrective action using methods approved by the CM Removal will be done in a manner that does not disturb work that meets QC/QA criteria; otherwise, the disturbed material will also be removed and replaced. Re-work or replacement will be done in accordance with the corresponding technical specifications. Re-work or replacement will be subjected to the same scope of QC/QA inspection and testing as the original work. If the re-work or replacement work is not in accordance with the drawings and specifications, the replacement work will be removed, replaced, re-inspected, and re-tested. Changes in operational processes or best management practices are expected to result in removal of the non-conforming situation.

6.5 PREVENTIVE ACTIONS

Each contractor and QC/QA team will take preventive actions as necessary to eliminate the causes of potential deficiencies so as to prevent their occurrence. The contractors' CQCPs are to include quality improvement practices to continually improve construction practices and address quality problems at their source. The CM and CQAO will monitor, inspect, and audit processes used to prevent erroneous information or construction products from being passed to GE. The project manager, CM, and CQAO will have the authority to implement, verify and review the project's preventive and corrective action effectiveness, and to determine and undertake steps to improve the project's work processes to eliminate the causes of potential nonconformities.

Preventive actions address the root cause of quality problems so that they can be eliminated. For example, failure to achieve the required inventory dredge prism grades in a given CU may be due to inaccurate dredge controls, poor dredge operator techniques, a mechanical problem with the excavator arm or bucket, or a number of other reasons. To prevent and/or reduce the occurrence of non-conforming dredge cuts, the CM staff will work with the Dredging Contractor to check the accuracy of the controls, to confirm that the equipment is operating properly, to verify that the operator is fully trained and has the skills to provide the desired product, or otherwise to determine the root cause of the problem so the problem can be prevented in the future.

SECTION 7

DOCUMENTATION

Technical Specification 01450 includes documentation and reporting requirements. Each contractor's QC documentation will cover all aspects of QC program activities, and include Daily Inspection Reports and Daily Test Reports. After approval of the CQCP by the CM, each contractor will document the QC activities pursuant to its CQCP. Ongoing QA oversight will be documented by the CM.

The results of QC/QA testing and other documentation procedures conducted to confirm that construction activities meet applicable design criteria, plans and specifications for the D&FO will be stored in the project QC/QA files and maintained as part of the permanent project record; these records will made available for EPA inspection upon request.

7.1 DAILY RECORDKEEPING

Project documents will be managed through a combination of secure document filing and storage and a computerized document tracking system.

Sufficient records will be prepared and maintained as work is performed to furnish documentary evidence of the quality of construction/operation and laboratory analysis and of activities affecting quality. Each contractor QC technician will maintain a daily log of all inspections performed for both contractor and subcontractor operations on a form acceptable to the CM.

The Daily Inspection and Daily Test reports will be signed by the responsible QC technician who prepared the report and checked by the QCM. The CM (or designee) will be provided at least one copy of each daily inspection and test report on the work day following the day of record.

The Daily QC Report will be the mechanism by which QC reporting is performed. Individually required reports, inspections, and other documentation will either be made part of the report itself or included as attachments to the report when required. Some documentation, such as surveys and photographs, will be referenced in the reports but may be filed and stored in a separate system

7.2 DAILY REPORT OF OPERATIONS

A daily report of operations will be prepared and signed by each FE and FI. The report will include a summary of the contractor's daily operational activities. Supporting inspection data sheets will be attached to the daily report where needed. Example forms are provided in Attachment 3.

The daily report of operations will include, but not be limited to, the following information:

- Date, project name, location, and other identification;
- Description of weather conditions, including temperature, cloud cover, and precipitation;
- Reports on any meetings held and their results;
- Record of visitors to site;
- Locations of operations underway during that day and specific locations;
- Equipment and personnel working in each activity, including subcontractors;
- Descriptions of contractors' work and inspections/tests being performed;
- Decisions made regarding approval of units of material or of work, as well as deficiencies and corrective actions to be taken;
- Description of problems or delays and resolution;
- Communications with contractor staff;
- Operational activities completed and/or in progress;
- Progress photos and other observations where applicable; and
- Signature of the report preparer.

As described in Section 7.5, the daily report of operations will be routed on a daily basis to the project QC/QA files and will be maintained as part of the permanent project record. These reports will be reviewed by the CM (or designee) and FE, and also distributed to the CQAO and GE.

In addition, a form to be used to record the estimated daily production of the project (Estimated Daily Dredging and Facility Operations Production Report) is also provided in Attachment 3.

7.3 INSPECTION AND TESTING REPORT FORMS

Report forms will be completed for inspections and tests conducted. The forms vary depending on inspection or test type. Representative forms for several types of inspection and testing reports are included in Attachment 3. These forms include:

- Description or title of the inspection activity;
- Location of the inspection activity or location from which the sample was obtained;
- Recorded observation or test data;
- Results of the inspection activity;
- Personnel involved in the inspection activity; and
- Signature of the inspector.

7.4 RECORD DRAWINGS

Contractors will submit draft record drawings to the CM for review and will prepare final record drawings based on CM comments. Record drawings will be required for the dredging operations and habitat construction. In addition, if, during the operation of the processing facility or rail yard, changes are made in layout or equipment to improve operations, then revisions to the record drawings already prepared for those completed facilities will be made. These records will be submitted on one set of CD-ROM disks. Record drawings submitted on CD-ROM will be the latest version of AutoCAD by Autodesk, Inc.

7.4.1 Responsibilities

The CM working with the contractor will be responsible for checking that what are traditionally referred to as "red-line record drawings" are maintained throughout the project construction and operations. Given the nature of the work and the method of recording constructed features, these "red-line record drawings" will more likely be printed plots of electronically recorded contours by the third-party survey contractor with their electronic files being used to update the design drawings to as-built status at the completion of the work. Mark-ups will also be done to the habitat construction drawings to reflect changes in substrate type, planting limits or other revisions; and the CM will make sure updates are prepared.

7.4.2 Preparation of As-Built Drawings

The contractor will be responsible for collecting actual construction data in the field as preparation for as-built drawings. The as-built drawings will record approved, actual field conditions upon completion of the work. The original design drawings will be superimposed by data collected by the contractor as the project progresses to indicate as-built conditions. Where there was a significant change to a specified material, dimension, location, or other feature, the final as-built drawing will indicate the change to the work performed. An as-built survey depicting the location and type of habitat placement will be conducted using global positioning system (GPS) and related technology. As previously noted in Section 2 above, the third-party survey contractor will verify the accuracy of the as-built results recorded by the contractor in its record drawings.

Record drawings will be compiled using the provided AutoCAD background files overlaid with each approved hydrographic acceptance survey for each CU and all shoreline survey data collected for acceptance. Note that the CM-arranged third-party hydrographic results will be used to provide CU acceptance guidance; this survey data will show dredge limits and post-capping/backfill locations and contours and therefore could be used to produce the as-built drawings.

7.4.3 Review of As-Built Drawings

Upon completion of the as-built red-line drawings, the contractor will submit the red-line mark-up drawings to the CM for review. The CM will provide the mark-ups to the engineer who will incorporate the mark-ups and issue the final as-built drawings to GE and the CM.

7.5 CONTROL OF QUALITY RECORDS

The CQAO will verify the accuracy of QA records and maintain copies of all quality-related documentation. This documentation will include, but may not be limited to:

- Daily operations QA logs and records;
- Inspection checklists and reports;
- Surveyor reports;
- Nonconformance reports;
- Material receiving and transport reports;
- Monitoring and test data; and
- Internal audit reports.

These records will be stored in files maintained in the project document control files. All original documents pertaining to project information will be maintained in the project file located at the project office in Fort Edward, New York.

The CM and SM will have primary responsibility for the centralized document control files for the project and construction documentation.

Pursuant to the contract specifications, the contractor will provide an electronic or paper copy (suitable for scanning) of all documentation associated with the work to document control within three business days of the generation of such documents, and will provide one electronic copy of all required submittals to the CM's document manager. All contractors will maintain a storage facility in their field office at the processing facility site. The storage facility will contain all inspection reports, test records, contract documents, project reports, daily field reports and other appropriate records.

Records will be available for inspection and audit, at any time, by the CM and /or GE. Project records will be retained in accordance with the requirements of Paragraph 121 of the CD.

SECTION 8

EPA APPROVALS FOR CERTIFICATION UNITS

This section describes the procedures for obtaining EPA approvals and certifications of completion for individual CUs in accordance with Section 5.2 of the SOW. This process is illustrated in the example CU acceptance schedule (Figure 8.1). To facilitate this process, throughout the Phase 1 RA, EPA will participate in regularly scheduled progress meetings which should provide the guidance and progressive background needed to evaluate formal submittals for approval.

8.1 CU DREDGING COMPLETION APPROVAL

After the inventory dredging is reported by the Dredging Contractor to be complete within an individual CU, the CM will provide notification to EPA of the start of the dredging approval process for that CU. Bathymetric data and sediment sample data are targeted to be available to allow EPA approval within six (6) days following the contractor's notification of completion. First, a multi-beam survey will be performed by the third-party hydrographic survey contractor to identify that the target inventory sediment has been removed. Single-beam or land surveys may be performed for areas within the target dredging surface boundaries shown on the contract drawings that are in shallow water at depths unsuitable to be surveyed using multi-beam sonar equipment. If unremoved target inventory sediment is identified by survey, the CM will inform EPA of the need for additional inventory dredging and return to dredging operations. Once certain of full removal of target sediment, the CM will again notify EPA of completion of dredging and initiate a second bathymetry survey as described above. If via the second survey all target inventory sediment is confirmed as having been removed, the collection and analysis of post-dredging sediment samples will be performed. In order to meet the target of completing all bathymetric surveys and sediment sampling within six (6) days, EPA is expected to be an integrated part of that daily process.

Should the target elevations be confirmed to have been met but sediment chemistry of the dredged area indicates the need for residual dredging, the contractor will be directed to begin the residual dredge process within seven (7) days of notice. The process for residual dredging confirmation is similar to inventory dredging – confirmation of the required six-inch minimum dredge cut by multi-beam survey followed by sampling and sediment polychlorinated biphenyl (PCB) analysis. The residual dredging and approval process may be repeated if sediment chemistry indicates another residual pass is necessary, and each review and confirmation of removal is expected to take approximately six (6) days including the review and determination by the EPA representative.

The CM will review the vertical and horizontal limits of removal and the results of the post-dredging sediment sampling within the CU in accordance with the applicable requirements of the

Phase 1 FDR (Section 4 – Monitoring and Compliance with Performance Standards), the PSCP Scope (Attachment C to the SOW), and the Phase 1 PSCP (Appendix D to RAWP #3).

The CM will complete the CU Dredging Completion Approval Form (Attachment F to the SOW and also included herein as Attachment 4). This form will also identify the extent of backfilling and/or capping for the CU in accordance with the applicable requirements of the Phase 1 FDR, the PSCP Scope, and the Phase 1 PSCP.

A completed CU Dredging Completion Approval Form, in addition to all laboratory data, will be presented to the EPA field representative for review and concurrence. If the EPA field representative agrees that dredging has been completed and that the specified plan for backfilling and/or capping conforms to the requirements of the above-mentioned documents, then the EPA field representative will promptly indicate concurrence by initialing and signing the CU Dredging Completion Approval Form. Due to the limited river season to complete the Phase 1 work, the EPA review process is expected to take no longer than one day from the receipt of the completed CU Dredging Completion Approval Form. Although the Dredging Contractor's weekly schedule should give an indication when CU completion is anticipated, it should be noted that the process of approving CUs will occur on a 24 hours per day, 7 days per week basis, and GE expects that EPA representatives will be available and prepared to receive and approve CU Dredging Completion Approval Forms at any time of day on any day of the week during Phase 1 operations.

8.2 CU BACKFILL / ENGINEERED CAP COMPLETION APPROVALS

Shortly after receiving written release from EPA that dredging operations have been completed in a given CU, placement of backfill/cap materials will begin. After backfill/cap material placement is complete within an individual CU, the CM will direct the third-party survey contractor to collect multi-beam bathymetry of the installed backfill and/or cap. The CM will then review the multi-beam bathymetry and other information including daily placement reports to determine whether the backfill and/or cap within the CU have been installed in accordance with the applicable requirements of the Phase 1 FDR, the PSCP Scope, and the Phase 1 PSCP.

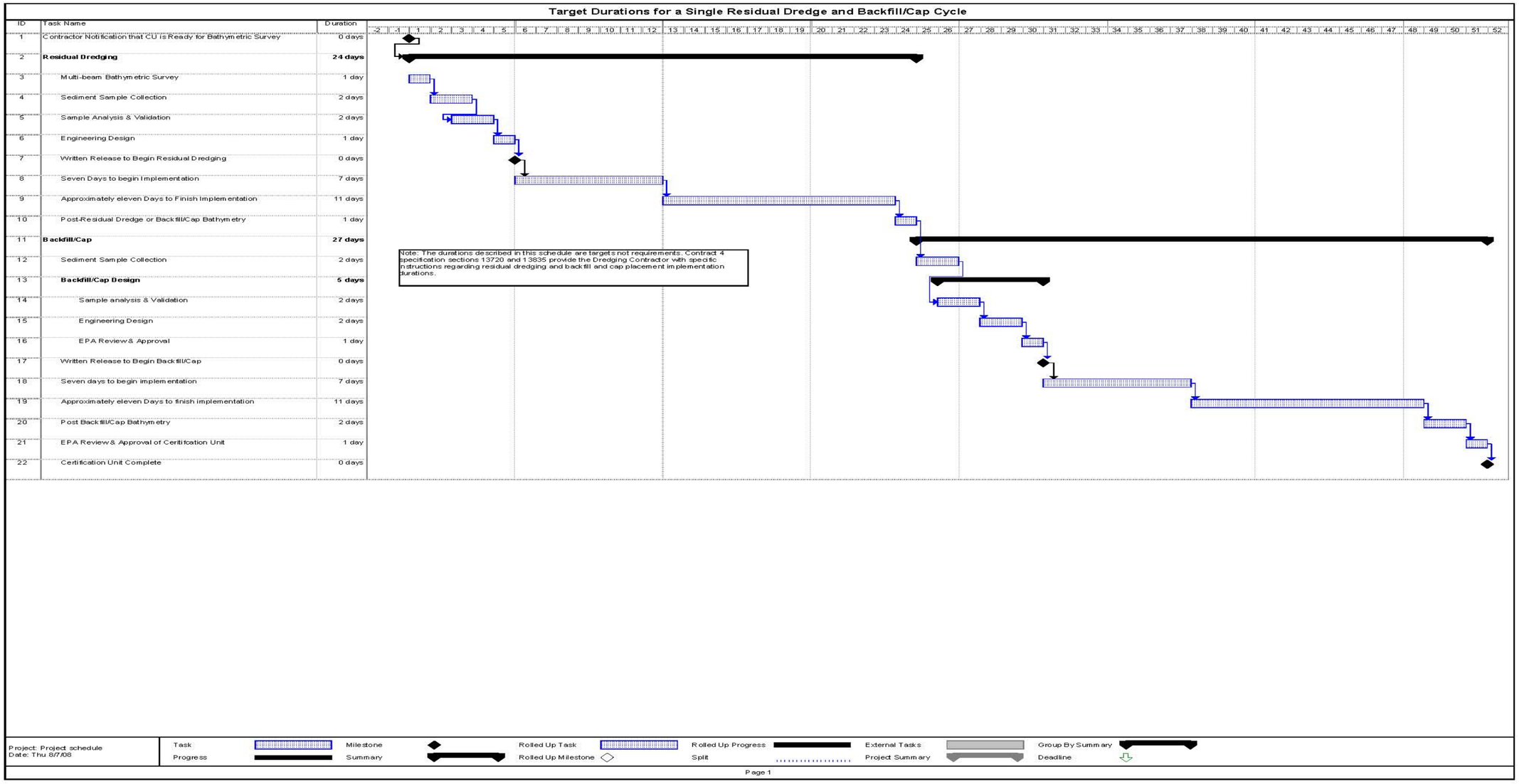
The CM will prepare a record drawing (hard copy and electronic) of the installed backfill and/or cap and complete the CU Backfill/Engineered Cap Completion Approval Form (Attachment F to the SOW and also included herein as Attachment 4). A completed CU Backfill/Engineered Cap Completion Approval Form will be presented to the EPA field representative for review and concurrence. If the EPA field representative agrees that the backfill and/or cap within the CU have been completed, then the EPA field representative will promptly indicate concurrence by initialing and signing the CU Backfill/Engineered Cap Completion Approval Form. As stated above, this is a 24 hours a day, 7 days per week approval process that requires active participation at all times from EPA for timely approvals.

8.3 FINAL CU CONSTRUCTION COMPLETION CERTIFICATIONS

Following completion of all remedial construction activities within an individual CU, including, but not limited to, the initial installation of habitat materials (if required under the Phase 1 FDR), but excluding operation, maintenance, and monitoring and adaptive management activities, the CM will review the information on the habitat construction measures installed within the CU to determine whether those measures have been installed in accordance with the applicable requirements of the Phase 1 FDR and the Critical Phase 1 Design Elements (Attachment A to the SOW).

The CM will prepare a record drawing (hard copy and electronic) of the location and type of habitat construction, the bathymetry/profile of the CU after backfill/cap placement, and complete the Final CU Construction Completion Certification Form (Attachment F to the SOW and also included herein as Attachment 4). A completed Final CU Construction Completion Certification Form will be presented to the EPA field representative for review and concurrence. If the EPA field representative agrees that all remedial construction activities within the CU have been completed, then the EPA field representative will promptly indicate concurrence by initialing and signing the Final CU Construction Completion Certification Form.

Figure 8.1 CU Acceptance Example Schedule



SECTION 9

FIELD CHANGES

Field changes described herein are limited to changes to the DQAP. The procedures for making and obtaining EPA approval for changes to design plans and specifications or construction/operation processes are discussed in Section 1.4 Work Plan Revisions of RAWP #3. Design change-order procedures are described in the contract between GE and the various contractors.

9.1 DQAP CHANGES

GE, the CM, SM, or CQAO may initiate revisions to this DQAP. The DQAP may be revised when it becomes apparent that the DQAP procedures or controls are inadequate to support work being produced in conformance with the specified quality requirements or are deemed to be more excessive than required to support work being produced in conformance with the specified quality requirements. Changes to QA procedures necessitating modification to this DQAP will be initiated by the CQAO for CM and GE approval. They will then be submitted to EPA for review and approval. Updates to DQAP staffing will be made by GE notification to EPA as described in Section 2.3 without submission of a fully revised DQAP.

9.2 QC CHANGES

The contractors' CQCPs required by Technical Specification 01450 may require revisions as necessary to achieve the goal of continual improvement and to correct unsatisfactory performance. At any time after approval by the CM, GE and the CM may require a contractor to make changes to its CQCP, including personnel changes, as necessary to obtain the quality specified. Moreover, the contractor may initiate CQCP changes to correct QC process problems, and is required to notify the CM in writing of any desired changes; all changes are subject to GE and CM acceptance. Revisions to the CQCPs will not be submitted to EPA for approval, but will be available for EPA review upon request.

SECTION 10

FINAL QC/QA REPORTING

Section 7.2 of the RAWP #3 describes the contents of the Phase 1 Construction Report to be submitted to EPA at the conclusion of Phase 1 Field Activities. As described in that section, the Phase 1 Construction Report will include the following DQAP-related documentation:

- The record (as built) drawings as described in Section 7.4 of this DQAP;
- Copies of the Final CU Construction Approval and Completion Certification forms for each completed CU; and
- Copies of Certificates of Disposal received from the disposal site.

SECTION 11

REFERENCES

Blasland, Bouck & Lee, Inc. 2006. *Phase 1 Final Design Report – Hudson River PCBs Superfund Site* (including Contract drawings and specifications). (March, 2006).

Parsons. 2005. *GE Response to US EPA Region 2 Consent Order Item 10b Parsons Commercial Technology Group Inc. Quality Management Plan (QMP).* (October 7, 2005).

Parsons. 2009. *Phase 1 Remedial Action Community Health and Safety Plan, Hudson River PCBs Superfund Site.* Revision 2. (RA CHASP). February

United States Environmental Protection Agency. 2002. *Superfund Record of Decision*. February 1, 2002.

United States Environmental Protection Agency and General Electric Company. 2003. *Administrative Order on Consent for Hudson River Remedial Design and Cost Recovery. Index No. CERCLA-02-2003- 2027*.

United States Environmental Protection Agency and General Electric Company. 2005. *Consent Decree in United States v. General Electric Company, Civil Action No.1:05-cv-1270,* lodged in United States District Court for the Northern District of New York, October 6, 2005. Final judgment entered November 2, 2006.

ATTACHMENT 1

DQAP STAFFING LIST AND RESUMES

DQAP STAFFING LIST

Dredging Construction Quality Control/Quality Assurance Plan (DQAP)
Phase 1 Dredging and Facility Operations
Hudson River PCB's Superfund Site

Revision 1 – May, 2009

The following personnel are assigned DQAP functions effective as indicated below. Periodic updates to this list are to be issued by the Construction Manager.

FUNCTION	NAME	ORGANIZATION
CQA Officer	David (Roy) Moseley	CM (Parsons)
CQA Field Inspector	Joel Kantola	CM (Parsons)
CQA Field Inspector	Kenneth Knipes	CM (Parsons)
CQA Field Inspector	Richard Kranes	CM (Parsons)

/s/ Larry Hartman_____ May, 2009
CM Approval Date

Firm:
Parsons

Years of Experience:
25+

Education:

- University of Texas – Austin, Texas, 1975 – 1977

Qualifications/Certifications:

- USACE Construction Quality Manager, 1999, CENAO-03-0468-100-2008, Nationwide, expiration date: 10/2008
- Surface Mine Supervisor, 2005, 1219-0070-8480, Nationwide, inactive
- Asbestos Abatement Supervisor, 1998, Nationwide, inactive
- U.S. DOT and IATA Hazmat Certification, Troxler, 2006
- Annual Training for the Operation of Nuclear Moisture/Density Gauges and Applicable Regulations, 2006
- Basic Civil Engineering - Red Vector, 2006
- OSHA 40 Hr. Hazmat Training, Lamar University, 1986

DAVID E. MOSELEY

Construction Quality Assurance Officer

Summary of Relevant Qualifications

David Moseley has more than 15 years of experience as a an accomplished Quality Assurance / Quality Control Manager in hazardous waste remediation/transportation/ remediation, landfill construction and closures, military base construction, Homeland Security safety inspections, hurricane emergency recovery and restoration, canals and reservoir dredging, construction, and restoration.

Work Experience

Project: Hudson River PCBs Superfund Site Project, February 2009 – Present. Serves as Construction Quality Assurance Officer (CQAO).

The CQAO reporting directly to the Construction Manager for the development, implementation, and maintenance of the quality assurance program for the Project, which monitors and documents the effectiveness of quality control and quality assurance measures used throughout the Project. The QA Manager interacts with representatives from a variety of functional groups, including design engineering, purchasing, the program office, and all production and inspection personnel in the assigned program area.

- Interact with Project management and staff for appropriate coordination, communication, and documentation related to quality assurance.
- Review and approve all Contractor Quality Control Plans for their respective areas of the Project. Also participate in the review of all documentation and submittals from the Contractors as it relates to quality assurance and quality control.
- Monitor and evaluate the quality of processing facility operations and maintenance activities along with environmental remediation accomplished by Parsons and Contractors to ensure the work is in conformance with the contract documents and industry standards.
- Review and verify operational data and laboratory testing results for conformance with contract requirements.
- Identify and report quality problems or trends in operation of the processing plant or construction of the project and approve, recommend and/or implement appropriate corrective actions to quality problems.

- ***David Moseley (Continued)***

- Maintain a database of all inspections, deficiencies, and corrective actions taken on the project.
- Direct and conduct activities designed to prevent errors or other deficiencies in the planning, construction, operation, and management of the Project.
- Assist as necessary the Parsons' CM Program Manager, the Construction Manager, the Site Construction Manager, Field Engineers, Construction Inspectors, and Contractors in the evaluation and correction of specific quality control problems and issues.
- Assess those procedures used to define and implement the basic functions of the construction management organization to assure that they remain effective and that they continue to meet the needs of GE and of the requirements of the Project.
- Define and monitor inspection and testing activities to assure that these follow the quality standards established for the Project. Assures sufficient acceptable documentation is being recorded, maintained, distributed, and retained.

Quality Assurance Specialist, Parsons International Limited Dubai, UAE. September 2008 through November 2008

Arabian Canal - Limitless LLC (LML) – Dubai World – Dubai, UAE

As the Quality Assurance Specialist (QAS), reporting directly to the Start-up Team Project Manager, developed the Quality Management Plan, developing the Internal Project Management Plan, Project Specific Vehicle Usage Policy and Procedure and the Procedure WM-001 Start-up for Major Projects Checklist, began development of the Construction Service Management Plan, and shared in the development of the Procurement Management Plan. Started development of ACCESS (Arabian Canal Commute – Employee Shuttle System) which is, as titled, The shuttle service Parsons International LTD intends to implement in assisting employee daily commute.

Quality Assurance / Quality Control Manager, Parsons Water and Infrastructure, West Palm Beach, Florida. June 2007 – December 2008

Barnard Parsons Joint Venture (BPJV) – South Florida Water Management District (SFWMD), Comprehensive Everglades Restoration Program (CERP), Everglades Agricultural Area (EAA) Reservoir A-1 Project: – South Bay, Florida 33493:

As the BPJV Quality Assurance / Quality Control Manager (QCM), reporting directly to the BPJV Project Manager (PM) and coordinating with the SFWMD Representatives, Design Engineers (DE), Subcontractors, and the BPJV Management, as necessary, for any and all issues or concerns relating to quality compliance. Responsibilities included developing the Quality Assurance / Quality Control Plan (QAQCP) and assisting the PM in the implementation, enforcement, monitoring, and reporting of procedures delineated in the CQCP. Ensured that the work product complied with the project's QAQC requirements and provide the necessary documentation to demonstrate compliance.

As the QAQCM, responsibilities included assisting the project personnel with the interpretation of the quality requirements and standards, review and approve project-specific quality related procedures, including amendments or modifications to the QAQCP, and directed the QAQC Staff of required duties to implement the QAQCP.

The project is currently in suspension, as the State of Florida and the South Florida Water Management District are exploring options of purchasing other properties which has stopped the project and re-directed the program.

Quality Assurance/Quality Control Manager, Shaw Environmental & Infrastructure, Inc., Houston, Texas. December 1997 – June 2007

As Quality Control Manager, responsibilities included the development of Quality Control Plans, inspecting and monitoring to insure that both in-progress and completed work comply with contract requirements, work plans, project specifications, QCP, protocols, project drawings, etc. Responsible for chairing progress meetings and implementing the three phase control process including preparation inspection meetings, initial, and follow up inspections, inspect all materials, supplies, and equipment to be used on the project, along with other various assigned duties: Served as the liaison between the client and the Operations Manager, on all project specifications, drawing concerns, and issues:

As Quality Assurance Manager, responsibilities included inspection and monitoring of the sub-contractor(s)' performances and documentation to ensure the Quality Control System was working and reporting deficiencies and non-compliances to the client and/or the Project Manager of the Construction Management.

As Quality Control Inspector, performed various inspections and documented the findings of the inspections and reporting, accordingly.

1994 – 1997, Field Operations Manager, ETEC, Inc., Belen, New Mexico

David Moseley (Continued)

1991 – 1994, Project Manager, Hulcher Remediation, Denton, Texas

1986 – 1991 Project Manager, Waste Processors, Inc., Houston, Texas

1977 – 1986, Vice President/General Manager, Trinity Bay/SOLOCO, Winnie, Texas

Firm:
Parsons

Years of Experience:
15+

Education:

- MS, University of New Hampshire
- BS, University of New Hampshire

Qualifications/Certifications:

- Professional Engineer (PE) New Hampshire and Massachusetts

JOEL Q. KANTOLA

Construction Quality Assurance Inspector

Work Experience

Parsons, February 2009–Present

Project CQA Inspector. Parsons - Hudson River PCBs Superfund Site Project. Inspects various facets of work on the construction site and performs continuous surveillance of assigned construction activities to ensure compliance with all applicable codes, standards, and specifications. Performs complex inspection tasks, including assessing adherence to quality control procedures for soils, concrete, steel, mechanical, and electrical disciplines.

Civil

- Soil compaction, moisture content, aggregation, graduation, concrete slump, air entrainment, concrete compression, lines and grades surveys, bolt torques, and concrete coring.
- Checks location of reinforcing steel before placement of concrete.
- Inspects and monitors piling installation to ensure location and bearing.

Electrical

- Inspects electrical installations to ensure proper grounding, circuit integrity, and adherence to statutory and customer regulations.

Building / Mechanical

- Performs destructive and nondestructive tests on metals and other materials through magnaflex, dye-penetrant, radiographic, tension and compression, paint thickness, and resistivity.
- Performs surveillance of underground piping to ensure tightness, bedding, and grade.
- Validates piping systems, including P&ID checks and hydraulic or other pressure tests.
- Performs continuing inspection of painting and insulation to ensure thickness and coverage continuity.
- Verifies equipment alignment and balancing operations.
- Administers welder qualification tests.
- Prepares quality control reports and recommends changes to procedures.

Marina Projects. Mr. Kantola has conducted geotechnical investigations, design, and has provided construction oversight for numerous marina bulkhead walls, riprap revetments, and piers. The more note worthy projects include the following: A 46 foot tall anchored bulkhead (sheet pile) wall with a large stone revetment for the QDC facility in North Kingston, RI; a 21 foot tall anchored bulkhead (sheet pile) wall at Tern Harbor in Weymouth, MA; and a 14 foot tall anchored bulkhead (sheet pile) wall at Bass River Marina in West Dennis, MA. These projects involved high surcharge loads, working in the water, and the installation and testing of high capacity soil anchors. Several other projects involved cantilever walls, anchored walls pinned into bedrock, and lateral pile design/testing for wharves. Further, the bulkhead wall projects typically require construction dredging at the toe of the walls.

Dam Design & Construction. Mr. Kantola has considerable experience in designing and constructing new dams and major rehabilitation of old dams. Most of the work has been conducted in Colorado and Massachusetts. Mr. Kantola was responsible for the design and analysis of slopes, retaining walls, pipe penetrations, filters, and riprap. He was also responsible for putting together the construction contract design drawings and specifications for several of the projects. When these projects went under construction, Mr. Kantola was closely involved with construction dredging, backfilling, riprap placement and the installation/repair of various structures. Installation/repair of structures typically included CIP and precast concrete structures, slurry walls, sheet piling, grouting, spillways, fish ladders, control gates, stop logs, masonry structures, and piping. Rudimentary validation of survey work is also a typical part of each project. Mr. Kantola has also inspected over 50 dams in the state of Massachusetts, including the large dams and dikes that form the Quabbin and Sudbury Reservoirs.

Port of Miami Phase II Dredging, Miami, Florida. Mr. Kantola prepared a thorough analysis of geotechnical factors that influenced the performance of cutterhead and mechanical dredging in bedrock as part of a legal defense for the Contractors insurance company. The analysis required comparing dredging performance versus geotechnical parameters and blasting records for over thirty projects conducted along the southeast coast of the United States. The analysis compared the conditions/production at the other projects sites to those that were encountered by the Contractor in Miami.

MWRA Diffuser Inspection Contract, Boston, Massachusetts. Mr. Kantola was the Engineer responsible for overseeing the offshore underwater inspection of the MWRA Outfall Diffusers using bathymetric surveying, side scan sonar, and ROV equipment.

MWRA Outfall Diffuser Contract, Boston, Massachusetts. Mr. Kantola was the Lead Field Engineer in charge of four Inspectors/Engineers on this $72-million contract. His responsibilities included overseeing all inspection activities related to construction dredging, bathymetric surveying, grouting, underwater diffuser assembly, and onshore construction activities. The work involved precise and accurate dredging in 110 feet of water, with tight controls and validation of riprap backfilling around each diffuser. Mr. Kantola was also in charge of insuring dredging/riprap material quantities and pay items were accurate. Onshore inspection included overseeing riprap production, precasting of the concrete diffuser heads, the preparation and repair of fiberglass diffuser pipes, and the onshore assembly and coating of various diffusers components.

ENVIRONMENTAL PROJECTS

Confidential Client, Silver Valley & Wallace, Idaho. Mr. Kantola prepared cost and volume estimates for two mine reclamation projects. The work included the following; landfill sizing, adit plugging, stream cleanout/stabilization, tailing pile capping, storm water control, demolition, earthwork, rehabilitation of riparian zone, and slope toe pullback.

CBC Groundwater Study, Davisville, Rhode Island, 1995. Mr. Kantola served as a Geotechnical Engineer responsible for the soil exploration and reporting on field screening results of soil, groundwater sampling (for metals), and installation of observation wells.

Hardee Plant Contaminate Study, Seminole Electric Coop, Florida. Mr. Kantola served as a Geotechnical Engineer responsible for estimating theoretical groundwater transport of contaminates.

Great Northern Paper Company PCB Study, East Millinocket, Maine. Mr. Kantola served as a Geotechnical Engineer responsible for geologic exploration and the installation of observation wells as part of a PCB contamination study.

Technical Field Service Contract, Department of Energy, Louisiana. Mr. Kantola served as a Construction Engineer responsible for providing field supervision for plugging and decommissioning wells that were up to 3,000 feet deep. Duties also included overseeing the construction of access roads, tree removal, site restoration, concrete placement, grouting, and writing a completion report.

SURVEYING

Land Surveying, Rockingham County, New Hampshire. Mr. Kantola was promoted from a Rod Man to a Crew Chief. As a Crew Chief he was responsible for running a three man crew. The work consisted of road layouts, perimeter surveys, stadia, level loops, boundary setting, and bank certifications.

UNDERGROUND PROJECTS

Drainage Service Department Tunnels, Hong Kong. Mr. Kantola has provided consulting services for the preparation of Geotechnical Baseline Reports and ground water inflow prediction recommendations for the following storm water drainage tunnels in Hong Kong: HATS Stage 2 Sewage Tunnel, Lai Chi Kok Transfer Scheme, and Tseun Wan Drainage Tunnel.

Confidential Client, Rifle, CO. Mr. Kantola has provided engineering support, equipment procurement, cost estimation and field supervision for a deep curtain wall grouting operation (up to depths of 2,000 feet) in oil shale. The grouting operation included injecting clay based grouts, cement grout, and microfine cement grout. Preliminary work for the injection of molten paraffin wax has also been started.

Underground Engineering. Mr. Kantola has provided engineering services for several underground projects involving ground support, mine plugging, microtunneling, horizontal directional drilling, and pre-bid reports.

MWRA Braintree-Weymouth Tunnel & Shafts (BWTS), Boston, Massachusetts. Mr. Kantola was a Project Engineer for Modern Continental (Contractor). During this time he mainly worked on the construction of the BWTS which included 3 miles of hard rock tunneling using both TBM and drill/blast methods, and the construction of three large diameter shafts. His tasks included overseeing and supporting the following operations; ground support, DIP pipe installation, concrete backfilling, geologic mapping, rock coring, site backfilling and restoration, landscaping, and contract closeout. He also prepared DSC claims related to slurry wall construction, water inflow, rock strength, rock fracturing, and ground collapses. During this time Mr. Kantola also work on other projects that required analysis for pre-bids and differing site condition claims

Central Artery / Third Harbor Tunnel Project, Contract C15A2, Massachusetts. Mr. Kantola served as the Office Engineer and Lead Field Engineer of six Field Engineers on a $218-million contract involving 1,500 feet of cut and cover tunnel constructed beneath the existing I-93 highway viaduct. The project included slurry walls, drilled

piers, utilities, structural steel, concrete placement, demolition, and lead paint abatement. The proximity of the slurry walls to I-93, and issues with water tightness, demanded that Mr. Kantola pay very close attention to all aspects of the slurry wall operation.

MWRA Metro West Water Supply Tunnel, Framingham, Massachusetts. Mr. Kantola served as the Chief Field Engineer on the MetroWest Water Tunnel. During this project he supervised up to five Engineers/Inspectors. The work included overseeing the construction of following; slurry walls, inclinometer data collection, access road and bridge, water treatment plant, shaft sinking, facilities, utilities, riprap, environmental controls, and landscaping. The critical nature of the slurry wall to bedrock contact demanded that Mr. Kantola pay very close attention to all aspects of the slurry wall operation.

MWRA Braintree-Weymouth Tunnel and Shafts Project, Boston, Massachusetts. Mr. Kantola was a Geotechnical Engineer during the exploration and design phase for the 2.7-mile hard rock tunnel. He was responsible for writing the Geotechnical Data Report, Rock Mass Rating calculations, rock fracturing analysis, and reviewing the Geotechnical Baseline Report.

Tunnel Inspection, Boston Harbor Project, Boston, Massachusetts. Mr. Kantola served as a Tunnel Inspector/Engineer on the following contracts: Outfall Tunnel, Inter-Island Tunnel and North System Tunnel. Mr. Kantola was responsible for inspecting the TBM hard rock mining, soft ground mining, steel plate support, CIP concrete lining, contact grouting, cut-off grouting, and precast facility for tunnel segments. Duties also included developing data to defend the owner against an excess water inflow claim and a contact grouting claim.

FOUNDATION PROJECTS

Foundation Engineering. Mr. Kantola has provided geotechnical engineering and investigations services for numerous projects involving; foundation design and repair, sheet pile walls, concrete walls, mechanically stabilized earth walls, piles, and grouting. These include projects for State Agencies, nuclear facilities, retail/residential developments, and a UPS Facility.

Firm:
Parsons

Years of Experience:
30+

Education:

- Regents Diploma, Granville Central High School 1979, Granville, NY

Qualifications/Certifications:

- Completion Certificate, Vermont State Apprenticeship Council 1984
- Master Electrician License 1986
- Vermont State Certified to inspect and install Fire Alarm Systems
- Completion Certificate Welding I and II Stafford Tech 2001
- Completion Certificate Intro to Auto Cad Stafford Tech 2004
- Completion Certificate Intro to Excel 2007 Vermont Tech
- Construction Management Seminar, Hudson Valley Community College Spring Semester 2005
- 10 hour OSHA training
- 24 hour OSHA Hazardous Waste and Emergency Response training

KENNETH KNIPES

Construction Quality Assurance Inspector

Work Experience

Parsons, June 2008–Present

Project CQA Inspector. Parsons - Hudson River PCBs Superfund Site Project. Performs technical and administrative activities requiring specialization in quality assurance, safety, inspection of water treatment facility and dewatering facilities operations as well as loading and unloading operations associated with barges and rail cars.

Witnesses, performs and/or evaluates water treatment and dewatering operations and tests such as water quality, specific gravity, density, percent solids, total suspended solids, sieve analysis, and paint filter tests. In addition, tracks treatment quantities, equipment, man-hours and monitors contractor production rates. Witnesses, performs and/or evaluates loading and unloading operations for the barges and the railcars.

Monitors and tracks the dewatering of the barges and unloading of sediments from the barges into the dewatering processing equipment for compliance with contract requirements. Monitors contractor's management of all on-site material stockpiles throughout the site for contract compliance.

Witnesses loading and weighing of the rail cars, movement of rail cars through the coupled in-motion rail scale, reviews data weigh log information and verifies car weight limits are in compliance with contract requirements.

Verifies equipment operational status, numbers of personnel and rates of production.

Assist in tracking and control of project spare parts inventory. Monitors contractors' compliance with approved contractor quality control program and submittals. Makes recommendations for improvements to standard operational quality control provisions as they apply in the field.

Prepares quality assurance reports and daily field reports that document contractor activities including: manpower, productivity, equipment, materials used, and pay quantities.

Construction of Sediment Processing Facility

Provided Electrical Inspection for the PCB Processing Facility Construction.

- Ensured construction is performed in accordance with approved shop drawings and contractual specifications.

- Maintained workmanship and adherence to the National Electrical Code.

Owner, Knipes Electric

- As business owner, focused on local Mining Industry, as well as commercial and industrial businesses.
- One major project included OMYA Product Development in Florence, VT. Duties included layout, mechanical / electrical /plumbing coordination, and commissioning of new equipment for Plant Safety and Automation upgrades. Scope of work derived from loop sheets and PID Drawings.

Supervisor, Omega Electric Construction, Inc.

- Completed a two-year electrical installation project at Middlebury College. A three building complex with two multi-story dorms and separate dining hall.
- Completed electrical installation at Ross Commons, a five story dormitory with separate dining hall also at Middlebury College.
- Performed power and control layout and supervision for Cabot Creamery for their new Whey Dryer Press Control at the Middlebury Creamery.

Supervisor, Lacorte Companies, Inc.

- Supervised electric construction of $850,000 Maintenance Hanger for Scotia Airlift Wing, Air National Guard. Responsible for coordinating the Fire Alarm and other Special Systems testing with the Air Force Inspection Team.
- Supervised electric construction of 1.2 million dollar addition to St. Mary's Hospital, Troy, New York. Responsible for layout and installation of several specialty systems including fire alarm, critical care systems, nurse call and infant security.
- Supervised electric construction of Wal-Mart Food Distribution Center. Responsible for layout and installation for power and control of refrigerated portion of warehouse, @ 550,000 Sq. Ft., and assisting the other foreman in the completion of the entire 1.2 million Sq. Ft. complex.

Supervisor/Electrician, Gomez Electric

- Supervised power and control for Queensbury, NY Water Treatment Plants Expansion to 15 million gallons per day.
- Supervised completion of two Sewer Treatment Plants for Upstate New York Correctional Facilities.
- Worked as Master Electrician on an all new fire Alarm System at Maximum Security Prison in Upstate New York.

Supervisor/Electrician, Stilsing Electric, Inc.

- Supervised completion of High School Addition- Lake George, New York.
- Worked as Master Electrician on several Fire Alarm System upgrades in New York State Schools.
- Worked as Master Electrician on power and control systems for a Hydro-Electric Plant- Watertown, New York.

Apprentice/Electrician/Forman, Claude Dern Electric, Inc.

- Worked through Vermont's Four Year Apprenticeship Training Program
- Began supervising work in second year of apprenticeship.
- Work ranged from Grocery Stores and Senior Citizen housing, to Resort Area Condominium projects.

Firm:
Parsons

Years of Experience:
25+

Education:

- MS, University of Rhode Island
- BS, University of New Hampshire

Qualifications/Certifications:

- PG – New Hampshire
- OSHA – 40 hour Hazardous Waste Safety Training

RICHARD KRANES

Senior River Operations Inspector

Summary of Relevant Qualifications

Richard Kranes has more than 15 years of experience as a Professional Geologist with over twenty-five years experience as a construction management inspector and an engineering / environmental geologist. Construction management work included the inspection of the offshore dredging operations, offshore backfill operations, marine drilling operations, submarine grouting operations, the inspection of landing fill placement over 1 million cubic yards of fill on Deer Island and over 3 million cubic yard of material from the Big Dig use to fill an old quarry.

Work Experience

Parsons, April 2009–Present

Project CQA Inspector. Parsons - Hudson River PCBs Superfund Site Project. Performs a broad cross-section of technical and administrative activities with specialization in quality control, quality assurance, civil construction work, and inspection of the in-river operations associated with the dredging project.

- Inspects various facets of the work and performs continuous surveillance of assigned operational activities and contractors to ensure compliance with applicable codes, standards, specifications and drawings and other contract documents.
- Evaluates in-river operations including shoreline tree trimming, debris removal, dredging, backfilling and capping, bank stabilization and lock passages.
- Analyzes applicable codes, standards, project contract documents, and quality assurance procedures and monitors construction activities to ensure compliance.
- Verifies equipment operational status, numbers of personnel and rates of production. Witnesses tests and inspections including sampling activities, hydrographic surveys, and backfill material tests.
- Monitors contractors' compliance with approved contractor quality control program and submittals. Makes recommendations for improvements to standard operational quality control provisions as they apply in the field.

Boston Harbor Outfall Risers/Seabed Diffusers

Work as a marine construction inspector for the installation of 55 risers/diffusers in the Massachusetts Bay nine miles out from Deer Island with water depths for 100 to 120 feet. First phase of this work involved the precision dredging of 80 foot holes 6 feet deep for the install of protective stone around the seabed diffusers. This work was performed with a floating mechanical dredge and required reviewing hydrographic surveys to verify the dredge depths.

For this project Mr. Kranes helped develop and conduct the QA/QC inspection program for the installation the risers and seabed diffusers.

This work was conducted from floating vessels and a jack-up barge requiring accurate GPS vessel locations and submarine inspection using remote operated vehicles (ROVs) and hardhat divers to ensure adequate ocean floor preparation and rock armor placement at a depth of approximately 100 feet.

Deer Island Sewage Treatment Project

Mr. Kranes managed and inspected excavation/backfill operations during construction of the Deer Island Sewage Treatment Plant.

This was the land-based portion of the previously cited project and because of physical and logistical constraints, all material excavated during the construction of the City of Boston sewage treatment plant was maintained on the island with excess excavate being placed and stabilized in a landform that provided a visual screen to the residential abutters. Construction of this landform involved the development and stabilization of two million cubic yards of excavate as well as ex-situ bioremediation of some petroleum contaminated soils prior to landform incorporation.

Logistical coordination between excavation sites and placement and stabilization of acceptable fill within the landform was also required. Fill not deemed acceptable for stabilization required placement at temporary location until weather or fill conditions met acceptable construction criteria.

Boston Central Artery Land Fill Project

For this project, Mr. Kranes provided construction oversight for the closure of three adjacent municipal landfills and the post-closure conversion of capped landfills to a 27-hole municipal golf course complex.

Phase I of this project involved the placement of capping material on three semi-adjacent municipal landfills in accordance with Massachusetts Department of Environmental Protection landfill closure regulations.

During Phase II, approximately 4.5-million cubic yards of semi-contaminated excavated materials from Boston's "Big Dig" project was transported to the Quarry Hills project site, placed in 100-cubic yard piles, sampled and analyzed for petroleum, volatile, heavy metal and PCB contaminants prior to acceptance and placement. Because of soil moisture conditions and adverse weather, soil brought to the project frequently required staging in temporary locations and treatment to meet acceptable project placement standards. To reduce storage and treatment time, Mr. Kranes developed soil treatment and placement procedures and oversaw the placement; stabilization and testing of acceptable fill.

Winning Farm Project
For this project Mr. Kranes provided remedial oversight, air monitoring assessment, post-closure sampling and closure documents for the removal of a 63,000 cubic yard unlicensed hazardous materials landfill in Woburn, Massachusetts.

SENIOR GEOLOGIST/Site Inspector
Conducted and supervised commercial property soil and groundwater environmental assessment and remediation services. Provided construction oversight for closure of municipal landfills and conversion to twenty-seven hole golf course. Work included provision of environmental oversight for remediation of unlicensed hazardous material landfill.

CONSTRUCTION MANAGEMENT INSPECTOR
Provided oversight inspection for cut and fill operations during construction of Boston Harbor sewage treatment plant. Supervised the construction a two million cubic yard landform with excess excavated materials from other construction on the island.

STAFF GEOLOGIST/CONSTRUCTION INSPECTOR
Provided oversight inspection of deep-rock drilling and conducted borehole log analysis for sitting of a nuclear waste repository. Was an offshore marine inspector for dredging, drilling, grouting and backfilling operations for installation of sewage treatment effluent outfall system.

ATTACHMENT 2

DREDGING AND FACILITY OPERATIONS TEST AND INSPECTION TABLES

Table A2-1 Contract 3B Processing Facility Operations Inspections and Tests

Inspection Schedule				
Inspection Parameter	**Specification Reference**	**Inspection Method**	**Minimum Inspection Frequency**	**Acceptance Criteria**
Sediment dewatering – filter cake and coarse material	Not applicable	Visual observation for appearance of free liquid or conditions that may result in the release of free liquid	Every batch	No apparent free liquid or sufficiently saturated condition of the material that could result in the release of free liquid
Test Schedule				
Test Parameter	**Specification Reference**	**Test Method**	**Minimum Testing Frequency**	**Acceptance Criteria**
Sediment dewatering – filter cake	Contract 3B, Section 13750 3.10	Paint Filter Liquids Test	To be performed on initial batches of filter cake until consistency is achieved; then periodically thereafter if visual observation indicate free liquid	Passes Paint Filter Liquids Test
Sediment dewatering -coarse material	Contract 3B, Section 13750 3.10	Visual + Paint Filter Liquids Test	Periodically to confirm visual observation	Pass: Paint Filter Liquids Test

Note: Technical Specification, Contract 3B, Section 13750 (Processing Facility Operations)

Table A2-2 Contract 4 Dredging Operations Inspections and Tests

DREDGING

Inspection Schedule				
Inspection Parameter	**Specification Reference**	**Inspection Method**	**Minimum Inspection Frequency**	**Acceptance Criteria**
Water quality (Note: This is contractor monitoring, not compliance monitoring under Resuspension Performance Standard.)	Contract 4 Section 13805	Visual observations for turbidity plume, floatables or sheen	Daily during each shift by visual observations	Per contract specifications
Flow velocity: East Channel of Rogers Island through rock dike	Contract 4 Section 13805	Velocity meter	Daily before 9:00 AM	Approx. minimum of 100 cfs Target maximum of 150 cfs
Bucket closure	Contract 4 Section 13801	Operator observation and limit switch monitor	Ongoing throughout Phase 1 via operator and inspector observations	Bucket closed around sediments, minimal leakage

Table A2-2 Contract 4 Dredging Operations Inspections and Tests

DREDGING

Inspection Schedule				
Inspection Parameter	**Specification Reference**	**Inspection Method**	**Minimum Inspection Frequency**	**Acceptance Criteria**
Dredge positioning	Contract 4 Section 13801	Operator observation of in-cab monitor	Ongoing throughout Phase 1 via real time kinematic differential global positioning system (RTK DGPS)	No dredging outside project limits
Heavy equipment inspection	01350 1.16 A&B	Visual	Daily	No leakage of liquids observed
Crane inspection	01350 1.05 C&D 1.16 D&F	Visual	Annual by qualified third party and daily (each shift) for QC	Annual Certificate of Compliance Per manufacturer requirements for safety and per specifications for quality (deficiencies)
Marine vessel inspection	01350 1.16 G 1.03 T 13897 3.01 F	Visual	Prior to Mobilization and monthly CM visual 45 days prior to start	Pre-mob: Certificate of Compliance Per Coast Guard and project specifications Monthly: No deficiencies

Table A2-2 Contract 4 Dredging Operations Inspections and Tests

DREDGING

Inspection Schedule				
Inspection Parameter	**Specification Reference**	**Inspection Method**	**Minimum Inspection Frequency**	**Acceptance Criteria**
RTK & GPS: Field Verification Calibration Check	13801 2.01 B (5)	Visual	Verify:30 days before equipment usage Calibrate: Daily	Per contract specifications and manufacturer's procedures
Night Work Lights	13801 2.01 E	Visual	Each shift	Per manufacturer and project specifications
Anchor Systems Check	13820 3.02 A	Visual	Daily: Prior to deployment	Per manufacturer requirements
Noise Management Reports (Note: This is contractor monitoring, not compliance monitoring under Noise Performance Standard.)	13895 1.03 B (3)	Decibel meter	Daily or per approved noise control plan	Per contract specifications

Table A2-2 Contract 4 Dredging Operations Inspections and Tests

DREDGING

Inspection Schedule				
Inspection Parameter	**Specification Reference**	**Inspection Method**	**Minimum Inspection Frequency**	**Acceptance Criteria**
Light Management Reports (Note: This is contractor monitoring, not compliance monitoring under Lighting Performance Standard.)	13896 1.02 B (2)	Footcandle meter	Nightly or per approved light control plan	Per contract specifications
Test Schedule				
Test Parameter	**Specification Reference**	**Test Method**	**Minimum Testing Frequency**	**Acceptance Criteria**
Dredging depths (elevations)	Contract 4 Section 13801 and Drawings D-0002 thru D0020	Post-dredge survey by third-party survey contractor	At completion of each CU	Required dredge depths (plus allowable overdredge depth)
Dredging extents (northings and eastings)	Contract 4 Section 13801 and Drawings D-0002 thru D0020	Post-dredge survey by third-party survey contractor	At completion of each CU	Required dredging extents

Table A2-2 Contract 4 Dredging Operations Inspections and Tests

[Note: This table provides samples of required tests and inspections - confirmatory sampling is detailed in RAM QAPP]

BACKFILLING, CAPPING, AND PLACING ARMORING MATERIALS

Inspection Schedule				
Inspection Parameter	**Specification Reference**	**Inspection Method**	**Minimum Inspection Frequency**	**Acceptance Criteria**
Water quality (Note: This is contractor monitoring, not compliance monitoring under Resuspension Performance Standard. Remedial action monitoring crews will note in field records any significant visual contrast due to increased turbidity and cause if known.)	Contract 4 Section 13805	Visual observations for turbidity plume, floatables or sheen	Daily during each shift by visual observations	Per contract specifications
Bucket positioning	Contract 4 Section 13720 & Section 13801	Operator observation of in cab monitor and limit records from Third-party survey contractor	Ongoing throughout via differential global positioning system (DGPS) system	No material placement outside project limits

Table A2-2 Contract 4 Dredging Operations Inspections and Tests

[Note: This table provides samples of required tests and inspections - confirmatory sampling is detailed in RAM QAPP]

BACKFILLING, CAPPING, AND PLACING ARMORING MATERIALS

Inspection Schedule				
Inspection Parameter	**Specification Reference**	**Inspection Method**	**Minimum Inspection Frequency**	**Acceptance Criteria**
Backfill and cap layer depths	Contract 4 Section 02205 & Section 13720	Multi-beam bathymetric surveys	Post-backfill/cap surveys completed after placement in each CU	Meet layer and thickness requirements (plus allowable over placement)
Test Schedule				
Tests for backfill/cap materials gradation by weight (per Contract 4 Specification 02205 Part 2.02)				
Select Fill Type "A", “B”, “C”, “D”	02205 2.02 B	ASTM C136	Once every 5,000 tons initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Gradation criteria from Specification 02205 2.01 A, B, C, D
Select Fill Type "E" , “G”	02205 2.02 B	ASTM D422	Once every 5,000 tons initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Gradation criteria from Specification 02205 2.01 E ,G

Table A2-2 Contract 4 Dredging Operations Inspections and Tests

BACKFILLING, CAPPING, AND PLACING ARMORING MATERIALS

Test Schedule				
Test Parameter	**Specification Reference**	**Test Method**	**Minimum Testing Frequency**	**Acceptance Criteria**
Select Fill Type "F"	02205 2.02 B	ASTM C136	Once every 5,000 tons initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Gradation criteria from Specification 02205 2.01 F NYSDOT Type 2
Select Fill Type "1" & “2”	02205 2.02 B	ASTM C136	Once every 5,000 tons initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Gradation criteria from Specification 02205 2.01 H, I
Select Fill Type "2” with TOC"	02205 2.02 B	ASTM D2974	Once every 5,000 tons initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Gradation criteria from Specification 02205 2.01 J

Table A2-2 Contract 4 Dredging Operations Inspections and Tests

BACKFILLING, CAPPING, AND PLACING ARMORING MATERIALS

Test Schedule				
Test Parameter	**Specification Reference**	**Test Method**	**Minimum Testing Frequency**	**Acceptance Criteria**
Topsoil (Physical test only)	02911 2.02 A.1	ASTM D422	Once per 1,000 cy initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Gradation criteria from Specification 02911 2.01 C & 2.01 D
Select Fill Type "3" (Blend of Type 1 and topsoil)	02911 2.02 A	ASTM D422	Once per 1,000 cy initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Gradation criteria from Specification 02205 2.01 K
Select Fill Type "L", “N”	02205 2.02 B	ASTM C136	Once every 5,000 tons initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Gradation criteria from Specification 02205 2.01 L, N 703 NYSDOT, 2002

Table A2-2 Contract 4 Dredging Operations Inspections and Tests

BACKFILLING, CAPPING, AND PLACING ARMORING MATERIALS

Test Schedule				
Test Parameter	**Specification Reference**	**Test Method**	**Minimum Testing Frequency**	**Acceptance Criteria**
Select Fill Type "M"	02205 2.02 B	ASTM C136	Once every 5,000 tons initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Gradation criteria from Specification 02205 2.01 M
Select Fill Type "O", “P”	02205 2.02 B	ASTM C136	Once every 5,000 tons initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Gradation criteria from Specification 02205 2.01 O, P 620 NYSDOT, 2002
Backfill/cap materials tests for chemical constituents (per Contract 4 Specification 02205), including laboratory analysis for PCBs, pesticides, VOC, SVOC, herbicides, TAL metals, cyanide, TOC				

Table A2-2 Contract 4 Dredging Operations Inspections and Tests

BACKFILLING, CAPPING, AND PLACING ARMORING MATERIALS

Test Schedule				
Test Parameter	**Specification Reference**	**Test Method**	**Minimum Testing Frequency**	**Acceptance Criteria**
Select Fill Type "A" , “B”, “C”, “D”, “E”, “F”	02205 2.02 C & D	EPA SW-846 Region 2 Method	Once every 20,000 tons initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Acceptance criteria are that no organic compounds shall be detected and inorganics shall be within background range for Eastern United States as identified in Table 4 of the New York State Department of Environmental Conservation's Technical and Administrative Guidance Memorandum #4046 (1994) with the exception of magnesium and calcium.
Select Fill Type "1" & “2”	02205 2.02 C & D	EPA SW-846 Region 2 Method	Once every 20,000 tons initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Acceptance criteria are that no organic compounds shall be detected and inorganics shall be within background range for Eastern United States as identified in Table 4 of the New York State Department of Environmental Conservation's Technical and Administrative Guidance Memorandum #4046 (1994) with the exception of magnesium and calcium.

Table A2-2 Contract 4 Dredging Operations Inspections and Tests

BACKFILLING, CAPPING, AND PLACING ARMORING MATERIALS

Test Schedule				
Test Parameter	**Specification Reference**	**Test Method**	**Minimum Testing Frequency**	**Acceptance Criteria**
Select Fill Type "2 with TOC"	02205 2.02 C & D	EPA SW-846 Region 2 Method	Once every 20,000 tons initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Minimum pre-placement TOC content is 0.5 % As determined by ASTM 2974
Topsoil (Multiple chemical analyses)	02911 2.02 A.2	ASTM D4972	Once per 1,000 cy initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Acidity Range (pH): 5.5 to 7.5
	02911 2.02 A.3	ASTM D2974	Once per 1,000 cy initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Contains minimum 2 percent and maximum 20 percent organic matter

Table A2-2 Contract 4 Dredging Operations Inspections and Tests

BACKFILLING, CAPPING, AND PLACING ARMORING MATERIALS

Test Schedule				
Test Parameter	**Specification Reference**	**Test Method**	**Minimum Testing Frequency**	**Acceptance Criteria**
Topsoil (cont'd)	02911 2.02 A.4	ASA Mehlich 3	Once per 1,000 cy initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Acceptance criteria as identified in Table 4 of the New York State Department of Environmental Conservation's Technical and Administrative Guidance Memorandum #4046 (1994) with the exception of magnesium and calcium.
	02911 2.02 A.5	EPA SW-846 Region 2 Method	Once per 1,000 cy initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Contains minimum 2 percent and maximum 20 percent organic matter Acidity Range (pH): 5.5 to 7.5 Criteria from Specification 02205 2.02 D
Select Fill Type "L", "M", "N", "O", "P"	02205 2.02 C & D	EPA SW-846 Region 2 Method	Once every 20,000 tons initial (more or less frequent at direction of CM based on visible variations in material characteristics)	Acceptance criteria are that no organic compounds shall be detected and inorganics shall be within background range for Eastern United States as identified in Table 4 of the New York State Department of Environmental Conservation's Technical and Administrative Guidance Memorandum #4046 (1994) with the exception of magnesium and calcium.

Notes:

1. Technical Specification: Contract 4, Section 13801 (Inventory Dredging) and 13835 (Residual Dredging); Contract 4, Section 13720 (Backfilling/Capping) and 13898 (Shoreline Stabilization).
2. QC Testing will be performed by Contractors Quality Analytical source QA Testing by CM of Cm's third party testing contractor.
3. Borrow soil must be from approved on-site borrow source with test results provided in Specification 02205. Any change in material must be consistent with approved material characteristics as determined by CM. New moisture content curves will need to be plotted for change in material.

Table A2-3 Contract 5 Habitat Construction Inspections and Tests

Inspection Schedule (after planting)				
Inspection Parameter	**Specification Reference**	**Inspection Method**	**Minimum Inspection Frequency**	**Acceptance Criteria**
Seeding (Coverage Only)	Contract 5, Section 13702 and Drawing H-0021	Visual inspection by Certified/Registered Professional[1]	Daily	No areas without seeding in excess of 4 square feet Rake within 12 hours of application
Mulch coverage	Contract 5, Section 13702 and Drawing H-0021	Visual inspection by Certified/Registered Professional[1]	Daily	Approximately 2 inches uniform thickness at loose measurement
Plantings (Installed)	Contract 5, Sections 13702 and 13703; Drawings H-0020 and H-0021	Visual inspection by Certified/Registered Professional[1]	Installation: Daily at 20% of planted areas Post-Installation: Monthly all areas	True to species name, size, and spacing
Survey Control Points	Contract 5, Section 01720	Inspection of surveyor's log by supervisory personnel	Daily	Control point and datum consistent and accurate at the beginning and end of each work day
Irrigation of Seeded Areas	Contract 5, Section 13702	Daily field records	Initial application Week 2 and 4 (after seeding)	25,000 gallons per acre (if rainfall is less than 1 inch per week)
Herbivory Control	Contract 5, Section 13702	Visual inspection	Daily [post plant installation monthly]	No holes in control fencing

Table A2-3 Contract 5 Habitat Construction Inspections and Tests

Inspection Schedule (after planting)				
Inspection Parameter	**Specification Reference**	**Inspection Method**	**Minimum Inspection Frequency**	**Acceptance Criteria**
SAV Plantings	Contract 5, Section 13703 and Drawing H-0020	Visual observation using underwater camera	Installation: Daily at 20% of planted areas Post-Installation: Monthly all areas	Wild Celery – 2 feet o.c.; 8,000/acre – Tubers: clusters of 25; 500/acre Pondweed – Adult shoots: 6-18 inches, 2 feet o.c.; 2,000/acre – Tubers: clusters of 25; 500/acre Water lily – Tubers: clusters of 25; 500/acre Tubers planted within 10 feet spacing between adult shoot groupings
RFW Plant	Contract 5, Section 13702 and Drawing H-0021	Visual observation under supervision of a Certified/ Registered Professional[1]	Installation: Daily at 20% of planted areas Post-Installation: Monthly all areas	Great Burreed – 2-inch plugs, 2 feet o.c. at shoreward edge White Water Lily, Wild Rice, Pickerelweed, and Broad Leaved Arrowhead – 2-inch plugs, 2 feet o.c. at riverward edge of site. Species randomly select among four listed in Specification 13702

Table A2-3 Contract 5 Habitat Construction Inspections and Tests

Inspection Schedule (after planting)				
Inspection Parameter	**Specification Reference**	**Inspection Method**	**Minimum Inspection Frequency**	**Acceptance Criteria**
SAV Undesirable Species Survey	Contract 5, Section 13703	Visual observation using underwater camera under supervision of a Certified/Registered Professional[1]	Monthly	– Per contract specifications
RFW Undesirable Species Survey	Contract 5, Section 13702	Visual observation	Monthly	– Per contract specifications
Planting Area Protection	Contract 5, Section 13702	Visual observation	Weekly [post plant installation monthly]	Ensure barriers intact to prevent foot travel and/or equipment in planting and landscaped areas.
Environmental Conditions	Contract 5, Section 13702	Meteorological equipment	Daily	Winds <5 mph for seeding Winds <30 mph for planting Temperature >35°F and <90°F River Flow <10,000 cfs
Marine Navigational and Dive Equipment	Section 01350 Manufacturer Operation Manuals	Visual of vessels by marine surveyor Per manufacturer equipment manual(s)	Pre-mob certification of vessels Daily	Certification of Compliance Calibrate and/or operate marine equipment in accordance with manufacturer's specifications and guidelines Inspect in accordance with Health and Safety Plan Complete vessel and equipment checklists

Table A2-3 Contract 5 Habitat Construction Inspections and Tests

Inspection Schedule (after planting)				
Inspection Parameter	**Specification Reference**	**Inspection Method**	**Minimum Inspection Frequency**	**Acceptance Criteria**
Survey/GPS Equipment	Section 13801 Manufacturer Operation Manuals	Per manufacturer equipment manual(s)	Daily	Manufacturer calibration requirements

Table A2-3 Contract 5 Habitat Construction Inspections and Tests

Test Schedule (for planting material prior to planting)				
Test Parameter	**Specification Reference**	**Test Method**	**Minimum Testing Frequency**	**Acceptance Criteria**
Seed mixtures	Contract 5, Section 13702 and Drawing H-0021	Visual inspection by Certified/Registered Professional[1]	Per shipment	Furnished by U.S. Department of Agriculture) USDA licensed supplier
Plant stock General: Pre-install	Contract 5, Section 13703 and Drawing H-0020	Visual inspection by Certified/Registered Professional[1]	Per 100 Plants	True to species name and size Furnished by USDA licensed supplier
Wild Celery Planting Unit *(Vallisneria americana)*	Contract 5, Section 13703 and Drawing H-0020	Visual inspection by Certified/ Registered Professional[1]	Per 100 plants	Planting Unit, Minimum: – two shoots containing growing leaves – one dormant tuber – growing medium Furnished by USDA licensed supplier
American Pondweed (*Potamogeton nodusus*)	Contract 5, Section 13703 and Drawing H-0020	Visual inspection by Certified/ Registered Professional[1]	Per 100 plants	Planting Unit, Minimum: – two shoots containing growing leaves, roots, rhizomes – growing medium – 6-18 inches high Furnished by USDA licensed supplier

Table A2-3 Contract 5 Habitat Construction Inspections and Tests

Test Schedule (for planting material prior to planting)				
Test Parameter	**Specification Reference**	**Test Method**	**Minimum Testing Frequency**	**Acceptance Criteria**
Water Lily (*Nymphaea odorata)*	Contract 5, Section 13703 and Drawing H-0020	Visual inspection by Certified/ Registered Professional[1]	Per 100 plants	Planting Unit, Minimum: – one tuber Furnished by USDA licensed supplier
Straw	Contract 5, Section 13702	Visual inspection by Certified/ Registered Professional[1]	Per shipment	Composed of oats, grain rye, barley, wheat and alfalfa Uniform in species composition Absence of wild ryegrass and ryegrass

Notes:

1. Certified/Registered Professional includes the following categories:
   - Certified Senior Ecologist according to the Ecological Society of America
   - Professional Wetland Scientist according to the Society of Wetlands Scientists
   - Certified Lake Manager according to North American Lake Management Society

Table A2-4 Contract 6 Rail Yard Operations Inspections and Tests

Inspection Schedule				
Inspection Parameter	**Specification Reference**	**Inspection Method**	**Minimum Inspection Frequency**	**Acceptance Criteria**
Inspect & maintain weigh-in-motion scale	Contract 6 Section 13900 1.01, 1.02	Per manufacturer equipment manual(s)	Daily as required	Per manufacturer specified requirements
Weigh empty rail cars placed into service	Contract 6 Section 13900 3.01 A. 13.	Weigh-in-motion scale	Weigh approx. 10% of the inbound empty cars	Per manufacturer specified requirements
Rail car loaded quantity	Contract 6 Section 13900 1.01, 1.02	Weigh-in-motion scale	Each car	>/=101 tons, </=105 tons (net weight)
Weigh empty rail cars placed into service	Contract 6 Section 13900 3.01 A. 13.	Weigh-in-motion scale	Weigh approx. 10% of the inbound empty cars	Per manufacturer specified requirements
Rail car loaded quantity	Contract 6 Section 13900 1.01, 1.02	Weigh-in-motion scale	Each car	>/=101 tons, </=105 tons (net weight)
Incoming and outgoing rail car condition, equipment condition, and rail infrastructure condition	Contract 6 Section 13900 1.01, 1.02	Varies per manufacturer and/or applicable regulations	Varies - daily or as required (Quarterly report)	Varies per manufacturer and/or applicable regulations

Table A2-4 Contract 6 Rail Yard Operations Inspections and Tests

Test Schedule				
Test Parameter	**Specification Reference**	**Test Method**	**Minimum Testing Frequency**	**Acceptance Criteria**
Calibrate & certify weigh-in-motion scale	Contract 6 Section 13900 1.01, 1.02	Per manufacturer equipment manual(s)	Calibrated by the first day of operations, approx. every 90 days, and after any scale outage or event that provides incorrect weights	Per manufacturer specified requirements
Scale Accuracy – bucket scales	Contract 6 Sections 13751 1.03 B.; 13900 1.01, 1.02	Per manufacturer equipment manual(s)	Prior to start up and thereafter per manufacturer equipment manual(s)	Scales meet manufacturer's calibration requirements
Calibrate & certify weigh-in-motion scale	Contract 6 Section 13900 1.01, 1.02	Per manufacturer equipment manual(s)	Calibrated by the first day of operations, approx. every 90 days, and after any scale outage or event that provides incorrect weights	Per manufacturer specified requirements
Functional condition of rails and turn-outs	Contract 6 Section 13900 1.01	Ultrasonic	End of shipping season	Per manufacturer specified requirements

Note: Technical Specification: Contract 6, Section 13900 (Rail Yard Operations).

ATTACHMENT 3

TYPICAL CONSTRUCTION FORMS

The following typical forms are included in this appendix:

- Daily Construction Report
- Quality Inspection Report
- Receiving Inspection Report
- Report for Daily Dredge Operations
- Report for Daily Capping and Backfilling Operations
- Estimated Daily Dredging and Facility Operations Production Report
- Inspection Notification Form
- Nonconformance Report
- Nonconformance Report Log
- Contractor Nonconformance Letter (Sample)
- Barge Trip Log

PARSONS

DAILY CONSTRUCTION REPORT
PHASE 1 FACILITY SITE WORK CONSTRUCTION/ HUDSON RIVER

DAILY CONSTRUCTION REPORT	**REPORT NO.**	**DATE:**
JOB NAME:	**Page of**	
JOB LOCATION:		
LOCATION OF CONSTRUCTION UNDERWAY:		
CONTRACTOR:	**WEATHER CONDITION:** **AM / PM** **Hi f / Lo f** **PRECIPITATION: INCH(S)**	
CONTRACTOR'S SUPERINTENDENT:	**GROUND CONDITIONS:**	
SUBCONTRACTORS (*):	**TIMES: START** AM	**STOP** PM

NAME / COMPANY	**CLASSIFICATION**	**HOURS**

EQUIPMENT	TIMES: START AM	**STOP** PM

MEETING:

WORK BEING INSPECTED:

PROBLEM/DELAYS/CORRECTIVE ACTION TO BE TAKEN:

PARSONS

DAILY CONSTRUCTION REPORT
PHASE 1 FACILITY SITE WORK CONSTRUCTION/ HUDSON RIVER

WORK PERFORMED

Work started at AM
CONSTRUCTION ACTIVITIES COMPLETED AND /OR IN PROGRESS:
COMMUNICATION WITH CONTRACTOR STAFF:
PROGRESS PHOTOS:
Departed job site at PM

Visitors:

Inspector Name: _____ **Signature:**_____

Field Engineer Name:_____ **Signature:** _____

PARSONS **Quality Inspection Report**	Job Number	Project	Page of **1/1**

CONTRACTOR: _____ REPORT NUMBER: _____

TYPE OF INSPECTION: ☐ Preparatory Inspection. ☐ Initial Inspection. ☐ Follow-up Inspection. ☐ Completion Inspection.

DESCRIPTION/INTENT OF INSPECTION: _____

_____

_____

COMPONENTS/MATERIALS REVIEWED: _____

_____

_____

CONTRACTOR PERSONNEL CONTACTED: _____

_____

_____

APPLICABLE CONTRACTOR PROCEDURES, CHECK LISTS, INSTRUCTIONS: _____

_____

_____

RESULTS OF INSPECTION: _____

_____

_____

_____

DEFICIENCIES NOTED: _____

_____

_____

RECOMMENDED CORRECTIVE ACTION: _____

_____

_____

NON-CONFORMANCES: _____

_____

_____

QA Inspector Signature: Date:

PARSONS **Receiving Inspection Report**	Job Number	Project	Page of **1/1**

PURCHASE ORDER _____ C.O. _____ REPORT NUMBER _____

SPECIFICATION _____ REV. _____ DRAWING _____ REV. _____

SUPPLIER _____ ITEM _____ QUANTITY _____

DOCUMENTATION

DOCUMENTS COMPLETE PER CONTRACTUAL REQTS: _____ LEGIBLE: _____

DOCUMENTS TRACEABLE TO ITEMS REC'D: _____ STAMPED BY SURV. REP: _____

LIST DOCUMENT PKG. DISCREPANCIES (IF ANY): _____

_____

_____

RESOLUTION: _____

_____

_____

DOCUMENT PKG. ACCEPTABLE: _____ QC SIGNATURE: _____

DATE: _____

REMARKS: _____

_____

_____

PHYSICAL INSPECTION

CHECK LIST NO: _____ ITEMS PROPERLY TAGGED/MARKED: _____

ENTER SERIAL AND/OR HEAT NO: _____

RESULTS OF INSPECTION: _____

_____

_____

_____

DEFICIENCY NO. (IF ANY): _____ DEFICIENCY RESOLVED: _____

INSPECTION ACCEPTABLE TAG ATTACHED: _____

QC SIGNATURE: _____ DATE: _____

REPORT FOR DAILY DREDGE OPERATIONS

DATE:

DREDGE	NAME AND TYPE		SIZE:	PIPELINE *in. dia. disch.*	BUCKET SIZE *cu. yds. cap.*
	HORSEPOWER OF:	DREDGE PUMP	SUCTION PIPE JET	CUTTER OR BUCKET	PROPULSION
	WORK SCHEDULE:	SHIFTS PER DAY		HOURS PER SHIFT	
PROJECT AND BAR	NAME:				
	LOCATION: (include station numbers)				
CHARACTER OF MATERIAL	GEOLOGICAL CLASSIFICATION:				
CHANNEL CONDITION	AVERAGE DEPTH:	BEFORE DREDGING AFTER DREDGING	MINIMUM SOUNDING:	BEFORE DREDGING AFTER DREDGING	
RIVER STAGE	MINIMUM	TIME	MAXIMUM	TIME	GAGE LOCATION
WEATHER CONDITION	*(clear, cloudy, rain, snow, and fog)*		VISIBILITY *miles*	WIND *(maximum velocity & direction)*	

WORK PERFORMED

ITEM	UNIT	QUANTITY
AVERAGE WIDTH OF CUT	FEET	
TOTAL ADVANCE THIS PERIOD	FEET	
DEPTH OF CUT	FEET	
FLOATING PIPE:	SHORE PIPE:	
TOTAL LENGTH OF DISCHARGE PIPE	FEET	
AVERAGE LIFT	FEET	
AVERAGE PUMP SPEED	RPM	
AVG. DREDGED PER PUMP. HR, GROSS	CY	
SCOWS LOADED	NUMBER	
AVERAGE LOAD PER SCOW	CY	
CUBIC YARDS REMOVED	CY	

CONTRACT USE ONLY:

DISTRIBUTION OF TIME

EFFECTIVE WORKING TIME	HOURS	MIN.
PUMPING OR DREDGING		
PCT. OF EFFECTIVE RENTAL TIME %		
BOOSTER *(in line)* *Hrs.* *Min.*		
NON-EFFECTIVE WORKING TIME		
HANDLING PIPE LINES		
HANDLING ANCHOR LINES		
CLEARING PUMP AND PIPE LINE		
WAITING FOR SCOWS		
TO AND FROM WHART OR ANCHORAGE		
CHANGING LOCATION OF PLANT ON JOB		
LOSS DUE TO OPPOSING NATURAL ELEMENTS		
LOSS DUE TO PASSING VESSELS (PROJECT)		
LOSS DUE TO PASSING VESSELS (NON-PROJECT)		
LOSS DUE TO RESUSPENSION SHUTDOWNS		
LOSS DUE TO QOL SHUTDOWNS		
LOSS DUE TO MONITORING-RELATED SHUTDOWNS		
LOSS DUE TO DEBRIS-RELATED SHUTDOWNS		
SHORE LINE AND SHORE WORK		
WAITING FOR BOOSTER		
MINOR OPER. REPAIRS		
WAITING FOR ATTENDANT PLANT		
PREPARATION AND MAKING UP TOW		
TRANSFERRING PLANT BETWEEN WORKS		
LAY TIME OFF SHIFT AND SATURDAYS		
SUNDAY AND HOLIDAYS		
FIRE DRILL		
MISCELLANEOUS *(explain in remarks)*		
TOTAL NON-EFFECTIVE WORKING TIME	0.00	
PCT. OF NON-EFFECTIVE RENTAL TIME %		
TOTAL EFFECTIVE AND NON-EFFECTIVE TIME	0.00	
PCT. OF TOTAL TIME IN PERIOD %		
LOST TIME		
MAJOR REPAIRS AND ALTERATIONS		
CESSATION		
COLLISIONS		
MISCELLANEOUS *(explain in remarks)*		
TOTAL LOST TIME	0.00	
PERCENTAGE OF TOTAL TIME %		
TOTAL TIME IN PERIOD	0.00	

SHORELINE WORK
LENGTH OF ADVANCE ALONG SHORELINE: (WITHIN 30 FT OF BANK)
CUBIC YARDS OF SHORELINE SEDIMENT REMOVED:
DEBRIS
QUANTITY OF DEBRIS DREDGED:
HYDROGRAPHIC SURVEY
SURVEY REMARKS:
VISITORS
VISITOR INFORMATION:
REMARKS

SUBMITTED BY: *(name, title, and signature)*	RECOMMENDED BY: *(name, title, and signature)*	APPROVED BY: *(name, title, and signature)*

PARSONS **Estimated Daily Dredging & Facility Operations Production Report**	Page of **1/1**

DATE: _____

PREPARED BY:_____

DESCRIPTION OF MATERIAL:	**EST, QTY.**
ESTIMATED *IN SITU* DESIGN MATERIAL DREDGED	_____CY
ESTIMATE OF ALL *IN SITU* MATERIAL DREDGED	_____CY
TOTAL EST. QUANTITY OF DREDGED MATERIAL PROCESSED	_____CY
TOTAL EST. QUANTITY OF MATERIAL SHIPPED OFF-SITE	_____TONS
TOTAL EST. QUANTITY OF MATERIAL STAGED ON-SITE	_____CY

NOTE: THE QUANTITIES OF MATERIALS SHOWN ON THIS FORM ARE ESTIMATED AND ONLY INTENDED TO PROVIDE AN INDICATION OF DAILY PERFORMANCE. THESE QUANTITIES WILL DIFFER FROM ACTUAL SURVEYED OR WEIGHED MEASUREMENTS AND SHOULD NOT BE USED FOR CONTRACTUAL COMPLIANCE, OR CONTRACTOR PAYMENT.

REPORT FOR DAILY CAPPING AND BACKFILLING OPERATIONS

DATE:					
PROJECT:					
LOCATION OF DAY'S WORK:	(include station numbers)				
CONSTRUCTION EQUIPMENT:	NAME AND TYPE			BUCKET SIZE	
	HORSEPOWER		PROPULSION		MAXIMUM REACH
	WORK SCHEDULE		SHIFTS PER DAY	HOURS PER SHIFT	
SITE CONDITIONS	AVERAGE RIVER DEPTH:	BEFORE CAPPING AFTER CAPPING		MINIMUM SOUNDING:	BEFORE CAPPING AFTER CAPPING
RIVER STAGE	MINIMUM	TIME	MAXIMUM	TIME	GAGE LOCATION:
WEATHER CONDITION	(clear, cloudy, rain, snow, fog)			VISIBILITY (miles)	WIND (max. velocity & direction)

	WORK PERFORMED			DISTRIBUTION OF TIME		
	ITEM	UNIT	QTY.	EFFECTIVE WORKING TIME	HOURS	MIN.
AREA / EVENT #1	AREA OF CAP / BACKFILL (STN.)			(productive construction activity)		
	WIDTH (CROSS-RIVER)	FEET				
	LENGTH (ALONG RIVER)	FEET				
	MATERIAL TYPE USED:					
	THICKNESS PLACED (AVERAGE)	FEET				
	(MAX)	FEET				
	NUMBER OF BARGE LOADS USED	NUMBER				
	AVERAGE LOAD PER BARGE	CY				
	ESTIMATED VOLUME PLACED	**CY**				
	CONVERSION VOLUME TO TONNAGE	TONS/CY				
	ESTIMATED TONNAGE PLACED	**TONS**				
AREA / EVENT #2	AREA OF CAP / BACKFILL (STN.)			**NON-EFFECTIVE WORKING TIME**	**HOURS**	**MIN.**
	WIDTH (CROSS-RIVER)	FEET		(repair, maintenance, etc)		
	LENGTH (ALONG RIVER)	FEET				
	MATERIAL TYPE USED:					
	THICKNESS PLACED (AVERAGE)	FEET				
	(MAX)	FEET				
	NUMBER OF BARGE LOADS USED	NUMBER				
	AVERAGE LOAD PER BARGE	CY				
	ESTIMATED VOLUME PLACED	**CY**				
	CONVERSION VOLUME TO TONNAGE	TONS/CY				
	ESTIMATED TONNAGE PLACED	**TONS**				
AREA / EVENT #3	AREA OF CAP / BACKFILL (STN.)			TOTAL NON-EFFECTIVE WORKING TIME		
	WIDTH (CROSS-RIVER)	FEET		PCT. OF NON-EFFECTIVE WORKING TIME (%)		
	LENGTH (ALONG RIVER)	FEET		TOTAL EFFECTIVE AND NON-EFFECTIVE TIME		
	MATERIAL TYPE USED:			PCT. OF TOTAL TIME IN PERIOD %		
	THICKNESS PLACED (AVERAGE)	FEET		**LOST TIME**	**HOURS**	**MIN.**
	(MAX)	FEET				
	NUMBER OF BARGE LOADS USED	NUMBER				
	AVERAGE LOAD PER BARGE	CY				
	ESTIMATED VOLUME PLACED	**CY**		TOTAL LOST TIME		
	CONVERSION VOLUME TO TONNAGE	TONS/CY		PCT OF TOTAL TIME %		
	ESTIMATED TONNAGE PLACED	**TONS**		**TOTAL TIME IN PERIOD**		

SUMMARY OF WORK COMPLETED

ISSUES OR PROBLEMS ENCOUNTERED

HYDROGRAPHIC SURVEY REMARKS

VISITORS TO SITE

REMARKS

SUBMITTED BY: (name, title, and signature)	RECOMMENDED BY: (name, title, and signature)	APPROVED BY: (name, title, and signature)

PARSONS **Inspection Notification Form**	Job Number	Project	Page of **1/1**

CONTRACTOR: _____ DATE: _____

TYPE OF INSPECTION REQUESTED: _____

_____

_____

DATE AND TIME OF INSPECTION REQUESTED: _____

_____

_____

LOCATION OF INSPECTION REQUESTED: _____

_____

_____

OTHER COMMENTS: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

CONTRACTOR SIGNATURE: _____ DATE: _____

PARSONS **Non-Conformance Report**	Job Number	Project	Page of **1/1**
CONTRACTOR	REPORT NO.	DATE	
SPECIFICATION/DRAWING NO.			
ITEM			

PART I – To be completed by the inspector who detects a deviation.

DESCRIPTION OF NON-CONFORMANCE:

_____
_____
_____
_____

RECOMMENDED DISPOSITION: USE AS IS ☐ REWORK ☐ REPAIR ☐ SCRAP ☐

_____
_____
_____
_____

SIGNED _____ DATE _____

PARSONS FIELD ENGINEER

PART I I– To be completed by the contractor who proposed the corrective action.

DESCRIPTION OF CORRECTIVE ACTION:

_____
_____
_____
_____
_____
_____
_____
_____
_____

SIGNED _____ DATE _____

CONSTRUCTION ENGINEER

PART III – To be completed by the design engineer.

RECOMMENDATION AND REMARKS:

_____
_____
_____
_____

Proposed corrective action status: Approved ☐ Rejected ☐

_____
_____
_____
_____

SIGNED _____ DATE _____

DESIGN ENGINEER

PART IV – QUALITY CONTROL DISPOSITION (To be determined by QC System Manager (Construction Engineer)

DECISION AND DISPOSITION INSTRUCTIONS: USE AS IS ☐ REWORK ☐ REPAIR ☐ SCRAP ☐

_____
_____
_____

SIGNED _____ DATE _____

PARSONS FIELD ENGINEER

SIGNED _____ DATE _____

PARSONS CONSTRUCTION MANAGER

PART V – ENGINEERING DISPOSITION

METHOD OF APPROVALS:

☐ TELEPHONE ☐ MEMORANDUM ☐ TELEX ☐ SPEC. CHANGE ☐ DRAWING CHANGE

CONVEYED BY

☐ PROJECT MANAGER _____ DATE _____

☐ PROJECT MANAGER _____ DATE _____

PART VI – DISPOSITION VERIFICATION

☐ CORRECTIVE ACTION WAS ACCOMPLISHED ON _____

SIGNED _____ DATE _____

PARSONS FIELD ENGINEER

SIGNED _____ DATE _____

PARSONS CONSTRUCTION MANAGER

PARSONS

Job Number Project Page of

Non-Conformance Report Log

CONTRACTOR

NCR No.	CONDITION DESCRIPTION	ORIGINATOR	DATE RECORDED	DATE TO CONTRACTOR	PROPOSED CORRECTIVE ACTION BY CONTRACTOR	PROPOSED APPROVED BY ENGINEER	DISPOSITION DATE	DISPOSITION VERIFICATION BY

PARSONS **Contractor Nonconformance Letter (Sample)**	Job Number	Project	Page of 1/1

Attention: _____

Subject: Nonconformance Report No. _____

Gentlemen:

The attached Nonconformance Report (NCR) details discrepancies on your contract.

Please review and take appropriate action to remedy this situation, also changing any procedures, methods and/or personnel necessary to preclude similar problems in the future. Your attention is specifically drawn to Item 10, disposition date.

We are available to discuss the attached with you.

Very truly yours,
PARSONS

_____
Construction Manager

cc: Program Manager
Project Manager
Construction Manager
Quality Assurance Department
Contract File

Phase 1 Hudson River Dredging Project Barge Trip Log Page 1

Instructions to contractors: This trip log must be used to track each barge load of material and is an integrated project record that must be transferred back and forth between the processing contractor and the dredging contractor. Each contractor shall enter data, initial and date as indicated below.

Process Facility Operations Contractor (enter data below): BY_____ DATE _____

- The barge number or name: _____
- The project trip number: _____
- Post-unload barge inspection completed: yes ☐ no☐ (comments on page 2)
- The time leaving the unloading wharf: _____

Dredging Contractor (enter data below): BY_____ DATE_____

- Time arriving at Lock 7: _____
- Time departing Lock 7: _____
- Time of arrival at dredge Contract Work Area: _____
- Time of arrival at dredge: _____
- Pre-load barge inspection completed: yes ☐ no☐ (comments on page 2)
- Pre-load draft: _____
- Load start time: _____
- Load end time: _____
- Loaded draft: _____
- Confirm that barge is not overflowing after loading. yes ☐ no☐
- Post-load barge inspection completed: yes ☐ no☐ (comments on page 2)
- Description of material: _____
- Time of departure from dredge: _____
- Time arriving at mooring dolphin (if used): _____
- Time leaving mooring dolphin (if used): _____
- Time arriving at Lock 7: _____
- Time departing Lock 7: _____
- Time arriving at unloading wharf: _____

Process Facility Operations Contractor (enter data below): BY_____ DATE_____

- Pre-unloading barge inspection completed: yes ☐ no☐ (comments on page 2)
- Time unloading began: _____
- Time unloading ends: _____

[Provide copy of completed form (both pages) to the CM on a daily basis]

Phase 1 Hudson River Dredging Project Barge Trip Log Page 2

BARGE INSPECTION COMMENTS

Post-Unload Barge Inspection **BY**_____ **DATE**_____

_____

_____

_____

_____

_____

Pre-Load Barge Inspection **BY**_____ **DATE**_____

_____

_____

_____

_____

_____

Post-Load Barge Inspection **BY**_____ **DATE**_____

_____

_____

_____

_____

_____

Pre-Unloading Barge Inspection **BY**_____ **DATE**_____

_____

_____

_____

_____

_____

ATTACHMENT 4

CU ACCEPTANCE FORMS

CU Certification of Completion

CU DREDGING COMPLETION APPROVAL - FORM 1

Reporting Date		**Dredging Start Date**		**End Date**		
CU Number						
Approximate CU Centroid	**Northing**		**Easting**		NY State NAD 83	
CU Size		Acres				
No of Dredge Attempts		→		**Inventory**		**Redredge**

Data collected/calculated after dredging pass for:
(Note if additional inventory re-dredging attempts are necessary, an additional form will be attached)

	Initial Dredge	Inventory Re-dredge	1st Residual Re-dredge	2nd Residual Re-dredge
Number of Nodes Sampled				
Average Tri+ PCBs Concentration				
Median Tri+ PCBs Concentration				
Nodes ≥ 15 mg/kg Tri+ PCBs				
Nodes ≥ 27 mg/kg Tri+ PCBs				

All data are for this CU only

In Navigation Channel? __Yes __No

CU Checklist	**Indicate one of the following**		**Reviewer Initial Acceptance**			
Item	**Attached**	**Not Applicable**	**GE**		**EPA**	
Drawing of Target and Post-Dredge Mudline Elevations						
Drawing of Confirmatory Sampling Locations,						
Resulting Tri + PCB data, and Identification of Non-Compliant Nodes						
Sediment Imaging (If performed)						
20 Acre Area Option Calculation Sheet (if performed)						
Drawing of Areas to be Backfilled						
Drawing of Areas to be Capped						

Indicate all that apply:
___Residual target met, approved for backfill
___Residual target met, no backfill required due to_____
___Residual target not met, approved for capping
___Residual target not met, approved for special cap in navigation channel
___Inventory remaining, approved for capping
Comments:

Upon signing this document, GE certifies that the sediment removal for the aforementioned CU is complete and that no additional dredging is necessary. This document also serves to certify that removal activities are complete and that the CU can be backfilled or capped as indicated. EPA accepts this certification and the CU can be backfilled or capped as indicated.

Signature of GE Representative	**Signature of EPA Representative**
Signature	Signature
Name	Name
Date	Date

CU Certification of Completion

CU DREDGING COMPLETION APPROVAL - FORM 1

Information to be included on drawings or on calculation sheets:

Drawing of Post-Dredging Mudline Elevations

Initial target elevations
Target elevations and horizontal extent of missed inventory and of first and second residual dredging passes (if attempted)
Mudline elevations following each dredging pass
Navigation channel boundaries
Description of sediment type(s) encountered
Discussion of any contingency actions taken

Drawing of Confirmatory Sampling Locations, Resulting Tri + PCB Data, and Identification of Non-Compliant Nodes
Narrative summary explaining the depth of cut for each dredging attempt
Shows the number of samples locations per CU is in compliance with the PSCP

Sample locations (coordinates), depths, Aroclor and Tri+ PCB concentrations collected after each dredging attempt including analytical data, field observations, [in database format or equivalent] of the data will be provided); results of data verification/validation
Integration of EPA split samples (if available within time to be used in decision-making.

Non-compliant nodes locations and concentrations at each node and the non-compliant area to be re-dredged or capped
Table of summary statistics
Horizontal extent of areas to be redredged, backfilled or capped with associated summary statistics
Locations of sediment image collection points, if performed

Sediment Imaging (If performed)
Photographs of sediment images collected from each location and associated interpretation

20 Acre Area Option Calculation Sheet (if performed)
Table of sample nodes used in calculations and associated Tri+ PCB data
Reference to appropriate CU Certification of Completion Forms from contributing CUs
Table of summary statistics

Drawing of Areas to be Backfilled (with specifications and appropriate section details)
Horizontal extent of areas to be backfilled
Predicted change in original bottom elevation, after backfilling
Reference to appropriate backfill material specifications and applicable design information
Backfill material specifications and/or cross-section details, if variance from reference documents necessary
Navigation channel boundaries

Drawing of Non-Compliant Areas to be Capped (with specifications and appropriate section details)
Horizontal extent of areas to be capped, for each cap type (Inventory or Residual)
Predicted change in original bottom elevation, after capping
Reference to appropriate cap material specifications and applicable design information
Reference to appropriate cap cross-section
Cap material specifications and/or cross-section details, if variance from reference documents necessary
Navigation channel boundaries

CU Certification of Completion

CU BACKFILL/ENGINEERED CAP COMPLETION APPROVAL - FORM 2						
Reporting Date				Placement Start Date		
CU Number				Placement End Date		
Approximate CU Centroid	Northing		Easting		NY State NAD 83	
CU Size		Acres				
Backfill Area		Acres				
Cap Area		Acres				
Backfill Surface Mean Tri+ PCBs Concentration (when required)		mg/kg				
Number of nodes sampled		mg/kg				
Backfill	Type of Backfill	Reference to appropriate drawings attached to Approval Form 1				
Cap	Type of Cap	Reference to appropriate drawings attached to Approval Form 1				
CU Checklist		Indicate one of the following		Reviewer Initial Acceptance		
Item		Attached	Not Applicable	GE		EPA
Drawing of Installed Backfill/Cap (with record drawing details, thickness and sample locations [when backfill/cap are placed])						
Where applicable in backfill areas provide the following: Sample locations (coordinates), depths, Aroclor and Tri+ PCB concentrations collected including analytical data, field observations, (hard copy and electronic copies [in database format or equivalent]						
Comments						
Upon signing this document, GE certifies that the backfill/cap has been installed satisfactorily and that no further backfill placement or capping is required for this CU. These remedial activities exclude long term operation, monitoring, maintenance and adaptive management at the CU. EPA accepts this certification.						
Signature of GE Representative				**Signature of EPA Representative**		
Signature				Signature		
Name				Name		
Date				Date		

CU Certification of Completion

FINAL CU CONSTRUCTION COMPLETION CERTIFICATION - FORM 3							
Reporting Date			Completion Date				
CU Number							
Approximate CU Centroid	Northing		Easting		NY State NAD 83		
CU Size		Acres					
CU Checklist	Indicate one of the following				Reviewer Initial Acceptance		
Item	Attached	Not Applicable	GE		EPA		
Record drawing of Location and Type of Habitat Replacement/Reconstruction (including method)							
Record Drawing of Final Mudline Elevation and Profile noting changes from original profile							
Comments							
Upon signing this document, GE certifies that the remedial activities related to the CU are complete and that no further action is required. These remedial activities exclude replantings and other activities that are part of initial restoration/reconstruction efforts, long term operation, monitoring, maintenance and adaptive management at the CU. EPA accepts this certification.							
Signature of GE Representative			**Signature of EPA Representative**				
Signature			Signature				
Name			Name				
Date			Date				

ATTACHMENT 5

STANDARD OPERATING PROCEDURE FOR PHASE 1 DREDGING OPERATIONS BATHYMETRIC SURVEYS

Standard Operating Procedure for Phase 1 Dredging Operations Bathymetric Surveys

I. Scope and Application

This Standard Operating Procedure (SOP) is applicable to multi-beam and single-beam bathymetry surveys conducted to support the Phase 1 Dredging Operations work for the for the Hudson River Polychlorinated Biphenyls (PCBs) Site. This SOP is based on the SOP used for the Remedial Design work for the Hudson River PCBs Site and describes the procedures that the third-party survey contractor will use to conduct multi-beam or single-beam surveys as part of the Phase 1 Dredging Operations work including Certification Unit (CU) acceptance surveys and daily or weekly progress surveys. Wherever possible, the procedures and documentation for this survey will be conducted in accordance with the *Field Procedures Manual for Hydrographic Surveying* produced by the National Oceanic and Atmospheric Administration's (NOAA's) Office of Coastal Survey (OCS; OCS, 1998).

The objectives of Phase 1 Dredging Operations multi-beam surveys are to collect georeferenced elevation data regarding sediment removal or backfill/cap placement work performed by the Dredging Contractor. To the extent possible, multi-beam surveys will cover the riverbed in and adjacent to the Phase 1 Dredge CUs and satisfy the applicable data quality objectives (DQOs) of the remedial design (RD). In areas too shallow or small to survey using a manned vessel land survey techniques will be used. In areas too shallow for multi-beam surveys to be practical, single-beam hydrographic survey techniques may be employed. Topographic maps and digital terrain models will be generated from the survey data to support the RD. Single-beam hydrographic surveys will be used to verify the depth of submerged (and floating) aquatic vegetation planting areas before the commencement of Habitat Construction activities.

At the time of writing this SOP the third-party survey contractor has not been retained, as such the third-party survey contractor's actual SOP may differ from certain of the details described in this SOP but will not differ from the substantive requirements of this SOP.

II. Equipment and Supplies

Equipment and supplies needed for the bathymetric survey include:

- Shallow draft survey vessel;
- Navigational charts and permits;
- Global positioning system (GPS) navigation equipment and real-time kinematic (RTK) control monuments;
- Marine communications equipment;
- Multi-beam or Single-beam depth sounding equipment;
- Motion sensor (heave pitch and roll);
- Gyro compass;
- Electronic data acquisition equipment;
- Electronic data storage equipment;
- Field logs and charting paper;
- Boat supplies (e.g., fuel, safety equipment); and
- Personnel supplies (e.g., protective clothing).

II a. Survey Vessel

The third-party survey contractor will conduct the bathymetric survey from a shallow bottomed work boat or skiff with a fully enclosed cabin and dual outboard engines. The boat will either be equipped with a bow or side mount for the multi-beam or single-beam transducer and surveyed positions for the gyro compass and motion sensor. The survey vessel will meet all requirements of the USCG for safety equipment for the vessel, survey crew and visiting representatives.

II b. Navigation Equipment

Navigational control monuments for the Supplemental Engineering Data Collection (SEDC) Program (BBL, 2004) survey operations have been established along the Upper Hudson River at the Troy Lock, Champlain Canal Locks 1 through 7, and along Rt. 4 north of Stillwater. Each control monument has known coordinates and elevation referenced to North American Vertical Datum 1983 (NAD83) and North American Vertical Datum 1988 (NAVD88) respectively and is located such that GPS receivers will have clear visibility of the sky from approximately 15 degrees above the horizon in all directions.

The third-party survey contractor will employ Trimble 7400 Msi GPS receivers (or the equivalent) to acquire navigation data based on GPS satellites and the shore-based control monuments. Differential correctors determined at the control stations will be transmitted to the survey vessel where they will be used by the onboard receiver using RTK OTF (on-the-fly) software to determine the accurate position of the GPS antenna in both the horizontal and vertical planes. These data will be logged on board at one-second intervals for the duration of the project. Data quality parameters will also be logged and monitored by the onboard navigator with flags put on all data points that do not meet the quality limits set. The specified accuracy for this system is +/- 2 centimeter (cm) when satellite configuration is sufficient. Where coverage is determined by GPS filters and navigational software flags to be insufficient, additional control stations will be added or, if there are only small gaps in coverage, the navigation data will be interpolated between points of adequate coverage based on boat speed and heading.

II c. Multi-beam Depth Sounding Equipment

Swath bathymetric data will be recorded using a Reson SeaBat 8125 multi-beam system (or the equivalent) operating at 455 kilohertz (kHz) with 240 individual 0.5 degree beams profiling a swath 120 degrees wide, oriented perpendicular to the alignment of the survey vessel. The system consists of a power supply, microprocessor, and transducer. In operation, the system generates a narrow (1 degree) fan shaped high frequency acoustical pulse in the water column that propagates downward and outward to the riverbed where it is reflected back to the transducer and received by the 240 individual 0.5 degree transducer elements. The system uses beam forming to determine the echo timing (and thus distance) from each elliptical area of the riverbed insonified.

The multi-beam sounder outputs digital depth data to the navigation and data logging computer. During survey operations, digital depth data will be merged with navigation data via the HYPACK® HYSWEEP software (or the equivalent), and saved for post-processing. Additionally, data from the motion sensor and the gyro compass will be inputted to the HYSWEEP software (or the equivalent) where they will be used to orient each of the 240 beams to assure that each riverbed reflection is assigned the correct geodetic coordinates. The HYSWEEP software (or the equivalent) also provides a means to view each profile (up to 50 profiles per second) and the swath coverage. The swath coverage map is critical to the field operation as it “paints” the riverbed (on the computer screen) with the swath from each survey line, allowing the survey crew to see any gaps in the coverage and fill these in with additional lines. As water depth varies the profile coverage will also vary (a 120 degree profile covers a swath 3.46 times the water depth), and line spacing will be adjusted to maintain full bottom coverage. As the vessel rolls or changes

heading, the location and width of the profile also change, requiring in-field adjustments to the survey line plan.

The multi-beam sounder incorporates means for draft corrections and a capability for local water mass sound speed calibration. Calibration for water mass sound speed is accomplished by performing conductivity temperature casts at frequent intervals during the survey day. The data from these casts are used to determine sound velocity throughout the water column. The sound velocity profile not only corrects time of travel for each beam of the multi-beam, but also allows calculation of adjustments for ray bending as the acoustic pulses travel at an oblique angle through the water column. These precise ray bending calculations are used to adjust the location where each acoustic beam reflects from the riverbed.

II d. Single-beam Depth Sounding Equipment

Equipment used for single-beam hydrographic surveying is similar to that described above for multi-beam surveying except that rather than using a sonar system with multiple beams a transducer emitting a single beam is utilized. The single beam transducer will operate in the 200 – 210 kHz range and will be used with an Odom Echotrak DF 3200 Mk II (or the equivalent) echo sounder.

The single-beam sounder outputs digital depth data to the navigation and data logging computer. During survey operations, digital depth data will be merged with navigation data via the HYPACK MAX software (or the equivalent), and saved for post-processing. Additionally, data from the motion sensor and the gyro compass will be inputted to the HYPACK MAX software (or the equivalent) where they will be used to correct for heave, pitch and roll. The HYPACK MAX software (or the equivalent) also provides a means to view the survey data as it is logged.

The single-beam sounder incorporates means for draft corrections and a capability for local water mass sound speed calibration. Calibration for water mass sound speed is accomplished by performing conductivity temperature casts at frequent intervals during the survey day. The data from these casts are used to determine sound velocity throughout the water column.

II e. Data Acquisition and Processing Equipment

Hypack Inc.'s software packages HYPACK® MAX and HYSWEEP (or the equivalent) will be used for trackline design, navigation, trackline control, and multi-beam or single-beam depth and RTK differential global positioning system (DGPS) data logging. The survey data is processed using HYSWEEP and AutoCAD software (or the equivalent) to generate maps. An example, data acquisition equipment, software, and file formats are summarized in Table 1. The third-party survey contractor may use a system that differs from that detailed in Table 1 in terms of specified equipment but not in terms of function.

Table 1 - Summary of Multi-beam Bathymetric Data Collection/Processing Equipment and Software
Equipment

Equipment Type	Manufacturer	Model	Data File Format
OTF DGPS Receiver	Trimble	7400 Msi	Logged by HYPACK® MAX
Navigation Software and Sounding Data Collection Platform	Hypack, Inc.	HYPACK® MAX	HYPACK® RAW
High Resolution Multi-beam Echo Sounder	Reson	8125	Logged by HYSWEEP
Data Processing Software	Hypack, Inc.	HYPACK® HYSWEEP	XYZ, DXF, TIFF
CAD Software	AutoCAD	Release 2000	DXF, DWG

III. Survey Procedures

III.a Multi-beam Survey Procedures

As directed by the Construction Manager (CM) the third-party survey contractor will conduct multi-beam surveys within designated Phase 1 CUs of the Upper Hudson River. Survey lines will generally be run parallel to the shore with their spacing determined by the water depth in each area. Line spacing is determined by multiplying the depth of water below the transducer head by 3.46 for the theoretical swath width, then adding factors for vessel roll, heading variation, and off-line deviations as the vessel traverses the pre-plotted line. After a series of lines have been run to "cover" an area, the swath coverage map will be reviewed and any data gaps will be filled in with additional lines. The following survey procedures will be used:

1. Before leaving dock, the hydrographic crew will open a daily survey log form and fill in pertinent site conditions and check to make sure all navigation and instrument systems are working properly. The crew will: 1) calibrate and set navigation instruments based on the instrument-specific standard operating procedures, and 2) prepare survey equipment for start of daily survey operations by deploying the multi-beam transducer into the water, measuring survey equipment offsets, conducting the first sound velocity cast, and performing other required pre-survey activities.
2. Navigate to the coordinates of the first transect. Hypack Inc.'s HYPACK® MAX software (or the equivalent) will be used for trackline design, navigation, trackline control, digital depth, and RTK DGPS data logging.
3. On the first day of the survey operations, and at the beginning of any day that CU acceptance surveys are to be performed thereafter, a "Patch Test" will be performed to align all sensors. The patch test involves running a series of parallel overlapping and crossing lines on flat and sloping riverbed topography to determine various offset values for the sensors (e.g., motion sensor, gyro compass, multi-beam transducer draft and orientation, and DGPS antenna position). Comparative depth data recorded during these lines are used to calculate the offset values. These offset values will be recorded and compared to the offset values currently entered into the computer. The third-party survey contractor may adjust the offset values entered into the computer based on the offset values recorded during the patch test.
4. Align survey vessel along transect and confirm heading and equipment operation. Start data acquisition and commence hydrographic survey along transect at a vessel speed of 2-4 knots or less. Log the depth data to the HYPACK® HYSWEEP system (or the equivalent).
5. Note relevant observations and changes in operational procedures to the field log. These may include: coordinates of observed obstructions or artifacts, areas where interferences or other conditions limit survey resolution, etc.
6. At the end of each transect, confirm successful data acquisition and storage as well as navigation and equipment calibrations and settings. Log time and coordinates at end of each transect line surveyed.
7. Navigate to next transect and repeat steps 4-5 for collecting depth data along each transect. Maintain a safe operating distance (as determined by boat operator) from lock gates, dams, and other vessels between transects. Following completion of each survey area, review swath coverage plot and run additional lines as needed to obtain full bottom coverage. In areas where water depths are too shallow for a reasonable swath width or safe vessel operation, the third-party survey contractor may rotate transducer to 45 degree position on mount and "look" (survey) only to one side of the vessel to increase bottom coverage in attempt to cover as much of the riverbed as possible or may use traditional land survey techniques to survey the area.
8. Backup the computer data and check for error flags periodically during the survey.

9. Output all notes and electronic target files to an ASCII file and store with the raw records. All raw survey data and information (e.g., field notes, instrumentation frequencies) will be documented electronically or in a field notebook. Back-up copies of raw electronic data and copies of field logbooks will be made at the end of each survey day.

III.a Single-beam Survey Procedures

As directed by the Construction Manager (CM) the third-party survey contractor will conduct single-beam surveys within designated Phase 1 CUs or SAV planting areas of the Upper Hudson River. Survey lines will generally be run parallel to the shore with their spacing determined by the type of survey to be perfomed.

The following survey procedures will be used:

1. Before leaving dock, the hydrographic crew will open a daily survey log form and fill in pertinent site conditions and check to make sure all navigation and instrument systems are working properly. The crew will: 1) calibrate and set navigation instruments based on the instrument-specific standard operating procedures, and 2) prepare survey equipment for start of daily survey operations by deploying the single-beam transducer into the water, measuring survey equipment offsets, conducting the first sound velocity cast, and performing other required pre-survey activities.
2. Navigate to the coordinates of the first transect. Hypack Inc.'s HYPACK® MAX software (or the equivalent) will be used for trackline design, navigation, trackline control, digital depth, and RTK DGPS data logging.
3. When close to or in the survey area conduct a "Bar Check" to verify and that the sounding system is functioning correctly. The bar check involves hanging a plate or par under the single beam transducer at known depths and comparing the known depth with the depth recorded by the sounding system. Parameters such as vessel draft or sound velocity will be corrected adjusted as necessary so that the measured depths are the same as the known depths of the bar or plate. These measured vs. known depths will be recorded as will any parameters that were changed.
4. Align survey vessel along transect and confirm heading and equipment operation. Start data acquisition and commence hydrographic survey along transect at a vessel speed of 2-4 knots or less. Log the depth data to the HYPACK® MAX system (or the equivalent).
5. Note relevant observations and changes in operational procedures to the field log. These may include: coordinates of observed obstructions or artifacts, areas where interferences or other conditions limit survey resolution, etc.
6. At the end of each transect, confirm successful data acquisition and storage as well as navigation and equipment calibrations and settings. Log time and coordinates at end of each transect line surveyed.
7. Navigate to next transect and repeat steps 4-5 for collecting depth data along each transect. Maintain a safe operating distance (as determined by boat operator) from lock gates, dams, and other vessels between transects.
8. Backup the computer data and check for error flags periodically during the survey.
9. At the end of each survey remove the paper record of the transducer output from the echo sounder and mark the date, time, surveyor and survey name on it.

Output all notes and electronic target files to an ASCII file and store with the raw records. All raw survey data and information (e.g., field notes, instrumentation frequencies) will be documented electronically or in a field notebook. Back-up copies of raw electronic data and copies of field logbooks will be made at the end of each survey day.

IV. Quality Assurance and Quality Control

The third-party survey contractor will follow the guidance of the Dredging Construction Quality Control / Quality Assurance Plan, Appendix A to the Remedial Action Work Plan for Phase 1 Dredging and Facility Operations (RAWP #3) (Parsons, 2008), the third-party survey contractor's in-house quality control / quality assurance plan and a site specific quality control plan prepared by the third-party survey contractor.

The third party hydrographic survey personnel will follow site specific SOPs for data transfer and transformation that ensure both the integrity of the original data set and the quality of postprocessed data. Confidence checks and calibration procedures will be performed daily, or as needed, to ensure proper equipment functionality and data quality. The following sections describe Quality Assurance/Quality Control (QA/QC) procedures for the survey equipment.

IV a. Positioning Systems and Confidence Checks

The third-party survey contractor shall initially verify the accuracy of the positioning system by occupying a survey monument set for this project. Once verified to this monument, the third-party survey contractor shall establish an accessible checkpoint. Using this checkpoint, the positioning system's accuracy will be verified at the beginning and end of each day of field operations.

IV b. Nadir (Vertical) Beam Confidence Checks

There shall be two primary methods of performing confidence checks for the vertical beam system. First, bar checks will be conducted at a minimum on a daily basis. In cases where variations in water mass speed of sound is suspected, additional bar checks will be performed. Second, a lead line sounding below the center beam will be conducted. This lead line sounding will verify proper sound speed calibration and provide an indication of the riverbed sediment consistency.

Additionally for multi-beam surveys, overlapping data from adjacent survey lines will be assessed during data processing (see Section V) to estimate the overall accuracy of the survey results.

V. Data Processing and Reporting

V a. Multi-beam Data Processing and Reporting

The third-party survey contractor will follow site specific SOPs for processing field survey data into project maps and elevation terrain models. Data processing and review will be accomplished employing HYPACK® HYSWEEP software (or the equivalent). The processing work flow will include review of offsets, heading, altitude, and navigation. Navigation will be recomputed with sensor offsets applied. Each line will be reviewed for data quality, and adjacent lines having overlapping data will be compared statistically. All corrections and offsets to the raw data will be applied in HYPACK® HYSWEEP (or the equivalent) during post-processing.

Depth and other applicable site information/observations gathered during the bathymetric survey will be plotted on the project base sheets using AutoCAD (or the equivalent) at an appropriate scale and resolution. Raw and edited data files will be stored for each survey along with field notations and supporting data. Final edited 10' average XYZ data files for each CU acceptance survey will be created that represent the average elevation (Z) within each 10' bin with each average elevation in that 10' bin being saved at the center-point (XY) of each 10' bin. The final edited 10' average XYZ data files will be used to confirm that the Dredging Contractor has met the required dredging removal and backfill/cap placement tolerances.

V b. Single-beam Data Processing and Reporting

The third-party survey contractor will follow site specific SOPs for processing field survey data into project maps and elevation terrain models. Data processing and review will be accomplished employing HYPACK® EDIT software (or the equivalent). The processing work flow will include review of offsets, heading, altitude and navigation parameters. Navigation will be recomputed with sensor offsets applied. Each line will be reviewed for data quality and compared to the corresponding paper output from the echo sounder.

Depth and other applicable site information/observations gathered during the bathymetric survey will be plotted on the project base sheets using AutoCAD (or the equivalent) at an appropriate scale and resolution. Raw and edited data files will be stored for each survey along with field notations, echo sounder paper output and supporting data.

VI. Health and Safety

Refer to the Remedial Action Health and Safety Plan revision 1 (RA HASP) (Parsons, 2008).

VII. References

Parsons. 2008. *Remedial Action Health and Safety Plan, revision 1* (RA HASP). Hudson River PCBs Superfund Site. Prepared for General Electric Company, Albany, NY.

BBL. 2004. *Supplemental Engineering Data Collection Work Plan* (SEDC Work Plan). Hudson River PCBs Superfund Site. Prepared for General Electric Company, Albany, NY. March 2004.

Parsons, 2008. Dredging Construction Quality Control / Quality Assurance Plan, Appendix A to the Remedial Action Work Plan for Phase 1 Dredging and Facility Operations (RAWP #3). Prepared for General Electric Company, Albany, NY.

Environmental Standards, Inc. (ESI) and Quantitative Environmental Analysis, LLC (QEA). 2002. *Design Support Sediment Sampling and Analysis Plan - Quality Assurance Project Plan*. Prepared for General Electric Company. August 2002.

Office of Coastal Survey (OCS). 1998. *Field Procedures Manual for Hydrographic Surveying.* National Oceanic and Atmospheric Administration, Office of Coastal Survey. March 1998.