APPENDIX B

STATEMENT OF WORK

Appendix B to the Consent Decree

Hudson River PCBs Site

Statement of Work (SOW) for Remedial Action and Operations, Maintenance and Monitoring

September, 2005

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1. Purpose and Scope

The purpose of this Statement of Work (SOW) is to set forth requirements for implementation of the remedial action (RA) set forth in the Record of Decision (ROD) for the Hudson River PCBs Superfund Site (Site), which was signed by the Administrator of the United States Environmental Protection Agency (EPA) and the Regional Administrator of EPA Region 2 on February 1, 2002, and Operation, Maintenance, and Monitoring (OM&M), as defined in Section IV of the Consent Decree. The General Electric Company (GE) shall carry out this work in accordance with the Consent Decree (including the attachments to the Consent Decree, which include this SOW), the Remedial Action Work Plans described herein, and all other plans, specifications, schedules, and documents set forth or referenced in the Consent Decree and/or this SOW, as approved by EPA pursuant to the Consent Decree.

In accordance with Paragraph 15.c of the Consent Decree, GE will notify EPA as to whether it will implement Phase 2 of the Remedial Action pursuant to the Consent Decree. If GE notifies EPA that it will implement Phase 2 under the Consent Decree, then GE shall proceed to implement and complete that work in accordance with the documents specified in the last sentence of the prior paragraph.

Work done in accordance with this SOW, the submittals required by the SOW and approved by EPA, the Approved Design Documents (as defined in Section IV of the Consent Decree), and the remainder of the Consent Decree shall be deemed to be done in accordance with the ROD, subject to the proviso in Paragraph 6 of the Consent Decree.

This SOW includes the following attachments, which are a part of this SOW:

Attachment A: Critical Phase 1 Design Elements;

Attachment B: Remedial Action Monitoring Scope;

Attachment C: Performance Standards Compliance Plan Scope;

Attachment D: Remedial Action Community Health and Safety Program Scope;

Attachment E: Operation, Maintenance, and Monitoring Scope; and

Attachment F: Certification Unit Completion Approval/Certification Forms.

The remainder of this SOW is organized into the following sections:

- Section 2 – Phase 1 of Remedial Action;
- Section 3 – Phase 2 of Remedial Action;
- Section 4 – Operation, Maintenance, and Monitoring;
- Section 5 – Progress Meetings, Completion Process, and Associated Reporting; and
- Section 6 – Schedule for Remedial Action Deliverables/Tasks.

2. Phase 1 of Remedial Action

2.1 Phase 1 Facility Site Work Construction

The Phase 1 facility site work construction shall consist of activities to develop the property to be used for the sediment processing/transfer facility. The site work construction efforts shall be defined in the Phase 1 Final Design Report and shall generally consist of civil construction work to begin development of the site. The Phase 1 Final Design Report shall separately identify and segment the portions thereof that pertain to the Phase 1 facility site work construction, and shall specify an estimated duration for the performance of such work, to be used by GE in soliciting bids for the work, for EPA review and approval. This section of the SOW includes a description of contracting activities, a description of the development of a Remedial Action (RA) Work Plan for Facility Site Work Construction, and a summary of Phase 1 facility site work construction activities.

2.1.1 Contracting for Phase 1 Facility Site Work

GE shall complete the contracting activities described in this section to select and retain contractor(s) to assist in development of the RA Work Plan for Phase 1 Facility Site Work Construction and to perform the site work construction.

Bid Solicitation, Contractor Selection, and Issuance of Notice(s) of Award

GE shall solicit bids for the Phase 1 facility site work construction based on the facility site work design component identified in the Phase 1 Final Design Report. It is anticipated that plans and specifications which are ready for construction will be developed in Final Design for this construction component. Adequate time shall be provided for pre-qualified bidders to prepare bids for GE evaluation. Following receipt of bids, GE will review and evaluate the bids, select a contractor(s), and issue a Notice of Award to the successful bidder(s). However, GE will not issue a Notice of Award to a contractor until EPA has approved the portion of the Phase 1 Final Design Report that has been developed for the facility site work, GE has had sufficient time to review any design changes and solicit bid revisions, if necessary based on the EPA-approved Phase 1 Final Design Report, and the Consent Decree has been entered. Specifically, GE shall issue a Notice of Award to the selected facility site work construction contractor(s) within the latest of the following: 1) 80 days after GE's submission of the

Phase 1 Final Design Report; 2) if bid revisions are not necessary, 15 days after EPA approval of the Phase 1 Final Design Report or the portion of that report that has been developed for the facility site work; 3) if bid revisions are necessary, 30 days after EPA approval of the Phase 1 Final Design Report or the portion of that report that has been developed for the facility site work, provided that no significant changes to the design are required; or 4) 10 days after entry of the Consent Decree by the court. If significant changes to the design are required, additional time for bid revisions may be necessary, and GE shall propose a revised schedule to EPA. Further, if GE does not receive any responsive bids, GE shall develop a plan to address that situation, shall discuss it with EPA, and if necessary shall propose a revised schedule for obtaining bids and issuing a Notice of Award. The Notice of Award will authorize the contractor(s) to assist GE in developing planning documents, including the RA Work Plan for Phase 1 Facility Site Work Construction.

Issuance of Notice to Proceed

Following issuance of the Notice of Award to the selected facility site work contractor(s), GE will enter into contract(s) with the selected contractor(s). Within 30 days after issuance of the Notice of Award to the selected contractor(s), GE shall issue a Notice to Proceed to the selected contractor(s). The Notice to Proceed will authorize the contractor(s) to order equipment and begin site work construction.

2.1.2 RA Work Plan for Phase 1 Facility Site Work Construction

Within 30 days after GE issues Notice(s) of Award to Phase 1 facility site work construction contractor(s), GE shall submit to EPA for review and approval an RA Work Plan for Phase 1 Facility Site Work Construction. In the event that GE issues Notices of Award for Phase 1 facility site work construction on different dates, the 30-day period shall begin on the date of the last such Notice of Award. The RA Work Plan for Phase 1 Facility Site Work Construction shall cover the component(s) of the Phase 1 Final Design Report pertaining to facility site work and shall be consistent with the Critical Phase 1 Design Elements (Attachment A to this SOW) and this SOW. The RA Work Plan for Phase 1 Facility Site Work Construction shall address the site work necessary for construction of the sediment processing/transfer facility, water treatment facilities, and ancillary and support facilities needed to implement Phase 1.

The RA Work Plan for Phase 1 Facility Site Work Construction shall include a description of the site work construction activities, monitoring requirements applicable to facility site work construction, equipment staging,

compliance monitoring, and a site work construction schedule. The construction schedule shall describe the sequencing and reasonable durations for construction elements and account for seasonal limitations for construction in the Upper Hudson Work Area (e.g., frost conditions which could compromise construction quality such as rail bed installation and foundations, high water events, ambient temperature limitations for asphalt paving, etc.). This construction schedule will be integrated with the construction schedule for the processing equipment installation and remaining site work (described below).

The RA Work Plan for Phase 1 Facility Site Work Construction also shall include a worker Health and Safety Plan (HASP) and a site work Construction Quality Control/Quality Assurance Plan (CQAP) addressing the items required pursuant to Section 2.3.2.2.1 of this SOW that are relevant to this work. The RA Work Plan for Phase 1 Facility Site Work Construction may incorporate by reference those elements listed above which were provided in the Phase 1 Final Design Report.

2.1.3 Phase 1 Facility Site Work Construction

2.1.3.1 Pre-Construction Conference

Within 15 days of receiving EPA's approval of the RA Work Plan for Phase 1 Facility Site Work Construction and GE's issuance of all Notices to Proceed to Phase 1 facility site work construction contractor(s), GE shall conduct a Pre-Construction Conference attended by EPA, the State, and other persons authorized by EPA (including contractors) to discuss the site work construction at the sediment processing/transfer facility(ies). The agenda for each Pre-Construction Conference will include:

- The procedure to be used by GE for documenting and reporting inspection data and compliance with specifications and plans, including procedures and timelines for processing design changes and securing EPA review and approval of such changes as necessary.
- The procedure to be used for distributing and storing documents and reports.
- Work area security.
- Safety programs and requirements.
- The Construction Management Plan and discussion of any appropriate modifications of the Site Work CQAP to verify that site-specific considerations are addressed.
- Quality control and quality assurance procedures.

- Site tour to confirm access, laydown locations, and other issues (i.e., verify that the design criteria, plans, and specifications are understood).

GE shall transmit a written summary of the Pre-Construction Conference to EPA and the State within 7 days after the conference.

2.1.3.2 Construction Activities

GE shall initiate facility site work construction for the Phase 1 sediment processing/transfer facility(ies) in accordance with the schedule in the RA Work Plan for Phase 1 Facility Site Work Construction, as approved by EPA. GE shall complete that site work in accordance with the approved RA Work Plan for Phase 1 Facility Site Work Construction and the schedule therein (as described in Section 2.1.2 and as approved by EPA), subject to extensions for delays attributable to force majeure, as provided in Section XVIII of the Consent Decree, or for EPA-approved changes in the scope of this work. Record drawings for permanent facilities shall be submitted to EPA after completion of facility site work construction activities, in accordance with the schedule provided in the RA Work Plan for Phase 1 Facility Site Work Construction.

2.2 Phase 1 Processing Equipment Installation and Remaining Site Work

The Phase 1 processing equipment installation and remaining site work shall consist of activities to procure and install sediment dewatering and water treatment equipment necessary to process dredged sediment, as well as to complete remaining site work (if necessary) construction on the property to be used for sediment processing. The processing equipment installation and remaining site work efforts shall be defined in the Phase 1 Final Design Report along with an estimated duration for the performance of such work, to be used by GE in soliciting bids for the work. EPA will review and approve the estimated schedule for completion of this work. This section of the SOW includes a description of contracting activities, a description of the development of an RA Work Plan for Phase 1 Processing Equipment Installation, and a summary of Phase 1 processing equipment installation and remaining site work activities.

2.2.1 Contracting for Phase 1 Processing Equipment Installation and Remaining Site Work

GE shall complete the contracting activities described in this section to select and retain contractor(s) to assist in development of the RA Work Plan for Phase 1 Processing Equipment Installation and to install the sediment processing equipment and complete any remaining site work construction.

Bid Solicitation, Contractor Selection, and Issuance of Notice(s) of Award

GE shall solicit bids for the Phase 1 processing equipment installation and remaining site work based on the Phase 1 Final Design Report. The bidding and contractor selection process for this aspect of facility construction will be completed in conjunction with the bidding and contractor selection process for Phase 1 dredging and facility operations, described below in Section 2.3.1, and shall follow the same schedule set forth in Section 2.3.1. This process will culminate in the issuance of a Notice of Award to the contractor(s) selected to perform the Phase 1 processing equipment installation and remaining site work. The Notice of Award will authorize the contractor(s) to assist GE in developing planning documents, including the RA Work Plan for Phase 1 Processing Equipment Installation.

Issuance of Notice(s) to Proceed

Following issuance of the Notice of Award to the selected contractor(s) for processing equipment installation and remaining site work, GE will enter into contract(s) with the successful contractor(s). Within 60 days after issuance of the Notice of Award to the selected contractor(s), GE shall issue a Notice to Proceed to the selected contractor(s). The Notice to Proceed will authorize the contractor(s) to order equipment and begin installation of processing equipment and remaining site work construction.

2.2.2 RA Work Plan for Phase 1 Processing Equipment Installation

Within 30 days after GE issues its Notice of Award to the contractors(s) for Phase 1 processing equipment installation and remaining site work, GE shall submit to EPA for review and approval an RA Work Plan for Phase 1 Processing Equipment Installation (note that the term “and Remaining Site Work” has been removed from the title of this RA Work Plan, for ease of future reference). In the event that GE issues Notices of Award for Phase 1 processing equipment installation and remaining site work on different dates, the 30-day period shall begin on the date of the last such Notice of Award. The RA Work Plan for Phase 1 Processing Equipment

Installation shall cover the component(s) of the Phase 1 Final Design Report pertaining to the procurement and installation of sediment processing and water treatment equipment, as well as any remaining site work to complete the sediment processing/transfer facility, and it shall be consistent with the Critical Phase 1 Design Elements (Attachment A to this SOW) and this SOW.

The RA Work Plan for Phase 1 Processing Equipment Installation shall address the work necessary for the construction of necessary structures, the procurement and installation of the sediment processing/transfer and water treatment equipment, and ancillary and support equipment needed to implement Phase 1, as well as any remaining site work. The RA Work Plan for Phase 1 Processing Equipment Installation shall describe the construction activities to be conducted to install the sediment processing and water treatment equipment and to complete any remaining site work at the Phase 1 processing facility, monitoring requirements applicable to processing equipment installation and remaining site work construction, equipment staging, compliance monitoring, and a construction schedule. The construction schedule shall describe the sequencing and reasonable durations for construction elements and account for seasonal limitations for construction in the Upper Hudson Work Area (e.g., frost conditions which could compromise construction quality such as building/equipment foundations, waterfront dredging, seasonal high water events, etc.). This processing equipment installation and remaining site work schedule will be integrated with the construction schedule for the site work (described above).

The RA Work Plan for Phase 1 Processing Equipment Installation also shall include a worker HASP and a CQAP that addresses the items required pursuant to Section 2.3.2.2.1 of this SOW that are relevant to this work. The RA Work Plan for Phase 1 Processing Equipment Installation may incorporate by reference those elements listed above which were provided in the Phase 1 Final Design Report.

2.2.3 Construction of Phase 1 Facility Equipment

2.2.3.1 Pre-Construction Conference

Within 15 days of receiving EPA's approval of the RA Work Plan for Phase 1 Processing Equipment Installation, and GE's issuance of all Notices to Proceed to Phase 1 processing equipment installation and remaining site work site work contractor(s), GE shall conduct a Pre-Construction Conference attended by EPA, the State, and other persons authorized by EPA (including contractors) to discuss the processing equipment

procurement and installation and any remaining site work at the sediment processing/transfer facility. At this Pre-Construction Conference, GE shall address the same items listed in Section 2.1.3.1 above. GE shall transmit a written summary of the conference to EPA and the State within 7 days after the conference.

2.2.3.2 Construction Activities

GE shall initiate processing equipment installation and remaining site work at the Phase 1 sediment processing/transfer facility(ies) in accordance with the schedule in the RA Work Plan for Phase 1 Processing Equipment Installation, as approved by EPA. GE shall complete that work in accordance with the approved RA Work Plan for Phase 1 Processing Equipment Installation and the schedule therein (as described in Section 2.2.2 and as approved by EPA), subject to extensions for delays attributable to force majeure, as provided in Section XVIII of the Consent Decree, or for EPA-approved changes in the scope of and/or means and methods for this work. Record drawings for permanent facilities shall be submitted to EPA after completion of processing equipment installation and remaining site work, in accordance with the schedule provided in the RA Work Plan for Phase 1 Processing Equipment Installation.

2.3 Phase 1 Dredging and Facility Operations

The Phase 1 dredging and facility operations shall consist of activities to procure dredging equipment and perform the dredging, backfilling/capping, habitat reconstruction/replacement, dredged material transport, sediment processing, and rail loading. The dredging and facility operations shall be defined in the Phase 1 Final Design Report along with an estimated duration for the performance of such work, to be used by GE in soliciting bids for the work. EPA will review and approve the estimated schedule for completion of this work. This section of the SOW includes a description of contracting activities, a description of the development of the RA Work Plan for Phase 1 Dredging and Facility Operations and other plans that will apply to the dredging and facility operations, and a summary of Phase 1 dredging and facility operations.

2.3.1 Contracting for Phase 1 Dredging and Facility Operations

GE shall complete the contracting activities described in this section to select and retain contractor(s) to assist in development of the RA Work Plan for Phase 1 Dredging and Facility Operations and to implement dredging and facility operations.

Bid Solicitation, Contractor Selection, and Issuance of Notice(s) of Award

GE shall solicit bids for the Phase 1 dredging and facility operations based on the Phase 1 Final Design Report. The bidding and contractor selection process for this aspect of Phase 1 will be completed in conjunction with the bidding and contractor selection process for processing equipment installation and remaining site work (described above in Section 2.2.1). Adequate time shall be provided for pre-qualified bidders to prepare a proposal for GE evaluation. For this component of Phase 1, as well as the Phase 1 processing equipment installation and remaining site work, GE expects that contractors may submit bids with an alternate design from that specified in the Phase 1 Final Design Report. If GE decides to proceed with such alternate design, and if that alternate design is determined to represent a significant modification to the Phase 1 Final Design, then as soon as GE believes that it may want to recommend an alternate design to EPA, GE shall notify EPA of such alternate design and begin consulting with EPA with regard to such alternate design. GE shall submit the alternate design to EPA for review and approval within 75 days from submittal of the Phase 1 Final Design Report.

GE's proposal of an alternate design will include information that allows EPA to evaluate the extent to which such alternate design provides a demonstrable improvement over the approved Phase 1 Final Design, and the impacts the implementation of such alternate design would have on the dredging schedule relative to what the dredging schedule would have been under the approved Phase 1 Final Design. Following the aforementioned consultation between EPA and GE, EPA will notify GE as to whether the company may proceed with implementation of such alternate design.

Following receipt of bids, GE will review and evaluate the bids, select a contractor(s) and issue a Notice of Award to the selected contractor(s). However, GE will not issue a Notice of Award to a contractor until EPA has approved the Phase 1 Final Design Report (or the alternate design, if EPA has agreed that GE may proceed with the alternate design), GE has had sufficient time to review any design changes and solicit bid revisions, if necessary, based on the EPA-approved Final Design Report, and the Consent Decree has been entered.

Specifically, GE shall issue a Notice of Award to the selected contractor(s) within the latest of the following: 1) 120 days after GE's submission of the Phase 1 Final Design Report; 2) if bid revisions are not necessary, 15 days after EPA approval of the Phase 1 Final Design Report (or the alternate design, if EPA has agreed that GE may proceed with the alternate design); 3) if bid revisions are necessary, 45 days after EPA approval of the Phase 1 Final Design Report (or the alternate design, if EPA has agreed that GE may proceed with the alternate design), provided that no significant changes to the design are required; or 4) 10 days after entry of the Consent Decree by the court. If significant changes to the design are required, additional time for bid revisions may be necessary, and GE shall propose a revised schedule to EPA. Further, if GE does not receive any responsive bids, GE shall develop a plan to address that situation, shall discuss it with EPA, and if necessary shall propose a revised schedule for obtaining bids and issuing a Notice of Award. The Notice of Award will authorize the contractor(s) to assist GE in developing planning documents, including the RA Work Plan for Phase 1 Dredging and Facility Operations.

Issuance of Notice to Proceed

Following issuance of the Notice of Award to the selected dredging and operations contractor(s), GE will enter into contract(s) with the selected contractor(s). Within 60 days after issuance of the Notice of Award to the selected contractor(s), GE shall issue a Notice to Proceed to the selected contractor(s). The Notice to Proceed will authorize the contractor(s) to order equipment and begin mobilization for dredging and operations.

2.3.2 Work Plans for Phase 1 Dredging and Facility Operations

2.3.2.1 Phase 1 RAM QAPP

Within 30 days after (a) submittal of the Phase 1 Final Design Report or (b) entry of the Consent Decree (whichever is later), GE shall submit a Phase 1 Remedial Action Monitoring Quality Assurance Project Plan (Phase 1 RAM QAPP) for GE's monitoring and sampling activities to be conducted during Phase 1 of the Remedial Action. The Phase 1 RAM QAPP shall address sample collection, analysis, and data handling activities for samples to be collected during Phase 1 of the RA. The RAM QAPP shall be consistent with the Remedial Action Monitoring Scope (RA Monitoring Scope), which is attached hereto as Attachment B and incorporated herein. All sampling, analysis, and data assessment and monitoring shall be performed in accordance with the Consent Decree (including this SOW and the attached RA Monitoring Scope) and the EPA-approved Phase 1 RAM QAPP. All testing methods and procedures shall be documented and referenced to

established methods or standards or alternate test methods approved by EPA for use in conducting the work. The objective of the Phase 1 RAM QAPP is to provide EPA and all parties involved with the collection and use of field data with a common written understanding of Phase 1 field sampling work. The Phase 1 RAM QAPP shall be written so a field sampling team unfamiliar with the Upper Hudson Work Area would be able to gather the samples and field information required.

The Phase 1 RAM QAPP shall include, but not be limited to, the following items:

- Data Quality Objectives (DQOs). The Phase 1 RAM QAPP shall include a detailed description of the DQOs developed in accordance with *EPA QA/G-4 Guidance for the DQO Process* and *EPA Requirements for QA Project Plans* (QA/R-5) (EPA/240/B-01/003, March 2001) (including why the data are being collected, how they will be used, what they will be compared to, and how they will be interpreted) to confirm that all data collected are relevant to the decision-making process, as well as to confirm that appropriate sampling and analytical techniques are selected.
- Sampling Location and Frequency. The Phase 1 RAM QAPP shall identify each matrix to be sampled and the constituents to be analyzed. Tables shall be used to clearly identify the number of samples, the type of sample (water, soil, etc.), and the number of quality control samples (duplicates, trip blanks, equipment blanks, etc.). Figures and/or maps shall be included to show the locations of existing or proposed sample points.
- Sample Designation. A sample numbering system shall be established for the project. The sample designation shall include the sample or location number, the sample round, the sample matrix (e.g., surface soil, ground water, soil boring), and the site name.
- Sampling Equipment and Procedures. Sampling procedures shall be clearly written in the Phase 1 RAM QAPP. Step-by-step instructions shall be included for each type of sampling to enable the field team to gather data that will meet the DQOs. The Phase 1 RAM QAPP shall identify the equipment to be used for sample collection activities, the material composition of such equipment (e.g., Teflon, stainless steel), and decontamination procedures.
- Sampling Handling and Analysis. A table shall be included that identifies sample preservation methods, types of sampling jars, shipping requirements, and holding times. Examples of paperwork such as traffic reports, chain-of-custody forms, packing slips, and sample tags filled out for each sample as well as instructions for filling out the paperwork shall be included. Field documentation methods including field notebooks and photographs shall be described.

- Testing and Analysis. The Phase 1 RAM QAPP shall include a detailed description of analysis and testing to be performed, including methods used.
- Schedule. The Phase 1 RAM QAPP shall include a schedule for performing specific tasks.
- Project Management. The Phase 1 RAM QAPP shall describe the project management, including the following items:
  - Title and approval sheet;
  - Table of contents and document control format;
  - Distribution list;
  - Project/task organization and schedule;
  - Problem definition/background;
  - Project/task description;
  - Quality objectives and criteria for measurement data;
  - Special training requirements/certification; and
  - Documentation and records (including electronic database and shapefiles).
- Measurement/Data Acquisition. The Phase 1 RAM QAPP shall include a description of the measurement and data acquisition procedures, including the following:
  - Sampling process design and rationale;
  - Sampling method requirements and SOPs;
  - Sample handling and custody requirements;
  - Archival procedures for sediment and fish samples and sample extracts;
  - Analytical method requirements and SOPs;
  - Quality control requirements for sampling and analysis;
  - Instrument/equipment testing, inspection, and maintenance requirements;
  - Instrument calibration and frequency;
  - Inspection/acceptance requirements for supplies and consumables;
  - Data acquisition requirements (non-direct measurements); and
  - Data management.
- Assessment/Oversight. The Phase 1 RAM QAPP will describe the following:
  - Assessments and response actions; and

- Reports to management.

- Data Validation and Usability. The Phase 1 RAM QAPP will describe the following:
  - Data review, validation, and verification requirements (*e.g.*, acceptance criteria) and procedures;
  - Validation and verification methods/procedures; and
  - Reconciliation with data quality objectives/usability assessment.

- Additional Quality Assurance/Quality Control (QA/QC) Procedures. To provide QA and maintain quality control with respect to all samples to be collected, GE shall comply with the requirements set forth in Paragraph 29 of the Consent Decree, as well as the following:
  - All laboratories utilized for analyses of samples must perform all analyses in accordance with the RA Monitoring Scope (Attachment B to this SOW) and the approved Phase 1 RAM QAPP.
  - All analytical data shall be verified, or verified and validated upon receipt from the laboratory, as required by the RA Monitoring Scope (Attachment B to this SOW) and the Phase 1 RAM QAPP.
  - GE shall submit to EPA, in accordance with the reporting requirements of the RA Monitoring Scope (Attachment B to this SOW), a data validation report or reports containing the information required by the EPA-approved Phase 1 RAM QAPP.
  - Unless indicated otherwise in the EPA-approved Phase 1 RAM QAPP, GE shall require deliverables equivalent to Contract Laboratory Program (CLP) data packages from the laboratory(ies) for analytical data. EPA reserves the right to perform an independent data validation, data validation check, or qualification check on generated data.
  - GE shall insert a provision in its contract(s) with the laboratory(ies) utilized for analyses of samples, which will require the laboratory(ies) to grant access to EPA and its authorized representatives for the purpose of ensuring the accuracy of laboratory results related to the Site.
  - Upon request, GE shall provide EPA and/or the Federal Trustees for Natural Resources (Federal Trustees), or their authorized representatives, with duplicate and/or split samples of any material sampled, including calibration standard materials, in connection with the implementation of the Consent Decree, provided that there is a sufficient volume of material to split, or will allow EPA and the Federal Trustees, or their authorized representatives, to take such duplicate or split samples. EPA and the Federal Trustees shall provide copies of the results of the analysis of such samples to GE after such results have undergone QA/QC analysis. GE shall also allow the State of New York to collect split or

duplicate samples of any such material, provided that the State agrees to provide GE with copies of the results of the analysis of such samples after those results have undergone QA/QC analysis.

- Documentation shall be provided to EPA in an electronic database and shapefiles.

2.3.2.2 RA Work Plan for Phase 1 Dredging and Facility Operations

Within 60 days after GE issues its Notice of Award to the contractors(s) for Phase 1 dredging and facility operations, GE shall submit to EPA for review and approval an RA Work Plan for Phase 1 Dredging and Facility Operations. In the event that GE issues Notices of Award for Phase 1 dredging and facility operations on different dates, the 60-day period shall begin on the date of the last such Notice of Award. The RA Work Plan for Phase 1 Dredging and Facility Operations shall include those components in the Phase 1 Final Design Report that pertain to Phase 1 dredging and sediment processing operations and shall include a detailed description of major remediation and construction activities, monitoring events, construction QA procedures, equipment staging, compliance monitoring, and construction schedule. The RA Work Plan for Phase 1 Dredging and Facility Operations shall also be consistent with the Critical Phase 1 Design Elements (Attachment A to this SOW) and this SOW. The construction schedule shall describe the sequencing and reasonable durations for construction elements and account for seasonal limitations for construction in the Upper Hudson Work Area (e.g., ice formation, safe working conditions such as water temperatures and flow conditions, etc.).

The RA Work Plan for Phase 1 Dredging and Facility Operations shall include the deliverables listed below in Sections 2.3.2.2.1 through 2.3.2.2.6 (unless GE has previously submitted a deliverable that is listed below, and such deliverable has been approved by EPA). The RA Work Plan for Phase 1 Dredging and Facility Operations shall contain an index specifying where each deliverable requirement is addressed (e.g., submitted as part of the RA Work Plan for Phase 1 Dredging and Facility Operations or in a final design document).

2.3.2.2.1 Phase 1 Dredging Construction Quality Control/Quality Assurance Plan

GE shall be responsible for QA/QC and shall establish and maintain an effective quality control system. The Phase 1 Dredging Construction Quality Control/Quality Assurance Plan (Phase 1 Dredging CQAP) shall identify personnel, procedures, controls, instructions, tests, records, and forms to be used for construction QA/QC purposes. The Phase 1 Dredging CQAP referenced herein shall describe the site-specific components of

the performance methods and quality assurance program which shall confirm that Phase 1 meets the applicable design criteria, plans, and specifications. In addition, if GE notifies EPA that it will implement Phase 2 of the RA under the Consent Decree, the Phase 2 Dredging CQAP (and any revisions and/or addenda thereto) submitted by GE pursuant to Sections 3.1.1.1 and 3.2.1.1 below, shall include all site-specific components of the performance methods and quality assurance program to confirm that Phase 2 of the RA meets the Phase 2 design criteria, plans, and specifications. The Phase 1 Dredging CQAP shall contain the following elements to cover dredging and facility operations, both on-site and off-site, including work by contractors, subcontractors, designers of record, consultants, architect/engineers, fabricators, suppliers, and purchasing agents:

- Responsibilities and Authorities. The Phase 1 Dredging CQAP shall include the responsibilities and authorities of all organizations and key personnel involved in the construction of the RA.
- Qualifications of the Construction Quality Assurance (CQA) Officer. The Phase 1 Dredging CQAP shall establish the minimum training and experience of the CQA Officer and supporting inspection personnel, and shall include the name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a Phase 1 CQAP function.
- QC Organization. The Phase 1 Dredging CQAP shall describe the QC organization, including a chart showing lines of authority.
- Submittals. The Phase 1 Dredging CQAP shall include procedures for scheduling, reviewing, certifying, and managing submittals, including those of contractors, subcontractors, off-site fabricators, suppliers, designers of record, consultants, architect engineers, and purchasing agents, dredged material transporters and disposal facilities.
- Performance Monitoring Requirements. The Phase 1 Dredging CQAP shall present the performance monitoring requirements to demonstrate that debris removal, sediment dredging and dewatering operations, transportation of dredged material, backfilling and cap placement and restoration techniques are implemented in accordance with the EPA-approved Phase 1 Final Design Report and the RA Work Plan for Phase 1 Dredging and Facility Operations.
- Inspection and Verification Activities. The Phase 1 Dredging CQAP shall establish the observations and tests that will be required to monitor the construction and/or installation of the components of the RA. The plan shall include the scope and frequency of each type of inspection to be conducted. Inspections shall be required to measure compliance with the EPA-approved Phase 1 Final Design Report and the RA Work Plan for Phase 1 Dredging and Facility Operations.

- Construction Deficiencies. The Phase 1 Dredging CQAP shall include procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures shall include methods to verify that identified deficiencies have been corrected.
- Documentation. Reporting requirements for Phase 1 CQAP activities shall be described in detail in the Phase 1 Dredging CQAP. This shall include such items as daily summary reports, inspection data sheets, problem identification and corrective measures reports, design acceptance reports, electronic submittals of database and shapefiles, and final documentation/storage. A description of the provisions for final storage of all records consistent with the requirements of the Consent Decree shall be included.
- EPA Approvals. The Phase 1 Dredging CQAP shall include procedures for obtaining EPA approvals and certifications of completion for individual CUs, as described below in Section 5.2.
- Field Changes. The Phase 1 Dredging CQAP shall describe procedures for processing design changes and securing EPA review and approval of such changes.
- Final Reporting. The Phase 1 Dredging CQAP shall identify all final Phase 1 CQAP documentation to be submitted to EPA in the Phase 1 Construction Completion Report or other deliverables and submissions.

2.3.2.2.2 Phase 1 Performance Standards Compliance Plan

The Phase 1 Performance Standards Compliance Plan shall set forth the actions that GE will implement to address the Engineering Performance Standards, the Quality of Life Performance Standards, the *Substantive Requirements Applicable to Releases of Constituents not Subject to Performance Standards,* the *Substantive Requirements of State Pollutant Discharge Elimination System Permit for Potential Discharges to Champlain Canal (land cut above Lock 7)*, and the *Substantive Requirements of State Pollutant Discharge Elimination System Permit for Potential Discharge to the Hudson River*. The Phase 1 Performance Standards Compliance Plan shall address, but not be limited to, monitoring activities (including monitoring contingencies), sampling and analysis, special studies, engineering contingencies, complaint procedures, mitigation measures, notification steps and reporting requirements. The Phase 1 Performance Standards Compliance Plan shall be consistent with the Performance Standards Compliance Plan Scope (PSCP Scope), which is attached hereto as Attachment C and incorporated herein. If any items that are required to be included in the Phase 1 Performance Standards Compliance Plan are set forth in another EPA-approved document, such requirements may be incorporated by reference into the Phase 1 Performance Standards Compliance Plan.

2.3.2.2.3 Phase 1 Property Access Plan

The Phase 1 Property Access Plan shall identify the procedures that GE will follow (or has followed) to obtain access agreements, easements, or title, as the case may be, with respect to all properties to which access is needed for purposes of implementing dredging and facility operations, if such access has not already been obtained for Phase 1 Facility Site Work Construction or Phase 1 Processing Equipment Installation. The Phase 1 Property Access Plan (if needed) shall also describe any steps taken by GE before its submission of the Phase 1 Property Access Plan to obtain such access, easements, or title.

2.3.2.2.4 Phase 1 Transportation and Disposal Plan

The Phase 1 Transportation and Disposal Plan shall include the following information:

- Characteristics of waste/water/material to be transported;
- Destinations;
- Transportation modes;
- Routes;
- On-site traffic control and loading procedures;
- Recordkeeping;
- Health and safety; and
- Contingency plans for spills that occur in the Work Area.

2.3.2.2.5 Phase 1 Facility Operation and Maintenance Plan

The Phase 1 Facility Operation and Maintenance Plan shall address the operation and maintenance of the Phase 1 sediment processing/transfer facility, water treatment facilities, and ancillary and support facilities. The Phase 1 Facility Operation and Maintenance Plan shall include:

- A written description of the major elements of work involved at and around the project's facilities with emphasis on dredging and dredged sediment transport (hydraulic or scow) operations, sediment dewatering and transfer operations, water treatment facilities, and environmental controls and protection measures.

- Operation and maintenance procedures required for critical machinery and equipment according to manufacturers' recommendations. This item shall include major daily, weekly, and monthly maintenance activities that will require shut-down of the equipment and a schedule for inspections that are required for specific equipment and machines.
- An operation schedule to include primary labor types (e.g., dredging, processing, monitoring, etc.), number of shifts and hours of operation, and estimated number of persons required on a daily basis.
- An Equipment Decontamination Plan for machinery and trucks that come into contact with PCBs or any other potential constituents of concern at the site and are leaving the site or otherwise need to be decontaminated (e.g., equipment leaving an exclusion zone).
- A Contingency Plan, along with the names and contacts of manufacturers and maintenance professionals for critical equipment related to Phase 1 activities. Emergency contact numbers for local, state and federal government organizations shall be cross-referenced to the appropriate RA document (i.e., Remedial Action Community Health and Safety Plan [RA CHASP], Remedial Action Health and Safety Plan [RA HASP]).
- Procedures for shutting down operations at the sediment processing facility for the off season (i.e., after processing of dredged sediments is completed for the season). Procedures for winterization of equipment, security and site access, demobilization of labor and equipment, and management of stormwater shall be included.

2.3.2.2.6 Updates to Phase 1 RA CHASP

To the extent necessary, GE shall update the RA CHASP submitted pursuant to the Remedial Design Administrative Order on Consent (RD AOC) (Index No. CERCLA-02-2003-2027). The RA CHASP update shall be consistent with the RA CHASP Scope, which is attached to this SOW as Attachment D and is incorporated herein. Upon approval by EPA, such update shall be incorporated into the RA CHASP.

2.3.2.3 RA HASP

To the extent necessary, GE shall update the RA HASP submitted pursuant to the RD AOC. Such update shall be submitted concurrently with the RA Work Plan for Phase 1 Dredging and Facility Operations.

EPA will review GE's update to the RA HASP and may request modifications thereto. Such update shall be incorporated into the RA HASP upon its finalization by GE. GE shall provide EPA with a copy of the final update to the RA HASP.

2.3.2.4 Phase 1 Facility Demobilization and Restoration Plan

In the event that GE elects not to perform Phase 2 pursuant to this Consent Decree, GE shall submit a Phase 1 Facility Demobilization and Restoration Plan within 30 days of GE's notification regarding performance of Phase 2. The Phase 1 Facility Demobilization and Restoration Plan shall address demobilization and restoration of any Phase 1 sediment processing/transfer facility(ies) and ancillary and support facilities, unless EPA advises GE that such facilities will be retained for Phase 2.

The Phase 1 Facility Demobilization and Restoration Plan shall include:

- A detailed description of the steps to be taken for removal or demobilization (i.e., decontamination of equipment, cleanup of all contamination resulting from remedial operations, disposal of residual wastes, sampling of soils at the processing site(s), etc.) and a plan for restoring any properties on which Phase 1 operations were conducted (e.g., removal of roads, railroad sidings, fences, signs, sumps, re-grading each property for drainage, topsoil and seed as applicable, disconnection of power, habitat restoration, etc.). The restoration of such properties shall be consistent with Paragraph 36.e of the Consent Decree. The Phase 1 Facility Demobilization and Restoration Plan shall include a decontamination plan specific to these activities.
- A preliminary schedule for removal, demobilization and site restoration indicating the duration of those activities.
- A Contingency Plan for obstacles or difficulties encountered during demobilization and site restoration.

2.3.3 Phase 1 Dredging Activities

GE shall implement Phase 1 of the RA in accordance with the Consent Decree, including, but not limited to, Paragraph 12.a of the Consent Decree.

2.3.3.1 Pre-Dredging Construction Conference

At least 15 days prior to the start of Phase 1 dredging and facility operations, GE shall conduct a Pre-Dredging Construction Conference with EPA, the State, and other persons authorized by EPA (including contractors). The agenda for the Pre-Dredging Construction Conference will include the following topics:

- Construction management, including but not limited to communications protocols and standing meetings.
- The procedure to be used by GE, its contractors, and other entities for documenting and reporting inspection data and compliance with specifications and plans, including procedures and timelines for processing design changes and securing EPA review and approval of such changes as necessary.
- The procedure to be used for distributing and storing documents and reports.
- Work area security.
- Safety programs and requirements.
- Quality control and quality assurance procedures (including process for modifications to the Phase 1 CQAP to verify that site-specific considerations are addressed).
- Site tour to confirm access, laydown space, and other issues (including an inspection of each facility, including temporary and ancillary facilities).

GE shall transmit a written summary of the conference to EPA and the State within 7 days after the conference.

2.3.3.2 Implementation of Phase 1 Dredging Activities

GE shall initiate Phase 1 dredging activities in accordance with the construction schedule included in the approved RA Work Plan for Phase 1 Dredging and Facility Operations (as described in Section 2.3.2.2) or upon completion of Phase 1 processing facility construction (including all site work and processing equipment installation), whichever is later, subject to extensions for delays attributable to force majeure, as provided in Section XVIII of the Consent Decree.

3. Phase 2 of Remedial Action

3.1 Phase 2, Year 1 of Remedial Action

This section of the SOW sets forth requirements relating to Phase 2, Year 1 of the RA. For purposes of this SOW, "Phase 2, Year 1" refers to the performance of Phase 2 dredging and associated remedial activities in the remainder of the calendar year in which GE is required to provide the notice described in Paragraph 15.c of the Consent Decree (as to whether GE will implement Phase 2 pursuant to the Consent Decree), provided that EPA and GE agree on an area for such dredging pursuant to Paragraph 17 of the Consent Decree, unless no dredging is performed in the year immediately following Phase 1. If no dredging is performed in the year immediately following Phase 1, then Phase 2, Year 1 will be the next year in which dredging will be performed.

3.1.1 Work Plans and Associated Submittals for Phase 2, Year 1

3.1.1.1 RA Work Plan and Revisions to Design Documents for Phase 2, Year 1 Dredging

Within 30 days of GE's receipt from EPA of EPA's final decision regarding changes, if any, to the Phase 1 Engineering Performance Standards, the Phase 1 Quality of Life Performance Standards, and the scope of Phase 2 (or within such other time as is agreed to by EPA and GE), and without regard to whether GE notifies (or intends to notify) EPA that it will implement Phase 2 pursuant to the Consent Decree, GE shall submit to EPA, for review and approval, an RA Work Plan for Phase 2, Year 1 Dredging and Facility Operations, and revisions and/or addenda to the applicable approved design documents that are needed for or applicable to Phase 2, Year 1 of the RA to account for EPA's decision regarding changes, if any, to the Phase 1 Engineering Performance Standards, Phase 1 Quality of Life Performance Standards, the SOW and the scope of Phase 2, subject to the following proviso: If, before the end of such 30-day period, the Parties agree that, based on the terms of Paragraph 17 of the Consent Decree, there will be no dredging of a discrete area in the calendar year that immediately follows the year in which the Phase 1 dredging takes place, then within such 30-day period, GE need only submit to EPA, for review and approval, a schedule for submitting, prior to the submission of the Phase 2 RA Work Plan specified in Section 3.2.1, below, the Phase 2 design revisions and/or addenda to the approved Phase 2 design documents that are needed for the remainder of Phase 2.

The RA Work Plan for Phase 2, Year 1 Dredging and Facility Operations shall propose a scope of dredging for Phase 2, Year 1 that is consistent with Paragraph 17 of the Consent Decree (if Paragraph 17 is applicable) and shall comply with the requirements of Section 2.3.2.2 of this SOW, except that such work plan shall address Phase 2, Year 1 of the Remedial Action instead of Phase 1. GE may, as appropriate, satisfy the foregoing requirement to submit the RA Work Plan for Phase 2, Year 1 Dredging and Facility Operations by submitting revisions and/or addenda to the RA Work Plan for Phase 1 Dredging and Facility Operations that are necessary for Phase 2, Year 1 of the RA. In addition, the RA Work Plan for Phase 2, Year 1 Dredging and Facility Operations and the revisions and/or addenda to the applicable approved design documents may specify certain changes to the design of Phase 2 that will not be implemented in Phase 2, Year 1 (if Phase 2, Year 1 occurs in the first calendar year following Phase 1) due to schedule limitations, but will be implemented in subsequent years of Phase 2. Such changes are referred to in this SOW as "Deferred Phase 2 Design Changes." The RA Work Plan for Phase 2, Year 1 will contain a schedule for submitting, prior to the submission of the Phase 2 RA Work Plan specified in Section 3.2.1, the Phase 2 design revisions and/or addenda to the approved Phase 2 design documents that are needed for the remainder of Phase 2.

Simultaneously with submission of the RA Work Plan for Phase 2, Year 1 Dredging and Facility Operations, GE shall also submit to EPA, for review and approval, revisions and/or addenda to the Phase 1 RAM QAPP to address monitoring during Phase 2, Year 1 of the RA. Such revisions and/or addenda shall comply with the requirements of Section 2.3.2.1 of this SOW, except that such revisions and/or addenda shall address Phase 2, Year 1 of the RA instead of Phase 1.

In the event that GE's RA Work Plan for Phase 2, Year 1 Dredging and Facility Operations provides for dredging to be performed in a discrete area in the calendar year that immediately follows Phase 1, but by operation of Paragraph 17 of the Consent Decree no dredging is performed in that year, then the design and scope of dredging that was set out in the RA Work Plan for Phase 2, Year 1 Dredging and Facility Operations and in the revisions and/or addenda to the applicable approved design documents that were submitted with that work plan shall no longer be applicable. Instead, in that case, the revisions and/or addenda to the applicable approved design documents for the first year of Phase 2 dredging shall be submitted in accordance with the schedule set out in the RA Work Plan for Phase 2, Year 1, as approved by EPA, and the RA Work Plan for the first year of Phase 2 dredging shall be submitted in accordance with Section 3.2.1.

3.1.1.2 Update to RA HASP

To the extent necessary and in accordance with Section 2.3.2.4 of this SOW, GE shall update the RA HASP to address Phase 2, Year 1 of the RA. Such updates shall be submitted within the 30-day period referenced in Section 3.1.1.1 above.

3.1.2 Implementation of Phase 2 Dredging During the First Calendar Year After Phase 1 Dredging

If GE notifies EPA that it will implement Phase 2 of the RA under the Consent Decree, and if GE and EPA agree on a discrete area(s), pursuant to Paragraph 17 of the Consent Decree, for performing Phase 2, Year 1 work, GE shall commence and conduct such work in accordance with Paragraph 18 of the Consent Decree.

3.2 Remainder of Phase 2 of Remedial Action

3.2.1 Work Plans and Associated Submittals for Phase 2

If GE notifies EPA that it will implement Phase 2 under the Consent Decree, then for the Work to be performed in each construction year following Phase 2, Year 1 of the RA or if no dredging was performed in the construction year following Phase 1, GE shall submit by February 15 of each such year (or by such alternate date as is agreed to by GE and EPA), for EPA review and approval, an RA Work Plan for Phase 2 Dredging and Facility Operations (or, for any year after the first full year of Phase 2, any necessary revisions and/or addenda to a previously approved RA Work Plan for Phase 2 Dredging and Facility Operations), along with any necessary revisions and/or addenda to the applicable approved design documents for Phase 2 (if such revisions and/or addenda have not already been submitted to EPA pursuant to the schedule contained in the EPA-approved RA Work Plan for Phase 2, Year 1 under Section 3.1.1.1). These submittals may include any previously proposed changes to the Phase 2 RD or Phase 2 of the RA, including the Deferred Phase 2 Design Changes described in Section 3.1.1.1 above.

3.2.1.1 RA Work Plans and Revisions to Design Documents for Phase 2 Dredging

Any revisions and/or addenda to the applicable approved design documents submitted by GE pursuant to this section shall, as appropriate, address, but not be limited to, the following project components:

- Construction specifications;
- Sediment processing facility design and operation;
- Dredging design;
- Resuspension control;
- Dredged material transport to processing facility;
- Sediment and water processing;
- Transportation for disposal or beneficial use;
- Disposal;
- Backfilling/capping; and
- Habitat replacement and reconstruction.

For any year after the first year of Phase 2 dredging, if experience from the prior year(s) of Phase 2 demonstrates that modifications to the previously approved Phase 2 design documents are necessary to achieve and maintain the Phase 2 Engineering and/or Quality of Life Performance Standards established by EPA, the revisions and/or addenda to the Phase 2 design documents that are submitted by GE for the upcoming year shall contain such modifications, subject to the provisions of Paragraph 20 of the Consent Decree.

The RA Work Plans for Phase 2 Dredging and Facility Operations (or RA Work Plan revisions or addenda) submitted by GE pursuant to this section, shall comply with the respective requirements of Section 2.3.2.2 of this SOW, except that such work plans, revisions and/or addenda shall address the appropriate construction season of Phase 2 instead of Phase 1. Thus, such RA Work Plans or RA Work Plan revisions and/or addenda shall include a Phase 2 Dredging CQAP, a Phase 2 Performance Standards Compliance Plan, a Phase 2 Property Access Plan, a Phase 2 Transportation and Disposal Plan, a Phase 2 Facility Operations and Maintenance Plan, and a Phase 2 CHASP – all of which may include updates to the comparable Phase 1 plans. In addition, a Phase 2 RAM QAPP (or revisions or addenda to a previously approved RAM QAPP) shall be submitted, as necessary, along with each RA Work Plan for Phase 2 Dredging and Facility Operations. Such Phase 2 RAM QAPP (or revisions and/or addenda) shall contain the information specified in Section 2.3.2.1 above.

3.2.1.2 RA Work Plan for Phase 2 Facility Construction (if necessary)

If Phase 2 will include the use of a sediment processing/transfer facility(ies) other than the facility used for Phase 1 and Phase 2, Year 1 (if Phase 2, Year 1 occurs in the first calendar year following Phase 1), GE shall

also submit, at the same time as the documents described in Section 3.2.1, an RA Work Plan for Phase 2 Facility Construction. The RA Work Plan for Phase 2 Facility Construction shall comply with the requirements of Sections 2.1.2 and 2.2.2 above, except that such work plan shall address the sediment processing/transfer facility(ies) to be constructed for Phase 2 instead of the facility constructed for Phase 1. The RA Work Plan for Phase 2 Facility Construction shall state the year of Phase 2 in which such Phase 2 facility(ies) shall begin to be used, and include a schedule for construction of such facility(ies). The schedule shall allow sufficient time for construction and startup prior to the facility being required for use.

3.2.1.3 Update to RA HASP

To the extent necessary (and in accordance with Section 2.3.2.3 of this SOW), by February 15 of each year following Phase 2, Year 1 of the RA (or by such alternate date as is agreed to by GE and EPA), GE shall update the RA HASP.

3.2.1.4 Phase 2 Facility Demobilization and Restoration Plan

In addition to the above plans, for any year of Phase 2 in which demobilization and/or restoration activities are scheduled for any sediment processing/transfer facility(ies) or other ancillary and/or support facilities, a Phase 2 Facility Demobilization and Restoration Plan shall be included with the RA Work Plan for such year. That Phase 2 Facility Demobilization and Restoration Plan shall address demobilization and restoration of such sediment processing/transfer facility(ies) and ancillary and support facilities and shall meet the same requirements specified in Section 2.3.2.4 for a Phase 1 Facility Demobilization and Restoration Plan.

3.2.2 Phase 2 Dredging Activities

If GE notifies EPA that it will implement Phase 2 under the Consent Decree, GE shall implement Phase 2 of the RA in accordance with the Consent Decree, including, but not limited to, Paragraph 12.b of the Consent Decree.

3.2.2.1 Annual Construction Conference for Phase 2

If GE notifies EPA that it will implement Phase 2 of the RA under the Consent Decree, then, at least 15 days prior to the start of dredging in each year of Phase 2, GE shall conduct a Construction Conference with EPA, the State, and other persons authorized by EPA (including contractors). The agenda for each Annual Conference will include the following topics:

- Construction management, including but not limited to communications protocols and standing meetings.
- The procedure to be used by GE, its contractors, and other entities for documenting and reporting inspection data, and compliance with specifications and plans, including procedures and timelines for processing design changes and securing EPA review and approval of such changes as necessary.
- The procedure to be used for distributing and storing documents and reports.
- Work area security.
- Safety programs and requirements.
- Quality control and quality assurance procedures (including process for modifications to the Phase 1 CQAP to verify that site-specific considerations are addressed).
- Site tour to confirm access, laydown space, and other issues (including an inspection of each facility, including temporary and ancillary facilities).

GE shall transmit a written summary of the conference to EPA and the State within 7 days after the conference.

3.2.2.2 Implementation of Phase 2 Dredging Activities

If GE notifies EPA that it will implement Phase 2 of the RA under the Consent Decree, GE shall initiate each year of Phase 2 dredging activities (after Phase 2, Year 1) in accordance with the construction schedule included in the approved RA Work Plan(s) for Phase 2 Dredging and Facility Operations (or in any approved revisions and/or addenda to a previously approved RA Work Plan for Phase 1 Dredging and Facility Operations), subject to extensions for delays attributable to force majeure, as provided in Section XVIII of the Consent Decree. GE shall complete and/or satisfy the following additional requirements for Phase 2 of the RA:

- Conduct activities required by the Consent Decree to seek property access agreements/acquisitions/ easements for ancillary facilities/support functions necessary to initiate each year of Phase 2 dredging in

accordance with the schedule set forth in the RA Work Plan for Phase 2 Dredging and Facility Operations; and

- Complete construction of sufficient sediment processing/transfer facility capacity and any necessary ancillary or temporary facilities in sufficient time for each year of Phase 2 dredging activities to begin in accordance with the schedule set forth in the EPA-approved RA Work Plan for Phase 2 Dredging and Facility Operations. Record drawings shall be submitted to EPA after completion of facility construction activities, in accordance with the schedule provided in the RA Work Plan for Phase 2 Dredging and Facility Operations.

4. Operation, Maintenance, and Monitoring

4.1 Operation, Maintenance, and Monitoring Plan for Phase 1 Caps and Habitat Replacement/Reconstruction

Within 90 days after completion of the Phase 1 in-water work that occurs in the first construction season of remedial dredging, GE shall submit to EPA, for review and approval, an Operation, Maintenance, and Monitoring Plan for Phase 1 Caps and Habitat Replacement/Reconstruction (Phase 1 Cap/Habitat OM&M Plan). This plan shall specify the activities that GE shall perform for operation, maintenance, and monitoring (OM&M) of the caps installed in the areas dredged in Phase 1 and for OM&M of any habitat replacement/reconstruction measures installed in those areas in that construction season. This plan shall be consistent with Sections 3 and 4 of the Operation, Maintenance, and Monitoring Scope (OM&M Scope), which is attached to this SOW as Attachment E and made a part hereof. The Phase 1 Cap/Habitat OM&M Plan shall also include the information specified in Section 2.3.2.1 of this SOW (relating to the RAM QAPP) where relevant to the scope of monitoring described in the Phase 1 Cap/Habitat OM&M Plan.

In addition, GE shall submit to EPA, for review and approval, within 90 days after completion of any additional habitat replacement/reconstruction measures that are installed in the Phase 1 dredge areas in the following construction season, an addendum to the Phase 1 Cap/Habitat OM&M Plan, which shall set forth the provisions for OM&M of those habitat replacement/reconstruction measures. This addendum shall meet the same requirements applicable to the Phase 1 Cap/Habitat OM&M Plan, as set forth above. If GE notifies EPA that it will implement Phase 2 of the RA under the Consent Decree, and if Phase 2, Year 1 dredging occurs in the construction season that immediately follows the year in which Phase 1 dredging is performed, then GE may submit such addendum as part of the first Operation, Maintenance and Monitoring Plan for Phase 2 Caps and Habitat Replacement/Reconstruction (Phase 2 Cap/Habitat OM&M Plan) submitted by GE pursuant to Section 4.2, below.

4.2 Operation, Maintenance, and Monitoring Plan for Phase 2 Caps and Habitat Replacement/Reconstruction

If GE notifies EPA that it will implement Phase 2 of the RA under the Consent Decree, GE shall submit to EPA, for review and approval, on an annual basis during Phase 2, a Phase 2 Cap/Habitat OM&M Plan or an

addendum to a previously approved Phase 2 Cap/Habitat OM&M Plan. This plan (or addendum) shall be submitted to EPA within 90 days after completion of field activities in each year of Phase 2. Each such plan (or addendum) shall specify the activities that GE shall perform for OM&M of the caps and habitat replacement/reconstruction measures installed in that construction season, and shall be consistent with Sections 3 and 4 of the OM&M Scope, which is attached to this SOW as Attachment E and made a part hereof. Each Phase 2 Cap/Habitat OM&M Plan (or addendum) shall also include the information specified in Section 2.3.2.1 of this SOW (relating to the RAM QAPP) where relevant to the scope of monitoring described in the Phase 2 Cap/Habitat OM&M Plan. The annual Phase 2 Cap/Habitat OM&M Plan (or addendum) for a given year may incorporate by reference provisions from a previously approved Phase 2 Cap/Habitat OM&M Plan.

4.3 Water, Fish and Sediment Operation, Maintenance, and Monitoring Plan

If GE notified EPA that it will implement Phase 2 of the RA under the Consent Decree, then by March 15 of the last year of Phase 2, GE shall submit to EPA, for review and approval, an Operation, Maintenance, and Monitoring Plan for Water, Fish and Sediment Monitoring. The Water, Fish and Sediment OM&M Plan shall specify the water column, fish, and sediment monitoring programs that GE shall conduct under the Consent Decree, commencing upon completion of all remedial activities under the Consent Decree (excluding OM&M), to assess PCB levels in those media. This plan shall be consistent with Section 2 of the OM&M Scope, which is attached to this SOW as Attachment E and made a part hereof. The Water, Fish and Sediment OM&M Plan shall also include the information specified in Section 2.3.2.1 of this SOW (relating to the RAM QAPP) where relevant to the scope of monitoring described in the Water, Fish and Sediment OM&M Plan.

In addition, GE shall update the RA HASP to address OM&M activities, and shall submit it to EPA simultaneously with the Water, Fish and Sediment OM&M Plan.

4.4 Implementation of Operation, Maintenance, and Monitoring Activities

GE shall commence and conduct implementation of OM&M for caps, habitat replacement/reconstruction, and water and fish monitoring in accordance with the schedules set forth in the approved OM&M Plans.

5. Progress Meetings, Completion Process, and Associated Reporting

5.1 RA Progress Meetings

Throughout Phase 1 of the RA (and throughout Phase 2 if GE notifies EPA that it will implement Phase 2 under the Consent Decree), GE shall participate in regularly scheduled RA progress meetings with EPA, the State of New York, and their authorized representatives. The meetings shall be held weekly during construction of the sediment processing/transfer facility(ies) and during remedial dredging unless a less frequent schedule is agreed to by EPA. At a minimum, GE shall address the following at the RA progress meetings:

- General progress of construction with respect to RA schedule;
- Problems encountered (including, but not limited to, problems with compliance with one or more Performance Standards) and associated action items;
- Pending design, RA Work Plan, personnel or schedule changes requiring EPA review and approval;
- Results of any sediment sampling to assess post-dredging PCB levels and associated decisions and action items; and
- Issues related to community and worker health and safety.

5.2 Certification Unit-Specific Completion Approvals/Certifications

This section sets forth the approvals and certifications that will be prepared following completion of particular activities in each Certification Unit (CU). (A CU is described in Section 3.2 of the RA Monitoring Scope, which is Attachment B hereto.) These provisions apply both to Phase 1 of the RA and, if GE notifies EPA that it will implement Phase 2 under the Consent Decree, to Phase 2.

5.2.1 CU Dredging Completion Approvals

Following the completion of dredging and collection and analysis of post-dredging sediment samples within a given CU, GE shall review the information on the horizontal and vertical limits of removal and the results of the

most recent round of post-dredging sediment sampling within the CU to determine whether the dredging in that CU has been completed in accordance with the applicable Final Design requirements and the requirements of the PSCP Scope (Attachment C hereto, Section 3), the Performance Standards Compliance Plan, and the CQAP. Once GE has determined that dredging in the CU has been completed in accordance with those requirements, GE shall also determine whether and to what extent the CU will be backfilled or capped in accordance with the applicable Final Design requirements and the requirements of the PSCP Scope (Attachment C hereto, Section 3) and the Performance Standards Compliance Plan. Upon making these determinations, GE shall complete the form entitled "CU Dredging Completion Approval," which is included in Attachment F hereto, and prepare the attachments referenced therein. GE shall then present that completed form to the EPA field representative for review and concurrence. If the EPA field representative agrees that dredging has been completed in accordance with the applicable Final Design requirements and the requirements of the PSCP Scope (Attachment C hereto, Section 3) and the Performance Standards Compliance Plan, and that the specified plan for backfilling and/or capping conforms to the requirements in those documents, the EPA field representative will promptly indicate concurrence by initialing and signing the form where indicated. Once the CU Dredging Completion Approval form has been signed of behalf of both GE and EPA, no additional dredging activities will be required in that CU (subject to the pre- and post-certification reservations in Paragraphs 100 and 101 of the Consent Decree and the general reservations of rights in Paragraph 104 of the Consent Decree) and GE may proceed with the backfilling and/or capping activities as indicated on the form.

5.2.2 CU Backfill/Engineered Cap Completion Approvals

Following completion of backfilling and/or capping in a given CU, GE shall review the information on the installed backfill and/or cap to determine whether the backfill and/or cap has been installed in accordance with the applicable Final Design requirements for backfill and/or capping, as well as the applicable requirements of the PSCP Scope (Attachment C hereto, Section 3), the Performance Standards Compliance Plan, and the CQAP. GE shall also prepare a record drawing of the installed backfill and/or cap. Once GE has determined that all backfilling and capping in the CU has been completed in accordance with the above requirements, GE shall complete the CU Backfill/Engineered Cap Completion Approval form, which is included in Attachment F hereto, and attach the record drawing thereto. GE shall then present that completed form to the EPA field representative for review and concurrence. If the EPA field representative agrees that all backfilling and capping in the CU has been completed in accordance with the above requirements, the EPA field representative will promptly indicate concurrence by initialing and signing the form where indicated. Once the CU Backfill/Engineered Cap Completion Approval form has been signed of behalf of both GE and EPA, no

additional backfill placement or capping will be required in that CU (subject to the pre- and post-certification reservations in Paragraphs 100 and 101 of the Consent Decree and the general reservations of rights in Paragraph 104 of the Consent Decree).

5.2.3 Final CU Construction Completion Certifications

Following completion of all remedial construction activities in a given CU, including, but not limited to, the initial installation of active habitat replacement/reconstruction measures (if required under the Final Design), but excluding OM&M and adaptive management activities, GE shall review the habitat replacement/reconstruction measures installed (if any) to verify that they have been installed in accordance with the applicable Final Design requirements, with any modifications consistent with the Final Design and with Section 2.7 of the Critical Phase 1 Design Elements (Attachment A hereto). GE shall also prepare record drawings (hard copy and electronic) of the location and type of habitat replacement/reconstruction within that CU and of the final bathymetry and profile. Upon determining that all remedial construction activities in the CU (excluding OM&M and adaptive management) have been completed, GE shall complete the Final CU Construction Completion Certification form, which is included in Attachment F hereto, and attach the record drawings thereto. GE shall then present that completed form to the EPA field representative for review and concurrence. If the EPA field representative agrees that all remedial construction activities in the CU (excluding OM&M and adaptive management) have been completed in accordance with the applicable requirements, the EPA field representative will promptly indicate concurrence by initialing and signing the form where indicated. Once the Final CU Construction Completion Certification form has been signed of behalf of both GE and EPA, no additional remedial activities will be required in that CU (excluding OM&M and adaptive management measures), subject to the pre- and post-certification reservations in Paragraphs 100 and 101 of the Consent Decree and the general reservations of rights in Paragraph 104 of the Consent Decree.

5.2.4 CU Completion Reports

Following the signing by both GE and EPA of the Final CU Construction Completion Certification for a given CU, GE shall prepare and submit to EPA a CU Completion Report. Each such report shall contain the information specified for such reports in Section 3.6 of the RA Monitoring Scope (Attachment B hereto).

5.3 Phase 1 Data Compilation and Evaluation Reports

GE shall submit to EPA a Phase 1 Data Compilation Report and Phase 1 Evaluation Report pursuant to Paragraph 13 of the Consent Decree.

5.4 Phase 1 Construction Completion Inspection(s) and Report(s)

Pursuant to Paragraph 56 of the Consent Decree, within 7 days after GE makes the preliminary determination that all "Phase 1 Field Activities" (as that term is defined in Paragraph 56.a of the Consent Decree) have been completed in accordance with the Consent Decree, GE shall schedule with EPA and the State a Pre-Final Phase 1 Construction Completion Inspection.

Within 15 days after completion of any activities that EPA requires GE to perform, pursuant to Paragraph 56 of the Consent Decree, in order to complete the Phase 1 Field Activities, GE shall schedule with EPA and the State a Final Phase 1 Construction Completion Inspection in accordance with Paragraph 56 of the Consent Decree.

GE shall submit a Phase 1 Construction Report (or Reports) in accordance with Paragraph 56 of the Consent Decree.

5.5 Phase 2 Annual Progress Reports

GE shall submit annual progress reports within 30 days of completion of work activities for each year of Phase 2 of the RA. (GE shall only be required to submit these annual progress reports pursuant to this SOW if GE notifies EPA that it will implement Phase 2 under the Consent Decree.)

The annual progress reports shall include the information required for the annual production progress reports as specified in Section 4.3 of the PSCP Scope (Attachment C hereto). The annual progress reports also shall include record drawings signed and stamped by a professional engineer registered in the State of New York, and other supporting documentation to demonstrate that the Phase 2 CQAP was followed. The report shall contain the following statement, signed by GE's Project Coordinator or a responsible corporate official of GE:

> I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather

and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information contained in or accompanying this submission is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

5.6 Remedial Action Completion Inspection(s) and Report(s)

If GE notifies EPA that it will implement Phase 2 of the RA under the Consent Decree, then GE shall comply with the following requirements:

Pursuant to Paragraph 57 of the Consent Decree, within 15 days after GE makes the preliminary determination that the RA is complete, GE shall schedule with EPA and the State an RA Completion Pre-Final Inspection.

Within 15 days after completion of any activities that EPA requires GE to perform, pursuant to Paragraph 57 of the Consent Decree, to complete the RA, GE shall schedule with EPA and the State an RA Completion Final Inspection in accordance with Paragraph 57 of the Consent Decree.

GE shall submit a Remedial Action Report (or Reports) in accordance with Paragraph 57 of the Consent Decree.

5.7 Work Completion Inspection(s) and Report(s)

Pursuant to Paragraph 58 of the Consent Decree, within 30 days after GE concludes that the work, including OM&M, has been fully performed, GE shall schedule with EPA and the State a Pre-Certification Inspection of the Work.

Within 15 days after completion of any activities that EPA requires GE to perform, pursuant to Paragraph 58 of the Consent Decree, to complete the Work, GE shall schedule with EPA and the State a Final Inspection of the Work in accordance with Paragraph 58 of the Consent Decree.

GE shall submit a Work Completion Report (or Reports) in accordance with Paragraph 58 of the Consent Decree.

6. Schedule for Remedial Action Deliverables/Tasks

The schedule for submission of major deliverables to EPA and completion of key tasks is set forth in Table 1. The tasks and submissions listed in Table 1 and their respective due dates, as well as additional requirements, are described more fully in prior sections of this SOW. To the extent that there is any apparent conflict between the requirements or the due dates listed in Table 1 and those that are listed in prior sections, the requirements and the due dates set forth in the prior sections shall control. In computing any period of time under this SOW, where the last day would fall on a Saturday, Sunday, or federal holiday, the period shall run until the close of business on the next working day. In addition, all due dates specified in prior sections of this SOW and in Table 1 are subject to modification if GE proposes an alternate date in the preceding deliverable and EPA approves that alternate date.

Table 1

Summary Schedule for Statement of Work

#	Activity	Deadline
Phase 1 Contracting		
1.	Issue Notice of Award to the Phase 1 Facility Site Work Construction contractor(s)	The latest of: • 15 days after EPA approval of the Phase 1 Final Design Report (or that portion of the Final Design that has been developed for Facility Site Work), if bid revisions (based on EPA-approved Phase 1 Final Design) are not necessary; • 30 days after EPA approval of the Phase 1 Final Design Report (or that portion of the Final Design that has been developed for Facility Site Work), if bid revisions (based on EPA-approved Phase 1 Final Design) are necessary and no significant changes to the design are required; • 80 days after GE's submission of the Phase 1 Final Design Report; or • 10 days after entry of the Consent Decree. If GE does not receive any responsive bids, GE shall develop a plan to address that situation, shall discuss it with EPA, and if necessary shall propose a revised schedule for obtaining bids and issuing a Notice of Award.
2.	Issue Notice to Proceed to the Phase 1 Facility Site Work Construction contractor(s)	30 days from Notice of Award to the Phase 1 Facility Site Work Construction contractor(s).
3.	Submit Alternative Designs for Phase 1 Dredging and/or Phase 1 Processing Equipment Installation, Facility Operations, and Remaining Site Work (if warranted based on input from potential contractors)	75 days from GE's submittal of Phase 1 Final Design Report.

Table 1

Summary Schedule for Statement of Work

#	Activity	Deadline
4.	Issue Notice of Award to the contractors(s) for Phase 1 Dredging and Phase 1 Processing Equipment Installation, Facility Operations, and Remaining Site Work	The latest of: • 15 days after EPA approval of the Phase 1 Final Design Report, if bid revisions (based on EPA-approved Phase 1 Final Design) are not necessary; • 45 days after EPA approval of the Phase 1 Final Design Report, if bid revisions (based on EPA-approved Phase 1 Final Design) are necessary and no significant changes to the design are required. • 120 days after GE's submission of the Phase 1 Final Design Report; • 15 days after EPA approval of alternative designs recommended by GE (if necessary); or • 10 days after entry of the Consent Decree. If GE does not receive any responsive bids, GE shall develop a plan to address that situation, shall discuss it with EPA, and if necessary shall propose a revised schedule for obtaining bids and issuing a Notice of Award.
5.	Issue Notice to Proceed to the contractor(s) for Phase 1 Dredging and Phase 1 Processing Equipment Installation, Facility Operations, and Remaining Site Work	60 days from Notice of Award to the contractors(s) for Phase 1 Dredging and Phase 1 Processing Equipment Installation, Facility Operations, and Remaining Site Work.
Work Plans for Phase 1		
6.	Submit RA Work Plan for Phase 1 Facility Site Work Construction	Within 30 days after Notice of Award to the Phase 1 Facility Site Work Construction contractor(s).

Table 1

Summary Schedule for Statement of Work

#	Activity	Deadline
7.	Submit Phase 1 Remedial Action Monitoring QAPP	Within 30 days after the later of: (a) GE's submission of the Phase 1 Final Design Report; or (b) entry of the Consent Decree.
8.	Submit RA Work Plan for Phase 1 Processing Equipment Installation and Remaining Site Work	Within 30 days after Notice of Award to the contractor(s) for Phase 1 Dredging and Phase 1 Processing Equipment Installation, Facility Operations, and Remaining Site Work.
9.	Submit Remedial Action Work Plan for Phase 1 Dredging and Facility Operations	Within 60 days after Notice of Award to the contractor(s) for Phase 1 Dredging and Phase 1 Processing Equipment Installation, Facility Operations, and Remaining Site Work.
10.	Submit update to Remedial Action Worker Health and Safety Plan	Concurrently with submission of RA Work Plan for Phase 1 Dredging and Facility Operations.
11.	Submit Phase 1 Facility Demobilization and Restoration Plan (if GE notifies EPA that it elects not to perform Phase 2 under the Consent Decree)	Within 30 days after GE notification regarding performance of Phase 2, in the event that GE elects not to perform Phase 2.
Phase 1 Construction and Dredging		
12.	Hold Pre-Construction Conference for Phase 1 Facility Site Work Construction	Within 15 days of (a) receiving EPA's approval of the RA Work Plan for Phase 1 Facility Site Work Construction or (b) issuing Notice to Proceed to the Phase 1 Facility Site Work Construction contractor(s), whichever is later.
13.	Initiate Phase 1 Facility Site Work Construction	In accordance with the approved RA Work Plan for Phase 1 Facility Site Work Construction and after issuing Notice to Proceed to the Phase 1 Facility Site Work Construction contractor(s).
14.	Complete Phase 1 Facility Site Work Construction	In accordance with the approved RA Work Plan for Phase 1 Facility Site Work Construction.

Table 1

Summary Schedule for Statement of Work

#	Activity	Deadline
15.	Hold Pre-Construction Conference for Phase 1 Processing Equipment Installation and Remaining Site Work	Within 15 days of (a) EPA approval of the RA Work Plan for Phase 1 Processing Equipment Installation and Remaining Site Work or (b) issuing Notice to Proceed to the contractor(s) for Phase 1 Processing Equipment Installation and Remaining Site Work, whichever is later.
16.	Initiate Phase 1 Processing Equipment Installation and Remaining Site Work	In accordance with the approved RA Work Plan for Phase 1 Processing Equipment Installation and Remaining Site Work and after issuing Notice to Proceed to the contractor(s) for Phase 1 Processing Equipment Installation and Remaining Site Work.
17.	Complete Phase 1 Processing Equipment Installation and Remaining Site Work	In accordance with the approved RA Work Plan for Phase 1 Processing Equipment Installation and Remaining Site Work.
18.	Hold Pre-Dredging Construction Conference for Phase 1 Dredging Activities	At least 15 days prior to the start of Phase 1 dredging and after issuing Notice to Proceed to the Phase 1 Dredging and Facility Operations contractor(s).
19.	Initiate Phase 1 Dredging Activities	In accordance with the construction schedule included in the approved RA Work Plan for Phase 1 Dredging and Facility Operations and upon completion of Phase 1 Facility Construction (including all Site Work and Processing Equipment Installation), whichever is later.

Table 1

Summary Schedule for Statement of Work

#	Activity	Deadline
RA Work Plans and Contracting for Phase 2		
20.	Submit RA Work Plan for Phase 2, Year 1 Dredging and Facility Operations and Revisions and/or Addenda to the applicable Approved Design Documents, as needed, for Phase 2, Year 1. This RA Work Plan, will include a schedule for submitting design revisions for "Deferred Phase 2 Design Changes", if any	Within 30 days of GE's receipt from EPA of EPA's final decision (following peer review) regarding changes, if any, to the Engineering Performance Standards, the Quality of Life Performance Standards, and the scope or design of Phase 2 (or such other time as agreed to by EPA and Settling Defendant).
21.	Submit update to RA Worker Health and Safety Plan to address Phase 2 Year 1	Concurrently with submission of RA Work Plan for Phase 2, Year 1 Dredging and Facility Operations.
22.	If Settling Defendant notifies EPA that it will implement Phase 2 pursuant to the Consent Decree, then for each construction year after Phase 2, Year 1, and for the first year of Phase 2 dredging if no dredging was performed in the construction year following Phase 1, submit RA Work Plan for Phase 2 Dredging and Facility Operations, RA Work Plan for Phase 2 Facility Construction (if needed), and for each year after the first full year of Phase 2, any necessary revisions and/or addenda to the Approved Design Documents	For each construction year following Phase 2, Year 1, or if no dredging was performed in the construction year following Phase 1, by February 15 of each such year (or by such date as is agreed to by EPA and GE).
23.	Submit update to RA Worker Health and Safety Plan to address Phase 2	Concurrently with submission of RA Work Plan for Phase 2 Dredging and Facility Operations.
Phase 2 Construction and Dredging (if GE notifies EPA that it will implement Phase 2 pursuant to the Consent Decree)		
24.	Hold Annual Construction Conference for Phase 2	At least 15 days prior to the start of dredging for each year of Phase 2.

Table 1

Summary Schedule for Statement of Work

#	Activity	Deadline
25.	Initiate Phase 2, Year 1 Dredging in the calendar year after Phase 1 dredging (if conditions in Paragraph 17 of Consent Decree are met and Parties agree on a discrete area for dredging in that year)	In accordance with Paragraph 18 of Consent Decree.
26.	Initiate Phase 2 Dredging Activities (for dredging not performed in the calendar year after Phase 1 dredging)	In accordance with the construction schedule included in the approved RA Work Plan for Phase 2 Dredging that is applicable to that construction year.
27.	Complete any property access agreements/acquisitions/ easements for ancillary facilities/support functions necessary to initiate each year of Phase 2 dredging	In accordance with the schedule set forth in the RA Work Plan for Phase 2 Facility Construction.
28.	Complete construction of sufficient sediment processing/transfer facility capacity and any necessary ancillary or "temporary" facilities for Phase 2	In accordance with the schedule set forth in the RA Work Plan for Phase 2 Facility Construction.
Operation, Maintenance and Monitoring (OM&M)		
29.	Submit OM&M Plan for Phase 1 Caps and Habitat Replacement/Reconstruction	Within 90 days after completion of Phase 1 in-water work that occurs in the first construction season (with an addendum to be submitted within 90 days after completion of any additional habitat replacement/reconstruction measures installed in Phase 1 areas in the following season).
30.	Submit OM&M Plan for Phase 2 Caps and Habitat Replacement/Reconstruction (if GE notifies EPA that it will implement Phase 2 pursuant to the Consent Decree)	Annually, within 90 days after completion of each year's field activities.

Table 1

Summary Schedule for Statement of Work

#	Activity	Deadline
31.	Submit Water, Fish and Sediment OM&M Plan (if GE notifies EPA that it will implement Phase 2 pursuant to the Consent Decree)	By March 15 of the final year of Phase 2.
32.	Initiate OM&M Activities	In accordance with the schedules in the approved OM&M Plans.
Progress Meetings, Inspections, Completion Process, and Reports		
33.	Hold RA Progress Meetings	Weekly during remedial construction unless a less frequent schedule is agreed to by EPA and Settling Defendant.
34.	Obtain Certification Unit (CU) Dredging Completion Approvals	After completion of dredging in each CU.
35.	Obtain CU Backfill/Engineered Cap Completion Approvals	After completion of backfilling/capping in each CU.
36.	Obtain Final CU Construction Completion Certifications	After completion of all remedial construction activities (including habitat replacement/reconstruction installations) in each CU.
37.	Submit CU Completion Reports	Following completion of all remedial activities (excluding OM&M) in each CU and obtaining of Final CU Construction Completion Certification for that CU.
38.	Submit Phase 1 Data Compilation Report	Pursuant to Paragraph 13 of the Consent Decree..
39.	Submit GE Phase 1 Evaluation Report	Pursuant to Paragraph 13 of the Consent Decree.
40.	Schedule Pre-Final Phase 1 Construction Completion Inspection	Within 7 days after GE makes the preliminary determination that all Phase 1 field activities have been completed.

Table 1

Summary Schedule for Statement of Work

#	Activity	Deadline
41.	Schedule Final Phase 1 Construction Completion Inspection (if necessary)	Within 15 days after completion of any activities that EPA requires GE to perform, pursuant to Paragraph 56 of the Consent Decree, in order to complete the Phase 1 field activities.
42.	Submit Phase 1 Construction Report	In accordance with Paragraph 56 of the Consent Decree
43.	Submit Phase 2 Annual Progress Reports (if GE notifies EPA that it will implement Phase 2 pursuant to the Consent Decree)	Within 30 days of completion of work activities for each year of Phase 2 of the Remedial Action.
44.	Schedule RA Completion Pre-Final Inspection (if GE notifies EPA that it will implement Phase 2 pursuant to the Consent Decree)	Within 15 days after GE makes the preliminary determination that the Remedial Action is complete.
45.	Schedule RA Completion Final Inspection (if necessary) (if GE notifies EPA that it will implement Phase 2 pursuant to the Consent Decree)	Within 15 days after completion of any activities that EPA requires GE to perform, pursuant to Paragraph 57 of the Consent Decree, in order to complete the Remedial Action.
46.	Submit Remedial Action Completion Report (if GE notifies EPA that it will implement Phase 2 pursuant to the Consent Decree)	In accordance with Paragraph 57 of the Consent Decree.
47.	Schedule Pre-Certification Inspection of the Work	Within 30 days after GE concludes that the Work, including OM&M, has been fully performed.
48.	Schedule Final Inspection of the Work (if necessary)	Within 15 days after completion of any activities that EPA requires GE to perform, pursuant to Paragraph 58 of the Consent Decree, in order to complete the Work.
49.	Submit Work Completion Report	In accordance with Paragraph 58 of the Consent Decree.

Table 1

Summary Schedule for Statement of Work

Notes:

1. Acronyms:

   EPA = United States Environmental Protection Agency
   OM&M = Operation, Maintenance, and Monitoring
   QAPP = Quality Assurance Project Plan
   RA = Remedial Action

2. All days are calendar days as defined in Consent Decree.

3. Assumes EPA approval includes any public review and comment that the EPA deems necessary.

4. For purposes of this schedule, EPA approval of a deliverable means approval of that entire deliverable. The Phase 1 Final Design Report will be segmented for approval of the Facility Site Work separate from Phase 1 Dredging, Processing Equipment Installation, and Facility Operations.

5. All deadlines may be extended upon approval of EPA.

6. The Phase 1 Final Design will contain a preliminary schedule for the completion of the work described in Items 16 and 19, which will be used by GE in soliciting bids for the work.

Attachment A to Statement of Work

Hudson River PCBs Site

Critical Phase 1 Design Elements

September 2005

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1. Introduction

This *Critical Phase 1 Design Elements* document describes the agreement between United States Environmental Protection Agency (EPA) and General Electric Company (GE) regarding a number of critical design elements for GE's Phase 1 Remedial Design. The *Phase 1 Intermediate Design Report* and *Final Design Report* are being prepared under the RD AOC (effective August 19, 2003 [Index No. CERCLA-02-2003-2027]) and shall be consistent with this *Critical Phase 1 Design Elements* document. The *Phase 2 Intermediate* and *Final Design Reports* shall also be prepared under the RD AOC consistent with this document, unless EPA and GE agree otherwise. The preceding sentence shall not be construed to affect or limit any rights EPA has under Paragraphs 15 and 20 of the Consent Decree to require modifications to the work.

There are seven Critical Phase 1 Design Elements, as follows:

- Dredge type selection;
- Resuspension containment design;
- Phase 1 dredge schedule;
- Dredge prism development;
- Processing facility design;
- Engineered cap design; and
- Habitat replacement and reconstruction design.

This document summarizes the key decisions affecting these critical design elements. The design details for these and other design elements shall be included in the intermediate and final design reports for Phase 1 and Phase 2.

2. Critical Phase 1 Design Elements

This section describes the Critical Phase 1 Design Elements. The design details for each element are not included herein, but shall be provided in the *Intermediate Design Reports* and the *Final Design Reports* issued for Phase 1 and Phase 2.

2.1 Dredge Type Selection

The design will specify the dredge type for sediment removal. The *Intermediate Design Report* shall identify the specific dredge technology and equipment on an area-specific basis (RD Work Plan, pp. 3-5 and 4-8). The fundamental choice between a mechanical dredge and a hydraulic dredge is a critical design issue. The dredge type for Phase 1 will be selected during the Phase 1 Intermediate Design. The rationale for dredge selection will be provided in the *Phase 1 Intermediate Design Report* using a comparative analysis of dredge types, considering their applicability to the Phase 1 dredge areas as well as Phase 2 areas, as currently understood. GE will not be required to change the fundamental dredge type (i.e., mechanical or hydraulic) for Phase 1 from that type selected in the EPA-approved *Phase 1 Intermediate Design Report*, either during subsequent Phase 1 design activities or during implementation of Phase 1. After Phase 1, the dredge type may be reassessed by GE (in the event that GE agrees to perform Phase 2) and EPA will determine if adjustments are needed to the dredging operations in Phase 2 (ROD, p. v). Note the selection of the fundamental dredge type shall not be used as a reason for proposing areas for exclusion as described in Section 2.4.

2.2 Resuspension Containment Design

The design will include modeling of resuspension from dredging to estimate the resulting concentrations of polychlorinated biphenyls (PCBs) and total suspended solids (TSS) at near-field and far-field monitoring locations. GE will assume a resuspension loss value of 0.35% of resuspendable material for estimating the resuspension of solids in the vicinity of the dredge. The results of the modeling will be compared to the Control Level triggers set forth in or derived from EPA's Resuspension Performance Standard – i.e., a total PCB (tPCB) concentration of 350 nanograms per liter (ng/L) (7-day running average) at far-field stations; a net increase (over baseline) in tPCB load of 65 kilograms (kg) for Phase 1 at far-field stations (pro-rated to each dredge area in Phase 1); a net increase (over upstream levels) in TSS concentration of 100 milligrams per liter (mg/L) (for the

daily dredging period) at the 300-m near-field stations; and a net increase (over baseline) in TSS concentration of 24 mg/L (for the daily dredging period) at far-field stations. These comparisons will be used to determine whether engineered resuspension containment systems (i.e., silt curtains, sheetpiling, or other physical barriers) will be specified for implementation during dredging. For areas where modeling indicates that the Control Level would be exceeded, resuspension containment systems will be specified in the design as required (except for dredging in the East Griffin Island Area, as discussed in Section 2.3 below). For areas where modeling using a resuspension loss value of 0.70% of the resuspendable fraction indicates that the Control Level would be exceeded, and where resuspension control barriers or controls are not already specified in design, resuspension control or containment systems will be specified in the design as contingencies to be available for such areas on an as-needed basis. In addition, applying the 0.70% loss will provide a sensitivity analysis of the model results to changes in input assumptions.

GE will not be required in Phase 1 design to have available additional engineered resuspension control system equipment for use on a contingency basis, beyond that specified in the prior paragraph. In addition, during implementation of Phase 1, GE will not be required to install additional engineered resuspension containment barriers beyond those specified in the design or as provided for in Section 2.4 of the PSCP Scope.

2.3 Phase 1 Dredge Schedule

The *Phase 1 Intermediate Design Report* shall include a dredge plan that specifies the estimated dredging duration for each dredge area, sequencing of sediment removal by dredge area, estimated number of dredges to be employed, estimated hours of operation, and estimated productivity on a weekly basis. For Phase 1, the dredge plan will show a "ramp-up" period, followed by a one month period of dredging at the currently estimated Phase 2 dredging rate. The specific hours or days of operation available for dredging during Phase 1 will not be limited by EPA. As stated in the RD Work Plan (p. 3-6), limitations on work-days or work-hours shall be identified in the *Intermediate Design Report.* In preparing the *Phase 1 Final Design Report*, GE shall consult with the New York State Canal Corporation on the hours and days of operation available for dredging and dredged material transport.

EPA's *Final Decision Regarding General Electric Company's Disputes on Draft Phase 1 Dredge Area Delineation Report and Draft Phase 1 Target Area Identification Report* (Final Decision), issued in July 2004, requires that Phase 1 include an area of fine-grained sediment to test the ability of the dredging operations to

meet the Resuspension Performance Standard. The Final Decision requires that fine-grained area (i) be predominantly silt (i.e., 50% or more of the cores in the area must have a length weighted average silt content of 45% or more by mass); (ii) be at least 5 acres and (iii) contain a sufficient volume of fine-grained sediment to be continuously dredged for approximately 5 weeks. EPA subsequently clarified that the definition of predominantly silt (i.e., 45%) applies to silt plus clay. GE proposed that this 5-week test be conducted in the East Griffin Island Area (EGIA). However, sufficient volume of sediment may not be present in the EGIA to perform this test. Also, at this time, it is not known if a resuspension containment system, such as sheetpiling, will be needed for the EGIA, but such controls may be necessary. As a result, GE will propose an alternative test plan in the *Phase 1 Intermediate Design Report*, including the location(s) for the test and anticipated production rate, duration, and resuspension control measures at each location dredged during the test. This plan is expected to include provisions for dredging in the EGIA to be performed initially without physical barriers, so as to provide a test of the ability of the dredging operations to meet the Resuspension Performance Standard. If resuspension from dredging in the EGIA exceeds the Control Level specified in the Resuspension Performance Standard, the contingency controls specified in the design (if any) will then be installed for the remainder of the dredging in the EGIA.

2.4 Dredge Prisms Development

The methodology for developing dredge prisms in the *Intermediate* and *Final Design Reports* is a multi-step process, as described below. Note that EPA's March 30, 2005 comments on the *Phase 1 Dredge Area Delineation (Phase 1 DAD) Report* will be addressed, where appropriate, in the *Phase 1 Intermediate Design Report*.

1. Develop the thickness of sediment below which the total PCB concentration is less than 1 mg/kg (i.e., depth of contamination (DoC)). Interpolate on a 10 x 10 ft grid total PCB concentration for the following layers: 0-2 in., 2-12 in., 12-24 in., 24-30 in., and every 6 inches until the maximum DoC is reached in a given area. Establish the DoC at each grid point as the bottom depth of the deepest layer with a total PCB concentration equal to or greater than 1 mg/kg (as defined by the core data described below), thereby forming a contoured DoC surface. This surface of sediment depth is converted to an elevation surface using bathymetry data.

   In conducting the interpolation, data treatment is dependent on the confidence level of the core (as defined in the *Phase 1 DAD Report*):

- CL1, 2A, 2B, 2E, 2F, 2G: tPCB for all measured and extrapolated sections are used to the maximum depth (2 times recovery depth). Below maximum depth tPCB=0.
- 2C and 2R: tPCB measured concentrations are used. From recovery depth to top of rock or clay, tPCB = -999 (coding technique to reflect no data). Below rock or clay, tPCB=0.
- 2D: tPCB measured concentrations used. Below the last measured sections, tPCB=-999 (coding technique to reflect no data).
- 2H: No measured tPCB concentrations are used. Below probing depth tPCB= 0.
- 2I: Ignored
- 2J: Below probing depth tPCB=0.
- 2K: Below probing depth tPCB=0.
- 2L: Ignored

2. Map the elevation of glacial Lake Albany clay ("glacial clay") for use as a confining geologic stratum. Develop a clay elevation data set by establishing the elevation at which clay was encountered in those Sediment Sampling and Analysis Program ("SSAP") cores that penetrated into glacial clay (the elevation for the SSAP cores will be established by assigning each core the elevation of the closest bathymetric contour) and supplementing these data with the elevation of clay measured in Supplemental Engineering Data Collection ("SEDC") borings. Note that the clay elevation data will not be applicable everywhere in dredge areas. The bottom layer in cores that did not have clay will be used as an upper bound of the elevation of clay in that area (i.e. the clay must be below the bottom layer). Five-foot contours will be hand drawn using the clay elevation data. One-foot contours will be interpolated between the five-foot contours using a triangulated integrated network (TIN) developed from the clay elevation data. The contours will then be modified based on the bathymetry contours and the elevation of the bottom of the cores where the clay was not found.

3. Identify areas where there is no layer of clean sediments (i.e., have a total PCB concentration of less than 1 mg/kg) on top of the glacial clay (i.e., where the clay surface defines the DoC). The difference between the DoC and the top of glacial clay will be plotted, and areas where the clay layer is equal to or less than the DoC will be identified as areas where the clay layer will be used to define the dredge depth.

4. Integrate the 1 mg/kg total PCB surface (Step 1) with the top of the glacial clay layer (Step 2) and the delineation of areas where the clay layer will be used to define the dredging depth (Step 3) to establish the DoC on an elevation basis.

5. Straighten the jagged sides of the 2-dimensional (2-D) dredge areas identified in the *DAD Report* using straight line segments that:

   a. do not decrease or increase the overall size of the 2-D dredge areas; and
   b. do not exclude sample locations above the Mass per Unit Area (MPA) or surface sediment criteria.

6. Develop preliminary dredge prisms by combining the refined 2-D dredge areas developed in Step 5 with the DoC developed in Step 3, and present as a 3-D surface on an elevation basis.

7. Propose specific areas for exclusion from the preliminary 3-D dredge prisms: Conduct the practicability assessment described in the RD Work Plan (p. 2-12). This exclusion process is conducted in two steps. The first step (Step 7A) involves an engineering practicality assessment and results in the identification of candidate exclusion areas. In the second step (Step 7B), GE will present its rationale for proposing to exclude such areas. These proposed areas would be presented to EPA for review and approval on a case-by-case basis.
   a. Step 7A – The goal of this step is to identify portions of the preliminary dredge prisms for which dredging may present unsafe work conditions, very inefficient operations and create risk to the schedule. The individual factors used for this initial screening are described below and are generally used in combination to identify candidate areas. However, a single factor alone may be sufficient in some cases to identify a candidate exclusion area. These factors will be considered alone or in combination when evaluating project inefficiencies (e.g., low productivity) and risk (e.g., schedule, structural integrity and safety). These engineering factors include, but are not limited to:

      i. Thin sediment layer;
      ii. Rocks and cobbles;
      iii. Shallow water; and
      iv. In-river and shoreline structures - The design will require the development of operational plans describing the equipment and procedures to be used to avoid compromising the integrity of structures located in and along the banks of the river. Representative structures that may require setbacks include but are not limited to the following (see RD Work Plan, p. 2-12):

1. Structures (such as bridge abutments, dams, locks, wing walls, etc.) whose structural integrity may be compromised by dredging;
2. Low clearance structures (such as bridges and piers);
3. Other physical obstacles within the waterway that cannot be removed (such as concrete ribs, very large boulders, bedrock, sewer outfalls, drinking water intakes, etc.); and
4. Buried utilities.

v. In addition to not compromising the integrity of structures, the design will require the contractor to identify equipment and procedures to provide a safe working environment while working near structures in and along the river. This includes the requirement for the contractor to comply with OSHA and other project-related safety requirements. Operational plans must identify a safe working distance from each structure; and must include procedures and equipment so that the project can be implemented safely. For working around dams, operational plans must consider people and property downstream of the dam, the dredge crew and equipment, and support personnel and equipment including sampling and oversight crews. Operational plans may or may not identify small portions of the dredge prisms to be excluded due to safety concerns.

The assessment shall identify each area within the dredge prisms where dredging is impracticable based on the operational characteristics of the dredging equipment (including specialty dredges) and the presence of permanent structures or obstructions that could potentially interfere with sediment removal activities. In situations where the dredge cannot remove the material due to obstructions, GE shall evaluate appropriate alternate means for sediment removal to allow removal of such material to the maximum extent reasonably practicable, before proposing eliminating an area that exceeds removal criteria from remediation. In some circumstances, removal in the vicinity of certain obstructions will require structural assessments of the obstructions by qualified structural and/or geotechnical engineers; in such cases, alternate means for sediment removal will be evaluated on a case-by-case basis (RD Work Plan, p. 2-12).

Operational plans that describe the equipment and procedures to be used to avoid compromising the integrity of structures located in and along the banks of the river will be presented in the RA Work Plan for Dredging and Facility Operations. GE shall also work to minimize the area proposed for exclusion.

b. Step 7B – In this step GE will present its rationale for each of the candidate exclusion areas previously identified in Step 7A. GE will quantify the following metrics: 1) volume of sediment, 2) mass of PCBs

in sediment, and 3) surface sediment concentrations. EPA will evaluate GE's rationale for proposing to exclude each area on a case-by-case basis and will also consider the areas collectively and determine whether such areas should be excluded.

8. Compare the DoC surface to the underlying DoC data to identify inconsistencies or instances in which single data values at variance with neighboring data have caused localized mounds or troughs in the interpolated surface developed during Step 4. Use weight of evidence to adjust the DoC surface to ensure conformity with the surrounding data. Included in the weight of evidence assessment will be the confidence designation of the cores, the heterogeneity of the local sediments, and the tendencies indicated by the preponderance of data in the local area. The weight of evidence evaluation shall take the following into consideration:

   - The depth of cut shall not be adjusted upward based on an interpolated clay elevation (in lieu of the PCB concentrations taken within a core), unless supported by the PCB data from surrounding cores;
   - The depth of cut may need to be adjusted in areas where the total PCB concentrations were assigned 0 based on observations of rock or clay if such assignment appears to have caused a low bias.

9. Develop engineering cross-sections (vertical slices) for the dredge prisms after completing Step 8. The horizontal distance between the cross-sections may vary from 25 feet to 200 feet based on sediment bathymetry and the variability of removal thicknesses in the local area. Areas with significant changes in the elevation of the sediment bed or varying thickness of sediment removal will require more frequent cross-section drawings. These cross-sections will be developed using a combination of horizontal cut lines, the DoC and stable side slopes as follows:

   a. In places where the edge of the dredge area does not extend to shoreline (as defined in the DAD Report), the lateral limits of construction will be defined using a stable slope (non-target materials will be removed such that a stable slope remains); or
   b. In areas where dredging extends to the shoreline and the extrapolated DoC is greater than 2 feet at the shoreline, a sediment removal cut of 2 feet will be used at the shoreline and extended along a stable slope until it intersects the dredge prism developed using steps 1 through 8 above.
   c. For purposes of developing dredge prisms, a stable slope is currently set at a maximum steepness of 3 horizontal to 1 vertical, based on a review of existing geotechnical data for targeted sediments. If existing bathymetry is steeper than 3 horizontal to 1 vertical in areas affected by steps 9a and 9b, the

objective will be to utilize the existing slope, if stable. The ability to achieve a steeper slope will need to be assessed on a case-by-case basis.

d. Following removal of sediment to the cut lines defined above, sampling will be conducted following the residuals sampling protocols. For the shoreline areas where the DoC was greater than the stable side slope (described above), if PCB concentrations in sediments below the cut line are found that exceed 50 ppm total PCBs, those sediments will be removed. If the sediments below the cut line are less than 50 ppm total PCBs, GE may elect to do additional sediment removal or a cap will be placed following the capping criteria summarized in Section 2.6. The 2 feet (or greater if additional dredging is performed, or less if the removal depth is set according to the DoC) cut will be replaced with backfill (or backfill/cap if capping is implemented) to maintain pre-existing shoreline configuration and river bathymetry in the backfilled or backfilled/capped area.

10. Create plan view drawings of post-dredge elevations using the engineering cross-sections developed in Step 9. These plan view drawings will identify locations where the thickness of sediment removal will be controlled by the presence of clay and not the target post-dredge elevation. The thickness of sediment removal in the other portions of the dredge prism will be controlled by the elevation contours identified on the drawings.

11. If determined appropriate by EPA, modify dredge prism boundaries to avoid impacting unique or sensitive habitats; and significant cultural resources. Revise cross-sections and plan view drawings to reflect these changes.

12. The results of the geophysical surveys analyses (GPR, multibeam bathymetry, magnetometry) shall be incorporated in the dredge prism development as appropriate.

13. The results of the 2005 Data Gap sampling program shall be incorporated into the final dredge cut lines.

2.5 Processing Facility Design

The following are the critical elements in the basis of design for the processing facility:

- If the EPA-approved design analysis indicates that the Quality of Life Performance Standards (QoLPS) can be achieved, then EPA will not impose any limitations on the hours of operation of the processing facility.

- On-site staging of processed sediment will be necessary to buffer the uncertainties in rail service reliability and fluctuations in sediment removal and processing rates. It is anticipated that there will be two basic categories of staging areas – one will be the operating staging area, which will be sized based on the expected fluctuations in sediment removal and processing rates, and the second will be an emergency staging area to be available in the event of disruptions in rail service. In the *Intermediate* and *Final Design Report*s, GE shall present an evaluation of the necessary sizes for on-site staging areas and a recommended size, location, and design of the liners or other containment systems for the two basic types. The specifications in the EPA-approved *Intermediate* and *Final Design Report(s)* shall not be modified without agreement between GE and EPA. GE shall design the project so that all staged sediment will be removed from the staging area and transported (or be en route) to the disposal facility by the end of the calendar year.

- The *Intermediate Design Reports* shall present an assessment of compliance with the QoLPS. To the extent practical, the facility layout will be designed to minimize QoL impacts, while still recognizing the need to maintain an efficient operation at the facility. If EPA agrees that the assessment indicates that the QoLPS will be met, the layout of the processing site in the EPA-approved *Intermediate Design Reports* shall not be modified without agreement between GE and EPA.

2.6 Engineered Cap Design

This design element includes development of prototype designs for caps which will be employed in dredge areas that do not achieve an average of 1 mg/kg Tri+ PCBs (either in individual certification units [CUs], or as a 20-acre average of up to four CUs). Specific areas to be capped shall be determined in accordance with the criteria set forth in the Engineering Performance Standard for Residuals and the *Performance Standards Compliance Plan*. EPA will be fully involved in the decision-making for each area to be capped by, among other things, Agency review of each site-specific cap design, which is subject to EPA approval via the CU checklist for completion of dredging. The cap designs will be reviewed after Phase 1 to assess whether refinements are appropriate for Phase 2.

Multiple prototype designs will be developed during design to account for a range of possible conditions in the river, including, but not limited to, residual sediment PCB concentration, water depth, and anticipated water velocities. Additional considerations may include location in the river (e.g., navigation channel, river banks), and habitat replacement and reconstruction objectives. Cap prototypes will be developed for two basic cap types: Isolation Cap Type A, to be placed in a portion of a CU where the average Tri+ PCB concentration is less than or equal to 6 mg/kg and capping is necessary; and Isolation Cap Type B, to be placed in a portion of a CU where the average Tri+ PCB concentration is greater than 6 mg/kg and GE and EPA have determined that additional dredging is not required. In the case of both cap types, the caps shall be placed over sufficient portions of the CU such that the arithmetic average Tri+ PCB concentration of the uncapped nodes is 1 mg/kg or less and no individual uncapped node has a Tri+ PCB concentration at or above 15 mg/kg.

The objective of developing these prototypes in advance is ease of construction, since these prototypes will be "pre-designed" for the range of conditions expected to be encountered after dredging. The prototype designs will need to consider practical limitations and efficiency of the dredging and capping operations and account for factors such as bottom conditions, hydraulic conditions, residuals PCB concentrations, habitat replacement and reconstruction needs, and cap placement success (in past CUs). The decision regarding appropriate cap prototype to be installed will be made in the field by GE's field representative (in consultation with the design engineer and subject to approval by EPA's field representative), since the actual performance of the dredge equipment and residuals concentrations will not be known until project implementation. The decision in the field shall only be which prototype is appropriate for the river conditions (velocity, habitat, etc.) guided by information in the *Final Design Report*, in conjunction with the average concentration in the areas of the CU to be capped. GE shall not install Isolation Cap Type B without first obtaining EPA approval to cease redredging attempts, except for CUs where the average concentration in the CU is less than 6 mg/kg Tri+ PCBs and the only noncompliant areas are due to exceedances of the prediction limit thresholds.

The design objectives for the sub-aqueous engineered caps as specified in the Engineering Performance Standards (Volume 3) include:

- Physically isolate the residual sediments from indigenous benthos and minimize bioturbation of the residual sediments;
- Resist erosion due to currents, vessel wakes and waves, propeller wash, and ice rafting, etc. and stabilize the contaminated sediments (i.e., prevent resuspension and migration of the contaminated sediments);

- Minimize or eliminate the flux of contaminants into the water column;
- Maintain integrity among the individual cap layers/components (e.g., address consolidation of compressible materials);
- Include consideration of additional protective measures and institutional controls that are needed (e.g., additional controls for caps constructed in any area where future navigation dredging may be necessary, notifications to boaters not to drop anchor in capped areas, etc).

The cap design also must address the following elements:

- Selection and characterization of materials for cap construction.
- Equipment and placement techniques to be used for cap construction.
- Appropriate monitoring and management program, including construction monitoring during cap placement, followed by long-term monitoring. Both a routine maintenance program and a set of actions that may be required based on monitoring results shall be developed, as described in the OM&M Scope.
- Ability to isolate the contaminated sediments chemically such that the concentration of Tri+ PCBs in the upper 6 inches of the cap is 0.25 mg/kg or less upon placement.

The basis of design for Isolation Cap Type A shall be as follows:

- Installation of an armor layer designed to withstand a minimum 10-year recurrence interval flow event, which will also provide resistance to ice events.
- A filter layer (i.e., layer of material with smaller particle size to separate residuals from the armor) shall be installed below (or mixed in with) the armor layer, if necessary to prevent transport of residual sediment up through the armor material. An Isolation Cap Type A shall have a total thickness of at least 12 inches when installed and shall satisfy the objective of isolating the residual sediments from indigenous benthos and limiting bioturbation of residual sediment.

The basis of design for Isolation Cap Type B shall be as follows:

- Installation of an engineered isolation layer and an armor layer.

- The isolation layer shall consist of material to physically and chemically isolate PCBs in contaminated sediment from the overlying water column. This layer may include a filter layer if deemed necessary for armoring purposes. An Isolation Cap Type B that includes an isolation layer that is at least 6 inches thick and has a minimum total organic carbon (TOC) content of 0.5% when installed shall satisfy the objective of reducing the flux of Tri+ PCBs from contaminated sediment into the water column. In addition, an Isolation Cap Type B shall have a total thickness of at least 12 inches when installed and shall satisfy the objective of isolating the contaminated sediments from indigenous benthos and limiting bioturbation of residual sediment.
- An armor layer shall be designed to withstand a 100-year recurrence interval flow event. The armoring layer shall also be designed to withstand ice events, vessel wake, and propeller wash in areas likely to be subject to such events.

2.7 Habitat Replacement and Reconstruction Design

Habitat replacement and reconstruction activities will be designed and performed consistent with the HDA Work Plan and associated deliverables approved by EPA. With respect to replacement of subaquatic vegetation (SAV), the following approach shall be employed. For design purposes, the post-dredging river bathymetry will be dictated by removing sediment contained within the dredge prisms that will be developed as described in Section 2.4. It will be assumed that one foot of backfill will be placed, where appropriate, in the river bed in all dredged areas to address the Residuals Performance Standard. Areas in the river that supported SAV prior to dredging and backfilling will be evaluated to determine if the resulting water depth has increased to a point where SAV would no longer be supported. During design, the areas that will no longer support SAV shall be evaluated to determine if placement of additional backfill would reduce the water depth so that SAV would be supported. Additional backfill up to 15% of the total volume estimated during design to be placed as part of the entire project (1 foot over all dredge areas) will be allocated for creation of SAV beds. Prior to final design submittal, GE shall consult with EPA on the placement of the additional backfill materials. The *Final Design Reports* shall incorporate the results of the consultation between GE and EPA on the placement of the additional backfill.

Attachment B to the Statement of Work

Hudson River PCBs Site

Remedial Action Monitoring Scope

September, 2005

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1. Introduction

This *Remedial Action Monitoring Scope* (RA Monitoring Scope) describes the environmental monitoring program that General Electric Company (GE) will carry out during the performance of Phase 1 of the Remedial Action (RA) for the Upper Hudson River to implement, and assess attainment of the criteria set forth in, the Engineering Performance Standards, the Quality of Life Performance Standards, and substantive water quality requirements issued by the United States Environmental Protection Agency (EPA) for Phase 1.

The Engineering Performance Standards consist of 1) the Resuspension Performance Standard, 2) the Residuals Performance Standard, and 3) the Productivity Performance Standard, and are set out in a five-volume document titled *Hudson River PCBs Superfund Site Engineering Performance Standards*, issued by EPA in April 2004 (EPA, 2004a). These standards are referred to herein as the EPS, and the EPA (2004a) document is cited as *EPS*.

The Quality of Life Performance Standards consist of performance standards governing 1) air quality, 2) odor, 3) noise, 4) lighting, and 5) navigation, and are set out in a document titled *Hudson River PCBs Superfund Site Quality of Life Performance Standards*, issued by EPA in May 2004 (EPA, 2004b). These standards are referred to herein as the QoLPS, and the EPA (2004b) document is cited as *QoLPS*.

The substantive water quality requirements consist of: 1) requirements relating to in-river releases of constituents not subject to EPS, as set forth in *Substantive Requirements Applicable to Releases of Constituents not Subject to Performance Standards*; and 2) the substantive requirements for discharges to the Hudson River and Champlain Canal, as set forth in *Substantive Requirements of State Pollutant Discharge Elimination System Permit for Potential Discharges to Champlain Canal (land cut above Lock 7)*, and *Substantive Requirements of State Pollutant Discharge Elimination System Permit for Potential Discharge to the Hudson River.* These three sets of requirements are contained in a single document in the form of a letter to GE with enclosures that EPA issued on January 7, 2005. These requirements are collectively referred to herein as the WQ requirements, and the January 7, 2005 EPA document is cited as *WQ Substantive Requirements*.

This RA Monitoring Scope will form the basis for the *Phase 1 Environmental Monitoring Plan* (Phase 1 EMP), which will accompany the *Phase 1 Final Design Report*, and the *Phase 1 Remedial Action Monitoring Quality Assurance Project Plan* (Phase 1 RAM QAPP) to be prepared in accordance with the *Statement of Work for*

Remedial Action and Long-Term Monitoring (SOW), which is Appendix B to the RA Consent Decree. The Phase 1 EMP and Phase 1 RAM QAPP shall be consistent with this RA Monitoring Scope.

This RA Monitoring Scope will also form the basis for the Phase 2 EMP to be submitted in conjunction with the *Phase 2 Final Design Report*. In the event that GE notifies the EPA, pursuant to the Consent Decree, that it will perform Phase 2 of the RA, the environmental monitoring to be performed by GE during Phase 2 will be governed by this RA Monitoring Scope, with any modifications specified by EPA following the completion of Phase 1 and prior to GE's notification to EPA as to whether it will perform Phase 2 pursuant to the Consent Decree. The details for such Phase 2 RA monitoring will be provided in a Phase 2 RAM QAPP (or, as necessary, in revisions and/or addenda to the Phase 1 RAM QAPP), which shall be consistent with this RA Monitoring Scope, as it may be modified following Phase 1 dredging, and which shall supersede the prior Phase 2 EMP and the Phase 1 RAM QAPP.

This RA Monitoring Scope is organized to cover each of the following major data acquisition programs:

- Water column and fish monitoring;
- Sediment residuals monitoring;
- Air quality and odor monitoring;
- Noise monitoring;
- Lighting monitoring;
- Water discharge monitoring; and
- Special studies.

Collectively, this monitoring program will be referred to as the Remedial Action Monitoring Program (RAMP). The RAMP will replace the Baseline Monitoring Program (BMP; QEA, 2003; QEA and ESI, 2004) during the RA.

The RAMP will not address the standard for navigation, which is included in the QoLPS, since no environmental monitoring requirements pertain to the navigation standard. The activities relating to implementation of the navigation standard will be described in detail in the design documents, the *Remedial Action Community Health and Safety Plan* (RA CHASP), and the *Performance Standards Compliance Plan* (PSCP) (which will be prepared as part of the *Remedial Action Work Plan for Phase 1 Dredging* in accordance with the SOW). Scopes for the RA CHASP and the PSCP are attached to the SOW.

In the event GE does not elect to perform Phase 2 of the dredging, GE agrees to continue the water column monitoring described in Section 2.5 (Off-Season Water Column Monitoring Program) until three months after the Phase 2 election date. Furthermore, in the event GE does not elect to perform Phase 2, GE will also perform fish monitoring required by Section 2.7 in the year after completion of Phase 1 dredging.

2. Water Column and Fish Monitoring

This section describes the Water Column Monitoring Program that GE shall carry out in Phase 1 of the Remedial Action to implement the Engineering Performance Standard for Dredging Resuspension (the Resuspension Standard) and the WQ requirements for in-river releases of constituents not subject to performance standards. This section also describes the Fish Monitoring Program that GE shall perform during Phase 1 of the Remedial Action.

2.1 Objectives, Criteria, and Parameters Subject to Monitoring

2.1.1 Resuspension Standard

The objectives of the Resuspension Standard (as stated in *EPS*, Volume 1, p. 37) are to:

- Maintain polychlorinated biphenyl (PCB) concentrations in the water column at or below the federal drinking water Maximum Contaminant Level (MCL) of 500 ng/L to protect downstream municipal intakes;
- Minimize the release of PCBs from sediment during remedial dredging; and
- Minimize the export of PCBs to downstream areas, including the Lower Hudson.

The EPA has designated threshold criteria to trigger contingency monitoring and engineering evaluation and controls to reduce the release of PCBs from dredge areas so that the objectives are met. There are three levels of such criteria – known as the Evaluation Level, Control Level, and Resuspension Standard Threshold Level (the Standard Level). These criteria are applied at near-field stations, located within 300 meters (m) of the dredging activities, and at far-field stations, located more than 1 mile downstream of the dredging activity. The applicable criteria are summarized in Table 2-1 of Volume 1 of the *EPS* and are as follows (specified separately for near-field and far-field stations):

Near-Field Criteria

Evaluation Level

Under the *EPS* (Section 4.1.1 Volume 2, pp. 87-92), the Evaluation Level would be exceeded if any of the following conditions occurs:

- "The sustained suspended solids concentration above ambient conditions at a location 300 m downstream (i.e., near-field monitoring) of the dredging operation or 150 m downstream from any suspended solids control measure (e.g., silt curtain) exceeds 100 mg/L for River Sections 1 and 3 and 60 mg/L for River Section 2. To exceed this criterion, this condition must exist on average for six hours or for the daily dredging period (whichever is shorter). Suspended solids are measured continuously by surrogate or every three hours by discrete samples."
- "The sustained suspended solids concentration above ambient conditions at the near-field side channel station or the 100 m downstream station exceeds 700 mg/L. To exceed this criterion, this condition must exist for more than three hours on average measured continuously or a confirmed occurrence of a concentration greater than 700 mg/L when suspended solids are measured every three hours by discrete samples."

Control Level

Under the *EPS* (Section 4.1.2 Volume 2, pp. 93-95), the Control Level would be exceeded if any of the following conditions occurs:

- "The sustained suspended solids concentration above ambient conditions at a location 300 meters downstream (i.e., near-field monitoring) of the dredging operation or 150 meters downstream from any suspended solids control measure (e.g., silt curtain) exceeds 100 mg/L for River Sections 1 and 3 and 60 mg/L for River Section 2. To exceed this criterion, this condition must exist for a period corresponding to the daily dredging period (6 hours or longer) or 24 hours if the operation runs continuously (whichever is shorter) on average. Suspended solids are measured continuously by surrogate or every three hours by discrete samples."

Far-Field Criteria

Evaluation Level

Under the EPS (Section 4.1.1 Volume 2, pp. 87-92), the Evaluation Level would be exceeded if any of the following conditions occurs:

- "The net increase in Total PCB mass transport due to dredging-related activities at any downstream far-field monitoring station exceeds 300 g/day for a seven-day running average."
- "The net increase in Tri+ PCB mass transport due to dredging-related activities at any downstream far-field monitoring station exceeds 100 g/day for a seven-day running average."
- "The sustained suspended solids concentration above ambient conditions at a far-field station exceeds 12 mg/L. To exceed this criterion, this condition must exist on average for 6 hours or a period corresponding to the daily dredging period (whichever is shorter). Suspended solids are measured continuously by turbidity (or an alternate surrogate) or every three hours by discrete samples."

Control Level

Under the *EPS* (Section 4.1.2 Volume 2, pp. 93-95), the Control Level would be exceeded if any of the following conditions occurs:

- "The Total PCB concentration during dredging-related activities at any downstream far-field monitoring station exceeds 350 ng/L for a seven-day running average."
- "The net increase in Total PCB mass transport due to dredging-related activities at any downstream far-field monitoring station exceeds 600 g/day on average over a seven-day period."
- "The net increase in Tri+ PCB mass transport due to dredging-related activities at any downstream far-field monitoring station exceeds 200 g/day on average over a seven-day period."
- "The net increase in PCB mass transport due to dredging-related activities measured at the downstream far-field monitoring stations exceeds 65 kg/year Total PCBs or 22 kg/year Tri+ PCBs."
- "The sustained suspended solids concentration above ambient conditions at a far-field station exceeds 24 mg/L. To exceed this criterion, this condition must exist for a period corresponding to the daily dredging

period (six hours or longer) or 24 hours if the operation runs continuously (whichever is shorter) on average. Suspended solids are measured continuously by surrogate or every three hours by discrete samples."

Standard Level

Under the *EPS* (Section 4.1.3 Volume 2, p. 98), the Standard Level is "a confirmed occurrence of 500 ng/L Total PCBs, measured at any main stem far-field station. To exceed the standard threshold, an initial result greater than or equal to 500 ng/L Total PCBs must be confirmed by the average concentration of four samples collected within 48 hours of the first sample. The standard threshold does not apply to far-field station measurements if the station is within one mile of the remediation."

2.1.2 WQ Requirements

The EPA, in consultation with the New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH), has specified water quality standards for a number of constituents that are not subject to the EPS and that will be monitored for compliance during Phase 1 of the Remedial Action. The objectives of these WQ requirements are:

- Protection of aquatic species via Aquatic Acute standards;
- Protection of drinking water supplies via Health (Water Source) standards; and
- Protection of drinking water supplies via New York State Department of Health (NYSDOH) action levels.

Aquatic Acute Water Quality Standards at Near-Field Stations

The *WQC Substantive Requirements* (pp. 1 & 2) set forth the following standards for near-field stations:

- "Aquatic standards (some of which are hardness-dependent) apply to the dissolved form. Hardness varies along the length of the project area and will result in a range of calculated standards. For example, based on limited available data, average hardness values from Corinth and Waterford range from 18 ppm to 55 ppm respectively. The resulting ranges of water quality standards are as follows (where applicable, the formulas for calculating the standards are in brackets):

- cadmium – Aquatic Acute A(A): 0.6 µg/L to 2.0 µg/L [(0.85) exp(1.128[ln (ppm hardness)] – 3.6867)]
- lead – Aquatic Acute A(A): 14.4 µg/L to 50.4 µg/L [{1.46203 – [ln (hardness) (0.145712)]} exp (1.273 [ln (hardness)] – 1.052)]
- chromium – Aquatic Acute A(A): 140 µg/L to 349 µg/L [(0.316) exp (0.819 ln (ppm hardness)) + 3.7256)]
- chromium (hexavalent) – Aquatic Acute A(A): 16 µg/L
- mercury – Aquatic Acute A(A): 1.4 µg/L"

- "Water quality standards for pH and dissolved oxygen are specified in NYCRR Title 6, Chapter X, Part 703.3.
  - pH shall not be less than 6.5 nor more than 8.5.
  - Dissolved oxygen for non-trout waters:
    - The minimum daily average shall not be less than 5.0 mg/L.
    - At no time shall the dissolved oxygen concentration be less than 4.0 mg/L."

Based on review of the historical data, routine monitoring for compliance with the foregoing Aquatic Acute standards for dissolved metals shall be limited to analyses for dissolved cadmium and lead, with total cadmium and lead analyses performed as well. It is expected that the monitoring of lead and cadmium should adequately represent the metals associated with sediment resuspension. The EPA, GE, and NYSDEC will evaluate whether mercury and chromium concentrations are adequately represented by lead and cadmium concentrations based on the BMP data, Treatability Study data, any additional sediment data that become available, and/or water column data collected during Phase 1. Based on evaluation of these data, these monitoring requirements may be modified upon agreement of EPA (after consultation with NYSDEC) and GE. GE shall report the analytical results for the entire target analyte list (TAL) of metals that are analyzed by EPA Method 200.8 (which exclude mercury and hexavalent chromium, which are analyzed by separate methods – see subsection 2.4.4),. As discussed further in subsection 2.4.4, if monitoring indicates that the dissolved cadmium and/or lead concentrations exceed the above standards, GE shall collect and analyze samples (in both dissolved and total form) for the entire suite of metals subject to the Aquatic Acute standards. If, during in-water activities, distressed or dying fish are observed, GE shall conduct increased monitoring for metals and additional water quality parameters, where appropriate, in accordance with the PSCP Scope (Section 7.5) and *WQ Substantive Requirements* (p. 9).

Health (Water Source) Standards at Far-Field Stations

The *WQ Substantive Requirements* (p. 2) set forth the following Health (Water Source) standards for cadmium, chromium, and mercury and the following action level for lead. These standards and action levels are based on total form and are not hardness dependent, and they are not to be exceeded at any of the Schuylerville, Stillwater, or Waterford far-field stations.

- Cadmium (total): 5.0 µg/L.
- Chromium (total): 50 µg/L.
- Mercury (total): 0.7 µg/L.
- Lead (total): 15.0 µg/L (NYSDOH action level).

In addition, the WQ requirements incorporate the NYSDOH's trigger level of 10 µg/L total lead for two far-field stations (Stillwater and Waterford) to protect water suppliers and the public, and state that if that trigger level is exceeded, certain notification and/or response actions must be taken, as described in the PSCP and its Scope.

Determination of an exceedance of the above standards and action level requires a "confirmed occurrence" – i.e., four subsequent samples exceeding the standard/action level, each representing a 6-hour composite, as specified in the *WQ Substantive Requirements* (p. 7).

Based on review of the historical data, routine monitoring for compliance with the foregoing standards and action/trigger levels shall be limited to analyses for total cadmium and lead, with dissolved cadmium and lead analyses performed as well. It is expected that the monitoring of lead and cadmium should adequately represent the metals associated with sediment resuspension. EPA, GE, and NYSDEC will evaluate whether mercury and chromium concentrations are adequately represented by lead and cadmium concentrations based on the BMP data, Treatability Study data, any additional sediment data that become available, and/or water column data collected during Phase 1. Based on evaluation of these data, these monitoring requirements may be modified upon agreement of EPA (after consultation with NYSDEC) and GE. GE shall report the analytical results for all TAL metals that are analyzed by EPA Method 200.8 (i.e., excluding mercury and hexavalent chromium, which are analyzed by separate methods – see subsection 2.4.4). As discussed further in subsection 2.4.4, if monitoring indicates that the total cadmium concentration exceeds the cadmium standard or that the total lead

concentration exceeds the lead action or trigger level, GE shall collect and analyze samples (in both dissolved and total form) for the entire suite of metals subject to the Health (Water Source) standards. If, during in-water activities, distressed or dying fish are observed, GE shall conduct increased monitoring for metals and additional water quality parameters, where appropriate, in accordance with the PSCP Scope (Section 7.5) and *WQ Substantive Requirements* (p. 9).

2.2 Monitoring Locations and Frequency

GE shall sample at the near-field and far-field monitoring locations and frequency specified in the *EPS* Volume 2, Sections 4.2.4, 4.2.5 and 4.2.6, except for modifications approved by EPA and documented herein.

Monitoring will be required for at least the remedial operations listed below. Other operations related to dredging may be included as well (*EPS* Volume 2, p. 102):

- Dredging
- Debris removal
- Resuspension control equipment removal
- Cap placement
- Backfill placement
- Installation of containment devices other than silt curtains (sheet piling and other structural devices requiring heavy equipment operation and disturbance of the river bottom)
- Shoreline excavation and restoration

The following remedial operation will not require near-field monitoring:

- Silt curtain placement

2.2.1 Near-Field Monitoring

GE shall monitor at the locations specified in the *EPS* (Volume 2, Section 4.2.4.2). Near-field monitoring locations are associated with individual remedial operations and move as the operation moves. Each remedial operation requires five monitoring locations. The locations of the near-field stations are dictated by the near-

field criteria. A single background station shall be located about 100 m upstream of the dredging activity on the centerline of flow through the area of dredging activity to provide water quality data for the water entering the dredging area. To monitor for resuspension caused by workboats, a single station shall be placed adjacent to the dredging activity, in the side channel downstream of the principal location of boat and barge activity supporting the dredging activity. The side channel station shall be located reasonably close to workboat activity (approximately 10 m away from the dredging operation), subject to the safety procedures described in the project *Health and Safety Plan* (HASP) (BBL, 2003). Three stations shall be placed downstream of the dredging operation in an approximately triangular distribution to provide reasonable assurance that a resuspension plume will not escape the near-field undetected. The station nearest the dredging activity (100 m downstream of the activity or 50 m downstream of the most exterior resuspension control system) shall be located along the estimated centerline of flow from the dredging activity. This will be defined as a line beginning at the location of the dredge and running parallel to the centerline of flow. The two stations further downstream shall be located to either side of the centerline along a cross-flow transect spaced as appropriate to monitor the plume. These stations shall be located approximately 300 m downstream of the dredging operation or 150 m downstream of the most exterior downstream resuspension barrier. The location of the three downstream stations shall be assessed daily to maintain their position relative to the centerline of flow through the dredging activities. A boat-mounted Acoustic Doppler Current Profiler (ADCP) or continuous turbidity probe shall be used to assess the location of any observable plume to ensure that these downstream compliance stations are located within the plume. In the event that a dredging area is isolated by a resuspension control barrier, a sixth monitoring location shall be added within the control barrier. The distances from the remedial operations are approximate and the location of the near-field stations may be changed in the field to better capture the plume, if EPA approves the change.

If remedial operations are located in close proximity to one another, it may not be feasible to maintain all of the locations since there may be safety concerns or the stations may be within the working area for another operation. In such cases, monitoring locations may need to be dropped. GE shall follow the requirements for reduction in the near-field monitoring locations, specified in the *EPS* Volume 2, Section 4.2.5. Decisions to drop locations must be documented in the weekly reports.

The near-field monitoring stations shall consist of an easily movable device such as a buoy or a mobile platform (e.g., a small pontoon boat) that can be anchored in place. On-board instrumentation shall include continuous water column monitoring probes, global positioning system (GPS), navigational lighting, radio communications,

and their associated power sources. Additional equipment, such as automated sampling systems, meteorological stations, and other monitoring equipment, shall be included on select near-field stations as necessary.

Near-field monitoring shall be sufficiently frequent to detect a dredging release with a minimum duration of 1 hour (the minimum number of sub-samples shall be identified in the Phase 1 RAM QAPP). To meet this requirement, continuous monitoring shall be performed for dissolved oxygen (DO), conductivity, temperature, pH, and turbidity (or other surrogate) at all near-field stations. Each near-field station will have continuous monitoring for turbidity, temperature, and conductivity for one hour prior to beginning remedial operations and for at least two hours after the operation ceases (*EPS* Volume 2, page 116). This applies to the five stations required if there are no barriers installed, and to all six stations if barriers are installed.

One TSS sample per station per day shall be collected to confirm the surrogate relationship. The ability of the surrogate to adequately predict the suspended solids concentrations will be assessed on a daily basis. The criteria and method for assessing the surrogate relationship will be provided in the Phase 1 RAM QAPP and may differ from that provided in the *EPS* Volume 2 Section 4.4. If the turbidity (or other surrogate) measurements indicate that a TSS criterion has been exceeded, two TSS samples per day shall be collected at the station with the exceedance until such time that the surrogate relationship is confirmed and the station is in compliance.

In the event that a suitable surrogate relationship is not sustainable, vertically-integrated samples will be collected every three hours and analyzed for suspended solids. One sample from each near-field station will be collected one hour prior to beginning the remedial operations at a location. GE shall take corrective measures to update or change the surrogate relationship to bring it back within the performance metrics set in the Phase 1 RAM QAPP, which will be based on the results of the TSS Surrogate Study (QEA, 2005a). These measures may include the collection of laser particle size measurements (if applicable) and additional TSS samples, and the evaluation of the performance of automated sampling equipment (if used) and turbidity probes.

Depending on the results of the TSS Surrogate Study, discrete laser particle counters may be used for suspended solids analysis. At both the near-field and far-field stations, pH and DO will be monitored discretely each time a sample is collected (*EPS* Volume 2, p. 117).

WQ samples for hardness and dissolved and total metals shall be collected from the upstream background station and the two stations located 300 m downstream of dredging operations if no resuspension barriers are

used or approximately 150 m downstream if resuspension barriers are used. These samples shall be collected using an automated sampling system (ISCO or equivalent) from a single, conservative monitoring depth (i.e., at ~ 75% of the water column depth or a minimum of 2 feet off the bottom), as described in Section 2.3.1. The vertical location of the intake may be adjusted based on information gathered during Phase 1. Sample aliquots shall be collected at a frequency that is appropriate for the amount of sample required over the sampling period, consistent with the capabilities of the automated sampling equipment. Given that the representativeness of samples will increase as the frequency of collection of sample aliquots increases, the capabilities of the automated samplers will be assessed prior to Phase 1, and the highest sample collection frequency that can be practically achieved on a routine basis shall be used. The aliquots from each station shall be integrated to form a single daily composite sample for each of the three monitoring stations under routine monitoring. If an automated sampler fails, a minimum of two discrete samples shall be collected per station per day and composited; these discrete samples shall be depth-integrated using the BMP sampling protocol.

If either of the downstream stations exceeds the WQ Acute Aquatic criteria, the sampling frequency shall increase to four aliquots per hour and four composite samples per day at each station and sufficient volume of water shall be collected to analyze for total and dissolved metals. If an automated sampler fails while in exceedance, a minimum of four discrete samples shall be collected per station per day; these discrete samples shall be depth-integrated using the BMP sampling protocol. This sampling frequency shall be maintained until such time as the station is in compliance and the EPA has authorized a return to routine monitoring. After the first month, the sampling results will be evaluated and modifications to the monitoring program may be made based on the results of such evaluation subject to EPA approval in consultation with NYSDEC.

2.2.2 Far-Field Monitoring

The far-field stations shall coincide with the stations established for the BMP, except where such stations need to be relocated to accommodate automated sampling. A correction may need to be applied to the baseline data to properly determine compliance with the load-based resuspension criteria. The correction factor will be developed during baseline based on additional data collection and analysis (GE's baseline automated sampler study). The far-field stations include a background station at Bakers Falls and the following five Upper Hudson River stations that will be used to assess achievement of the applicable far-field criteria:

- Rogers Island (River Mile [RM] 194.2);

- Thompson Island (RM 187.5);
- Schuylerville (RM 181.4);
- Stillwater (RM 168.4); and
- Waterford (RM 156.0).

Two additional far-field stations shall be located in the Lower Hudson River at Albany (RM 140) and Poughkeepsie (RM 77). A third station at the Mohawk River at Cohoes, which has historically shown low levels of PCB, shall be monitored every month. EPA has approved this deviation from the EPS (i.e., contingency monitoring is not required); however, EPA may require higher frequency sampling during Phase 1, if warranted, at the Mohawk River station (e.g., concentrations are greater on average than measured during baseline).

GE is constructing and operating an automated sampling station at Lock 5 (RM 182.3) in 2005 on a pilot basis in accordance with the *Scope of Work for Pilot Studies for Automated Near- and Far-Field Water Column Sampling* (QEA, 2005b). This automated station will replace the Schuylerville BMP station after appropriate testing is completed, subject to EPA approval. Automated samplers will also be used at the four remaining Upper Hudson River far-field sampling stations. The precise locations of those automated sampling stations will be determined following completion of the pilot studies, and construction and validation of those stations will be performed in 2006. Each station has been or will be constructed such that water can be automatically sampled from a number of locations along a cross-sectional transect and water quality parameters can be monitored continuously. Once the pilot study has been completed and the other automated stations have been constructed and tested, and EPA has reviewed the test data and approved use of the stations for the BMP, automated sampling techniques shall replace manual BMP sampling protocols at these far-field locations. However, GE shall maintain the capability to perform manual sampling at the routine monitoring frequency specified in the Resuspension Standard, using the BMP sampling protocols, in the event that an automated station fails or is off-line for maintenance.

Monitoring for assessment of the far-field criteria shall be conducted at the each downstream far-field station that is a minimum of 1 mile away from the dredging activity. The Thompson Island station will be the nearest representative downstream far-field station for the entire Phase 1 dredging program because this program will terminate at about RM 189.8. The Thompson Island station will serve as a compliance check point for near-

field exceedances of TSS at the Evaluation and Control Levels (*EPS* Volume 2, p. 117, "Exceedance of the Near-Field Resuspension Criteria"). Following Phase 1, recommendations for modification of the RAMP during Phase 2 (if necessary) will be developed based on the data from Phase 1.

In the event that dredging occurs in more than one river section, effectively creating two nearest far-field stations, this standard applies in the same manner to both stations. That is, the far-field concentration criteria apply to both stations equally. Given the various uncertainties in load estimation, no pro-rating of the standard for the upper station will be required, although GE could consider doing so, as needed. This means that any of the far-field stations can dictate response actions. In the event that dredging operations move to a location less than one mile upstream of a far-field monitoring point, the next downstream far-field station will become the representative far-field station for the operation. The nearer far-field station will continue to be monitored at the routine level, not to judge compliance with the standard, but rather to provide data to allow comparison of the far-field station to the new far-field compliance station.

In addition, continuous particle counter measurements may be acquired at these stations if it is determined during the course of the TSS Surrogate Study (QEA, 2005a) that this technology provides information that will be useful for compliance monitoring. GE will submit recommendations to EPA for the adoption or abandonment of this technology along with the results of the TSS Surrogate Study.

Rogers Island will serve as the upstream far-field station that will be used to assess PCB load contributions originating upstream of the remediation area. The statistical criteria for this assessment shall utilize those described in the *EPS* (Volume 2, Section 4.1.4.3) and will be included in the PSCP and Phase 1 RAM QAPP.

To provide upstream data for application of some of the resuspension criteria, weekly background samples shall be collected at Bakers Falls for PCB, TSS, dissolved organic carbon (DOC), and particulate organic carbon (POC) analysis. These samples shall be collected using the manual BMP sampling protocol and discrete measurements of water quality parameters (turbidity, temperature, pH, conductivity and dissolved oxygen) will be taken at the time of sample collection. The sampling frequency at Bakers Falls may be reduced to monthly, with EPA's approval, if the analysis of BMP sampling results indicates that this station has uniformly low PCB concentrations. Daily composite PCB, TSS, DOC, and POC samples shall be collected at Rogers Island using the automated sampling system, with sample aliquots collected at a frequency that is appropriate for the amount of sample required over the sampling period, consistent with the capabilities of the automated sampling equipment, subject to EPA approval. Water quality parameters (turbidity, temperature, pH and conductivity)

shall be monitored continuously at this station. DO will be measured along with each grab sample collected for suspended solids. A daily discrete sample shall be collected for TSS for the purposes of confirming the TSS surrogate relationship. If it is determined that the surrogate relationship is not adequate, samples will be collected for suspended solids every 3 hours, 24 hours per day, with a maximum 24 hour turnaround time, but GE would use reasonable efforts to reduce the 24 hour turnaround time. If manual sampling is conducted at Rogers Island due to a failure or maintenance of the automated sampling station, daily discrete samples shall be collected using the manual BMP sampling protocol. As stated in the *EPS* (Volume 2, p. 112), the monitoring frequency at Rogers Island may be reduced to weekly, with EPA approval, for all parameters except TSS if the data will not be used to monitor for releases from upstream sources that could be interpreted as releases from the remediation.

Routine monitoring at each of the Thompson Island, Schuylerville, Stillwater, and Waterford stations shall be conducted at a frequency sufficient (sub-sampling at once per half hour at a minimum) to verify that short-term (1 hour or more) elevated dredging-induced releases do not pass that far-field station undetected. To meet this requirement, continuous monitoring shall be performed for DO, pH, conductivity, temperature, and turbidity. At the Thompson Island station, suspended solids will be continuously monitored with a turbidity monitor. TI Dam shall have a surrogate relationship for suspended solids concentrations in place prior to Phase 1. A particle counter may also be used at the TI Dam station if it is determined during the TSS Surrogate Study that the technology provides useful data for compliance monitoring. If it is determined that the surrogate relationship does not provide a reasonable estimate of TSS, samples will be collected for suspended solids every 3 hours, 24 hours per day, with a maximum 24 hour turnaround time, but GE would use reasonable efforts to reduce the 24 hour turnaround time. The turnaround time starts at sample receipt by the laboratory. Daily composite PCB, DOC, and POC samples shall be collected at these stations under routine monitoring conditions. Modeling indicates that a 1-hour long dredging release that originates from the furthest downstream point of the Phase 1 areas in River Section 1 will result in elevating the concentrations of monitored parameters at the Thompson Island Station for several hours due to dispersion. Sample aliquots shall be obtained at a frequency that is appropriate for the amount of sample required over the sampling period, consistent with the capabilities of the automated sampling equipment. Since the representativeness of samples will increase as the frequency of collection of sample aliquots increases, the capabilities of the automatic samplers will be assessed prior to Phase 1, and the highest sample collection frequency that can be practically achieved on a routine basis shall be used. These aliquots shall be used to form 24-hour composites. This sampling frequency will ensure that multiple measurements will occur during the minimum release of interest. If manual sampling is conducted at Thompson

Island or Schuylerville due to a failure or maintenance of the automated sampling station, the daily discrete sample shall be collected with consideration of time of travel from dredging operations.

If the nearest representative downstream station exceeds the Evaluation Level criteria, the sampling frequency shall increase to two 12-hour composite samples per day at Thompson Island and Schuylerville. If the compliance station exceeds the Control or Standard Level criteria, the sampling frequency shall increase to three (8-hour) or four (6-hour) composites samples per day, respectively, at Thompson Island and Schuylerville. These increased sampling frequencies shall be maintained until the stations are back in compliance as specified in Section 4.3 of the *EPS* (Reverting to Lower Action Levels), in some cases requiring EPA approval. If the Standard Level has been exceeded at the Thompson Island Dam station or Schuylerville station, the sample collection frequency at Stillwater and Waterford shall increase to four composite samples per day and the appropriate, notification, and contingency measures shall be implemented in accordance with the PSCP and RA CHASP.

The Lower Hudson River stations at Albany and Poughkeepsie shall be sampled every four weeks (*EPS* Volume 2 p. 115) using the manual BMP sampling protocol (i.e., vertically-integrated sampling at a centroid location). (This low frequency is contingent on the results of the BMP showing Total PCB concentrations less than 100 ng/L on average to allow a margin of safety for the public water supplies [*EPS* Volume 2 p. 115].) If the 7-day running average total PCB concentration at Waterford or Troy is 350 ng/L (measured or estimated [*EPS* Volume 2, Section 4.2.6.4]) or greater (Control Level), the sampling frequency shall be increased to weekly and maintained at that level until the conditions for reverting to routine monitoring are met as specified in Section 4.3 of the *EPS* (Reverting to Lower Action Levels). GE shall collect samples for PCBs, DOC, POC and suspended solids. Water quality parameters will be measured on each sample (turbidity, temperature, pH, conductivity and dissolved oxygen). The results of the analyses will be required within 72 hours (*EPS* Volume 2, p. 115).

The Mohawk River station shall be sampled once every other month from May through November to maintain the historical record; these samples shall be collected manually from a centroid location and shall be vertically integrated. If the PCB concentrations at Albany are shown to exceed those at Waterford, GE shall collect a grab sample at the Mohawk River at Cohoes to investigate whether the Mohawk is the source of elevated PCB levels in the Lower Hudson River. If sampling indicates that PCB levels in the Mohawk River have increased significantly, the Mohawk River station shall be sampled at the same frequency as the Albany and Poughkeepsie stations during Phase 1.

These monitoring contingencies are for remediation of River Section 1 more than one mile upstream from the Thompson Island monitoring location. If dredging were conducted in River Sections 2 and 3, the two stations downstream of the dredging will have the parameters, frequency, sampling methods, and turn-around times associated with the Thompson Island and Schuylerville as described above, and stations below these stations will have the parameters, frequency, sampling methods and turn around times associated with Stillwater and Waterford, also as described above (*EPS* Vol. 2 p. 113).

If the remediation is conducted in more than one river section, more than two stations are representative. If there were an accidental release in a section that was not undergoing remediation at that time, the two stations at least one mile downstream of the accidental release would be representative until the situation was resolved. Representative stations must always be more than one mile downstream from the source of the resuspended material. In the event that a far-field suspended solids resuspension criterion is exceeded, the far-field station would be monitored for PCBs (*EPS* Volume 2 p. 113).

To comply with the WQ Health (Water Source) standard, daily composite samples shall be collected for metals analysis at Schuylerville, Stillwater, and Waterford, with sample aliquots collected at a frequency of twice per hour. In the event of an exceedance, the sampling frequency shall be increased to four composites per day with sufficient volume collected to analyze for dissolved and total metals. If manual monitoring is implemented due to automated station failure or maintenance, discrete sampling shall be conducted with consideration of time of travel. The results of TSS samples collected in conjunction with Resuspension Standard monitoring may substitute for those required for WQ requirements, provided that the number of samples and timing of sample collection corresponds to those collected for metals analyses. Continuous turbidity monitoring for the WQ requirements shall be performed in conjunction with monitoring for the Resuspension Standard.

2.3 Sampling Methods

The design of the sampling program is based on the need to meet the following objectives:

Objectives for Far-Field Monitoring in the Upper Hudson

- Provide a set of data to demonstrate compliance with the Resuspension Standard Total and Tri+ PCB concentration thresholds.

- Provide a set of data to demonstrate compliance with the WQ requirements.
- Provide a means to rapidly assess water column Total PCB levels so that EPA can advise public water suppliers when water column concentrations are expected to approach or exceed the federal MCL (i.e., 500 ng/L) during the remediation.
- Provide a set of data to demonstrate compliance with the Total PCB load components of the Resuspension Standard (i.e., 300 g/day and 600 g/day).
- Determine the primary means of PCB release via dredging-related activities.
- Determine the baseline Total PCB levels entering River Section 1 from upstream sources.
- Determine ancillary remediation-related effects on the river (e.g., barge traffic-related resuspension, spillage during transit or off-loading of sediment) that may occur in areas that are not captured by the nearest representative far-field station.

Objectives for Near-Field Monitoring in the Upper Hudson

- Provide a real-time indication of suspended solids release in the near field.
- Provide a set of data to demonstrate compliance with the WQ requirements.
- Determine the amount of suspended solids released by the remedial operations to provide an indication of PCB export.
- Verify that the NYSDEC surface water quality regulations are not violated during the remediation.

Additional Monitoring Objectives

- Monitoring in the Lower Hudson to examine the effect of Upper Hudson dredging activities on Lower Hudson PCB concentrations.
- Verify the selection of the monitoring locations.

- Non-Target Area Monitoring: Determine the degree and extent of contamination resulting from the remedial operations downstream from the target areas. (See Section 8.)

Adjustments to the sampling program shall be made through corrective action memoranda (CAMs) subject to EPA approval.

No splitting of water samples is permissible for any measurements that must accurately reflect the suspended solids content. If duplicate samples are required, the sample bottles for the duplicate and sample analysis can be deployed at once or in series to generate co-located samples. Sample bottles for PCB and suspended solids analysis should be deployed simultaneously if possible (*EPS* Volume 2 p. 110).

During the BMP, GE is testing automated sampling systems for both near-field and far-field monitoring. Based on the results of these tests, the Phase 1 RAM QAPP will provide necessary details on the sampling program. In the event that the automated samplers are not able to provide data of adequate quality to address the Resuspension Standard, the Phase 1 RAM QAPP will provide an alternate monitoring method to evaluate compliance with the Resuspension Standard monitoring requirements. In this case, the Phase 1 RAM QAPP will provide for the collection of data required at the routine level and will use best efforts to propose a program to address the objectives of the Resuspension Standard at higher action levels. In addition, the Phase 1 RAM QAPP will specify contingencies in the event of automated sampler failure during dredging.

2.3.1 Near-Field Monitoring

Near-field monitoring requires the collection of continuous water column monitoring data for temperature, specific conductance, pH, DO, and turbidity and the collection of TSS grab samples and metals and hardness composite samples. Continuous water column monitoring data shall be acquired using a YSI 6000 Series multi-parameter probe (or equivalent). This probe shall be suspended from the monitoring platform at a conservative depth in the water column (i.e., toward the bottom of the water column) at ~ 75% of the water column depth or a minimum of 2 feet off the bottom. Confirmatory TSS samples shall be collected at the same depth at which the water quality monitoring probes are deployed, such that these samples may be directly compared to the concurrent continuous turbidity measurements. If the surrogate relationship is not adequate for one or more stations, GE shall collect vertically integrated grab samples for compliance monitoring. Hardness and metals samples shall be collected using an automated sampling system (ISCO or equivalent) with the sampling manifold located at the same depth in the water column as the probe.

As described in Section 2.2.1, the automated sampling system shall be configured to draw aliquots at the highest frequency that can be practically achieved. In the event that an automated sampler fails, grab samples for metals and hardness shall be collected at 75% of the water depth or a minimum of 2 ft. off the bottom at the prescribed daily frequency.

2.3.1.1 Demonstration of Near-Field Automated Samplers during Phase 1

As noted Section 2.3 above, efforts will be made during the BMP to demonstrate the utility of automatic samplers for near-field monitoring. Sampling shall be conducted during Phase 1 to verify that the automatic samplers meet the requirements of the EPS and to support modifications or maintenance of the systems that may be needed to meet those requirements. The near-field monitoring will be for continuous water quality parameters and metals. The DQOs and sampling requirements are described below:

Assess the vertical location of the intakes.

Turbidity data shall be collected through the water column at each near-field station during remedial operations once a week throughout Phase 1. The data will be assessed to determine if the single intake captures the average (or higher) concentration in the water column. The location of the single intake in the water column may be adjusted based on review of the data.

Determine the long-term calibration and stability of continuous water quality monitoring probes.

The same water parcel shall be measured for the continuous water quality parameters (turbidity, DO, pH, conductivity and temperature) using the automated sampler and a calibrated instrument with the probe at the level of the single intake. All stations will be assessed on a weekly basis throughout Phase 1. The data will be assessed using a control chart method (specific thresholds to be defined in the Phase 1 RAMP QAPP).

2.3.2 Far-Field Monitoring

At the automated far-field stations, water shall be pumped continuously through the system from several sampling inlets located along a cross-river transect. The water from each sampling location shall be combined

and continuous water quality monitoring measurements shall be made on this combined stream using in-line probes located near the automated systems sampling port. In this way, the continuous water quality measurements will be representative of conditions at the time the sample aliquots are collected. As described in Section 2.2.2, sample aliquots shall be collected from the combined stream using an automated sampler (ISCO or equivalent) at the highest frequency that can be practically achieved, at a minimum every 30 minutes, to form station composite samples. This departure from the monitoring requirements of the standard is acceptable to EPA as long as the automated samplers are shown to meet the data quality objectives specified in the EPS.

If the surrogate relationship is not adequate for one or more stations, GE shall collect suspended solids samples every 3 hours, 24 hours per day, with a maximum 24-hour turnaround time, but GE would use reasonable efforts to reduce the 24-hour turnaround time. The turnaround time starts at sample receipt by the laboratory. GE shall take corrective measures to update or change the surrogate relationship to bring it back within the performance metrics set in the Phase 1 RAM QAPP, which will be based on the EPS requirements for the Special Study to Develop and Maintain of a Semi-Quantitative Relationship between TSS and a Surrogate Real-Time Measurement For the Near-Field and Far-Field Stations (Full Scale), the TSS Surrogate Study (QEA, 2005a), and subsequent phases of the TSS Surrogate Study. These measures may include the collection of laser particle size measurements (if applicable) and additional TSS samples, bench-scale TSS studies, and the evaluation of the performance of automated sampling equipment (if used) and turbidity probes.

At the Bakers Falls, Albany, Poughkeepsie, and Mohawk River stations, sampling shall be performed at a centroid location using the manual BMP sampling protocol.

2.3.2.1 Demonstration of Far-Field Automated Samplers during Phase 1

As noted Section 2.3 above, efforts will be made during the BMP to demonstrate the utility of automated samplers for far-field monitoring. Sampling shall be conducted during Phase 1 to verify that the automated samplers at the far-field stations meet the requirements of the EPS. The results of this sampling may indicate that modifications or maintenance of the systems is required. The DQOs and sampling requirements are described below:

Determine whether the automated samplers collect a sample that is comparable to the vertically integrated grab samples under construction conditions. These samples are necessary to determine if the automated sampler

collects a representative sample, even though the samplers do not collect a vertically integrated sample. This sampling is not required if the samplers are located in an area that EPA agrees is likely to be well mixed.

If the TI Dam station is located above the dam, the Phase 1 RAM QAPP will address the issue of vertical integration and comparability with the original TI Dam station. If needed, paired samples may be collected during Phase 1.

Determine the integrity of the samples collected with automated samplers. Determine if the sampling devices are aging or corrupted by biofilms. This test must be completed on each station because construction may differ from one station to another and the degree of biofilm development may differ depending on local conditions such as the location of CSOs.

Samples shall be collected from each intake line at the pump house while timing the sample to match discrete samples collected at the intake ports to the automated sampler. Both the pump house samples and the intake point samples will be composited, generating a single sample for the intakes and a single sample from the pump house. All far-field stations shall be sampled. The frequency of sampling will be proposed by GE for EPA approval based on review of the automated sampler data collected during baseline. Each sample shall be analyzed for TSS, PCB and metals (where measured for WQ requirements) throughout Phase 1. The results of the sampling will be assessed using a control chart method based on the absolute difference between the measurements and the relative percent difference. If the data appear to have a bias, the sampling apparatus will be modified (such as by increasing the flow) and samples will be collected with the modified sampler.

In addition, pressure testing of the lines will be conducted at a frequency that will be proposed by GE for EPA approval based on review of the automated sampler data collected during baseline.

Assess the performance of the automated samplers.

The performance of the automated samplers will be assessed based on the concentration relationships among far-field monitoring stations on a weekly basis throughout Phase 1. All measured parameters will be considered (Total PCBs, Tri+ PCBs, and all probe measurements). The assessment of the data will be qualitative with comparison of Phase 1 measurements to the BMP results.

If the relationships among the far-field stations are not comparable to baseline conditions, it may be necessary to modify the location or number of substations in the cross-section of one or more stations. USGS guidance should be consulted to determine the number of EDI stations required in the cross-section (USGS, 2002, Section 4.1.1). PCB fluxes are expected to remain relatively constant downstream of the dredging operation, with only minor increases, and PCB and TSS concentrations are expected to gradually decline in response to increases in flow (e.g., from tributaries) downstream of the dredging operations.

Determine the long-term calibration and stability of continuous water quality monitoring probes.

During sampling to assess the integrity of the automated samplers over time, water quality data shall be collected continuously in the river at each pump intake and in the corresponding pump discharge in the pump house for a minimum of one half hour during the manual sampling to be conducted in conjunction with the automated sampling. The samples will be measured for turbidity, particle distribution, DO, pH, conductivity and temperature. The results of the sampling will be assessed using a control chart method based on the absolute difference between the measurements and the relative percent difference.

2.3.3 Equipment Maintenance and Calibration

Testing of the near- and far-field sampling equipment, including automatic samplers and continuous water quality monitoring instruments, will be performed during the pilot study. The need for and scope of ongoing evaluations of the ability of the automatic samplers and continuous water quality monitoring equipment to collect representative data will be identified prior to Phase 1. Appropriate operation, maintenance, and calibration procedures will be developed and incorporated into the Phase 1 RAMP QAPP.

Near-field continuous monitors will be checked daily for problems such as bio-fouling and damage (*EPS* Volume 2, p.106).

2.4 Analytical Methods

GE shall analyze the samples according to the requirements of the *EPS* Volume 2, Section 4.2.6, except for modifications presented herein and unless EPA agrees to other modifications. Adjustments to the sampling program shall be made through corrective action memoranda (CAMs) subject to EPA approval.

The analytical methods will need to be sensitive enough to measure water column concentrations of PCBs at each station. For Total and Tri+ PCBs, a PCB analytical method with a detection limit low enough to detect expected PCB concentrations at Bakers Falls, Rogers Island, and Waterford is required (*EPS* Volume 2, p. 103). The current PCB analytical methods specified in the BMP QAPP (QEA and ESI, 2004) are expected to meet detection limit requirements during remedial action.

The analytical methods chosen for this program must meet or exceed the specifications of the methods used in the baseline monitoring program in terms of precision, sensitivity, accuracy, representativeness, comparability, completeness and sensitivity. The only exception to this requirement would be in the case that efforts to produce a modified method for TSS to allow a reduced turnaround time are successful. The same analytical methods chosen for each station will be maintained at each station throughout the program for consistency (*EPS* Volume 2, p. 103).

2.4.1 Suspended Solids

Suspended solids analysis shall be conducted using EPA Method 160.2 with modifications to be consistent with American Society for Testing and Materials (ASTM) Method D 3977-97, with a 24-hour turnaround time. However, during non-routine monitoring, reasonable efforts will be made to reduce the 24-hour turnaround time. Any modifications to the method made to reduce turnaround time will be detailed in the Phase 1 RAM QAPP.

2.4.2 PCBs

Analysis of whole water PCBs shall be conducted using the modified Green Bay Method (mGBM) and extraction protocols used during the BMP. Under routine monitoring, samples collected at the two nearest far-field stations to the dredging operations (Thompson Island and Schuylerville for Phase 1) shall have a 24-hour turnaround time from the time that the last sample is collected at either of these stations until the results are reported from the laboratory, to the extent that such turnaround time is feasible. The time between sample collections at these stations shall not exceed four hours. Samples shall be processed in batches to provide some daily measure of QA/QC (e.g., laboratory control spikes and continuing calibration standards). However, given the field and laboratory logistics required to provide results within 24 hours, it will not be possible for the initial

analytical results to have undergone the standard QA/QC procedures. All PCB samples shall be subject to electronic verification and a subset (minimum 5%) will be subject to manual validation. The validation will be frontloaded in order to assess the analyses early in the season. The QA/QC details for PCB analytical samples will be provided in the Phase 1 RAM QAPP.

At stations downstream from the two nearest far-field stations to the dredging operations, Bakers Falls and Rogers Island, PCB results shall be reported within 72 hours of collection during routine monitoring. If the Control or Standard Level is exceeded, analyses for samples collected from the stations at Thompson Island, Schuylerville, Stillwater, and Waterford shall all have 24-hour turnaround times, to the extent feasible. In this case, reporting of results from the station in exceedance (to confirm the results per the EPS) and Stillwater and Waterford (to be protective of water supplies) shall be prioritized. The details of the QA/QC procedure will be provided in the Phase 1 RAM QAPP.

2.4.3 Organic Carbon

Samples shall be analyzed for DOC and POC using EPA Method 415.1, as described in the BMP QAPP (QEA and ESI, 2004). Sample turnaround times will be the same as for PCBs at each station.

2.4.4 Metals and Hardness

Metals analysis for the WQ requirements shall be conducted using EPA Method 200.8, with the exception of mercury, which will be analyzed using EPA Method 1631, and hexavalent chromium, which will be analyzed using colorimetric Method SW-846 7196A (although Method SW-846 7199 may be used as an alternate procedure for samples when interference exists with the colorimetric Method SW-846 7196A). Each metals composite shall be considered a sample upon the collection of the last aliquot. As discussed in Section 2.1.2, samples from near- and far-field stations shall be analyzed for total and dissolved cadmium and lead under routine conditions. In the event of an exceedance of an applicable metals standard in either the near field or the far field, the subsequent samples collected for metals analysis from such location(s) shall be analyzed for the suite of total and dissolved metals subject to the applicable set of standards, until such time as the metals concentrations fall below the standards. If, during in-water activities, distressed or dying fish are observed, GE shall conduct increased monitoring for metals (total and dissolved) and additional water quality parameters, where appropriate, in accordance with the PSCP Scope (Section 7.5) and *WQ Substantive Requirements* (p. 9).

At that time, routine metals monitoring shall resume. Hardness analysis shall be conducted on near-field samples using EPA Method 130.2.

Initially, the laboratory will be required to report the metals results from the far-field stations within 24 hours of the last sample collected at the far-field stations, to the extent feasible. Given the field and laboratory logistics required to provide results within 24 hours, it will not be possible for the initial analytical results to have undergone standard QA/QC procedures. The amount and type of QA/QC procedures will be delineated in the Phase 1 RAM QAPP.

2.5 Off-Season Water Column Monitoring

In the off-season when dredging activities have ceased, the sampling schedule currently being followed under the BMP shall continue, with certain modifications. Specifically, this sampling shall include routine weekly sampling for PCBs, TSS, DOC, and POC at the five Upper Hudson River stations (to the extent that weather and river conditions allow), monthly sampling at Bakers Falls and at the Lower Hudson River stations at Albany and Poughkeepsie, and every other month at the Mohawk River. Metals sampling shall not be conducted during the off-season.

2.6 Public Water Supply Monitoring

When dredging operations are underway, the frequency of monitoring for PCBs shall be increased at the public water supply facilities for the Town of Halfmoon and the City of Waterford. This monitoring will augment the already extensive water column sampling to be conducted in the river, which will ensure that PCB levels at the far-field stations remain below the Standard Level set forth in the Resuspension Standard. That Standard Level is a confirmed total PCB concentration of 500 ng/L, which is the same as the National Primary Drinking Water Maximum Contaminant Level (MCL).

The monitoring of the potable water supplies shall be on raw and finished water and the analytical method shall be EPA Method 508 (PCBs as Aroclors) in accordance with 40 CFR 141.24. This monitoring will be done weekly when dredging operations are underway. GE will work with the water suppliers and the regulatory agencies to implement the plan described above.

2.7 Fish Monitoring

Throughout the RA period, fish collections shall continue to be performed in the Upper Hudson River and Lower Hudson River as described below, except that (a) the sampling locations may be modified, if necessary and with EPA approval, to avoid impacts from dredging in that year, and (b) the total number of fish samples collected in each river section each year may be modified upon EPA approval in consultation with the NYSDEC.

2.7.1 Sampling Locations

In the Upper Hudson River, fish sampling shall be conducted at locations identified to coincide with the BMP fish sampling locations. Specifically, fish sampling shall be conducted in the Upper Hudson River from each of the river sections at the stations listed below:

- Feeder Dam (representative of reference conditions);
- Thompson Island Pool (representative of River Section 1);
- Northumberland/Fort Miller Pools (representative of River Section 2); and
- Stillwater Pool (representative of River Section 3).

In the Lower Hudson River, fish monitoring shall be conducted at the following stations:

- Albany/Troy (location shall coincide with the BMP fish sampling locations);
- Catskill; and
- Tappan Zee area.

2.7.2 Sampling Frequency

Sampling shall be conducted annually at the Upper Hudson River stations. At the Lower Hudson River stations, fish sampling shall be conducted annually at Albany/Troy and every two years at Catskill and Tappan Zee.

2.7.3 Species and Sampling Methods

This section specifies the species to be sampled during the Remedial Action.

2.7.3.1 Upper Hudson River

In the Upper Hudson River, the same species groups as are sampled in the BMP shall be collected. These species groups are:

- black bass (largemouth and/or smallmouth bass, with a goal of half of each species but in whatever combination is available to meet the applicable sample size from Section 2.7.4);
- ictalurids [bullhead (brown and/or yellow) and/or channel catfish (white and/or channel), with a goal of half of each species but in whatever combination is available to meet the applicable sample size from Section 2.7.4);
- yellow perch;
- yearling pumpkinseed; and
- forage fish (spottail shiner and/or alternative).

Standard sampling methods, including netting, electroshocking, and angling, shall be used to collect target species. The samples to be processed for analysis shall be standard fillets for bass, bullhead, catfish, and perch; individual whole body samples for yearling pumpkinseed; and whole body composites for spottail shiners or other forage fish species.

2.7.3.2 Lower Hudson River

At the Lower Hudson River stations, the following species shall be sampled as part of the fish monitoring program:

- At Albany/Troy: striped bass, black bass (largemouth and/or smallmouth bass, 10 of each, or in whatever combination is available for a total of 20), ictalurids [10 bullhead (brown and/or yellow) and/or 10 catfish (white and/or channel), or in whatever combination is available for a total of 20], and perch (white and/or

yellow, 10 of each, or in whatever combination is available), yearling pumpkinseed and forage fish (spottail shiner and/or alternative) – all to be collected annually;

- At Catskill, striped bass, black bass (largemouth and/or smallmouth bass, 10 of each, or in whatever combination is available), and ictalurids [10 bullhead (brown and/or yellow) and/or 10 catfish (white and/or channel), or in whatever combination is available] - all to be collected every two years; and
- At Tappan Zee area, striped bass – to be collected every two years.

These samples shall be processed as standard fillets.

2.7.4 Sample Size

Sample size within each pool in the Upper Hudson River shall be the same as described in the BMP QAPP (QEA and ESI, 2004). For locations where individual fish will be submitted for analysis, the number of fish to be collected shall consist of a maximum (i.e., more of one species may be collected than another in order to achieve the total if one species is present in smaller numbers, or not at all) of: 20 individuals per species group at Feeder Dam; 25 individuals per species group at Northumberland/Fort Miller pool; and 30 individuals per species group at each of the Thompson Island and Stillwater pools. The individuals may be collected from multiple stations within the pool, as necessary to achieve a representative River Section-wide average. In addition, where forage fish will be sampled, ten whole body composites of forage fish shall be collected from each pool (two composites per location).

At each of the Lower Hudson River stations, a maximum of 20 individuals of each species group shall be collected.

2.7.5 Measurements

PCBs and percent lipid shall be measured to monitor PCB levels in fish. All fish samples shall be analyzed for total PCBs using a modification of the USEPA Method 8082 Aroclor Sum Method, as specified in the BMP QAPP (QEA and ESI, 2004), unless USEPA determines that the data quality objectives established in the Phase 1 RAM QAPP can no longer be assessed by that method. Analysis by the mGBM will be performed on 5 percent of the total number of samples, during every other sampling event that is conducted at a given sampling location, in order to verify that the Aroclor method is accurately quantifying the Total PCB concentrations in fish, as the contaminant pattern in fish may change as a result of the remediation, which may affect the

quantification by the Aroclor method. The weight and length of collected fish also shall be measured to assess fish condition. Captured fish shall be visually inspected for external abnormalities (e.g., tumors, lesions). Sex of fish will be determined, if possible, prior to processing in the analytical laboratory.

2.8 Reporting

An electronic data export shall be provided to EPA on a weekly basis. The export shall contain the most recent version of the data at the time of file creation. Additionally, a "readme" file documenting data additions and corrections shall be provided with the database. Changes and/or updates to the project data shall be documented by two methods. Data verification and validation changes shall be detailed in the automated data verification module (DVM) and validation reports. Other significant changes to the database shall be documented in corrective action memoranda provided electronically to EPA.

GE shall report the analytical results and continuous water column monitoring data as follows:

- Continuous water column monitoring data shall be made available immediately to EPA's designated representative in the field and will be submitted to EPA within 12 hours of collection.
- The reporting system shall be designed such that additional sampling can commence within 6 hours of any reported near- or far-field exceedance.
- Analytical results shall be made available to EPA upon receipt from the laboratories. The data package contents will be defined in the Phase 1 RAM QAPP.
- Any exceedances of the 500 ng/L total PCB standard shall be reported to EPA within 3 hours of laboratory reporting.
- Any near-field exceedances of the Acute Aquatic standards shall be reported promptly to EPA and NYSDEC, but no later than 3 hours after receipt of the laboratory data.
- Any exceedances of the Health (Water Source) standards or of the NYSDOH action or trigger levels for lead, as defined in Section 2.1.2, shall be reported to EPA, NYSDEC, NYSDOH, and the downstream public water suppliers promptly, but no later than 3 hours after receipt of the laboratory data.

- Weekly reports shall be submitted that summarize the results of near- and far-field monitoring, exceedances of criteria, and any corrective actions taken.

GE will facilitate such reporting through the use of a data management system that will post results for authorized project personnel in near-real time, allow for the creation of summary reports, and provide notification of exceedances. The GE project manager or designated representative shall submit a weekly report with the requisite information. Further details regarding the reporting will be included in the Phase 1 RAM QAPP.

GE shall provide the data from the off-season water column and fish monitoring programs to EPA in the monthly reports and monthly database updates under the Consent Decree.

In addition, GE shall provide annual Data Summary Reports (DSRs) that document the data collected in each calendar year in both the water column and fish monitoring programs. These reports shall be submitted by April 1 of the following year. Each DSR shall fully document the prior calendar year's work, including a summary of the work performed, a tabulation of results, field notes, processing data, chain-of-custody (COC) forms, copies of laboratory audits, data validation results, copies of laboratory reports, and a compact disk version of the project database.

3. Sediment Residuals Monitoring

A residuals sampling and evaluation program shall be implemented to monitor the level of PCBs in sediment remaining in dredge areas.

3.1 Objectives and Criteria

The objectives of the Sediment Residuals Monitoring Program are to:

- Verify the removal of the sediment PCB inventory in dredge areas; and
- Determine the concentrations of Tri+ PCBs in sediment residuals (i.e., individual node concentrations, arithmetic average, and median) ; and
- Provide information for evaluation of the Residuals Performance Standard.

This section presents the locations and frequency for sample collection activities pursuant to the Residuals Performance Standard, including:

- Collection of samples to assess Tri+ PCB levels in residuals immediately following dredging;
- Collection of samples to assess Tri+ PCB levels in residuals immediately following re-dredging;
- Collection of samples to assess Tri+ PCB inventory in sediment remaining after dredging; and
- Collection of samples to assess Tri+ PCB levels in backfill.

For clarity, the above activities are referred to herein as “post-dredging residuals sampling,” “post-re-dredging residuals sampling,” “post-dredging inventory sampling,” and “backfill sampling.” Residuals sampling shall target the top 6 inches of the post-dredging surface.

Residuals sampling shall be performed in each certification unit (CU), as described further below, following completion of dredging activities. The sampling results shall be evaluated against criteria presented in the

Residuals Performance Standard to determine whether the standard has been met or contingency actions are required. Sampling locations, collection methods, and analytical methods for the Sediment Residuals Monitoring Program are described below in subsections 3.2 through 3.4. Contingency actions may require additional sampling and analysis, such as re-dredging sampling activities, etc., depending on the results of the initial sampling effort. These activities are described in subsection 3.5 – Contingency Monitoring.

3.2 Monitoring Locations and Frequency

Samples shall be collected for residuals characterization following completion of all dredging activities in a given CU. GE shall comply with the requirements of *EPS* Volume 3, Section 4.1, for sampling grid establishment. In general, a CU shall consist of approximately 5 acres and shall be sampled at 40 locations on a triangular grid, except in the following circumstances:

- Isolated dredge areas smaller than 5 acres shall be designated as a single CU, and samples shall be collected from 40 locations along a proportional grid.
- Non-contiguous dredge areas smaller than 5 acres and within 0.5 mile of one another may be evaluated as a single CU, up to a maximum area of 7.5 acres. For resulting CUs less than 5 acres in size, samples shall be collected from 40 locations along a proportional grid while CUs greater than 5 acres shall be sampled using a grid with 80-foot spacing (i.e., up to 60 samples for a 7.5-acre area).
- If a number of noncontiguous dredging areas smaller than 5 acres in size are contained within a common silt barrier during dredging, the construction manager must submit a proposal to EPA that explains how the dredging project will be managed to prevent the spread of contamination to the interstitial, non-targeted areas, or propose additional sampling to investigate those areas during residuals sampling in the CUs.
- Contiguous dredging areas up to 7.5 acres in size may be considered a single CU and sampled using a grid with 80-foot spacing (i.e., up to 60 samples for a 7.5-acre area).
- Contiguous dredging areas between 7.5 and 10 acres shall be divided into two CUs of equivalent area, and 40 samples collected from each CU along a proportionate grid.
- Contiguous dredging areas larger than 10 acres shall be divided equally into approximately 5-acre CUs, and samples collected in each CU using a grid with 80-foot spacing.

Specifics of the CUs and their associated sampling grid will be established following development of the dredge prisms during design and shall conform to the above requirements. Sampling points for compliance with the Residuals Performance Standard criteria and PSCP Scope Section 3 shall be located only in areas where inventory dredging was conducted. If overdredge areas (i.e., side slope areas located laterally outside the areas identified in the *Dredge Area Delineation Reports*) are not backfilled, these locations will also be sampled at the same frequency, and the results will be used to evaluate the residual levels remaining in these areas because the spatial extent of these areas is not known at this time. The size of the CU will be estimated based on the area where inventory dredging was conducted. As noted above, approximately 40 to 60 samples shall be collected from each CU along a triangular grid. The grid shall be offset from the design support sampling grid used in the Sediment Sampling and Analysis Program (SSAP) such that the residuals sampling nodes are located between 40 and 60% of the distance between SSAP sampling nodes, with the goal being 50% of the nodal distance. If obstructions are encountered at a grid node, the sample shall be relocated within a 20-foot radius of the original location.

Sampling in a CU shall be completed within 7 days of completion of each dredging attempt in that CU. Samples may be collected prior to completion of the unit as long as the area sampled complies with the requirements of the PSCP Scope Section 3.1. Cores shall initially be advanced to a depth of 2 feet and samples collected from the 0- to 6-inch interval using the methods discussed in subsection 3.3. It may be necessary to re-sample some nodes for deeper samples, if the depth of contamination (DoC) has not been identified and the DoC cannot be estimated through extrapolation. The remainder of the core shall be archived according to the same procedures used during the SSAP; archived samples shall be stored until EPA permits the samples to be disposed of. However, upon notification to EPA, GE may dispose of samples one year after collection unless EPA chooses to have GE transfer the samples to EPA or its representative. The core depth may be modified during implementation of the residuals sampling program, with EPA approval, based on the results for CUs sampled early in the program. Such modifications shall be made through GE's submission of a corrective action memorandum (CAM) for EPA approval.

3.3 Sampling Methods

Sample collection and processing shall generally follow the SSAP protocols, with modifications to incorporate requirements from the Residuals Performance Standard. The protocols to be followed for sample collection are presented below, followed by the protocols for processing.

3.3.1 Sample Collection

- Samples shall be collected via coring, vibracoring, or manual coring techniques.

- Clear Lexan tubes (or other appropriate semi-transparent tubes) shall be used for manual coring. If substrate conditions are such that manual coring is not feasible, cores shall be retrieved using vibracoring.

- If vibracoring is employed, the rig shall be activated at the sediment-water interface and used throughout the full depth of the core.

- Under conditions where a core cannot be collected, samples shall be collected using small ponar-type samplers.

- Core locations shall be located using GPS and referenced to an appropriate horizontal coordinate system and vertical datum.

- Sampling locations and all other field data shall be recorded.

- Sediment probing shall be conducted in an adjacent location prior to core collection to identify the approximate depth and the texture of the sediments.

- Backfill samples and samples from redredged nodes will also be collected as 0-to-6-in core samples; and in all respects sample collection, management, and analysis will be identical to residual sediment samples.

- The probing information shall be used to determine if a core can be obtained, or if a grab sampler should be deployed instead.

- Design information and probing results shall be used to determine the target coring depth.

- Sediment cores shall be advanced to a depth of 2 feet (with the objective of collecting a representative surficial 0- to 6-inch sample), or to refusal (if less than 2-foot depth).

- Core recovery shall be measured upon collection directly through visual inspection of the sample and confirmed after extraction of the core during processing.

- Actual sample recovery shall be calculated by dividing the length of the sediment recovered by the total penetration depth of the core.

- The sampler shall document sediment recovery, visually classifying the sediment sample and the thickness of the residuals layer.

- When probing indicates less than 6 inches of sediment over a hard material, at least one attempt shall be made to collect a core. A ponar grab sample shall be collected when the sediment core cannot be collected.

- If sample recovery is hindered by the presence of bedrock, up to three attempts shall be made to retrieve sediments using a coring approach (manual or vibracore) within a 20-foot radius from the proposed sampling location. If that approach is unsuccessful, grab sample collection shall be attempted using a ponar-type sampler for up to three additional attempts. Following such attempts, if sediment recovery is still not attainable, presence of bedrock shall be noted at the location and the rig shall move to the next sampling location.

- If a ponar dredge is used, it shall be of sufficient size to penetrate at least 6 inches or the thickness of sediment believed present on the river bottom, whichever is less.

- After collection, the core shall be capped, sealed, and labeled. Labeling shall include core identification information, date, time, and an arrow to indicate the upper end.

- All other information shall be recorded in a field log book.

- The cores shall be transported with river water in the headspace to minimize disturbance of the top core layer.

- The cores shall be stored on ice on a storage rack in a vertical position and kept in the dark until submitted for processing and analysis.

- Ponar samples shall be homogenized in a dedicated, laboratory-decontaminated, stainless steel bowl, transferred to an appropriately selected and labeled sample jar, and stored on ice in a cooler until submitted for processing and analysis.

3.3.2 Sample Processing

- A field processing facility similar to that used in SSAP activities shall be used.

- Retrieved core samples shall be photographed.

- Field notes shall arrive at the processing facility with the core or ponar sample and be entered into the database.

- The initial core processing step shall be to drain the excess water, once the fine particles have settled with the goal of minimizing disturbance to the fluff layer.

- The weight of the core tube will then be measured and will be used as an initial estimate of the sediment bulk density.

- Any observed sediment "fluff" layer (the layer the measuring stick will go through to hit the sediment-water interface) shall be retained and homogenized with the 0- to 6-inch sample.

- For cores, obvious disturbances to sediment layer created due to the dredge will be documented. Observations including thickness of separate layers of redeposited sediments, disturbed sediment, and undisturbed underlying sediment shall be recorded.

- The length of the recovered core shall be measured, the core tube shall be marked to identify where it will be cut into segments (if more than the 0- to 6-inch segment will be analyzed), and an arrow shall be marked on each segment to indicate the upper end.

- The core shall be cut into 6-inch segments prior to extrusion. Since the core sections will be separated prior to the extrusion process, the sediment will only be extruded from the section of core tubing that corresponds

to the sample to be mixed and analyzed, in most cases, the 0-to-6 in interval. While the core tube is being cut, support will be given to the areas above and below the cut. Once the core tube has been cut through, the core segment will be separated from the rest of the core.

- Sediment shall be extruded using a decontaminated stainless steel tool and rigorously homogenized using decontaminated stainless steel or glass equipment.

- Visual descriptions shall be recorded into the database, including a description of the physical characteristics of the core segment; general soil type (sand, silt, clay, and organic/other matter such as wood chips, as determined using the Unified Soil type Classification System (USCS)); approximate grain size; and presence of observable biota, odor, and color. If Glacial Lake Albany Clay is observed, the presence of clay shall be confirmed by a manual test of plasticity. The nature and length of stratigraphy changes shall also be noted, if present. Visual texture characterization shall be done by a field geologist or equivalent.

- Objects of cultural significance, if present, shall be noted in the database, inspected by a qualified geomorphologist or archaeologist, and stored at the processing facility.

- Wood chips shall not be separated, but manually pulverized or chopped as necessary to allow homogenization with and inclusion in the sediment samples submitted for laboratory analysis.

- Sample aliquots designated for analysis shall be chilled to 4°C and kept in a dark location until sent to the analytical laboratory.

3.4 Analytical Methods and Quality Assurance/Quality Control Procedures

Sediment samples shall be analyzed for PCBs using Method GEHR8082, the same method used during the SSAP, with modifications to achieve lower reporting limits as described below (if necessary). To the extent feasible, these analyses shall achieve a reporting limit of 0.1 mg/kg for each PCB Aroclor, with a Method Detection Limit (MDL) of 0.05 mg/kg or a reporting limit equivalent to 0.1 mg/kg for Tri+ PCBs over the range of conditions that can be anticipated (e.g., high moisture content). Prior to submittal of the Phase 1 RAM QAPP, GE will submit for EPA review and approval, additional paired analysis using GEHR8082 and the mGBM to refine the regression equation to meet the reporting limit of 0.1 mg/kg. The information shall identify

the source and number of samples to be used to develop the conversion and the approach for developing the regression equation. The samples shall also be analyzed for moisture content (as part of the PCB analyses) using EPA Method 160.2. If a regression equation is approved by EPA, GE shall analyze 4 percent of the samples by the PCB method used to develop the equation, throughout remediation. The paired estimates of Tri+ PCB will be used to assess and maintain the regression throughout the remediation.

If, during remediation, a regression equation is used to estimate Tri+ PCBs, and if a sample with detection(s) of one or more Aroclors that are not included in regression equation contains concentrations of these Aroclors at more than 5 percent of the Total PCB concentration, then GE shall propose a means of calculating Tri+ PCBs for this sample for EPA's review and approval (for instance, add any Aroclors not in the regression equation to the 1242 plus 1254 total).

QA/QC procedures for residuals sampling shall be described in the Phase 1 RAM QAPP and be approved by EPA. The parties agree that it is critical to generate high quality data with sufficient QA/QC to adequately document CU closure decisions on a timely basis. The parties further agree that results from manual data validation will be a critical component to the overall QA/QC program (particularly in the beginning of the project) and will be used to continuously evaluate and improve analytical procedures, but manual data validation will not be used as a basis to revisit decisions already made regarding actions at a specific CU.

3.5 Contingency Monitoring

Following the initial post-dredging residuals sampling and analysis, the resulting PCB data shall be reviewed to determine the appropriate response. Under the Residuals Performance Standard, there are four possible responses:

- Response 1: Backfill and demobilize at a CU (including testing of backfill if necessary).
- Response 2: Jointly evaluate a 20-Acre Average
- Response 3: Re-dredge or Construct Subaqueous Cap at a CU.
- Response 4: Redredging is required.
- Response 5: Capping.

The criteria to be used to determine which of these responses will be implemented during Phase 1 dredging, and the methods used to apply these criteria, shall follow the Residuals Performance Standard, as described in the

PSCP Scope, and will be presented in more detail in the *Phase 1 Intermediate* and *Final Design Reports* and the PSCP; these criteria and methods are not discussed herein.

This subsection describes the additional sampling and analysis associated with one or more of these responses – namely, re-dredging residuals sampling/analysis, inventory re-characterization sampling/analysis, and backfill sampling/analysis. These activities, where performed, shall be conducted in accordance with the sampling and analytical methods described in subsections 3.3 and 3.4 and the PSCP Scope Section 3.4.

In areas where re-dredging is conducted, residuals samples shall be collected following completion of each re-dredge attempt from the redredged nodes and analyzed. Re-dredging sample core locations shall be offset from the original residuals sample grid by 10 feet. Samples shall be collected from the 0- to 6-inch depth interval.

Samples from depths below 6 inches may be analyzed for PCBs to define the depth of contamination as specified in the PSCP Scope.

Backfill samples shall be collected, when required, along the same grid as the residuals samples. Backfill samples shall be collected from the 0- to 6-inch depth interval. Backfill samples shall be analyzed for PCBs using the same procedure described for residual samples in subsection 3.4 above.

In addition, construction monitoring shall be implemented during cap placement activities. This construction monitoring shall be described in the *Construction Quality Assurance Plan* for Phase 1 dredging operations.

3.6 Data Reporting

GE shall prepare weekly progress reports and submit them to the EPA site manager according to a schedule to be agreed upon by GE and EPA. The reports shall summarize, at a minimum, the following:

- Results of residuals sampling;
- Exceedances of the Residuals Performance Standard by CU and joint 20-acre evaluation area; and
- The course of actions that were undertaken, and rationale.

Also, laboratory data shall be made available to EPA upon receipt from the laboratory.

In accordance with Section 5 of the SOW, following the signing by both GE and EPA of a Final CU Construction Completion Certification for a given CU, GE shall prepare and submit to EPA, according to a schedule to be agreed upon by GE and EPA, a CU Completion Report. Each CU Completion Report shall include:

- CU identification;
- Description of the type(s) of dredging equipment used;
- Description of sediment type(s) encountered;
- Results of residuals sampling;
- Sediment imaging results (if available);
- Written verification that the sampling data were verified in accordance with the procedure described in subsection 3.4 above, including a discussion of any data qualifiers applied;
- Results of the required comparisons to action levels for each dredging pass;
- Discussion of any contingency actions taken;
- Number of dredging passes for residuals concentration reduction;
- For each attempt, a map of the CU showing the concentration at each node and the non-compliant area (if any) to be re-dredged or capped; and
- A signed verification that the CU was backfilled or capped (as applicable) in accordance with the requirements of the PSCP Scope, the PSCP, and the approved remedial design, as well as any other applicable requirements under the Consent Decree.
- A signed verification that the initial habitat replacement/reconstruction was completed (as applicable) in accordance with the requirements of the approved remedial design, as well as any other applicable requirements under the Consent Decree.

4. Air Quality and Odor Monitoring

An air quality and odor monitoring program shall be conducted to assess achievement of the standards set forth in the QoLPS for air quality and, as necessary, for odor. Specific objectives and criteria for air monitoring are described below, organized according to:

- PCBs;
- Criteria Pollutants;
- Opacity; and
- Odor (including hydrogen sulfide [H_2S]).

4.1.1 PCBs

The objective of PCB air quality monitoring is to assess the potential exposure of receptors in the project area to airborne emissions of PCB from the project.

EPA determined that emissions of PCBs during remediation activities could result in a short-term increase in ambient air levels of these pollutants. The QoLPS for air quality has been established to confirm that this potential impact does not result in unacceptable exposure.

The air quality standards for PCBs, as set forth in the *QoLPS* (pp. 6-8 & 6-18), are as follows:

- During remedial action, the Residential Standard is:
  24-hour average, total PCBs = 0.11 micrograms per cubic meter ($\mu g/m^3$), with a "Concern Level" of 0.08 $\mu g/m^3$ (24-hour average) total PCBs.

- During remedial action, the Commercial/Industrial Standard is:
  24-hour average, total PCBs = 0.26 $\mu g/m^3$, with a "Concern Level" of 0.21 $\mu g/m^3$ (24-hour average) total PCBs.

4.1.2 Criteria Pollutants

In accordance with the *QoLPS* (pp. 6-9 to 6-1), an assessment will also be made of the following pollutants for which EPA has promulgated National Ambient Air Quality Standards (NAAQS) (known as "criteria pollutants"): nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), particulate matter with a median diameter of 10 micrometers or less (PM_{10}), particulate matter with a median diameter of 2.5 micrometers or less ($PM_{2.5}$), and ozone (O_3). Ozone (O_3) is evaluated using its precursors, NO_x and volatile organic compounds (VOCs).

The need for monitoring of these constituents shall be determined during remedial design using specific design data. The RD Team will repeat the assessment in EPA's *White Paper – Air Quality Evaluation* analyses (USEPA, 2002) using project specific design data. If this project-specific information developed during design validates the assumption used in EPA's *White Paper – Air Quality Evaluation* analyses (USEPA, 2002), this will be considered a determination of compliance with the QoLPS such that further demonstration by on-site or off-site sampling shall not be required. If air quality compliance is not demonstrated as a result of these analyses for any NAAQS, GE shall evaluate potential design changes that could result in achievement of the NAAQS and/or the need for monitoring for such pollutant(s), and shall submit a proposal on this topic to EPA for review and approval.

4.1.3 Opacity

The air quality standard for opacity, which is based on New York State air regulations (6 NYCRR Title III, Subpart 211.3), is that opacity must be less than 20% (as a 6-minute average), except that there can be one continuous 6-minute period per hour of not more than 57% opacity (*QoLPS*, p. 6-16).

4.1.4 Odor

The stated objective of the QoLPS for odor is to protect the public from odors that unreasonably interfere with the comfortable enjoyment of life and property (*QoLPS*, p. 6-18). Odors are difficult to measure because they depend on not only the concentration of the pollutant, but also on the sensitivity of the person exposed to the odor. The QoLPS for odor has two components. The first is a standard for hydrogen sulfide (H_2S) of 14 $\mu g/m^3$

(0.01 ppm), expressed as a 1-hour average, which applies if an odor identified as H_2S is detected by workers or the public. The second component is that odor complaints will be investigated and mitigated, as appropriate (*QoLPS*, p. 6-19).

4.2 Monitoring Locations and Frequency

The locations and frequency of the air quality and odor monitoring program are described below. Detailed monitoring plans will be submitted as part of the Phase 1 RAM QAPP.

4.2.1 PCBs

Air monitoring shall be conducted, employing samplers operating continuously for 24 hours, to verify the assessment and demonstration of compliance with the QoLPS for PCBs. Such monitoring shall be conducted at locations along the dredging corridor, at unloading areas, and around the sediment processing/transfer facility (processing facility), as discussed further below. (Note that the monitoring for unloading areas and processing facility may be combined, depending on final configuration of the processing facility.) In addition, monitoring shall be conducted at a permanent background station situated upwind of the Phase 1 dredge areas, the unloading areas, and the processing facility. This station shall be situated permanently at a fixed upwind location away from the river and operate throughout the entire term of the remediation program. The specific location for this station will be specified in the design documents. If an approach other than a standard EPA-approved method is being proposed to demonstrate compliance, that approach will require EPA approval and will be specified in the Phase 1 RAM QAPP.

Further, a meteorological station shall be established at the processing facility to provide meteorological data for use in this air monitoring program. The specific location for this meteorological station, as well as the equipment to be used at the station, shall be specified in the design, which shall consider EPA guidance for siting meteorological monitoring stations (USEPA, 2000b).

Monitoring Site Selection Process

In selecting locations for the PCB monitoring stations, GE shall apply a three-tiered site selection process. This process shall involve application of the following criteria.

The primary criteria for site selection shall involve consideration of the location of the facility perimeter (for monitoring stations that are to be placed on that perimeter), pertinent information on predominant wind direction and wind vectors, and pertinent information on the most likely receptor locations. Information on predominant wind direction and vectors shall be obtained through review of the historical meteorological data collected at Albany Airport, in combination with data collected from the meteorological station at the processing facility prior to project start-up. This information shall be coupled with dispersion modeling analyses of air emissions to identify the most likely receptor locations.

The secondary criteria for site selection shall involve application of the EPA's and U.S. Army Corps of Engineers' (USACE's) guidelines applicable to ambient particulate sampling systems (USEPA, 1987; USACE, 1997). These criteria include the following:

- Height of sampler inlet above ground (2 to 15 meters);
- Distance of sampler from trees (> 20 meters);
- Distance from sampler to obstacle at least twice the height of the obstacle above the sampler;
- Unrestricted airflow (270° arc of unrestricted space around sampler);
- Roof placement > 2 meters from any wall, parapet, penthouse, etc., and no nearby flues that may significantly impact sampling;
- Sufficient separation of the sample inlet from nearby roadways to avoid the effects of dust re-entrainment and vehicular emissions on measured air concentrations; and
- Avoidance of locating particulate matter sampling systems in an unpaved area unless there is vegetative ground cover so that the effect of locally re-entrained fugitive dusts will be kept to a minimum.

The tertiary criteria shall consist of logistical considerations, including availability of electrical service, site accessibility, site operator safety considerations, and the availability of site security to mitigate tampering with and/or vandalism of instrumentation.

The details on monitoring locations will be provided in the Intermediate and/or Final Design Reports and the Phase 1 RAM QAPP.

Monitoring Frequency

The Phase 1 monitoring for PCBs shall be conducted at the following frequencies:

- Stations at the sediment processing facility and unloading areas will be sampled continuously during processing plant operations, and a 24-hour sample will be collected at each station for each day during such operations. Additionally, at least two days of baseline data, prior to the start of processing operations, will be collected at the processing facility stations.
- Representative stations within the dredging corridor will be sampled continuously during dredging, and a 24-hour sample will be collected for each day during dredging operations. Additionally, at least two days of baseline data, prior to the start of dredging, will be collected at stations that are representative of the first day of dredging.
- The permanent background station will be sampled continuously during dredging or processing plant operations, and a 24-hour sample will be collected for each day during such operations. The sample at this station will be analyzed for PCBs. Additionally, at least two days of baseline data will be collected at this station prior to the start of dredging.

During Phase 1 operations, EPA will determine if the objectives of the air monitoring program can be achieved with less frequent monitoring or monitoring at fewer stations (e.g., only selecting the samples collected at the predominantly downwind and upwind stations for analysis).

Meteorological Monitoring

Meteorological data shall also be collected at the processing facility. These data shall consist of wind speed, wind direction, and ambient temperature collected on a continuous basis during project operations and/or during ambient air monitoring. Data shall be collected as 5-minute averages and downloaded for archival storage. The meteorological station shall be placed atop a tower and situated so as to meet EPA siting criteria for meteorological monitoring stations (USEPA, 2000b).

4.2.2 Criteria Pollutants

As discussed above in subsection 4.1.2, sampling for criteria pollutants is not expected to be required. Should the design suggest that this monitoring is required, the details will be specified in the Phase 1 EMP to be submitted with the *Phase 1 Final Design Report,* as well as reflected in the Phase 1 RAM QAPP.

4.2.3 Opacity

The opacity standard shall be applied to vessels, vehicles, and equipment as a performance standard for this project. The locomotives used by rail carriers shall not be subject to this opacity standard. These line-haul engines are regulated by EPA's national standards governing opacity (40 CFR Part 92). However, the switcher engine used to operate the on-site rail yard shall be subject to the QoLPS for opacity. Vessels and vehicles used for this project shall be maintained and operated properly to prevent opacity problems. Also, pollution control systems for process equipment shall be designed to prevent opacity concerns. The primary monitoring for opacity shall be visual observations, as described in subsection 4.3.3, these observations will be made by a certified visual observer using EPA Method 9 documented in field logs. Opacity shall be observed at the initial start-up of each piece of equipment permanently assigned to the site that has air emissions. Additional opacity observations shall be made if an opacity complaint is received from the public.

4.2.4 Odor

Receptors include residents along the river and users of the river such as boaters. Odor measurement is difficult because no instrument has been found to successfully measure odor and all of its components. The human nose is the most effective instrument to measure odor, but personal preference affects what is considered acceptable or offensive. Instruments can measure some compounds that make up odor (e.g., H_2S), but odor is typically a combination of many compounds. A high or low concentration of just one compound is not generally a good indicator of whether an offensive odor is present.

Although odor measurements are difficult, monitoring can be implemented to demonstrate compliance with the ambient air concentration standards. An assessment of potential activities and conditions that could result in exceeding the H_2S standard or in the detection of other odors will be performed during remedial design. However, if an odor complaint is received or if workers detect an unacceptable odor, and the odor is identified

as potentially H_2S, H_2S monitoring shall commence. At this time, specific locations and frequency for such monitoring cannot be defined, but it is anticipated that two locations would be monitored – one upwind and one downwind of the suspected source of odors.

4.3 Sampling Methods

4.3.1 PCBs

High-volume air samplers (e.g., Tisch or Andersen PS-1) fitted with a polyurethane foam (PUF) cartridge and a glass-fiber filter shall be used for sampling for PCBs in ambient air, where practical. This sampling approach is consistent with EPA Method TO-4A (January 1999). The detection limit for PCBs, expressed as an Aroclor-based total PCB concentration, is expected to be 30 nanograms per cubic meter (ng/m^3) employing this methodology. Lower-volume pumps, which operate with a rechargeable battery, may be used in locations where electricity is not available, provided that a 24-hour sample can be collected. This sampling approach is consistent with EPA Method TO-10A (January 1999). Procedures and modifications, if any, for these methods will be described in the Phase 1 RAM QAPP.

4.3.2 Criteria Pollutants

No sampling for criteria pollutants is anticipated to be required. However, if such sampling is required, the sampling methods will be specified in the Phase 1 EMP and Phase 1 RAM QAPP.

4.3.3 Opacity

A certified observer will visually observe opacity using EPA Method 9 at the point of emission and record this reading using Method 9 datasheets in a field log. A detailed procedure with be provided in the Phase 1 RAM QAPP.

4.3.4 Odor

When sampling for H_2S is warranted, H_2S levels shall be measured via direct readings using a hand-held meter (e.g., Arizona Instruments Jerome Meter) or, when this is not possible, via collection in an evacuated Tedlar bag followed by measurement using a hand-held meter. In the latter case, the H_2S meter can be brought to the sample or the sample can be transported in the Tedlar bag to the meter for direct measurement of H_2S. The Tedlar bag will allow multiple samples to be collected simultaneously and will allow more rapid deployment of the sampler. These samples shall be collected over a one-hour period using a low-volume sampling pump that draws ambient air into the evacuated bag. These devices shall be available at the processing facility, at barge unloading areas, and at shoreline locations, such that pumps and bags can be readily deployed to the site of the odor in the event of a complaint. A detailed procedure with be provided in the Phase 1 RAM QAPP.

4.4 Analytical Methods

4.4.1 PCBs

Air samples will be analyzed for PCBs, using a gas chromatograph fitted with a capillary column in combination with an electron capture detector (GC/ECD). Results shall be reported as Aroclor-based PCBs concentrations, consistent with Method TO-4A. However, this analytical method will be optimized for monitoring Hudson-specific PCB air samples collected at the site, so that the results present accurate Total PCB quantitation. The procedure to optimize the GC/ECD analysis will be described in the Phase 1 RAM QAPP.

Under routine monitoring conditions, the laboratory shall be required to report the PCB results within 72 hours of receipt of the air sample by the laboratory. A shorter turnaround time of 48 hours shall be employed during start-up or when changes in operations take place, such as relocation of dredging operations; this shorter turnaround time shall be used for the 5 consecutive days of monitoring in such circumstances. Additionally, a turnaround time of 48 hours shall be employed in situations where PCB concentrations in any sample exceed the daily average total PCB standards or are greater than the Concern Levels (which represent 80% of the Standard Levels). Such contingency sampling is discussed further below.

4.4.2 Criteria Pollutants

No sampling for criteria pollutants is anticipated to be required. However, if such sampling is required, the analytical methods will be specified in the Phase 1 EMP and Phase 1 RAM QAPP.

4.4.3 Opacity

A certified EPA Method 9 opacity reader will make and record observations for opacity; as such, no analytical methods will be needed.

4.4.4 Odor

H_2S levels shall be determined by hand-held direct reading H_2S monitors (e.g., Arizona Instruments Jerome meter). When the Tedlar bag sampling method is used, ambient air samples shall be collected over a 1-hour period at the location of an odor complaint, employing an evacuated Tedlar bag fitted with a sampling pump. Measurement of H_2S concentrations in each bag shall then be made with a portable meter. In those instances where the odor complaint occurs near the location of the hand-held meter, the Tedlar bag sample may not be necessary as H_2S concentrations can be measured directly with the meter. A detailed procedure will be provided in the Phase 1 RAM QAPP.

4.5 Contingency Monitoring

In the event of an exceedance of the PCB Concern Level or PCB Standard Level or receipt of an odor complaint, contingency monitoring shall be performed as outlined below. Details regarding the contingency monitoring shall be provided in the Phase 1 RAM QAPP and RA CHASP.

4.5.1 PCBs

If a Concern Level is exceeded (i.e., daily average PCB concentration greater than 80% of the Standard Level), then the following contingency monitoring shall occur:

- Examine background PCB concentrations (sampling-event-specific as well as baseline database) and site-specific meteorological data to assist in PCB emissions source identification; and
- Reduce analytical turnaround time to 48 hours from the receipt of the sample at the laboratory.

If the daily average total PCB concentration exceeds the Standard Level, then the following contingency monitoring shall occur:

- Establish additional monitoring stations as needed to evaluate cause of increased emissions, utilizing the three-tiered site selection process described above;
- Examine background PCB concentrations (sampling-event-specific as well as baseline data base) and site-specific meteorological data to assist in PCB emissions source identification;
- Reduce laboratory turnaround time to 48 hours; and
- Continue monitoring to confirm compliance with the standard.

4.5.2 Odor

In the event of an odor complaint, the complaint shall be recorded and investigated in accordance with the RA CHASP and its Scope. If an odor complaint is received from workers or the public and the odor is identified as potentially H_2S, sampling shall be implemented to confirm and measure H_2S concentrations. If the H_2S standard is exceeded or there are recurrent odor complaints, H_2S monitoring shall be conducted on a regular basis until compliance with the standard is established. This monitoring will include the use of Tedlar bags for the collection of 1-hour air samples, with subsequent analyses employing a hand-held meter (e.g., Arizona Instruments Jerome). Mitigation measures and associated monitoring shall be evaluated and implemented as appropriate, and this action shall be recorded in a log.

4.6 Data Reporting

4.6.1 PCBs

Regular weekly progress reports shall be submitted to EPA that include information related to PCB concentrations in air near the processing facility and dredging operations, ambient (background and baseline) PCB levels, and monitoring plan adjustments. These weekly reports shall be provided to EPA in conjunction with the project implementation schedule. Report content and distribution will be described in the Phase 1 RAM QAPP.

EPA shall be notified of an exceedance of the 24-hour PCB standard promptly, but no later than 3 hours following receipt of the analytical data. In the event of an exceedance, a report shall be developed that includes an analysis of the reasons for the exceedance and a description of any mitigation measures. The written report shall be provided to EPA within 3 working days of the discovery of the exceedance. This report shall include background and baseline monitoring data to help determine whether the project is the source of the exceedance or whether there are external reasons for the exceedance. A summary of data collected at the on-site meteorological station (e.g., wind rose) shall also be provided in support of report findings and conclusions regarding the potential source(s) of the PCBs. Contingency report content and distribution will be described in the Phase 1 RAM QAPP.

4.6.2 Odor

During dredging operations, a monthly report shall be submitted to EPA summarizing the monitoring activities for the previous month. The summary shall be in tabular format and shall include a log of any odor complaints, monitoring, and the necessary information and follow-up actions needed to resolve the complaint. An example of the log will be included in the Phase 1 RAM QAPP and RA CHASP.

EPA shall be notified of odor complaints from the public or of an exceedance of the H_2S performance standard within 24 hours of discovery. A report outlining the reasons for the exceedance and any mitigation measures taken shall be submitted to EPA within 10 days of the event. Report content and distribution will be described in the Phase 1 RAM QAPP and RA CHASP.

5. Noise Monitoring

The purpose of the Noise Monitoring Program is to allow the RA team to make operational changes to mitigate any potential noise impacts.

5.1 Objectives and Criteria

The objectives and criteria of noise monitoring are described in this section, which is organized as follows:

- Noise standards;
- Monitoring locations and frequency;
- Sampling and analytical methods;
- Contingency monitoring; and
- Reporting.

5.2 Noise Standards

The QoLPS criteria for noise that have been developed for the remedial action, as set forth in the *QoLPS* (p. 6-25), are as follows:

- Short-Term – These criteria apply to facility construction, dredging, and backfilling activities:
    - Residential Control Level (maximum hourly average)
      Daytime = 75 dBA (A-weighted decibels)
    - Residential Standard (maximum hourly average)
      Daytime = 80 dBA
      Nighttime (10:00 pm – 7:00 am) = 65 dBA

- Commercial/Industrial Standard (maximum hourly average)
  Daytime and nighttime = 80 dBA

- Long-Term – These criteria apply to processing facility and transfer operations:

  - Residential Standard (24-hour average)
    Day-night average = 65 dBA (after addition of 10 dBA to noise levels measured from 10:00 pm to 7:00 am)

  - Commercial/Industrial Standard (maximum hourly average)
    Daytime and nighttime = 72 dBA

The attenuation model will be utilized to predict and evaluate noise levels and the results shall be presented in the Phase 1 Intermediate and/or Final Design Reports. If there is a predicted exceedance at a receptor location, based on a scaling factor relative to the monitoring point as predicted by an attenuation model, noise controls will be integrated into the design.

During project operations, the attenuation model will be used to evaluate noise levels at the receptor based upon noise levels on the perimeter of the facility or dredging area. A predicted exceedance shall trigger additional monitoring at the point of exceedance or, if possible, the nearest possible receptor. If the additional monitoring shows attainment of the standard, the predicted exceedance shall be reported with a note that monitoring at the receptor demonstrated attainment. If additional monitoring shows continued exceedances of the standards, the project team shall implement a contingency monitoring program, which is discussed later in subsection 5.4 - Contingency Monitoring.

5.3 Monitoring Locations and Frequency

Potential noise impacts due to Phase 1 project activities can be divided into short- and long-term impacts for both residential and commercial/industrial environments in the daytime and nighttime. The compliance point for noise monitoring shall be at the nearest receptor, either industrial or residential. If it is determined that noise levels are below the standards closer to the source of the noise, then the closer locations shall be considered acceptable for demonstrating attainment of the standards. During the design, more accurate information will become available to better specify noise monitoring locations.

Monitoring shall be conducted in the slow response mode for continuous equivalent sound level over a 1-hour period (L_{eq}(h)) at the receptor location while the process or activity is at peak load. The L_{eq} monitoring duration can be shortened for sources having steady noise emission levels.

Monitoring shall be conducted on a regular basis (at a minimum of every 4 hours) during construction of the processing facility. Potential reduction of the monitoring frequency will be evaluated on an ongoing basis, with reductions implemented if approved by EPA. Once construction has been completed, monitoring shall be conducted during the startup of the facility (to validate design assumptions) and on a regular basis during typical facility operations. If noise levels measured at monitoring locations during the remedial action indicate, based upon predictive analyses, that noise levels at a given receptor would exceed the Control Level or limits established by the standard, that receptor location shall be monitored, if practical, to demonstrate attainment. Monitoring frequency shall be increased if the daytime Control Level or nighttime standard is exceeded. In addition, more frequent monitoring (i.e., hourly monitoring) shall be conducted as needed to evaluate changes in operations or to respond to complaints. Background levels shall be measured in cases where noise levels approach the standard or to distinguish between project-related and non-project related noise. Where and when possible, routine monitoring locations shall be at the fenceline of the processing and unloading facilities and the shoreline of the river, adjacent to dredging operations.

At the beginning of Phase 1, a noise study shall be conducted to collect noise level data from the dredging operation at various distances. The noise study shall be a 2-week study, which will measure noise emissions from the dredging, barge transport, unloading, and processing operations. This study shall measure 1-hour L_{eq} noise for all major operations. There shall be approximately 20 full 1-hour sampling events for dredging, barge transport, unloading, and processing facility operations, cumulatively. Data gathered from this study shall be used to validate design and to confirm that the operations are attaining the noise standard as set forth in the QoLPS. In addition, based on this information and using calculations for noise attenuation over distance, noise monitoring requirements may be modified, with EPA concurrence, during the dredging of some locations where the nearest receptors are distant or noise levels are consistent. During Phase 1 dredging, monitoring shall be conducted on a regular basis (a minimum of every 4 hours) while the dredging and backfilling operations are ongoing if receptors have been determined to be within the impact range of the project (i.e., within the range where the model indicates that there could be an exceedance of the standard.) Potential reduction of the monitoring frequency will be evaluated on an ongoing basis by GE and EPA.

The following table outlines the Noise Monitoring Program for Phase 1 dredging operations.

Operations	Monitoring Plan	Additional Comments
Background Noise Levels	A 2-week noise monitoring study shall be conducted to establish baseline noise levels at the processing facility, as well as at locations that will be representative of receptor locations during Phase 1 dredging operations. A minimum of three 24-hour sampling events shall be conducted for the processing facility. A minimum of five 24-hour sampling events shall occur along the dredging corridor. This effort will be used to establish 1-hour L_{eq} noise levels at different times of the day for various receptor locations.	Additional background noise data may be needed if background noise levels at receptors are close to or exceed the noise standards.
Phase 1 Noise Study	At the initial startup of Phase 1 dredging operations, a 2-week study shall measure noise levels around the dredging, unloading, and processing operations. This study shall measure 1-hour L_{eq} noise for all major operations. There shall be approximately 20 full 1-hour sampling events making up this noise study. This study shall include monitoring data from dredging, barge transport, unloading, and processing facility operations.	
Construction Monitoring	During construction of the processing facilities, noise monitoring shall occur at a minimum of every 4 hours. This monitoring shall measure 1-hour L_{eq} noise levels.	Should noise monitoring over a 2-week period demonstrate no exceedances of the noise standards, GE will review the potential for reducing the frequency of noise monitoring for construction and may propose a modification to the noise monitoring frequency to EPA. Should construction activities exceed the noise standards, additional monitoring shall be performed in accordance with subsection 5.4 – Contingency Monitoring.
Dredging Operations - Compliance Monitoring	Noise monitoring shall be conducted at a minimum of every 4 hours (day and/or nighttime). It is anticipated that many of the noise monitoring locations, for dredging operations, will be located on nearby shorelines.	Should noise monitoring demonstrate no exceedances of the noise standards, GE will review the potential for reducing the monitoring frequency and may propose a modification to EPA.
Dredging Operations - Contingency Monitoring	Should monitoring results of dredging operations indicate a noise level that exceeds the control level or if a project-related noise complaint is received, monitoring shall be conducted for at least 1 hour to demonstrate compliance with noise standards. If the trigger for additional monitoring is a complaint, noise monitoring shall be conducted at the location in question from the complaint.	Contingency monitoring is discussed further in subsection 5.4 – Contingency Monitoring. Should monitored noise levels demonstrate exceedances of the standards, additional background noise monitoring may be needed to assess the potential impact of non-project-related noise source sensitive receptors.

Operations	Monitoring Plan	Additional Comments
Processing Operations - Compliance Monitoring	Noise monitoring shall be conducted at a minimum of every 4 hours. At a minimum, one monitoring location shall be identified for the processing facility and one for unloading operations. The specific locations will be shown in the *Phase 1 Final Design Report*. The *Phase 1 Intermediate* and *Final Design Reports* will also show modeled results from processing and unloading operations that will help focus on specific areas adjacent to the processing facility that may be of concern. For each monitoring location, the *Phase 1 Final Design Report* will identify the nearest receptors. The distance from the monitoring location to the nearest receptors will be used to model noise levels throughout the day and evening, as measured at the monitoring locations, which would keep project operations within Compliance and Concern Levels.	
Processing Operations - Contingency Monitoring	Should monitoring results of processing/unloading operations indicate a noise level that exceeds the control level, monitoring shall be conducted to demonstrate compliance with noise standards. If the trigger for additional monitoring is a complaint, then noise monitoring shall be conducted at the location in question from the complaint.	Should monitored noise levels demonstrate exceedances of the standards, additional background noise monitoring may be needed to assess the potential impact of non-project-related noise source.

5.4 Monitoring Methods

A Type 1 or Type 2 sound-level meter, as rated by the American National Standards Institute (ANSI), shall be used to measure noise levels.

5.5 Contingency Monitoring

Contingency noise monitoring is described conceptually in this subsection. The Concern and Exceedance Levels for the QoLPS for noise are described in the *QoLPS* (p. 6-38). The triggers for taking action to address noise exceedances and complaints at the Control and Exceedance Levels, as well as potential mitigation efforts, are outlined in the PSCP Scope and RA CHASP Scope and will be discussed further in the PSCP and RA CHASP, as well as in the Phase 1 design reports.

If a noise complaint is received from the public and is verified as project-related, monitoring shall be conducted at the site of the complaint as necessary to determine if the Control Level or standard has been exceeded.

In the event that noise levels above the Control Level or a standard are recorded (whether in response to a complaint or otherwise), additional monitoring shall be conducted (as needed) to evaluate the cause of noise increases, and noise monitoring shall continue until it confirms that noise levels are below the applicable noise standard. In addition, should monitored noise levels demonstrate exceedances of the noise standard as set forth in the QoLPS, additional background noise monitoring may be needed to assess the potential impact of non-project-related noise source on receptors.

Information related to contingency actions that would be employed to mitigate noise exceedances shall be provided as part of the Remedial Design documents as well as in the PSCP and RA CHASP.

5.6 Data Reporting

Records of noise measurements shall be maintained, including the measurement location, time of measurement, meteorological conditions, identification of significant sound sources, model and serial numbers of all equipment used, and calibration results. These results shall be documented on daily noise monitoring field data sheets or by using automated data loggers during times when noise monitoring is being conducted. Noise complaints shall be documented as described in the RA CHASP. A monthly report shall be sent to EPA summarizing the monitoring activities for the previous month. The summary shall include (in tabular format) the date, time, location, activity being conducted, and results in dBA. The summary shall also include (in tabular format) a log of any noise complaints and the necessary information and follow-up action needed to resolve the complaint. Only noise complaints (as opposed to inquiries), as defined in the RA CHASP and its Scope, will be reported on a routine basis.

EPA shall be notified of any exceedances of the noise standard within 24 hours after the discovery. In the event of any occurrence of the Concern Level (as defined in the QoLPS for noise), a follow-up report shall be sent to EPA describing the response. When there is an occurrence of the Exceedance Level, a report outlining the reasons for the exceedance and any mitigation employed shall be submitted to EPA within 10 days of the event.

6. Lighting Monitoring

To meet the project schedule, nighttime activities may be necessary, which would require artificial lighting. Specifically, artificial lighting may be needed for dredging operations, sediment offloading, processing, and rail loadout activities at night; this lighting may affect nearby receptors. This section describes the Lighting Monitoring Program that GE will conduct during Phase 1 to implement the QoLPS for lighting. However, the lighting QoLPS will not supersede worker health and safety lighting requirements established by the Occupational Safety and Health Administration (OSHA).

6.1 Objectives and Criteria

The main objectives of the Lighting Monitoring Program are to monitor and assess lighting impacts. The lighting standards established by EPA in the *QoLPS* (p. 6-39) are as follows:

- Rural and suburban residential areas = 0.2 footcandle.
- Urban residential areas = 0.5 footcandle.
- Commercial/industrial areas = 1 footcandle.

Similar to other nuisance impacts, all lighting complaints will be addressed as described in the RA CHASP and PSCP and their Scopes.

6.2 Monitoring Locations and Frequency

Potential lighting impacts due to project activities may occur in various types of areas, which can be divided into rural and suburban residential areas, urban residential areas, and commercial/industrial areas. The primary compliance point for the light standards shall be at the receptor. However, if it is determined that light levels closer to the source meet the lighting standards, such locations shall be considered acceptable for demonstrating attainment.

Light monitoring shall be conducted at the property line of the receptors nearest to the dredging operations that have the potential to experience an exceedance of the lighting standards or at locations closer to the lighting

source (e.g., the shoreline). Such monitoring shall be conducted three times between 10:00 pm and dawn during the first night of dredging activities at a given area to assess achievement of the standard. Monitoring shall be repeated whenever the dredging operation is moved to a different dredge area. Monitoring shall also be performed during Phase 1 at the perimeter of the processing facility or at the nearest receptor property line when the facility initially begins activities after dusk and when significant changes in lighting for the facility have been made. Complaints will also trigger additional monitoring, as described below.

6.3 Monitoring Method

A footcandle meter shall be used to measure illumination.

6.4 Contingency Monitoring

Contingency light monitoring is described conceptually in this subsection. The Concern and Exceedance Levels for the QoLPS for lighting are described in the *QoLPS* (p. 6-45). The triggers for taking action to address lighting exceedances and complaints at the Control and Exceedance Levels, as well as potential mitigation efforts, are outlined in the PSCP Scope and RA CHASP Scope and will be discussed further in the PSCP and RA CHASP, as well as in the Phase 1 design reports.

If a lighting complaint is received from the public and is verified as project-related, monitoring shall be conducted at the site of the complaint as necessary to determine if the lighting standard as set forth in the QoLPS has been exceeded.

In the event that light levels above the applicable standard are recorded (whether in response to a complaint or otherwise), regular light monitoring shall be conducted (as needed) to evaluate lighting conditions, and shall be continued until achievement of the standard is confirmed.

6.5 Data Reporting

Monitoring results shall be documented on light monitoring field data sheets. Records of measurements shall be made, including specifics of the measurement location, time of measurement, meteorological conditions during the measurement, identification of significant light sources (including non-project-related sources such as

streetlights or moonlight), and model and serial numbers of all equipment used to measure illumination. Lighting complaints shall be addressed as described in the RA CHASP and its Scope.

A monthly report summarizing the monitoring activities for the previous month shall be submitted to EPA. The summary shall be in a tabular format and shall include the monitoring results, as well as a log of any lighting complaints received (including date and time received) and a description of the action taken to resolve the complaint.

EPA shall be notified of any exceedances of the lighting standard within 24 hours after the discovery. In the event of any occurrence of the Concern Level (as defined in the QoLPS for lighting), a follow-up report shall be sent to EPA describing the response. When there is an occurrence of the Exceedance Level, a report outlining the reasons for the exceedance and any mitigation employed shall be submitted to EPA within 10 days of the event.

7. Monitoring of Discharges to Hudson River and Champlain Canal (Land Cut above Lock 7

The WQ requirements consist of: 1) requirements relating to in-river releases of constituents not subject to the EPS, as set forth in *Substantive Requirements Applicable to Releases of Constituents not Subject to Performance Standards*; and 2) the substantive requirements for discharges to the Hudson River and Champlain Canal, as set forth in *Substantive Requirements of State Pollutant Discharge Elimination System Permit for Potential Discharges to Champlain Canal (land cut above Lock 7),* and *Substantive Requirements of State Pollutant Discharge Elimination System Permit for Potential Discharge to the Hudson River*. These three sets of requirements are contained in a single document in the form of a letter to GE with enclosures that EPA issued on January 7, 2005.

This section addresses the monitoring requirements for discharges to Hudson River and Champlain Canal (land cut above Lock 7), including the associated monitoring requirements, sample and analytical methods, contingency monitoring, and reporting requirements. Requirements relating to in-river releases are detailed in Section 2.

7.1 Discharge Limitations

Effluent limitations for discharges of water from the sediment processing facility are described in Section 8 of the PSCP Scope.

7.2 Monitoring Locations and Frequency, Sampling and Analytical Methods

GE shall implement the following monitoring requirements for the above discharges. Additional details will be specified in the Phase 1 EMP and the Phase 1 RAM QAPP.

- Discharge flow shall be measured continuously with a flow meter.
- pH shall be monitored in the discharge monthly in a grab sample.
- All other parameters shall be measured weekly, with PCBs to be measured as a 24-hour runtime composite and the other parameters to be measured in grab samples.

- PCBs shall be analyzed by EPA Method 608. GE shall instruct the laboratory to make all reasonable attempts to achieve a Minimum Detection Level (MDL) of 0.065 µg/L for each Aroclor.
- Mercury shall be analyzed by EPA Method 1631.

7.3 Contingency Monitoring/Response Actions

In the event of an exceedance of the discharge limitations, GE shall perform the response actions described in subsection 8.3 of the PSCP Scope. If such actions require additional monitoring, the scope of such monitoring shall be set forth in the Engineering Evaluation Report described in that subsection of the PSCP Scope. If additional testing is proposed, GE shall notify EPA of the anticipated additional testing.

7.4 Data Reporting

GE shall submit to EPA a monthly report that includes the routine monitoring results for discharges to the Hudson River and the Champlain Canal (Land Cut above Lock 7). Both concentration (mg/L or µg/L) and mass loadings (lbs/day) shall be reported for all parameters except flow and pH. In the event of an exceedance of the discharge limitations or PCB detection, GE shall prepare and submit to EPA a separate report, as described in subsection 8.3 of the PSCP Scope. Copies of monitoring data and reports submitted to EPA shall be provided to the NYSDEC.

Monitoring data, engineering submissions, and modification requests shall be submitted to EPA with a copy sent to the NYSDEC.

8. Special Studies

This section describes the special studies that GE will carry out to provide information to evaluate and refine the implementation of the Resuspension Standard. As stated in the *EPS* (Vol. 2, p. 118): "The special studies will be conducted for limited periods of time to gather information for specific conditions that may be encountered during the remediation or to develop an alternate strategy for monitoring. Specific conditions may include different dredge types, contaminant concentration ranges, and varying sediment textures. Each of these studies is integral to the Phase 1 evaluation, the development of Phase 2, and is also tied to compliance issues."

The Resuspension Standard (*EPS*, Vol. 2, pp. 118 *et seq.*) specifies the following special studies:

- Near-field PCB Release Mechanism (Near-field PCB Concentrations);
- Development of a Semi-Quantitative Relationship between TSS and a Surrogate Real-Time Measurement for the Near-field and Far-field Stations (Bench Scale);
- Development of a Semi-Quantitative Relationship between TSS and a Surrogate Real-Time Measurement for the Near-field and Far-field Stations (Full Scale);
- Non-Target, Downstream Area Contamination; and
- Automated Monitoring (referred to the in *EPS* as "Phase 2 Monitoring Plan").

As discussed in Section 2 of this RA Monitoring Scope, the special study directed to developing a TSS-surrogate relationship and the special study on automated monitoring are described in separate work plans (QEA 2005a and 2005b). This section presents the work plans for the special studies of Near-field PCB Release Mechanism and Non-Target Downstream Area Contamination.

8.1 Near-Field PCB Release Mechanism

8.1.1 Objective

The objective of this study is to determine the nature of PCB release during dredging (sediment resuspension/particle-associated or dissolved phase mechanism). If near-field TSS concentrations can be considered a reliable indicator of PCB releases due to dredging-related activities, then real-time TSS surrogate measurements that will be taken at near-field stations may be used to identify when modifications of dredging activities to reduce resuspension are needed and to anticipate when elevated PCB concentrations may be expected at far-field monitoring stations.

8.1.2 Study Areas

The study shall be carried out at multiple locations so that a range of dredging conditions can be evaluated (e.g., different sediment types (cohesive and non-cohesive), PCB concentration ranges, and the range of dredge types expected to be selected in the Final Design Reports). Five locations have been chosen, four in the Northern Thompson Island Pool (NTIP) and one to the east of Griffin Island (EGIA) (Figures 8-1 and 8-2). The characteristics of these locations are summarized in the following table:

Table 8-1. Summary Statistics for Special Study Areas

Location (see Figures 8-1 and 8-2)	Side-Scan Sonar Designation	Mean % Silt & Clay	Mean % Fine Sand	Mean % Med./Coarse Sand & Gravel	Mean % Organic	Mean T-PCB Conc. (ppm)	Mean DOC (in.)	Mean Tri+ PCB MPA (g/m2)
1	Transitional	24	31	44	1	17	15	8
2	Transitional	18	8	73	1	32	27	18
3	Sand	9	21	68	2	34	25	17
4	Fine	19	45	34	2	50	33	18
5	Fine	73	17	11	0	444	21	24

Notes:
1. Mean DOC and mean Tri+ PCB MPA are area-weighted.
2. Mean percent sediment type and the mean total PCB concentration are volume-weighted, and were calculated using measured or extrapolated data down to the average depth of dredging.
3. Average depth of dredging is based on the 6/8/05 version of the married grid which covers both dredge and non-dredge areas.

8.1.3 Monitoring Frequency and Duration

Discrete monitoring of each study area shall be performed on three occasions, spaced approximately 2 days apart.

8.1.4 Monitoring Stations

A single background station shall be located about 100 m upstream of the dredging activity near the approximate centerline of flow through the area of dredging activity. This station will be coincident with the upstream near-field station used to assess compliance with the Resuspension Standard so that the other parameters measured at this station may be factored into the interpretation of the study results. To monitor the loss of TSS due to settling and the desorption of PCBs that occurs as resuspended sediments are transported

downstream, transects shall be placed at nominal distances (e.g., 30 m, 100 m and 300 m) downstream of the dredging activity in the approximate center of the plume. Sampling in close proximity to the near-field stations will provide measurements of PCB phase distribution that directly address the issue of the correlation between near-field TSS surrogate measurements and PCB release. The three downstream transects shall be placed within the dredging TSS plume so as to remain within the central two-thirds of the plume based on the increased levels of turbidity and TSS. A boat-mounted Acoustic Doppler Current Profiler (ADCP) or continuous reading turbidity probe shall be used to characterize the plume (e.g., location, width). The Phase 1 RAM QAPP will provide justification for the technique to be used to characterize the plume. In the event that the ADCP is not used or is not sufficiently sensitive to TSS conditions, the continuous reading turbidity probe shall be used to vertically profile the dredge plume along each cross section. The coordinates of the end points of each transect shall be established using GPS and marked using small buoys.

8.1.5 Sampling Methods

The background sample shall be a single depth-integrated composite. At locations downstream of the dredging, sampling shall be conducted at 0.2 and 0.8 of the water depth at each monitoring station. One sample will be collected at each location per sampling event, compositing the samples from each depth. For PCB samples, water shall be pumped from these depths through an in-line filter using a peristaltic pump. The pumping rate shall be set at a rate that will result in collecting approximately 8L of water over a one hour period. The sampling vessel shall move back and forth laterally across the river along the transect at idle speed during sample collection. The pump intake tubing shall be attached to a downrigger or similar device to maintain depth while moving. The level of the intake tubing shall be adjusted as the boat is moving to compensate for significant changes in bathymetry. A second pumping system shall be used concurrently to collect a sample for TSS analysis. Pumping shall be temporarily suspended to allow changing of filters, as required. All of the filters used, and all of the filtrate generated, shall be submitted for laboratory analysis. Upon completion of sampling at one transect, the sampling vessel shall move downstream and begin sample collection at the next transect.

During the period of sampling, continuous monitoring shall be performed at each sampling location for DO, conductivity, temperature, pH, particle distribution, and turbidity; these measurements shall be logged at a minimum frequency of one minute. Continuous water column monitoring data shall be acquired using a YSI 6000 Series multi-parameter probe, or equivalent. Continuous monitoring data will also be available from the near-field monitoring stations during each sampling event.

8.1.6 Analytical Methods

8.1.6.1 Suspended Solids

The composite water samples shall be analyzed for suspended solids using EPA Method 160.2 with modifications to be consistent with American Society for Testing and Materials (ASTM) Method D 3977-97.

8.1.6.2 PCBs

The solids on the filter and the filtrate shall be analyzed for PCBs using the modified Green Bay Method (mGBM) and extraction protocols used during the BMP.

8.1.6.3 Organic Carbon

The composite water samples shall be analyzed for dissolved organic carbon (DOC) using EPA Method 415.1, as described in the BMP QAPP (QEA and ESI, 2004), and for particulate organic carbon (POC) via filtration and combustion of the filtered material (Lloyd Kahn method).

8.1.7 Reporting

The procedures and schedule for reporting the results of this special study shall be provided in the Phase 1 RAM QAPP.

8.2 Non-Target, Downstream Area Contamination

8.2.1 Objective

The objective of this study is to determine the extent of contamination in terms of spatial extent, concentration and mass of Tri+ PCB contamination deposited downstream from the dredged target areas in non-target areas,

that is, to determine the extent to which resuspension induced by dredging activities results in the movement of PCBs to non-target areas. Such movement is expected and is of consequence if the PCB levels in the non-target areas are materially increased. Knowledge of the nature and extent of this movement and its relationship to the type of sediment being dredged, its PCB concentration, and the physical setting may provide a means to assess the need for resuspension controls to prevent the contamination of non-target areas to levels exceeding the mass per unit area (MPA) and surface Tri+ PCB concentration thresholds for dredging.

8.2.2 Study Areas

The study shall be carried out at multiple locations so that a range of dredging conditions can be evaluated (e. g., different sediment types (cohesive and non-cohesive), PCB concentration ranges, and the range of dredge types expected to be selected in the Final Design Reports). Three locations have been chosen and are: (1) a location within transitional sediments in NTIP (Location 1 on Table 8-1 and Figure 8-1); (2) a location within sandy sediments in NTIP (Location 3 on Table 8-1 and Figure 8-1); and (3) a location within fine sediments in EGIA (Location 5 on Table 8-1 and Figure 8-2).

8.2.3 Monitoring Frequency and Duration

The monitoring period for each study area shall extend over the entire time that the study area is being dredged, which will likely be a period of several weeks. Obtaining useful data will be complicated due to changes in the location of the dredging activity in relation to the sampling locations (i.e., to the extent that the distances between the sampling points and the dredging activities vary, it will be difficult to interpret the data). Six rounds of data shall be obtained at approximately equal time intervals. The length of these time intervals shall be determined by subdividing the estimated time required to dredge the target area by 6. Time intervals are anticipated to be between a few days to a few weeks depending on dredging productivity. The frequency of monitoring may be adjusted during the study to reflect actual dredging progress. At a minimum, the study shall consist of approximately three weeks per study area unless dredging in a study area is less than three weeks in duration. No sampling interval shall be less than 3 days to avoid obtaining non-detect results.

8.2.4 Monitoring Stations

Stations will be located within an area extending not more than 300 m downstream of the dredging activity. Because substantial lateral gradients in deposition are expected due to the distribution of TSS in the resuspension plume, stations shall be located along transects perpendicular to the plume. Five stations about 15 m apart shall be located on each of the first 3 transects. Transects shall be set at nominal distances of 15m, 30 m, and 100 m. downstream of the furthest downstream extent of the dredging within the targeted area. Two additional sampling nodes will be placed 300 m downstream, 15 m to either side of the assumed centerline of the plume. The coordinates of the station locations shall be established using GPS.

Initially, the locations of these transects will be much further from the dredge than the distances specified above (assuming that the dredging will proceed from upstream to downstream.). Tracking of the dredge position and measuring the accumulation of sediment at the downstream monitoring stations on a temporal basis will provide data to perform an analysis of sediment deposition characteristics for distances greater than 300 m. As the dredging operation approaches the downstream end of the dredge area, data shall be obtained at the proper distances to assess the modeling results.

8.2.5 Sampling Methods

Sediment deposition shall be monitored by deploying sediment traps at the stations described above. The final design and deployment procedures for the sediment traps will be defined in the Phase 1 RAM QAPP. The sediment traps shall be deployed in pairs. Sediment mass shall be measured in one of the two traps at each monitoring time interval (primary trap), and redeployed. The secondary traps in each pair shall be retrieved upon the completion of the dredging in the target area upstream of the study area. The mass and PCB concentration of the sediment collected in the secondary traps shall be measured.

The sediment samples shall be removed from the traps by decanting water that overlies the sediment that has accumulated to the extent possible without losing solids. The remaining water and sediment shall be poured from the trap into a collection vessel; the traps shall then be rinsed with distilled water and the rinseate also placed in the collection vessel. After rinsing, the primary traps shall be redeployed.

8.2.6 Analytical Methods

8.2.7 Mass of Solids

The mass of solids that is captured in the sediment traps shall be determined by filtering, drying, and then reweighing the sample. The specific method will be presented in the Phase 1 RAM QAPP.

8.2.8 PCBs

The sediments collected from the traps shall be analyzed for Aroclor-based PCBs using Method GEHR8082, with the same target reporting limit and MDL specified in subsection 3.4 above. The PCB Aroclor data shall be converted from total PCBs to Tri+ PCBs using the EPA-approved regression model to be developed in accordance with subsection 3.4; and the results will be reported as Tri+ PCBs.

8.2.9 Organic Carbon

The sediments collected from the traps shall be analyzed for POC using the Lloyd Kahn method.

8.2.10 Reporting

The procedures and schedule for reporting the results of this special study shall be provided in the Phase 1 RAM QAPP.

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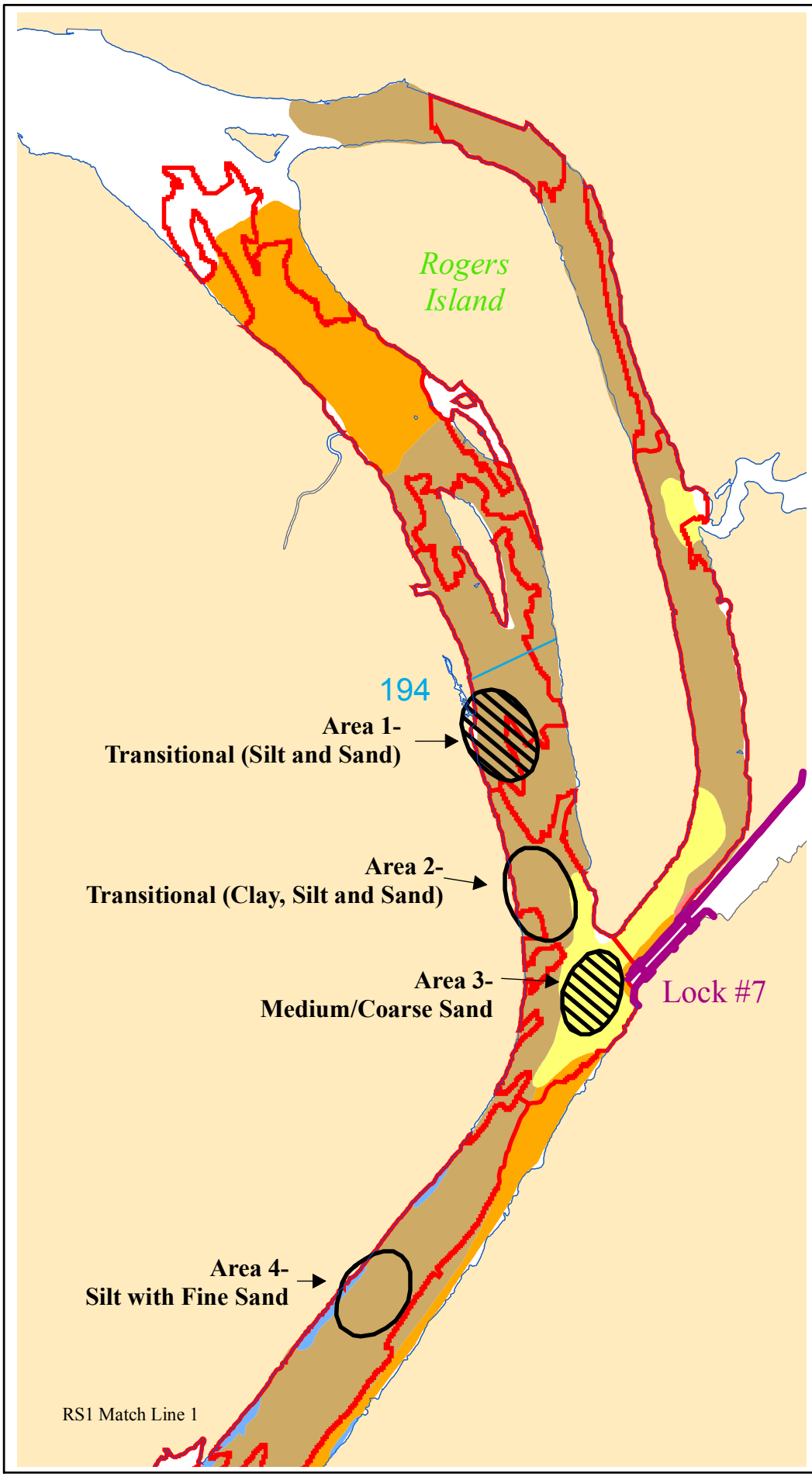
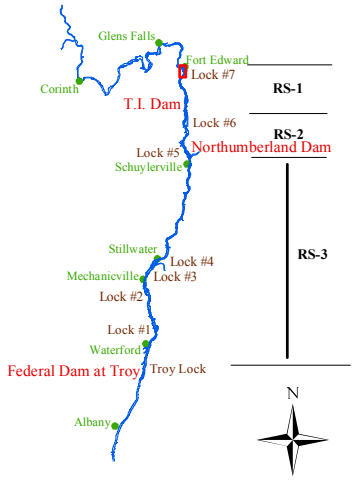


LOCATOR MAP OF THE UPPER HUDSON RIVER



GRAPHIC SCALE

0 250 500 Feet

LEGEND

- Dams and Locks
- River Miles
- Shore Line
- Land

Dredge Areas

- Phase 1 Dredge Areas
- Preliminary Phase 2 Dredge Areas

Special Studies

- Near-Field PCB Release Mechanism Study Areas
- Near-Field PCB Release Mechanism and Non-Target, Downstream Area Contamination Study Areas

Sediment Type

- Type I
- Type II
- Type III
- Type IV
- Type V

FIGURE 8-1

Proposed locations for special studies in NTIP.

QEA Quantitative Environmental Analysis, LLC

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August 10, 2005

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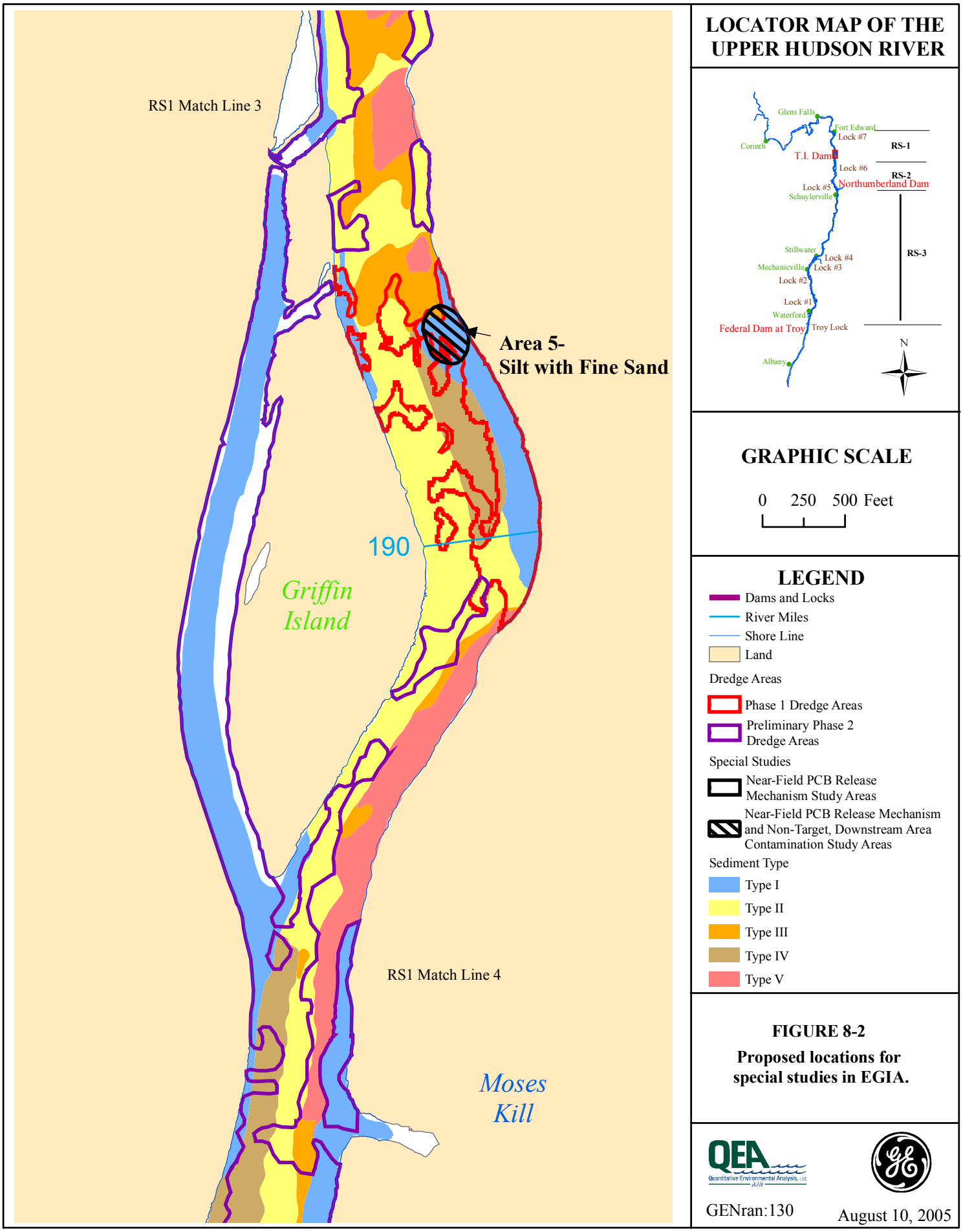

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Attachment C to Statement of Work

Hudson River PCBs Site

Performance Standards Compliance Plan Scope

September, 2005

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8-3 Limits to Discharges from the Treatment Facility to Water Index Number H, Class B/C, Hudson River

1. Introduction

This *Performance Standards Compliance Plan Scope* (PSCP Scope) provides a general description of the actions that General Electric Company (GE) shall undertake during Phase 1 of the Remedial Action (RA) for the Upper Hudson River to implement the Engineering Performance Standards (EPS), the Quality of Life Performance Standards (QoLPS), and the water quality requirements (WQ requirements) issued by the United States Environmental Protection Agency (EPA) for Phase 1 of the RA. The EPS consist of 1) the Resuspension Performance Standard, 2) the Residuals Performance Standard, and 3) the Productivity Performance Standard, and are set out in a five-volume document titled *Hudson River PCBs Superfund Site Engineering Performance Standards*, issued by EPA in April 2004.

The QoLPS consist of performance standards governing 1) air quality, 2) odor, 3) noise, 4) lighting, and 5) navigation, and are set out in a document titled *Hudson River PCBs Superfund Site Quality of Life Performance Standards*, issued by EPA in May 2004.

The WQ requirements consist of: 1) requirements relating to in-river releases of constituents not subject to the EPS, as set forth in *Substantive Requirements Applicable to Releases of Constituents not Subject to Performance Standards*; 2) the substantive requirements for discharges to the Hudson River and Champlain Canal, as set forth in *Substantive Requirements of State Pollutant Discharge Elimination System Permit for Potential Discharges to Champlain Canal (land cut above Lock 7)* and 3) *Substantive Requirements of State Pollutant Discharge Elimination System Permit for Potential Discharges to the Hudson River.* These three sets of requirements are contained in a single document in the form of a letter to GE with enclosures that EPA issued on January 7, 2005.

This PSCP Scope will form the basis for the *Phase 1 Performance Standards Compliance Plan* (Phase 1 PSCP), to be prepared as part of the *Remedial Action Work Plan for Phase 1 Dredging and Facility Operations* (Phase 1 RA Work Plan) in accordance with the *Statement of Work for Remedial Action and Long-Term Monitoring* (RA SOW), which is Appendix B to the RA Consent Decree. The Phase 1 PSCP will set forth further details as to how GE will implement the EPS, the QoLPS, and the WQ requirements during Phase 1 and shall be consistent with this PSCP Scope.

Following the completion of Phase 1, EPA will provide GE with an opportunity to discuss with EPA the changes that the Agency believes are appropriate, if any, to the EPS, the QoLPS, the SOW, and/or the scope of Phase 2 before EPA makes its decision regarding such changes. GE shall prepare and submit, as part of the Phase 2 RA Work Plan for Phase 2, Year 1 of the RA a Phase 2 PSCP (or revisions and/or addenda to the Phase 1 PSCP that are necessary for Phase 2, Year 1 of the RA), which shall incorporate any modifications to the

Phase 1 PSCP that are needed to account for EPA's decision regarding changes, if any, to the EPS, the QoLPS, the SOW and the scope of Phase 2. If GE notifies EPA that it will perform Phase 2 pursuant to the Consent Decree, then the approved PSCP for each construction season of Phase 2 after Phase 2, Year 1 may consist of revisions and/or addenda to the previously approved PSCP. Moreover, if GE notifies EPA that it will perform Phase 2 pursuant to the Consent Decree, then the actions that GE shall take to implement the EPS, the QoLPS, and the WQ requirements during Phase 2 shall be governed by the approved Phase 2 PSCP.

This PSCP Scope is an attachment to the RA SOW. Each section provides, for each performance standard or WQ requirement, an overview of the standard or requirement established by the EPA, and describes the actions that GE shall take to implement that standard or requirement. Actions that GE shall take to implement the EPS, the QoLPS, and the WQ requirements also are set forth in other attachments to the RA SOW or to the RA Consent Decree, including the *Remedial Action Monitoring Scope* (RA Monitoring Scope) (Attachment B to the RA SOW), the *Remedial Action Community Health and Safety Program Scope* (RA CHASP Scope) (Attachment D to the RA SOW), and the *Critical Phase 1 Design Elements* (Attachment A to the RA SOW). Where actions to implement the EPS, the QoLPS or the WQ requirements are specified in those attachments, this PSCP Scope incorporates those documents by reference. In addition, this PSCP Scope incorporates by reference the Remedial Design (RD) documents being prepared under the Administrative Order on Consent for Hudson River Remedial Design and Cost Recovery (RD AOC) (Index No. CERCLA-02-2003-2027, effective August 18, 2003). Any significant requirement in the EPS, the QoLPS, or the WQ requirements that is not specified in this PSCP Scope, the RA SOW or its attachments, or the RA Consent Decree remains in effect and shall be included in the PSCPs unless EPA approves otherwise.

GE shall not be required, during a Phase 1 or Phase 2 field season, to make equipment modifications or additions for that season that are not reasonably available from a schedule or cost standpoint, recognizing that substitutions during a field season for major equipment approved in the Phase 1 or 2 *Final Design Reports* or being used in Phase 1 or Phase 2 may be impractical. (If necessary, more significant changes in equipment, operations, or processes may be required for subsequent seasons, subject to Paragraphs 15 and 20 of the Consent Decree.) However, in the event reasonable changes can be made to address achievement of the performance standards during any dredge season, GE will propose (either on its own initiative or at EPA's request) such changes to equipment or operations for EPA review and approval. The Parties agree that what is considered "reasonable" or "reasonably available" in a given situation, for the purposes of this paragraph, may depend on the circumstances and will need to take account of what is necessary in order for the project to be done in a way that does not jeopardize public health or safety. During Phase 1, EPA will consider any information that GE may submit regarding impacts to schedule and project costs when the Agency reviews GE's proposals, if any, for modification of the EPA-approved *Phase 1 Final Design Report* based on field conditions or experience.

This paragraph shall not be construed to affect or limit any rights EPA has under Paragraph 15 or 20 of the Consent Decree.

2. Resuspension Performance Standard

This section of the PSCP Scope discusses the Resuspension Performance Standard. It provides an overview of the resuspension standard as set forth in the EPS (e.g., Volume 2), and specifies the routine monitoring requirements (Section 4.2 of Volume 2 of the EPS), the contingency monitoring (Section 4.2 of Volume 2 of the EPS) and other responses (Section 4.5 of Volume 2 of the EPS) in the event of an exceedance of an action level, the notification and reporting requirements, and the special studies (Section 4.4 of Volume 2 of the EPS) to be conducted. Some of these requirements are specified in the RA Monitoring Scope; in such cases, the requirements are incorporated by reference.

2.1 Overview of Standard

The Resuspension Performance Standard specifies a routine monitoring program and three action levels – Evaluation, Control, and Standard Levels. These action levels apply to polychlorinated biphenyls (PCBs) and/or total suspended solids (TSS) in surface water at either near-field stations (located within 300 meters [m] of the dredging activities) or far-field stations (located more than 1 mile downstream of dredging activities). As described in more detail below, these action levels will be used to trigger additional monitoring or contingency actions during the RA beyond those required by the routine monitoring program. These action levels are also summarized in Table 2-1 of Volume 1 of the EPS and Section 4.0 of Volume 2 of the EPS. The monitoring program is described in the RA Monitoring Scope and will be detailed in the Phase 1 *Remedial Action Monitoring Quality Assurance Project Plan* (Phase 1 RAM QAPP).

Evaluation Level

Under the EPS (Section 4.1.1 Volume 2, pp. 87-92), the Evaluation Level would be exceeded if any of the following conditions occurs:

- "The net increase in Total PCB mass transport due to dredging-related activities at any downstream far-field monitoring station exceeds 300 g/day for a seven-day running average."
- "The net increase in Tri+ PCB mass transport due to dredging-related activities at any downstream far-field monitoring station exceeds 100 g/day for a seven-day running average." (Tri+ PCBs refers to PCBs with three or more chlorines.)
- "The sustained suspended solids concentration above ambient conditions at a far-field station exceeds 12 mg/L. To exceed this criterion, this condition must exist on average for 6 hours or a period corresponding to

the daily dredging period (whichever is shorter). Suspended solids are measured continuously by turbidity (or an alternate surrogate) or every three hours by discrete samples."

- "The sustained suspended solids concentration above ambient conditions at a location 300 m downstream (i.e., near-field monitoring) of the dredging operation or 150 m downstream from any suspended solids control measure (e.g., silt curtain) exceeds 100 mg/L for River Sections 1 and 3 and 60 mg/L for River Section 2. To exceed this criterion, this condition must exist on average for six hours or for the daily dredging period (whichever is shorter). Suspended solids are measured continuously by surrogate or every three hours by discrete samples."
- "The sustained suspended solids concentration above ambient conditions at the near-field side channel station or the 100 m downstream station exceeds 700 mg/L. To exceed this criterion, this condition must exist for more than three hours on average measured continuously or a confirmed occurrence of a concentration greater than 700 mg/L when suspended solids are measured every three hours by discrete samples."

Control Level

Under the EPS (Section 4.1.2 Volume 2, pp. 93-95), the Control Level would be exceeded if any of the following conditions occurs:

- "The Total PCB concentration during dredging-related activities at any downstream far-field monitoring station exceeds 350 ng/L for a seven-day running average."
- "The net increase in Total PCB mass transport due to dredging-related activities at any downstream far-field monitoring station exceeds 600 g/day on average over a seven-day period."
- "The net increase in Tri+ PCB mass transport due to dredging-related activities at any downstream far-field monitoring station exceeds 200 g/day on average over a seven-day period."
- "The sustained suspended solids concentration above ambient conditions at a far-field station exceeds 24 mg/L. To exceed this criterion, this condition must exist for a period corresponding to the daily dredging period (six hours or longer) or 24 hours if the operation runs continuously (whichever is shorter) on average. Suspended solids are measured continuously by surrogate or every three hours by discrete samples."
- "The sustained suspended solids concentration above ambient conditions at a location 300 meters downstream (i.e., near-field monitoring) of the dredging operation or 150 meters downstream from any suspended solids control measure (e.g., silt curtain) exceeds 100 mg/L for River Sections 1 and 3 and 60 mg/L for River Section 2. To exceed this criterion, this condition must exist for a period corresponding to the daily dredging period (6 hours or longer) or 24 hours if the operation runs continuously (whichever is

shorter) on average. Suspended solids are measured continuously by surrogate or every three hours by discrete samples."

- "The net increase in PCB mass transport due to dredging-related activities measured at the downstream far-field monitoring stations exceeds 65 kg/year Total PCBs or 22 kg/year Tri+ PCBs."

Standard Level

Under the EPS (Section 4.1.3 Volume 2, p. 98), the Standard Level is "a confirmed occurrence of 500 ng/L Total PCBs, measured at any main stem far-field station. To exceed the standard threshold, an initial result greater than or equal to 500 ng/L Total PCBs must be confirmed by the average concentration of four samples collected within 48 hours of the first sample. The standard threshold does not apply to far-field station measurements if the station is within one mile of the remediation."

Adjustments of PCB Load Criteria

The Resuspension Performance Standard (EPS, Section 4.1.3 Volume 2, pp. 97-98) also specifies that adjustments can be made to the allowable total PCB load criteria based on the results of the following:

- "The production rate will be reviewed on a weekly basis. The allowable Total PCB load loss for the season will be adjusted if this target rate is not met…."
- "The allowable seven-day Total PCB load loss thresholds will be revised if the production rate varies from the anticipated value or the operation schedule differs from that assumed for this report. The revision is to be calculated once per dredging season (i.e. the 7-day running average criterion is set once per season)."

GE shall calculate the allowable seven-day Total PCB mass load loss using the equations in Section 4.1.2.7 (pp. 97-98) of Volume 2 of the EPS. EPA will review the total project mass load (currently set at 650 kg total PCBs) after the dredge area delineation for Phase 2 is complete. If appropriate, EPA will increase or decrease the total allowable project load proportionally to the total project mass load.

2.2 Routine Monitoring

GE shall conduct the routine near-field and far-field monitoring described in subsections 2.2 through 2.4 of the RA Monitoring Scope as such monitoring relates to PCBs, TSS, and other parameters specified in the Resuspension Performance Standard.

2.3 Contingency Monitoring

In the event that the routine monitoring shows an exceedance of the Evaluation Level, the Control Level, or the Standard Level for PCBs or TSS, GE shall conduct the contingency monitoring specified for the exceedance at that level in accordance with subsections 2.2, 2.4.1, and 2.5 of the RA Monitoring Scope.

2.4 Contingency Actions/Responses

If the monitoring indicates an exceedance of the Evaluation Level, the Control Level, or the Standard Level, GE shall undertake the associated contingency actions and engineering responses as outlined below.

Evaluation Level

In the event that the monitoring shows an exceedance of the Evaluation Level, GE shall consider conducting an engineering evaluation as outlined in Section 4.5 of Volume 2 of the EPS in an effort to determine the cause of the exceedance. If performed, the engineering evaluation will begin upon receipt of data confirming an exceedance of the Evaluation Level. As part of this evaluation, GE may implement investigative measures to determine the cause of the exceedance. If GE determines that such measures are appropriate, it shall propose such investigative measures to the EPA field representative. The selection of investigative measures will depend on specific project circumstances and may include one or more the following different actions:

- Visual observations of operations;
- Discussions with project personnel;
- Review of operations records;
- Examination of the integrity of containment barriers (if in use);
- Examination of sediment transport pipeline (if in use);
- Examination of barge loading system and barge integrity;
- Examination of resuspension associated with tugs, barges, and other support vessels; and
- Additional monitoring and/or sampling.

Following the engineering evaluation (where conducted), if the cause of the exceedance can be identified and is project-related, GE shall consider potential engineering solutions and may recommend such a solution. The engineering evaluation and results shall be presented to EPA in an *Engineering Evaluation Report*. That

Engineering Evaluation Report also shall include recommendations regarding an engineering solution, if any, to address the cause, except as follows: If the engineering solution involves a refinement in operations or equipment that is consistent with, and would not require a modification of, the EPA-approved *Final Design Report* or the RA Work Plan, GE may implement the solution in consultation with the EPA field representative, and then document the implementation of that solution in the *Engineering Evaluation Report*. In any other case, GE shall implement the engineering solution in accordance with the EPA-approved *Engineering Evaluation Report*.

Control Level

If the monitoring shows an exceedance of the Control Level, GE shall conduct an engineering evaluation, as outlined in Section 4.5 of Volume 2 of the EPS beginning upon receipt of data confirming the exceedance, in an effort to determine the cause of the exceedance. As specified in the Resuspension Performance Standard (Section 3.4.4 of Volume 2 of the EPS), a Control Level exceedance of a TSS criterion must be confirmed by far field PCB measurements before actions other than increased monitoring are required. If investigative measures are warranted to determine the cause of the Control Level exceedance, GE shall propose such investigative measures to the EPA field representative. The selection of investigative measures will depend on specific project circumstances and may include, but are not limited to, the measures described above under Evaluation Level.

If the Control Level is exceeded, GE shall evaluate potential engineering solutions to address the exceedance, and shall propose the implementation of an engineering solution unless the EPA field representative determines that no engineering solution is necessary to address the Control Level exceedance (for example, if the exceedance is not sustained or is mitigated by implementation of a non-project-related action). The possible engineering solutions to be considered include the following:

- Initiate mandatory engineering evaluation and continual adjustments to dredging operations until the Evaluation Level or better is attained.
- Evaluate and identify any problems.
- Consider changes in resuspension controls, dredge operation, or dredging equipment.
- Consider implementing additional or different resuspension controls.
- Consider changing location and rescheduling more highly contaminated areas for later in the year (applies to May and June only), if other options are not effective.
- Temporarily cease operations if required.

GE shall prepare and submit an *Engineering Evaluation Report*, which contains the results of this engineering evaluation, the proposed engineering solution and a proposed schedule for implementing that solution (and for reinitiating dredging, if operations were temporarily ceased), except as follows: if the solution involves a refinement in operations or equipment that is consistent with, and would not require a modification of, the EPA-approved *Final Design Report* or the RA Work Plan, then GE shall implement the solution in consultation with the EPA field representative and shall document the implementation of that solution in the *Engineering Evaluation Report*. In all other cases, GE shall implement the engineering solution in accordance with the EPA-approved *Engineering Evaluation Report*. If the cause of the exceedance was not identified by the engineering evaluation, the *Engineering Evaluation Report* shall include a course of action for continued monitoring and evaluation to determine the cause of the exceedance. GE shall consult with EPA on a regular basis until the cause and solution are determined, or until EPA orders a temporary cessation of the operation(s) that caused the exceedance or until EPA determines that further evaluation is not necessary.

Standard Level

If the monitoring shows an initial occurrence of a PCB concentration in excess of the Standard Level, GE shall promptly notify EPA, but no later than 3 hours after receipt of the data. If subsequent sampling confirms an exceedance of the Standard Level, GE shall: 1) again promptly notify EPA, but no later than 3 hours after data receipt; 2) temporarily cease dredging and other river-based operations that caused the exceedance; 3) perform an engineering evaluation; and 4) develop an engineering solution as described above for the Control Level. GE shall also develop a schedule for reinitiating dredging and other river-based operations that were suspended, with an objective of minimizing the time that dredging is temporarily shut down. Following such evaluation, GE shall present the results of the engineering evaluation to EPA in an *Engineering Evaluation Report*, along with the proposed engineering solution (or a course of action for continued monitoring and study to further evaluate the cause of the exceedance) and a proposed schedule for implementing that solution and reinitiating dredging, except as follows: if the solution involves a refinement in operations or equipment that is consistent with, and would not require a modification of, the EPA-approved *Final Design Report* or the RA Work Plan, GE shall implement the solution in consultation with the EPA field representative, and then document the implementation of that solution in the *Engineering Evaluation Report*, along with a schedule for the reinitiation of dredging. In all other cases, GE shall implement the engineering solution in accordance with the EPA-approved *Engineering Evaluation Report*. Dredging will be reinitiated, upon EPA approval, once the exceedance has been mitigated, in accordance with the schedule in the EPA-approved *Engineering Evaluation Report*. If the cause of the exceedance was not identified during the engineering evaluation, the *Engineering*

Evaluation Report submitted to EPA shall include a course of action for continued evaluation to determine the cause of the exceedance. GE shall consult with EPA on a regular basis until the cause and solution are determined, or until EPA determines that further evaluation is not necessary.

General

The time frames for engineering evaluations and implementation of engineering solutions in compliance with the Resuspension Standard are discussed in the EPS Volume 2, Section 4.5.1 except as modified below. The time frames for GE to initiate and complete engineering evaluations and implementation of the engineering solutions shall be estimated in the remedial design. The time frames for completion of the engineering evaluations and implementation of engineering solutions (if any) will be variable, depending on the circumstances surrounding the exceedance. EPA may modify these time frames during Phase 1 depending on the circumstances surrounding the exceedance. The actual schedule to be implemented in the field shall be subject to EPA review. It is anticipated that engineering evaluations will begin immediately upon receipt of data indicating the exceedance of a criterion. It is similarly anticipated that the required engineering contingencies should begin as soon as possible so as to minimize PCB releases. At a minimum, engineering contingency actions should begin within a week of an exceedance, assuming conditions remain in exceedance (EPS, Vol. 2, p. 133). In the case of a temporary halt of the operations, an evaluation should be completed with five days. In the event of a temporary cessation, every effort should be made to correct the problem and minimize the length of time of the stoppage (EPS, Vol. 2, pp. 131-132).

GE shall not be required, during a Phase 1 or Phase 2 field season, to make equipment modifications or additions for that season that are not reasonably available from a schedule or cost standpoint, recognizing that substitutions during a field season for major equipment approved in the Phase 1 or 2 *Final Design Reports* or being used in Phase 1 or Phase 2 may be impractical. (If necessary, more significant changes in equipment, operations, or processes may be required for subsequent seasons, subject to Paragraphs 15 and 20 of the Consent Decree.) However, in the event reasonable changes can be made to address achievement of the performance standards during any dredge season, GE will propose (either on its own initiative or at EPA's request) such changes to equipment or operations for EPA review and approval. The Parties agree that what is considered "reasonable" or "reasonably available" in a given situation, for the purposes of this paragraph, may depend on the circumstances and will need to take account of what is necessary in order for the project to be done in a way that does not jeopardize public health or safety. During Phase 1, EPA will consider any information that GE may submit regarding impacts to schedule and project costs when the Agency reviews GE's proposals, if any, for modification of the EPA-approved *Phase 1 Final Design Report* based on field conditions or experience.

This paragraph shall not be construed to affect or limit any rights EPA has under Paragraph 15 or 20 of the Consent Decree.

During implementation of Phase 1, in the event that there is an exceedance of the Evaluation Level, the Control Level or the Standard Level that requires or warrants an engineering solution (as described above), the engineering solution(s) performed may include routine maintenance, operational changes, equipment or process modifications, additions of equipment, or a temporary cessation of certain operations – all depending on the specific circumstances.

2.5 Notifications and Reporting

GE shall conduct the notification and reporting activities specified in the Executive Summary of Volume 1 of the EPS and in the subsection 2.8 of the RA Monitoring Scope and the CHASP that GE shall develop and which shall be subject to EPA review and approval pursuant to the RD AOC.

2.6 Special Studies

GE will perform four special studies related to PCB resuspension and monitoring. Details for two of the special studies: near-field release mechanism and non-target area downstream contamination are described in Section 8 of the RA Monitoring Scope. The third study, to determine the relationship between TSS and turbidity is currently being discussed with EPA and a work plan has been submitted for EPA review and approval. Once approved, GE will perform the study. The results of the study will be provided as part of the Phase 1 RAM QAPP.

The last study is for determining the potential use of automated water samplers at the far-field stations (see Section 2.3 of RA Monitoring Scope). A work plan for testing automated samplers has been submitted for EPA review and approval. Upon approval, GE shall perform this study. Details on the potential use of automated samplers during Phase 1 dredging will be provided in the Phase 1 RAM QAPP.

3. Residuals Performance Standard

This section of the PSCP Scope discusses the Residuals Performance Standard. It provides an overview of the residuals standards as set forth in the EPS (e.g., Volume 3), and specifies the routine monitoring requirements, contingency monitoring and other responses in the event of an exceedance of an action level (Section 3 of Volume 3 of the EPS), the required actions (Section 4.5 of Volume 3 of the EPS), the notification and reporting requirements (Section 4.8 of Volume 3 of the EPS), and the special study (Section 4.7 of Volume 3 of the EPS) under this standard.

3.1 Overview of Standard

The Residuals Performance Standard describes action levels for Tri+ PCBs in surface sediment that remains after dredging. The action levels will apply to a Certification Unit (CU), which is described in subsection 3.2 of the RA Monitoring Scope and in subsection 3.3 of this PSCP Scope. The action levels in the Residuals Performance Standard are summarized in Table 3-1.

The various actions to be taken based on the results of residual sediment sampling are described in subsection 3.4.

Table 3-1

Summary of the Performance Standard for Dredging Residuals

Case	Certification Unit Arithmetic Average (mg/kg Tri+ PCBs)	No. of Sample Results ≥15 mg/kg Tri+ PCBs AND < 27 mg/kg Tri+ PCBs	No. of Sample Results ≥ 27 mg/kg Tri+ PCBs	No. of Re-Dredging Attempts Conducted	Required Action (when all conditions are met)*
A	Avg. ≤ 1	≤ 1	0	N/A	Backfill certification unit (where appropriate); no testing of backfill required.
B	N/A	≥ 2	N/A	< 2	Redredge sampling nodes and re-sample.
C	N/A	N/A	1 or more	< 2	Redredge sampling node(s) and re-sample.
D	1 < avg. ≤ 3	≤ 1	0	N/A	Evaluate 20-acre area-weighted average concentration. If 20-acre area-weighted average concentration ≤ 1 mg/kg Tri+ PCBs, place and sample backfill. **If 20-acre area-weighted average concentration > 1 mg/kg, follow actions for Case E below.
E	3 < avg. ≤ 6	≤ 1	0	< 2	Construct sub-aqueous cap immediately OR redredge. Construct cap so that arithmetic avg. of uncapped nodes is ≤ 1 mg/kg Tri+ PCBs, no nodes > 27 mg/kg Tri+ PCBs, and not more than one node > 15 mg/kg Tri+ PCBs.
F	avg. > 6	N/A	N/A	0	Collect additional sediment samples to re-characterize vertical extent of contamination and redredge. If certification unit median > 6 mg/kg Tri+ PCBs, entire certification unit must be sampled for vertical extent. If certification unit median ≤ 6 mg/kg Tri+ PCBs, additional sampling required only in portions of certification unit contributing to elevated mean concentration.
G	avg. > 6	N/A	N/A	1	Re-dredge. ***
H	avg. > 1 (20-acre avg. > 1)	≥ 2	≥ 1	2	Construct sub-aqueous cap (if any of these arithmetic average/sample result conditions are true) as described in Case E and two re-dredging attempts have been conducted OR choose to continue to re-dredge.

* Except for Case H, where any of the listed conditions will require cap construction.
** Following placement of backfill, sampling of 0 to 6 inch backfill surface must demonstrate average concentration ≤ 0.25 mg/kg Tri+ PCBs. If backfill surface average concentration is > 0.25 mg/kg, backfill must be dredged and replaced or otherwise remediated with input from EPA.
***GE shall not install an Isolation Cap Type B without receiving EPA approval to cease redredging attempts, except for CUs where the average concentration in the CU is less than 6 mg/kg Tri+ PCB and the only non-compliant areas are due to exceedances of the prediction limits.

3.2 Sampling and Analysis Requirements

Following the completion of dredging in a CU, GE shall verify that the design cut lines have been achieved and conduct the sampling and analysis of sediment residuals described in subsections 3.3 and 3.4 of the RA Monitoring Scope.

3.3 Evaluation of Sampling Data

The sediment sampling results shall be used to evaluate the CU by: 1) converting the analytical results for Total PCBs to Tri+ PCBs, using the procedure described in subsection 3.4 of the RA Monitoring Scope; and then 2) comparing the following values (rounded to whole numbers) to the action levels specified in subsection 3.1, above.

- Arithmetic average Tri+ PCB concentration in the CU (or portion of the CU) under evaluation;
- Individual node sample Tri+ PCB concentration in the CU (or portion of the CU) under evaluation;
- Median Tri+ PCB concentration in the CU (or portion of the CU) under evaluation; and
- Area-weighted arithmetic average concentration in a moving 20-acre area consisting of the CU under evaluation, and the two, three, or four most recently dredged CUs within 2 river miles of the current CU (measured along the centerline of the river).

Arithmetic Average of CU

The arithmetic average Tri+ PCB concentration in the CU (or portion of the CU) under evaluation shall be calculated by dividing the sum of the individual Tri+ PCB concentrations by the total number of individual sample locations. When calculating the CU arithmetic average, the following procedures shall be applied:

- Non-detect sample results shall be included in the arithmetic average calculation at a value of ½ the detection limit.

- If no sample is available from a grid node due to field difficulties that cannot be resolved (e.g., outcropping of bedrock), the arithmetic average shall be calculated without counting that sample node.
- Following re-dredging of all or part of a CU, the arithmetic average shall be subsequently re-calculated by substituting the new sample results from the re-dredged nodes.
- If a subaqueous cap is constructed, the arithmetic average shall be calculated using the sample results from the nodes in the uncapped area (i.e., the extent of the capped area and its PCB levels will not be included in the calculation of the arithmetic average).
- The maximum of any duplicate results shall be used to determine compliance with the Residuals Performance Standard.
- EPA split sample data will be considered if they are available prior to EPA concurrence on the Dredging Completion Approval Form for the CU under evaluation.

20-Acre Arithmetic Average

The 20-acre arithmetic average Tri+ PCB concentration shall be calculated, using the 20-Acre Area-Weighted Average equation on p. 54 of Volume 3 of the EPS, by summing the area-weighted average Tri+ PCB concentrations in the CUs making up the 20 acre area, and dividing the total by the actual total acreage of the CUs.

The 20-acre evaluation unit shall be composed of the CU under evaluation and the additional CUs (as necessary to provide a total area of approximately 20 acres) in which dredging was most recently completed, and which are located within 2 miles, measured along the centerline of the river, of the current CU. For purposes of calculating the area of the 20-acre unit, the total areas of these additional CUs shall be included regardless of how they were closed. For purposes of calculating the average Tri+ PCB concentration in the 20-acre unit, the pre-backfill arithmetic average for any CU where backfill was placed shall be utilized. Similarly, in CUs where a subaqueous cap is placed, for purposes of calculating the average Tri+ PCB concentration in the 20-acre unit, the capped CU's average concentration shall be re-calculated based on the sample results from the nodes in the uncapped portion of the CU. The total acreage of the CUs shall be used. If a CU is entirely capped, it shall not be included in any 20-acre averaging calculations.

3.4 Required Actions

The Residuals Performance Standard requires confirmation that the design dredging cut lines developed using the procedures described in Section 2.4 of the Critical Phase 1 Design Elements have been achieved and

collection of residual sediment samples has been completed. The need for and type of response actions required to be taken in a CU after confirmation that the design cut lines have been achieved shall be based on comparing both the arithmetic average Tri+ PCB concentrations (calculated according to the procedures described above in subsection 3.3) and also the individual sample node concentrations to the criteria specified in the Residuals Performance Standard. For the purposes of the response actions that follow, removal to the design cut lines shall be defined as those specified in the EPA-approved *Final Design Report* and verified through bathymetric measurement and shall comprise the first inventory removal attempt. Should average CU concentrations following the first inventory pass exceed 6 mg/kg Tri+ PCBs, the dredge cut lines will be revised, subject to EPA approval, and a second inventory removal attempt will be made. Following bathymetric verification of the second inventory removal (if required), this will complete the inventory removal steps. Subsequent removal will be referred to as residual re-dredging. Post-inventory sampling results will dictate the appropriate response actions to be undertaken. The required response actions are described below.

The Residuals Performance Standard contains five required actions:

1. Backfill and demobilize (including testing of backfill if necessary)
2. Jointly Evaluate a 20-Acre Average
3. Re-dredge or Construct Subaqueous Cap at a CU
4. Re-dredging Required
5. Capping

The habitat replacement and reconstruction program shall be considered in implementing the required actions under the Residuals Performance Standard.

Response 1 – Backfill and Demobilize

As outlined in Section 4.5.3 of Volume 3 of the EPS, if the Tri+ PCB average of a CU is ≤ 1 mg/kg, no node has a Tri+ PCB sample result ≥ 27 mg/kg, and not more than one node has a Tri+ PCB sample result of ≥ 15 mg/kg, GE shall place backfill (where appropriate) and demobilize. (The criteria for determining when it is appropriate to place backfill, for purposes of the Residuals Performance Standard, are discussed in subsection 3.5.) Under this response, backfill testing after placement will not be performed.

In addition, a portion of a contiguous CU may be backfilled after the cut lines are met if: 1) dredging proceeds in a downstream direction in the CU, and EPA has concurred on the Dredging Completion Approval Forms for all CUs that are upstream of the portion of the contiguous CU; 2) the arithmetic average Tri+ PCB concentration of

the samples collected from that portion of the CU is 1 mg/kg or less; 3) all nodes sampled within that portion of the CU have Tri+ PCB concentrations less than 15 mg/kg; and (4) GE has determined that it has adequate measures in place to minimize recontamination of that dredged portion of the CU. The EPA field representative will evaluate the adequacy of the measures in place to minimize recontamination and may indicate the need for additional sampling.

Response 2 – Jointly Evaluate a 20-Acre Average

As outlined in Section 4.5.3 of Volume 3 of the EPS, if the average Tri+ PCB concentration of samples collected in a CU is > 1 and < 3 mg/kg, no individual node has a Tri+ PCB sample result ≥ 27 mg/kg, and not more than one individual node has a Tri+ PCB sample result ≥ 15 mg/kg, GE shall evaluate the 20-acre area described above as follows:

For the 20-acre average, if the area-weighted arithmetic average of the individual means from the certification unit under evaluation and the three previously dredge certification units (within two miles of the current unit) is ≤ 1 mg/kg Tri+ PCBs, GE shall, where appropriate, place backfill and perform sampling to confirm that the average backfill surface Tri+ PCB concentration is ≤ 0.25 mg/kg. Sampling of backfill shall follow the procedures described in subsection 3.5 (under Backfill Samples) of the RA Monitoring Scope; the development of an average concentration shall follow procedures described in subsection 3.3 above. If the concentration of the upper 6 inches of backfill is > 0.25 mg/kg Tri+ PCBs, GE shall, in consultation with the EPA field representative, either 1) re-dredge and replace the backfill in the non-compliant area, or 2) place an additional lift of backfill (no less than 6 inches in thickness) in those areas that caused the average concentration to exceed 0.25 mg/kg, considering hydraulic conditions. Following actions 1) or 2) above, the backfill shall be sampled again and the area-weighted concentration of the CU under evaluation shall be recalculated. In general, the backfill thickness will be 12 inches to address residuals; in some instances, no backfill may be placed, and in others, more than one foot may be placed. The details regarding the backfill type and thickness in specific locations shall be determined during remedial design.

If the area-weighted arithmetic average of the individual means from the certification unit under evaluation and the three previously dredge certification units (within two miles of the current unit) is > 1 mg/kg Tri+ PCBs, GE shall re-dredge or place a subaqueous cap at the specific areas within the CU that caused the non-compliant average concentration. GE shall decide whether to re-dredge or to cap a non-compliant area considering engineering judgment in the field and evaluation of the sediment data for that CU. GE's decision shall take into

account potential impacts on dredging productivity as appropriate, consistent with Section 3.5, Volume 3 of EPS.

For the startup of Phase 1, the cumulative mean can be calculated using the area-weighted average equation provided in EPS Volume 3, Section 4.5.2 in lieu of the 20-acre area-weighted arithmetic average, given that the first three CUs will not have a sufficient number of previously dredged CUs to allow for calculation of such 20-acre area-weighted arithmetic average (see Attachment A of Volume 3 of the EPS).

Response 3 – Re-dredge or Construct Subaqueous Cap at a CU

As outlined in Section 4.5.3 of Volume 3 of the EPS, if the Tri+ PCB average is > 3 mg/kg but ≤ 6 mg/kg, no Tri+ PCB sample result is ≥ 27 mg/kg, and not more than one Tri+ PCB sample result is ≥ 15 mg/kg, GE shall re-dredge or construct a subaqueous cap. The process for determining whether a non-compliant area will be re-dredged or capped will be as described above under *Response 2*.

If re-dredging is selected, GE shall sample the surface sediment of the re-dredged area in accordance with the re-dredging residuals sampling procedures in subsection 3.5 of the RA Monitoring Scope (if concentrations are high, GE should advance the core a depth of 2 feet, where possible) and re-evaluate the CU. If subaqueous capping is selected, GE shall select the capped area such that the arithmetic average Tri+ PCB concentration of the uncapped nodes is 1 mg/kg or less and no individual node has a Tri+ PCB concentration ≥ 15 mg/kg.

Response 4 – Re-dredging is Required

1. Specific Nodes with Discrete Exceedances

Regardless of the average Tri+ PCB concentration, if two or more samples within a CU have Tri+ PCB concentrations ≥ 15 mg/kg, GE shall re-dredge the non-compliant area and re-sample the non-complaint nodes in accordance with Section 4.5.3 of Volume 3 of the EPS. If one or more sample(s) has Tri+ PCB concentration ≥ 27 mg/kg, GE shall re-dredge such sampling node(s) and re-sample. Any re-sampling shall comply with the re-dredging residuals sampling procedures in Section 4 of Volume 3 of the EPS and subsection 3.5 of the RA Monitoring Scope. Under this response, no more than two residual re-dredging attempts shall be required. After these node-specific redredging efforts are completed, the CU shall be re-evaluated as described in subsection 3.3 of this PSCP Scope.

2. CU Average > 6 mg/kg

If two inventory removal attempts have been completed and the Tri+ PCB average for a CU is still > 6 mg/kg, up to two residual redredging attempts will be performed in the non-compliant areas. If after two residual passes the average is still > 6 mg/kg Tri+ PCBs, GE must petition EPA to cease redredging attempts and place a cap over the non-compliant area.

Response 5 – Capping

As outlined in Section 4.5.3 of Volume 3 of the EPS, if after two re-dredging attempts, a CU has a Tri+ PCB average > 1 mg/kg (and the 20-acre area-weighted arithmetic average is > 1 mg/kg), two or more samples show Tri+ PCB concentrations ≥ 15 mg/kg, or one or more samples show Tri+ PCB concentration ≥ 27 mg/kg, GE may construct a subaqueous cap, where conditions allow. In such a case, GE shall select the area to cap such that the arithmetic average concentration of the uncapped nodes is 1 mg/kg Tri+ PCB or less and no individual uncapped node has a concentration ≥ 15 mg/kg Tri+ PCB.

Extent of Non-Compliant Area

To determine the extent of the non-compliant area subject to further response action (e.g., re-dredging, capping) as described above, GE shall follow the procedures set forth in Section 4.5.5 of Volume 3 of the EPS and further discussed below. The extent of a non-compliant area around a single node sample shall be determined using the following equation (repeated for each surrounding node) (as set forth in the EPS, Volume 3, pp. 58 to 59):

$$d_r = \frac{d * (C_1 - C_3)}{C_1 - C_2}$$

where:

d_r = the distance (in feet) to the edge of the non-compliant area (i.e., from the C_1 to C_2 nodes)

d = the distance (in feet) between nodes (typically 80 feet)

C_1 = the concentration (in mg/kg Tri+ PCBs) at the elevated node under consideration

C_2 = the concentration (in mg/kg Tri+ PCBs) at a compliant node surrounding C_1

C_3 = 1 mg/kg Tri+ PCB

When calculating the extent of the non-compliant area using the preceding formula, the following procedures shall apply:

- The distance which defines the non-compliant area shall be at least half the distance between the nodes.
- The non-compliant area shall be contained within a boundary that has sides perpendicular to the axes between the sampled nodes.
- The non-compliant area shall not extend beyond the polygon created by connecting the surrounding nodes.
- The non-compliant area shall not extend beyond the boundary of the CU.

Where the arithmetic average Tri+ PCB concentration in a CU following a dredging attempt exceeds an action level, the procedures for determining the extent of the non-compliant area will depend on the value of the average Tri+ PCB concentration in the CU.

Where the arithmetic average Tri+ PCB concentration in the CU is > 1 mg/kg but < 6 mg/kg, the horizontal extent of non-compliant areas subject to further response action shall be delineated by applying the criteria set forth in the preceding paragraph to the individual sample nodes with the highest Tri+ PCB concentrations (ensuring removal of those ≥ 27 mg/kg and 15 mg/kg and others as necessary), and then recalculating the average Tri+ PCB concentration in the CU, until that average concentration is ≤ 1 mg/kg. In making these recalculations, the concentration at nodes to be re-dredged shall be considered to be at the average Tri+ PCB concentration of the nodes in the CU that will not be re-dredged or capped, and nodes to be capped shall not be considered in calculating the average. The vertical extent of non-compliant areas shall be determined based on the dredge equipment, thickness of the residuals layer, and other pertinent information. The vertical extent of non-compliant areas in this situation shall be no less than 6 inches for purposes of establishing dredge cut lines for re-dredging purposes. If the residuals layer is thicker than 6 inches, GE shall determine the vertical extent of dredging based on analysis of samples from depths greater than 6 inches, unless the cut lines will require dredging to bedrock or glacial clay.

Where the arithmetic average concentration in a CU exceeds 6 mg/kg Tri+ PCB, the following procedures shall be followed in accordance with Section 4.5.3 of Volume 3 of the EPS: First, as described in subsection 3.5 of the RA Monitoring Scope, deeper core samples (> 6 inches) shall be taken from the archived samples (or collected if not archived) in successive 6-inch segments and analyzed for PCBs as necessary to characterize the depth to the first 6-inch sediment layer with ≤ 1 mg/kg Total PCBs. This depth shall be the vertical extent of

contamination used as the basis for developing the dredge prism for further removal in the area surrounding that node. If the median concentration also exceeds 6 mg/kg Tri+ PCB, these deeper samples shall be taken from areas throughout the CU. However, upon EPA approval, only a subset of the CU could be resampled if Tri+ PCB levels in the sampled nodes within the excluded portion if the CU are < 1 mg/kg. In this case, this discrete area shall be considered a compliant area, and the remainder of the CU shall be considered the noncompliant area subject to further dredging to remove the additional PCB inventory. If the median Tri+ PCB concentration is 6 mg/kg or less, the additional core sampling may be limited to areas of elevated PCB concentrations that are contributing to the non-compliant average concentration in the CU.

Based on physical conditions encountered in the field (e.g., bedrock, glacial clay), GE may modify the extent of the non-compliant area subject to the approval of EPA.

3.5 Reporting

GE shall submit the weekly progress reports and the individual CU-specific reports (to follow EPA approval of the backfill/cap installation at that CU) described in Sections 4.8 of Volume 3 of the EPS and subsection 3.6 of the RA Monitoring Scope.

3.6 Special Study

The data GE will collect to address the special study to characterize residual sediment strata and thickness in accordance with the EPS Volume 3 Attachment B is described in Section 3.3 of the RA Monitoring Scope.

4. Productivity Performance Standard

This section discusses the Productivity Performance Standard. It provides an overview of the productivity standards as set forth in the EPS, describes how the design will establish a production schedule, specifies the monitoring and reporting requirements (Section 4.2 of Volume 4 of the EPS), and outlines the responses in the event that the production schedule is not being met (Section 4.3 of Volume 4 of the EPS). The measures specified in this section that are applicable to or during implementation of Phase 2 shall apply only if GE notifies EPA, pursuant to the Consent Decree, that it will perform Phase 2.

4.1 Overview of Standard

The Productivity Performance Standard specifies the following annual minimum and target cumulative volumes of sediment (*in-situ* volumes, exclusive of re-dredging volumes) to be removed, processed, and shipped off-site each year during Phase 1 and Phase 2 (EPS, Section 4.1 of Volume 4, see also Table 4-1 of Volume 4):

Phase 1

- "The minimum volume of sediment to be removed, processed, and shipped off site during Phase 1 shall be 200,000 cy. Phase 1 must be designed and scheduled to meet the target removal of 265,000 cy."
- "For a period of at least one month during Phase 1, the minimum production rate shall be the rate required to meet the Phase 2 Performance Standard in order to demonstrate the capabilities of the dredging equipment and the sediment processing and transportations systems."
- "Stabilization of shorelines and backfilling of areas dredged during Phase 1, as appropriate, shall be completed by the end of the calendar year and prior to the spring high flow period on the river. Processed sediment shall not be stockpiled and carried over to Phase 2 for disposal."

Phase 2

- "Based on an estimate of 2.65 million cy of sediment, the minimum cumulative volume of sediment to be removed, processed and shipped off site during each of the five years of Phase 2 (full scale dredging) shall be as shown in the third column of Table 4-1, below (Required Cumulative Volume (cy). Furthermore, Phase 2 must be designed and scheduled to meet the targeted cumulative removal volumes shown in the fifth column of Table 4-1, below (Target Cumulative Volume (cy). The project must be designed to be completed with a reduced annual volume for the final season of the project (Phase 2, Year 5)."

- "Stabilization of shorelines and backfilling, as appropriate, of areas dredged during a dredging season in Phase 2 shall be completed by the end of the work season and prior to the spring high flow period in the river."
- "All dredged materials should be processed and shipped for disposal by the end of each calendar year. Processed sediment shall not be stockpiled for disposal the following dredging season."

Table 4-1 – EPS Summary of Productivity Requirements and Targets

Project Phase and Year	Required Annual Volume (cy)	Required Cumulative Volume (cy)	Target Annual Volume (cy)	Target Cumulative Volume (cy)
Phase 1	200,000	approximately 200,000	265,000	265,000
Phase 2, Year 1	490,000	690,000	530,000	795,000
Phase 2, Year 2	490,000	1,180,000	530,000	1,325,000
Phase 2, Year 3	490,000	1,670,000	530,000	1,855,000
Phase 2, Year 4	490,000	2,160,000	530,000	2,385,000
Phase 2, Year 5	490,000	2,650,000	265,000	2,650,000

Note:

cy = cubic yards

In addition, the Productivity Performance Standard states that if the actual estimated removal volumes that are developed during design vary by more than 10% from the 2.65 million cy estimated in the Record of Decision (ROD), then the annual removal volume thresholds listed above for Phase 2 shall be revised (EPS, Volume 4, pp. 2 & 28). Further, consistent with Paragraph 17 of the Consent Decree, if dredging occurs in the first year following completion of the Phase 1 dredging, the Productivity Performance Standard required and target volumes will not apply. However, applicable monitoring and reporting requirements of Section 4.3 will be completed.

The Productivity Performance Standard includes three action levels: Concern, Control, and Standard outlined in Section 4.3 of Volume 4 of the EPS. These action levels are to be based on a comparison of the actual production rate to what is referred to as the scheduled productivity. The scheduled productivity for a dredging season shall be defined in the RA Work Plan for that season, as described in subsection 4.2.

Concern Level

The Concern Level is defined in the EPS (Volume 4, p. 30) as a situation during dredging operations in which "the monthly dredging productivity falls below the scheduled productivity for that month by 10 percent or more."

Control Level

The Control Level is defined in the EPS (Volume 4, p. 30) as a situation during dredging operations in which "the monthly productivity falls below scheduled productivity by 10 percent or more for two or more consecutive months."

Standard Level

The Standard Level is defined in the EPS (Volume 1, p. 69) as a situation in which the "[a]nnual cumulative volume fails to meet production requirements."

4.2 Design Activities to Establish Production Schedule

GE shall develop a production schedule during the RD using the target annual removal volumes described in subsection 4.1, above. GE shall design Phase 1 to meet the Phase 1 target removal volume of 265,000 cy, and shall include in the design a minimum of one month of dredging at the anticipated Phase 2 production rate. The estimated one-month full production rate presented in the EPS was 70,000 cy, based on dividing the target annual volume for Phase 2 (530,000 cy) by a 7-month season. This monthly volume may be revised during Phase 1 design considering the Phase 2 target removal volume and the number of operational days during the construction season (including hours per day and days per week). In addition, as noted above, if the total estimated removal volume for the RA, as determined during design, varies by more than 10% from 2.65 million cy, the removal volume thresholds for Phase 2 shall be revised and presented in the *Phase* 2 *Intermediate* or *Final Design Report*. If necessary, the revision shall be performed as set forth below (using the revised total sediment removal volume for the project, as determined during design, which is referred to as "Revised Removal Volume"):

1. The minimum annual removal volume (in cy) for Phase 2 shall be equal to [Revised Removal Volume (cy)-200,000 cy]/5 years.

2. The target annual removal volume (in cy) for Phase 2 shall be equal to [Revised Removal Volume (cy)-265,000 cy]/4.5 years.

The RD shall use the dredge areas and target removal volumes from the EPA-approved *Dredge Area Delineation Reports*, as modified in the *Intermediate* and *Final Design Reports*, to develop dredging production schedules, which shall be documented in the RA Work Plans. For purposes of developing the production schedules in the RD, the overall production schedule for a dredging season shall include the removal of sediment as specified in the dredge prisms shown in the *Final Design Report*, along with the installation of backfill and caps and stabilization of impacted shorelines prior to the end of the dredging season, which will be weather-dependent. The production schedule shall also include a schedule for sediment processing and shipment off-site for disposal prior to the end of the calendar year. This production schedule may be subject to further revision by the contractor selected to perform the dredging; any revised production schedule shall be provided in proposed revisions to the Phase 1 or Phase 2 RA Work Plans, as the case may be, and shall be subject to EPA approval. However, changes in the production schedule made by the contractor shall not result in a revision in the volume to be dredged in any construction season as indicated in the *Final Design Reports*. The actual dredging production rate during each phase of the project shall be compared to the production schedule provided in the relevant RA Work Plan to determine whether the Concern, the Control, or the Standard Level has occurred. For purposes of establishing whether the Concern, the Control, or the Standard Level has occurred, the following rules shall apply:

- The dredging productivity shall be based on the actual volume dredged, which shall be measured as *in-situ* cy and shall include the volume of sediment removed to achieve the removal limits specified in design, including any volume associated with overcut, side slope removal, overdredging allowance, and dredging for navigational purposes. For purposes of the Productivity Performance Standard, the volume dredged shall not include sediment removed outside the dredge cut lines shown or specified in the EPA-approved *Final Design Report*, sediment removed during re-dredging to capture dredging residuals, additional material removed solely to facilitate cap/backfill placement, sediment removed from non-target areas (if any), or non-compliant backfill that is removed.
- For comparisons to monthly production schedule, the actual *in-situ* volume dredged that month shall be compared to the *in-situ* volume scheduled for that month in the production schedule to be included in the RA Work Plan for the dredging season.
- For comparisons to the annual production schedule, the actual *in-situ* volume dredged and processed shall be compared to the *in-situ* volume scheduled for that season in the production schedule to be included in the RA Work Plan for that season.

4.3 Routine Monitoring and Reporting

The specific activities to monitor the actual dredging productivity shall be provided in the *Intermediate Design Report* and the *Final Design Report*. The monitoring activities also will be specified in the *Construction Quality Assurance Plan* (Construction QA Plan), which will be part of the RA Work Plan. Reporting shall be in accordance with Section 4.2 of Volume 4 of the EPS and shall include daily, weekly, monthly and annual reports, providing the volume of sediment dredged, which shall be measured or estimated as *in-situ* cy, as described above.

- Data for daily dredging operations shall be maintained to evaluate productivity performance. The data to be collected will be relevant to the design, the specific equipment, and the contracting approach used for the project, and shall include the following for each dredge: dredge operating hours and shifts per day; downtime for repairs to the dredge plant; downtime waiting for support equipment (e.g., barge, clogged pipeline, pipeline booster pump malfunction, etc.); downtime due to project and non-project vessel traffic; downtime to re-set the dredge and the number of re-sets per day; downtime associated with EPS-related shutdowns; downtime associated with QoLPS-related shutdowns; and the estimated average width, length, and depth of the dredge cut to estimate the volume of *in-situ* sediment removed. The actual report form to be used will be provided in the *Final Design Reports* and Phase 1 Construction QA Plan, and shall include records of productivity data (e.g., estimated total cy of material processed, shipped off-site, and staged onsite), and be available on site.
- Weekly reports shall be prepared providing information on the following:
  - Locations dredged;
  - Number of hours of actual dredging time per dredge and gross volume dredged each day and each week;
  - Cumulative amount dredged for the season;
  - Number of scows loaded and transported for off-loading, and approximate volume in each;
  - Time required for off-loading scows (if used);
  - Information on re-dredging efforts (locations, approximate volume, and time expended);
  - Total tonnage of material processed, shipped off-site, and stored on-site;
  - Concentration and mass of PCBs in processed sediments;
  - Volume of water treated and returned to river; and
  - Delays encountered in the project, the reasons for the delays, and the hours lost to production due to the delays.

The above list intentionally omits the requirement for weekly reporting of weight and moisture content of dredged sediments shipped off-site, as specified in the Productivity Standard. This modification is acceptable to EPA because GE is required to report these parameters annually (see sub-bullets under third bullet, below).

- GE shall provide to EPA, as part of the Phase 2 RA Work Plan for a dredging season, the production schedule showing anticipated productivity on a monthly basis for the upcoming season.
- Monthly summaries shall be prepared and submitted to EPA by the 15th of the following month, providing the same information listed above for each week during the month, the month, the season, and the overall project. The monthly reports shall also compare productivity on a weekly, monthly, season, and project-total basis to the production schedule specified in the relevant RA Work Plan.
- Annual reports shall be submitted to EPA within 30 days of the end of work activities each season during Phase 2, i.e., 30 days after completion of dredging, backfilling, capping, shoreline reconstruction/ stabilization, and sediment processing/water treatment for that season. The annual reports during Phase 2 shall provide:
  - Estimated total *in-situ* volume of sediments dredged;
  - Map showing locations where dredging, confirmatory sampling, and backfilling or capping has been completed and where work is ongoing. These maps shall display general type of work in each area, including dredging, confirmatory sampling, re-dredging, backfilling, capping, shoreline excavation and stabilization, containment installation or removal work. The maps developed as part of the CU certification process shall satisfy this requirement;
  - Total weight and average moisture content of sediments shipped off-site or added to temporary on-site stockpiles;
  - Graph showing anticipated cumulative dredging production necessary to meet performance standard and actual cumulative production achieved to date;
  - Table, graph, or other means of showing cumulative mass of total PCBs released to the Lower Hudson River from the beginning of the project to the latest date for which data are available, and a projection as to whether cumulative loss to the Lower Hudson River is anticipated to be below 650 kg total PCBs (or other mass value, if adjusted in accordance with the Resuspension Performance Standard) for the project duration. This analysis will include an estimate of total PCB mass removed from the river compared to the remaining mass to be removed;
  - Identification of any problems in meeting the Productivity Performance Standard and steps taken to overcome those problems; and
  - Copies of all daily production report forms and all weekly reports.

- On-site records shall also be kept of the following:

- Locations of backfill and sediment caps placed;
- Volumes of backfill or capping material placed and hours spent in placing backfill and sediment caps; and
- Locations and details of shoreline work, including shoreline dredging and restoration rates.

4.4 Required Response Actions

If monitoring indicates an occurrence of the Concern, Control, or Standard Level, GE shall take the response actions required in Section 2.3.2.2 of Volume 1 of the EPS and described below.

During implementation of Phase 1, and Phase 2 if GE elects to perform Phase 2, in the event that the production rate falls below the scheduled productivity, GE shall evaluate measures to make up the shortfall (in whole or in part), including but not limited to increasing the hours and/or days of operation or utilizing available equipment to increase throughput.

GE shall not be required, during a Phase 1 or Phase 2 field season, to make equipment modifications or additions for that season that are not reasonably available from a schedule or cost standpoint, recognizing that substitutions during a field season for major equipment approved in the Phase 1 or 2 *Final Design Reports* or being used in Phase 1 or Phase 2 may be impractical. (If necessary, more significant changes in equipment, operations, or processes may be required for subsequent seasons, subject to Paragraphs 15 and 20 of the Consent Decree.) However, in the event reasonable changes can be made to address achievement of the performance standards during any dredge season, GE will propose (either on its own initiative or at EPA's request) such changes to equipment or operations for EPA review and approval. The Parties agree that what is considered "reasonable" or "reasonably available" in a given situation, for the purposes of this paragraph, may depend on the circumstances and will need to take account of what is necessary in order for the project to be done in a way that does not jeopardize public health or safety. During Phase 1, EPA will consider any information that GE may submit regarding impacts to schedule and project costs when the Agency reviews GE's proposals, if any, for modification of the EPA-approved *Phase 1 Final Design Report* based on field conditions or experience. This paragraph shall not be construed to affect or limit any rights EPA has under Paragraph 15 or 20 of the Consent Decree.

Concern Level

In the event that the Concern Level occurs, GE shall: 1) notify EPA in its monthly report; 2) complete an assessment to determine the cause of the shortfall and whether there are any practical means to make up the shortfall or otherwise increase productivity within the next 2 months; and 3) present the results of that assessment and, if warranted, a proposal for such measures to EPA. GE shall implement measures, as approved by EPA, to make up the shortfall or otherwise increase productivity, to the extent practical and subject to the general considerations described above. Activities that GE will consider for increasing productivity shall include increasing work schedule, if not already operating 24 hours a day, 7 days a week, modifying the dredge plan, staging additional sediment at the processing facility, and other contingencies that are specified in the *Final Design Reports*.

Control Level

In the event that the Control Level occurs, GE shall: 1) notify EPA; and 2) provide a report/action plan to EPA explaining the reasons for the shortfall and describing the steps underway or to be taken to increase production, subject to the general considerations described above. The objective will be to erase the shortfall by the end of the dredging season, if the shortfall can practically be erased. GE shall implement measures, as approved by EPA, to make up the shortfall or otherwise increase productivity, to the extent practical and subject to the general considerations described above. Activities that GE will consider for increasing productivity will include increasing work schedule, if not already running 24 hours a day, 7 days a week, modifying the dredge plan, staging additional sediment at the processing facility, and other contingencies that are specified in the *Final Design Reports*.

Standard Level

If GE has notified EPA that it will perform Phase 2, then in the event that the annual cumulative volume fails to meet the scheduled annual volume or if any shortfall cannot be erased by the end of the dredging season, GE shall provide to EPA an explanation of the deficit and recommendations (if any) for changes in the upcoming dredging season's RA Work Plan. GE shall implement measures, as approved by EPA, to make up the shortfall or otherwise increase productivity in the subsequent dredging season, to the extent practical and subject to the general considerations described above. Activities that GE will consider for increasing productivity shall include increasing work schedule, if not already operating 24 hours a day, 7 days a week, modifying the dredge plan, staging additional sediment at the processing facility, and other contingencies that are specified in the *Final Design Reports*.

5. Performance Standards for Air Quality, Odor, Noise, and Lighting

This section discusses the QoLPS for air quality, odor, noise, and lighting. It provides an overview of the quality-of-life standards as set out in the QoLPS, describes the design analyses to be performed to assess achievement of the standards, and specifies the routine monitoring requirements, contingency monitoring and other responses in the event of an exceedance of an applicable standard or other trigger level, requirements for responding to complaints, and notification and reporting requirements. Most of these requirements are specified in the RA Monitoring Scope and/or the RA CHASP Scope, and thus this section consists, in large part, of a roadmap with cross-references to those documents. (Note that the average concentrations described in this section for given time periods are block averages for that discrete time period, not running averages.)

5.1 Overview of Standards

Air Quality Performance Standard

The standards for total PCB concentrations in ambient air are 24-hour average concentrations of 0.11 micrograms per cubic meter (µg/m3) in residential areas and 0.26 µg/m3 in commercial/industrial areas, with "Concern Levels" at 80% of those values (0.08 µg/m3 in residential areas and 0.21 µg/m3 in commercial/industrial areas) (QoLPS, pp. 6-8 & 6-18).

The air quality standard for opacity, based on New York State regulations (6 NYCRR 211.3), is that opacity during project operations must be less than 20% as a 6-minute average, except that there can be one 6-minute period per hour of not more than 57% (QoLPS, p. 6-16).

In addition, the Air Quality Performance Standard requires an assessment during design of the following pollutants for which EPA has promulgated National Ambient Air Quality Standards (NAAQS): nitrogen oxides, sulfur dioxide, carbon monoxide, particulate matter with a median diameter of 10 micrometers or less, particulate matter with a median diameter of 2.5 micrometers or less, and ozone (QoLPS, pp. 6-9 to 6- 11).

The need for monitoring of these constituents shall be determined during remedial design using specific design data. GE will perform the assessment in EPA's *White Paper – Air Quality Evaluation* analyses (included in the ROD, 2002) using project-specific design data. If this project-specific information developed during design

validates the assumption used in EPA's *White Paper – Air Quality Evaluation* analyses, this will be considered a determination of compliance with the Air Quality Performance Standard such that further demonstration by on-site or off-site sampling shall not be required. If air quality compliance is not demonstrated as a result of these analyses for any NAAQS, GE shall evaluate potential design changes that could result in achievement of the NAAQS and/or the need for monitoring for such pollutant(s), and shall submit a proposal on this topic to EPA for review and approval.

Odor Performance Standard

The odor standard has two components: 1) a numerical standard for hydrogen sulfide (H2S), which is 0.01 ppm (14 $\mu g/m^3$) over 1 hour; and 2) a standard for odor complaints, which is that the complaints are investigated and mitigated (QoLPS, p. 6-19).

Noise Performance Standard

The noise standards are as follows (QoLPS, p. 6-25):

Short-term criteria – applicable to facility construction, dredging, and backfilling:

- Residential Control Level (maximum hourly average):
  - Daytime = 75 dBA (A-weighted decibels)
- Residential Standard (maximum hourly average):
  - Daytime = 80 dBA
  - Nighttime (10:00 pm – 7:00 am) = 65 dBA
- Commercial/Industrial Standard (maximum hourly average):
  - Daytime and nighttime = 80 dBA

Long-term criteria – applicable to the processing facility and transfer operations:

- Residential Standard (24-hour average):
  - Day-night average = 65 dBA (after addition of 10 dBA penalty to night levels from 10:00 pm to 7:00 am)
- Commercial/Industrial Standard (maximum hourly average):
  - Daytime and nighttime = 72 dBA

Lighting Performance Standard

The numerical lighting standards for light emissions attributable to the project are as follows (QoLPS, p. 6-39):

- Rural and suburban residential areas = 0.2 footcandle;
- Urban residential areas = 0.5 footcandle; and
- Commercial/Industrial areas = 1 footcandle.

In addition to these numerical standards, the Lighting Performance Standard references certain statutory and regulatory requirements pertaining to lighting. These include the following (QoLPS, p. 6-42):

- 33 CFR 154.570, which requires adequate fixed lighting for bulk transfer facilities at nighttime and states that lighting will be located or shielded so as not to mislead or otherwise interfere with navigation; and
- 33 USC §§ 2020 through 2024 (specifying various lighting requirements for vessels).

GE shall comply with these requirements, as well as 33 CFR §§ 84-88, Annex I and Annex V, and the other requirements specified in the Navigation Performance Standard governing lighting on vessels.

As noted in the QoLPS, the Lighting Performance Standard shall not supersede worker safety lighting requirements established by the Occupational Safety and Health Administration (OSHA) (QoLPS, p. 6-40).

5.2 Design Analysis

The *Phase 1 Intermediate Design Report* and the *Phase 1 Final Design Report* shall document the engineering bases and assumptions for the design to demonstrate that the equipment and processes to be used in Phase 1 are expected to meet the above quantitative standards as required by the Quality of Life Performance Standards.[1] Pursuant to the Remedial Design Work Plan, RA CHASP Scope, and RA SOW, GE shall develop a *RA Community Health and Safety Plan (RA CHASP)*.

[1] The *Phase 1 Intermediate Design Report* and the *Phase 1 Final Design Report* also shall document how Phase 1 will comply with OSHA requirements. GE shall develop a separate Worker Health and Safety Plan that addresses OSHA requirements.

5.3 Routine Monitoring

GE shall conduct the following monitoring:

- Routine and baseline air quality monitoring for PCBs in accordance with the requirements set forth in Section 6.1 of the QoLPS and subsections 4.2.1, 4.3.1, and 4.4.1 of the RA Monitoring Scope;
- Opacity monitoring in accordance with the requirements set forth in Section 6.1 of the QoLPS and subsections 4.2.3, 4.3.3, and 4.4.3 of the RA Monitoring Scope;
- Odor monitoring in accordance with the requirements set forth in Section 6.2 of the QoLPS and subsections 4.2.4, 4.3.4, and 4.4.4 of the RA Monitoring Scope;
- A 2-week noise study at the beginning of Phase 1 dredging operations, as described in subsection 5.3 of the RA Monitoring Scope;
- Routine noise monitoring in accordance with the requirements set forth in Table 6-8 and Section 6.3 of the QoLPS and subsections 5.3 and 5.4 of the RA Monitoring Scope; and
- Lighting monitoring in accordance with the requirements set forth in Section 6.4 of the QoLPS and subsections 6.2 and 6.3 of the RA Monitoring Scope.

5.4 Contingency Monitoring and Responses

Ambient Air Concentrations of PCBs

In the event that air quality monitoring for PCBs shows an exceedance of an applicable Concern Level (defined in subsection 5.1 above) or of a PCB air quality standard, GE shall take the required actions specified in Table 6-2 of the QoLPS. GE shall provide the notifications specified in subsection 4.6.1 of the RA Monitoring Scope, conduct the contingency monitoring specified for such exceedances in subsection 4.5.1 of the RA Monitoring Scope, and take the other response actions specified for such exceedances in subsection 2.1 of the RA CHASP Scope.

Opacity

In the event that opacity monitoring shows an exceedance of the opacity standard, GE shall: 1) notify EPA and the New York Department of Environmental Conservation (NYSDEC); 2) undertake the contingency actions, to be specified for this situation in the RA CHASP; and 3) submit to EPA a report on the reasons for the exceedance and measures taken to prevent further exceedances.

Odor

The Odor Performance Standard defines the "Concern Level" as the presence of uncomfortable project-related odors identified by RA workers or an odor complaint from the public; and it defines the "Exceedance Level" as an exceedance of the H_2S standard or "[f]requent, recurrent odor complaints related to project activities" (QoLPS, p. 6-24). If the Concern Level occurs and the odor is identified as potentially H_2S, GE shall take the required actions specified in Table 6-4 of the QoLPS. GE shall provide the notification specified in subsection 4.6.2 of the RA Monitoring Scope and conduct H_2S monitoring as described in subsections 4.2.4 and 4.5.2 of the RA Monitoring Scope. If that monitoring shows an exceedance of the H_2S standard, GE shall continue monitoring on a regular basis until the standard is met, and shall take the response actions specified in subsection 2.2 of the RA CHASP Scope. In addition, if the Control or Exceedance Level is triggered by an odor complaint, GE shall provide the notification specified in subsection 4.6.2 of the RA Monitoring Scope and shall respond to the complaint in accordance with the procedures set forth in Section 3 of the RA CHASP Scope, as noted in subsection 5.5 below. The specified responses differ depending on whether the odor is identified as H_2S.

Noise

The Noise Performance Standard defines the "Concern Level" as an exceedance of the residential control level, or an exceedance of an applicable noise standard that can be easily and immediately mitigated, or receipt of a project-related noise complaint (QoLPS, p. 6-38). It defines the "Exceedance Level" as an exceedance of an applicable noise standard that cannot be easily and immediately mitigated, or "[f]requent, recurrent noise complaints related to project activities" (QoLPS, p. 6-38). If there is an occurrence of the Concern Level or the Exceedance Level, GE shall take the required actions specified in Table 6-9 of the QoLPS. GE shall provide the notifications specified in subsection 5.6 of the RA Monitoring Scope and shall conduct the contingency monitoring specified in subsections 5.3 and 5.5 of the RA Monitoring Scope. In addition, if noise levels are measured above the residential control level or an applicable noise standard, GE shall conduct the response actions specified for such contingencies in subsection 2.3 of RA CHASP Scope. The process for responding to complaints shall be set forth in Section 3 of the RA CHASP Scope, as noted in subsection 5.5 below.

Lighting

The Lighting Performance Standard defines the "Concern Level" as an exceedance of an applicable numerical standard that can be easily and immediately mitigated, or receipt of a project-related lighting complaint (QoLPS, p. 6-45). It defines the "Exceedance Level" as an exceedance of an applicable numerical lighting standard that

cannot be easily and immediately mitigated, or "[f]requent, recurrent complaints related to project activities" (QoLPS, p. 6-45). If there is an occurrence of the Concern Level or the Exceedance Level, GE shall take the required actions specified in Table 6-11 of the QoLPS. GE shall provide the notifications specified in subsection 6.5 of the RA Monitoring Scope and shall conduct the contingency monitoring specified in subsection 6.4 of the RA Monitoring Scope. In addition, if lighting levels are measured above an applicable numerical standard, GE shall conduct the response actions specified for the relevant level (Control or Exceedance) in subsection 2.3 of the RA CHASP Scope. The process for responding to complaints shall be set forth in Section 3 of the RA CHASP Scope, as noted in subsection 5.5 below. Further, in the event of a deviation from a lighting requirement applicable to lighting on vessels, GE shall follow the procedures for deviations from the navigation requirements, as specified in subsection 2.5 of the RA CHASP Scope. These procedures for deviations from the standard include notifying the EPA and NYS Canal Corporation promptly but no later than 24 hours after discovery of the deviation, identifying the cause of the deviation, implementing an action plan for mitigation measures and providing a corrective action report to the EPA in accordance with the RA CHASP.

GE shall not be required, during a Phase 1 or Phase 2 field season, to make equipment modifications or additions for that season that are not reasonably available from a schedule or cost standpoint, recognizing that substitutions during a field season for major equipment approved in the Phase 1 or 2 *Final Design Reports* or being used in Phase 1 or Phase 2 may be impractical. (If necessary, more significant changes in equipment, operations, or processes may be required for subsequent seasons, subject to Paragraphs 15 and 20 of the Consent Decree.) However, in the event reasonable changes can be made to address achievement of the performance standards during any dredge season, GE will propose (either on its own initiative or at EPA's request) such changes to equipment or operations for EPA review and approval. The Parties agree that what is considered "reasonable" or "reasonably available" in a given situation, for the purposes of this paragraph, may depend on the circumstances and will need to take account of what is necessary in order for the project to be done in a way that does not jeopardize public health or safety. During Phase 1, EPA will consider any information that GE may submit regarding impacts to schedule and project costs when the Agency reviews GE's proposals, if any, for modification of the EPA-approved *Phase 1 Final Design Report* based on field conditions or experience. This paragraph shall not be construed to affect or limit any rights EPA has under Paragraph 15 or 20 of the Consent Decree.

5.5 Response to Complaints

The process to be followed for handling and responding to complaints from the public relating to quality-of-life issues shall be set forth in Section 3 of the RA CHASP Scope. If a complaint is received relating to air quality, odor, noise, or lighting, GE shall follow the procedure specified in that section for recording and responding to the complaint.

5.6 Notifications and Reporting

GE shall conduct the recordkeeping, reporting, and notification activities specified in the following:

- For air quality, Section 6.1 of the QoLPS, Section 2.1 of the RA CHASP Scope and subsection 4.6.1 of the RA Monitoring Scope;
- For odor, Section 6.2 of the QoLPS, Section 2.2 of the RA CHASP Scope and subsection 4.6.2 of the RA Monitoring Scope;
- For noise, Section 6.3 of the QoLPS, Section 2.3 of the RA CHASP Scope and subsection 5.6 of the RA Monitoring Scope; and
- For lighting, Section 6.4 of the QoLPS, Section 2.4 of the RA CHASP Scope and subsection 6.5 of the RA Monitoring Scope.

In addition, reporting on the handling of complaints shall be conducted as illustrated in Figure 6-1 of the QoLPS and as described in Section 3 of the RA CHASP Scope and in the RA CHASP.

6. Navigation Performance Standard

This section discusses the QoLPS for navigation during dredging operations. It sets forth the general requirements of the standard, describes the design analyses to be performed to assess achievement of the standard, and specifies the routine notice and monitoring requirements, contingency actions in the event of a deviation from the applicable requirements, requirements for responding to complaints, and notification and reporting requirements. Some of these requirements are specified in the RA CHASP Scope; these requirements are incorporated by reference in this section.

6.1 General Requirements

GE shall comply with the following requirements of the Navigation Performance Standard**:**

- **Obstructions:** GE shall, to the extent practical consistent with meeting the goals of the project and complying with the other performance standards, comply with 33 U.S.C. Ch. 9 § 409, which prohibits tying up or anchoring vessels or other craft in navigable channels in such a manner as to prevent or obstruct the passage of other vessels or craft.
- **Lighting on vessels:** GE shall comply with the following requirements relating to the type, size, location, color, and use of lighting on all ships:
  - 33 CFR §§ 84-88, Annex I – requirements for positioning and spacing of lights, location of direction-indicating lights for dredges, and screens, color, shape, and intensity of lights;
  - 33 CFR §§ 84-88, Annex V – additional requirements for lighting of moored barges and dredge pipelines; and
  - NYS Canal Corporation regulations at 21 NYCRR 151.11 – lighting requirements for moored floats.
- **Signals on vessels:** GE shall comply with the following requirements relating to the type, intensity, and use of lighting and sound for signaling on all ships:
  - 33 CFR § 86, Annex III – requirements for technical details of sound signals;
  - 33 CFR § 87, Annex IV – requirements for distress signals; and
  - NYS Canal Corporation regulations at 21 NYCRR 151.6 (draft marking on floats), 151.15 (buoys and lights displaced), 151.23 (warning signals approaching bends), and 151.26 (aids to navigation).
- **Piloting:** GE shall comply with the following requirements regarding the piloting and movement of vessels:

- 33 CFR § 88, Annex V – requirements for public safety activities, obtaining copies of rules, and law enforcement vessels; and
- NYS Canal Corporation regulations at 21 NYCRR 151.7, 151.8, 151.9, 151.17. 151.18, 151.19, 151.20, 151.21, and 151.24 – piloting requirements.

As stated in the QoLPS (Section 7: Finalizing the Standards, p. 7-1): "If during design EPA determines that adjustments to the quality of life performance standards are warranted, EPA may adjust the standards and will involve the public in any such adjustment." The Navigation Performance Standard is modified herein to be consistent with the recent revisions to the navigational regulations of the New York State Canal Corporation (NYS Canal Corporation) (21 NYCRR Part 151), which were identified after release of the QoLPS.

In addition to the above, GE shall comply with the following:

- **Restricting access:** Access to work areas undergoing remediation shall be restricted where necessary in coordination with the NYS Canal Corporation. Where access is restricted, GE shall take necessary steps, to the extent practical, to provide an adequate buffer zone for safe passage of commercial and recreational vessels in the navigational channel. In any event, channel encroachment requirements shall be established in consultation with the NYS Canal Corporation.
- **Scheduling activities and use of locks:** Project-related river traffic shall be controlled and scheduled so that interference with non-project-related vessels is not unnecessarily hindered, while at the same time allowing efficient performance of the project. Where locks are used, remedial operations shall be coordinated with the NYS Canal Corporation and its lock operators. Project-related vessels shall be considered commercial vessels for purposes of navigation.
- **Temporary aids to navigation:** Temporary aids to navigation (e.g., lighting, signs, buoys) in areas of active work may be necessary and shall consist of items specified by the NYS Canal Corporation or United States Coast Guard (USCG).

The navigation performance standard includes two action levels – Concern and Exceedance Levels, as described below.

- The Concern Level occurs if there is a deviation from the requirements described above and the deviation can be easily mitigated, or if a project-related navigation complaint is received from the public.
- The Exceedance Level occurs if remedial activities unnecessarily hinder overall non-project related vessel movement and create project-related navigation interferences, or if there are frequent recurrent

complaints from the public that project activities are unnecessarily hindering non-project vessel movement.

6.2 Design Analysis

The *Phase 1 Intermediate Design Report* and the *Phase 1 Final Design Report* shall document the bases and assumptions for the design to demonstrate that the vessels and other equipment to be used in Phase 1 are expected to meet the Performance Standard for Navigation. The NYS Canal Corporation shall be consulted during RD on issues relating to navigation.

6.3 Routine Notices

In accordance with the Performance Standard for Navigation (Sections 6.5.6 and 6.5.7 of QoLPS), GE shall provide routine notices during dredging, which shall include the following:

- GE shall notify the NYS Canal Corporation when in-river project activities are anticipated. This shall be done by both verbal and written notice. Information shall be provided to allow the NYS Canal Corporation and/or USCG to issue Notices to Mariners.
- GE shall provide the public with a schedule of anticipated project activities. Methods for informing the public of anticipated actions may include the following, where appropriate:
    - Communications with lock operators during lock usage;
    - Broadcasting on appropriate marine frequencies during in-river activities to notify lock operators and other mariners of transient activities that may affect navigation;
    - Posting notices at marinas, public boat launches, and locks;
    - Providing interested commercial and recreational user groups with a summary of anticipated activities on an annual basis prior to initiating in-river activities; and
    - Posting information about in-river activities on a publicly accessible website.

The details for providing notices to the public shall be provided in the *Phase 1 Intermediate Design Report* and the *Phase 1 Final Design Report.*

6.4 Routine Monitoring

In accordance with the Performance Standard for Navigation (Section 6.5.6 of QoLPS), GE shall implement a routine monitoring program to assess in-river activities associated with the project and non-project vessel traffic in the vicinity of the in-river activities. The routine monitoring shall include the following:

- Periodic monitoring of in-river activities that may have an impact on navigation of the river by commercial and recreational watercraft; and
- Monitoring vessel traffic and compiling daily logs of river navigation activities in the vicinity of in-river project activities along with any resulting navigation issues.

The details regarding the routine monitoring shall be provided in the *Phase 1 Intermediate Design Report* and the *Phase 1 Final Design Report.*

6.5 Contingency Actions/Responses

In the event that the Concern or Exceedance Level occurs in the form of a deviation from the navigation requirements specified in subsection 6.1, GE shall take the required actions specified in Table 6-13 of the QoLPS. GE shall conduct the contingency response actions specified for such level in subsection 2.5 of the RA CHASP Scope.

GE shall not be required, during a Phase 1 or Phase 2 field season, to make equipment modifications or additions for that season that are not reasonably available from a schedule or cost standpoint, recognizing that substitutions during a field season for major equipment approved in the Phase 1 or 2 *Final Design Reports* or being used in Phase 1 or Phase 2 may be impractical. (If necessary, more significant changes in equipment, operations, or processes may be required for subsequent seasons, subject to Paragraphs 15 and 20 of the Consent Decree.) However, in the event reasonable changes can be made to address achievement of the performance standards during any dredge season, GE will propose (either on its own initiative or at EPA's request) such changes to equipment or operations for EPA review and approval. The Parties agree that what is considered "reasonable" or "reasonably available" in a given situation, for the purposes of this paragraph, may depend on the circumstances and will need to take account of what is necessary in order for the project to be done in a way that does not jeopardize public health or safety. During Phase 1, EPA will consider any information that GE may submit regarding impacts to schedule and project costs when the Agency reviews GE's proposals, if any, for modification of the EPA-approved *Phase 1 Final Design Report* based on field conditions or experience.

This paragraph shall not be construed to affect or limit any rights EPA has under Paragraph 15 or 20 of the Consent Decree.

6.6 Specific Requirements for Handling Complaints

If a navigation complaint is received from the public, GE shall follow the procedure specified in subsections 3.1 and 3.3 of the RA CHASP Scope, which shall describe the system for managing navigation complaints at and around the project site.

6.7 Notifications and Reporting

In accordance with the Performance Standard for Navigation (Sections 6.5.8 and 6.5.9 of the QoLPS), GE shall make the following notifications and reports:

- A monthly navigation monitoring report summarizing monitoring activities for the previous month shall be submitted to EPA and NYS Canal Corporation. This report shall include the daily record logs of river navigation activities and issues. The report shall be in a tabular format and include a log of navigation complaints and follow-up actions taken to resolve the complaint.
- If there is a deviation from the navigation requirements specified in subsection 6.1, GE shall notify EPA and the NYS Canal Corporation verbally within 24 hours for deviations at the Concern Level and immediately upon knowledge of the deviation for deviations at the Exceedance Level.
- In the event of an occurrence of the Concern Level, GE shall provide a follow-up report to EPA and the NYS Canal Corporation with a summary of the navigation issue and any mitigation conducted. In the event of an occurrence of the Exceedance Level, GE shall submit daily navigation reports to EPA and the NYS Canal Corporation until compliance is achieved, and shall submit a corrective action report within 10 days of discovery of the deviation, describing the cause of the problem and the mitigation measures implemented.

The required contents of these reports shall be provided in the *Phase 1 Intermediate Design Report* and the *Phase 1 Final Design Report*. In addition, reporting on the handling of complaints shall be conducted as described in Section 3 of the RA CHASP Scope, and in the RA CHASP.

7. WQ Requirements for In-River Releases of Constituents Not Subject to Performance Standards

This section discusses the WQ requirements for in-river releases of constituents not subject to the EPS. It provides an overview of the substantive standards as set forth in EPA's WQ requirements, and specifies the routine monitoring requirements, contingency monitoring and other responses in the event of an exceedance of an applicable standard or an observation of distressed or dying fish, and notification and reporting requirements. Where these requirements are specified in the RA Monitoring Scope and RA CHASP Scope, this section incorporates those requirements by reference.

7.1 Overview of Standard

The WQ requirements for in-river releases are divided into acute water quality standards to be met at near-field stations and health-based standards to be met at far-field stations.

Aquatic acute water quality standards at near-field stations

The WQ requirements (pp. 1 & 2 EPA January 2005) set forth the following standards for near-field stations:

- "Aquatic standards (some of which are hardness-dependent) apply to the dissolved form. Hardness varies along the length of the project area and will result in a range of calculated standards. For example, based on limited available data, average hardness values from Corinth and Waterford range from 18 ppm to 55 ppm respectively. The resulting ranges of water quality standards are as follows (where applicable , the formulas for calculating the standards are in brackets):
  - cadmium – Aquatic Acute A(A): 0.6 µg/L to 2.0 µg/L [(0.85) exp(1.128[ln (ppm hardness)] – 3.6867)]
  - lead – Aquatic Acute A(A): 14.4 µg/L to 50.4 µg/L [{1.46203 – [ln (hardness) (0.145712)]} exp (1.273 [ln (hardness)] – 1.052)]
  - chromium – Aquatic Acute A(A): 140 µg/L to 349 µg/L [(0.316) exp (0.819 ln (ppm hardness)) + 3.7256)]
  - chromium (hexavalent) – Aquatic Acute A(A): 16 µg/L
  - mercury – Aquatic Acute A(A): 1.4 µg/L"

- "Water quality standards for pH and dissolved oxygen are specified in NYCRR Title 6, Chapter X, Part 703.3.
  - pH shall not be less than 6.5 nor more than 8.5.
  - Dissolved oxygen for non-trout waters:
    - The minimum daily average shall not be less than 5.0 mg/L.
    - At no time shall the dissolved oxygen concentration be less than 4.0 mg/L."

Health (water source) standards at far-field stations

The WQ requirements (pp. 2 & 8 EPA January 2005) set forth the following standards for far-field stations:

- The following water quality standards, which apply to the total form and are not hardness dependent, should not be exceeded at any of the Schuylerville, Stillwater, or Waterford fixed far-field stations:
  - Cadmium (total): 5 µg/L;
  - Chromium (total): 50 µg/L;
  - Mercury (total): 0.7 µg/L; and
  - Lead (total): 15 µg/L (New York State Department of Health [NYSDOH] action level), with a "trigger level" of 10 µg/L at Stillwater and Waterford.
- Determination of an exceedance requires a "confirmed occurrence" prior to any changes in operation, though the potential changes shall be formulated after one exceedance – i.e., four subsequent samples, each representing a 6-hour composite, as specified in the WQ requirements.

7.2 Routine Monitoring

GE shall conduct the routine near-field and far-field monitoring for metals and water quality parameters (i.e., pH, DO, temperature, turbidity, suspended solids, hardness, and conductivity as described in the WQ requirements (pp. 2-7) and in subsections 2.1.2, 2.3, and 2.4.4 of the RA Monitoring Scope. Total and dissolved lead and cadmium at near-field stations and total and dissolved lead and cadmium at far-field stations shall serve as a surrogate for the routine metals monitoring program during the RA. EPA, GE and NYSDEC will continue to evaluate whether mercury and chromium concentrations are adequately represented by lead and cadmium concentrations based on the Baseline Monitoring Program data, Treatability Study data, any additional sediment data that become available, and/or Phase 1 water column data. Based on evaluation of these data, these monitoring requirements may be modified upon agreement of EPA (after consultation with NYSDEC) and GE.

7.3 Contingency Monitoring

In the event that the routine monitoring shows an exceedance of an applicable standard (or the trigger level for total lead), GE shall conduct the contingency monitoring specified for the relevant exceedance in the WQ requirements (pp. 2-7) and subsections 2.2, 2.4.4, and 2.5 of the RA Monitoring Scope. As described in Section 7.2 above, lead and cadmium will be used initially as a surrogate for the metals RA monitoring program. Monitoring requirements may be modified to include the additional metals as identified in the WQ requirements and section 7.1 above.

7.4 Contingency Actions/Responses

If any of the above standards is exceeded at a near-field or far-field station, GE shall promptly notify EPA and NYSDEC (and, for exceedances of the health standards at far-field stations, the NYSDOH and the public water suppliers), but no later than 3 hours after receipt of the laboratory data, evaluate the cause(s) of the exceedance, and propose an appropriate response to EPA for approval. GE shall make these laboratory data available to EPA, NYSDEC, NYSDOH and the water suppliers.

The selection of investigative measures will depend on specific project circumstances and may include one or more the following different actions:

- Visual observations of operations;
- Discussions with project personnel;
- Review of operations records;
- Examination of the integrity of containment barriers (if in use);
- Examination of sediment transport pipeline (if in use);
- Examination of barge loading system and barge integrity;
- Examination of resuspension associated with tugs, barges, and other support vessels; and
- Additional monitoring and/or sampling.

GE shall consider and evaluate potential responses and propose an appropriate response to EPA. Such responses may include additional studies, increased monitoring, and/or implementation of engineering controls. GE shall consider potential engineering controls including:

- Initiate engineering evaluation and continual adjustments to dredging operations until concentrations are in compliance with the WQ requirements.
- Evaluate and identify any problems.
- Changes in resuspension controls, dredge operation, or dredge type.
- Implementing additional resuspension controls.
- Temporarily cease operations if required.

GE shall prepare and submit an *Engineering Evaluation Report*, which contains the results of this engineering evaluation, the proposed engineering solution and a proposed schedule for implementing that solution, except as follows: if the solution involves a refinement in operations or equipment that is consistent with, and would not require a modification of, the EPA-approved *Final Design Report* or the RA Work Plan, then GE shall implement the solution in consultation with the EPA field representative and shall document the implementation of that solution in the *Engineering Evaluation Report*. In all other cases, GE shall implement the engineering solution in accordance with the EPA-approved *Engineering Evaluation Report*. If the cause of the exceedance was not identified by the engineering evaluation, the *Engineering Evaluation Report* shall include a course of action for continued monitoring and evaluation to determine the cause of the exceedance. GE shall consult with EPA on a regular basis until the cause and solution are determined, or until EPA orders a temporary halt to the operation(s) that caused the exceedance or until EPA determines that further evaluation is not necessary.

GE shall not be required, during a Phase 1 or Phase 2 field season, to make equipment modifications or additions for that season that are not reasonably available from a schedule or cost standpoint, recognizing that substitutions during a field season for major equipment approved in the Phase 1 or 2 *Final Design Reports* or being used in Phase 1 or Phase 2 may be impractical. (If necessary, more significant changes in equipment, operations, or processes may be required for subsequent seasons, subject to Paragraphs 15 and 20 of the Consent Decree.) However, in the event reasonable changes can be made to address achievement of the performance standards during any dredge season, GE will propose (either on its own initiative or at EPA's request) such changes to equipment or operations for EPA review and approval. The Parties agree that what is considered "reasonable" or "reasonably available" in a given situation, for the purposes of this paragraph, may depend on the circumstances and will need to take account of what is necessary in order for the project to be done in a way that does not jeopardize public health or safety. During Phase 1, EPA will consider any information that GE may submit regarding impacts to schedule and project costs when the Agency reviews GE's proposals, if any, for modification of the EPA-approved *Phase 1 Final Design Report* based on field conditions or experience. This paragraph shall not be construed to affect or limit any rights EPA has under Paragraph 15 or 20 of the Consent Decree.

In addition, if a trigger level of 10 µg/L total lead (~ 70% of the action level) is exceeded by a single water column sample at the Stillwater or Waterford stations, GE shall promptly notify EPA, NYSDEC, NYSDOH and the water suppliers, but no later than 3 hours after receipt of the laboratory results. If that exceedance is confirmed by the next 24-hour sample, GE shall evaluate the cause of the exceedance and propose an appropriate response to EPA. Such response may include increased monitoring and/or implementation of engineering controls, as described in the preceding paragraph.

7.5 Responses to Observations of Distressed or Dying Fish

If, during in-water activities, distressed or dying fish are observed, GE shall promptly notify EPA and NYSDEC. GE shall also assess the cause(s) of the situation; and if the cause can be determined and is project-related, GE shall conduct increased monitoring for metals and additional water quality parameters, where appropriate, in accordance with the WQ requirements (p.9) and the RA Monitoring Scope, and shall propose an appropriate response to EPA, following the same requirements and subject to the same qualifications specified in subsection 7.4 for an exceedance of water quality standards.

7.6 Notifications and Reporting

In addition to the notifications and reporting described above in this section, GE shall conduct the notification and reporting activities specified in subsection 2.7 of the RA Monitoring Scope.

8. Substantive WQ Requirements for Discharges to Hudson River and Champlain Canal (Land Cut above Lock 7)

This section addresses the substantive WQ requirements for discharges to the Hudson River and Champlain Canal (land cut above Lock 7), as well as the associated monitoring requirements, response actions, and notification and reporting requirements.

8.1 Effluent Limitations

The following are effluent limits for the potential discharge from dredged sediment dewatering facilities to the Champlain Canal (land cut portion) above Lock 7 for the Hudson River PCBs Site Remedial Action.

Table 8-1 – Effluent Limits for Potential Discharge from Dredged Sediment Dewatering Facilities to the Champlain Canal (Land Cut Portion) Above Lock 7

Parameter	Treatment Plant Discharge Flow Rate	Water Quality Based Effluent Limits
PCBs	Any Assumed Flow Rate	0.3 µg/l, goal of 0.065 µg/l (same as for discharge to Hudson River)
Mercury	Any Assumed Flow Rate	(same as for discharge to Hudson River)
Chromium	0.1 MGD	0.21 mg/l (0.175 lb/day)
	Discharge Flow rate greater than 0.1 MGD	18.9 lb/day (maximum mass flow rate)
Cadmium	0.1 MGD	0.04 mg/l (0.033 lb/day)
	Discharge Flow rate greater than 0.1 MGD	0.62 lb/day (maximum mass flow rate)
Lead	0.1 MGD	0.038 mg/l (0.03 lb/day)
	Discharge Flow rate greater than 0.1 MGD	0.31 lb/day (maximum mass flow rate)
Copper	0.1 MGD	0.136 mg/l (0.11 lb/day)
	Discharge Flow rate greater than 0.1 MGD	0.75 lb/day (maximum mass flow rate)

Note: The accompanying table lists concentrations and associated mass loading rates for Cadmium, Chromium, Lead and Copper for discharge flow rates between 0.1 and 15 MGD.

All other parameters and conditions included in the substantive requirements of a State Pollutant Discharge Elimination System permit for potential discharge to the Hudson River from dredged sediment dewatering facilities as listed below would also be applicable to discharges to the Champlain Canal.

Table 8-2: Other Parameters and Conditions Included In the Substantive Requirements of a State Pollutant Discharge Elimination System Permit

Flow, MGD	Cr	Load	Cd	Load	Pb	Load	Cu	Load
0.100	0.210	0.175	0.040	0.033	0.038	0.032	0.136	0.113
0.300	0.210	0.525	0.040	0.100	0.038	0.095	0.136	0.340
0.500	0.210	0.876	0.040	0.167	0.038	0.158	0.136	0.567
0.700	0.210	1.226	0.040	0.234	0.038	0.222	0.128	0.750
0.900	0.210	1.576	0.040	0.300	0.038	0.285	0.100	0.750
1.100	0.210	1.927	0.040	0.367	0.034	0.310	0.082	0.750
1.300	0.210	2.277	0.040	0.434	0.029	0.310	0.069	0.750
1.500	0.210	2.627	0.040	0.500	0.025	0.310	0.060	0.750
1.700	0.210	2.977	0.040	0.567	0.022	0.310	0.053	0.750
1.900	0.210	3.328	0.039	0.620	0.020	0.310	0.047	0.750
2.100	0.210	3.678	0.035	0.620	0.018	0.310	0.043	0.750
2.300	0.210	4.028	0.032	0.620	0.016	0.310	0.039	0.750
2.500	0.210	4.379	0.030	0.620	0.015	0.310	0.036	0.750
2.700	0.210	4.729	0.028	0.620	0.014	0.310	0.033	0.750
2.900	0.210	5.079	0.026	0.620	0.013	0.310	0.031	0.750
3.000	0.210	5.254	0.025	0.620	0.012	0.310	0.030	0.750
3.500	0.210	6.130	0.021	0.620	0.011	0.310	0.026	0.750
4.000	0.210	7.006	0.019	0.620	0.009	0.310	0.022	0.750
4.500	0.210	7.881	0.017	0.620	0.008	0.310	0.020	0.750
5.000	0.210	8.757	0.015	0.620	0.007	0.310	0.018	0.750
5.500	0.210	9.633	0.014	0.620	0.007	0.310	0.016	0.750
6.000	0.210	10.508	0.012	0.620	0.006	0.310	0.015	0.750
6.500	0.210	11.384	0.011	0.620	0.006	0.310	0.014	0.750
7.000	0.210	12.260	0.011	0.620	0.005	0.310	0.013	0.750
7.500	0.210	13.136	0.010	0.620	0.005	0.310	0.012	0.750
8.000	0.210	14.011	0.009	0.620	0.005	0.310	0.011	0.750
8.500	0.210	14.887	0.009	0.620	0.004	0.310	0.011	0.750
9.000	0.210	15.763	0.008	0.620	0.004	0.310	0.010	0.750
9.500	0.210	16.638	0.008	0.620	0.004	0.310	0.009	0.750
10.000	0.210	17.514	0.007	0.620	0.004	0.310	0.009	0.750
10.500	0.210	18.390	0.007	0.620	0.004	0.310	0.009	0.750
11.000	0.206	18.900	0.007	0.620	0.003	0.310	0.008	0.750
11.500	0.197	18.900	0.006	0.620	0.003	0.310	0.008	0.750
12.000	0.189	18.900	0.006	0.620	0.003	0.310	0.007	0.750
12.500	0.181	18.900	0.006	0.620	0.003	0.310	0.007	0.750
13.000	0.174	18.900	0.006	0.620	0.003	0.310	0.007	0.750
13.500	0.168	18.900	0.006	0.620	0.003	0.310	0.007	0.750
14.000	0.162	18.900	0.005	0.620	0.003	0.310	0.006	0.750
14.500	0.156	18.900	0.005	0.620	0.003	0.310	0.006	0.750

Flow, MGD	Cr	Load	Cd	Load	Pb	Load	Cu	Load
15.000	0.151	18.900	0.005	0.620	0.002	0.310	0.006	0.750

Note: Mass Loadings, in lb/day, and Concentrations, in mg/l, for Chromium (Cr), Cadmium (Cd), Lead (Pb), and Copper (Cu) for Various Discharge Flow Rates to the Champlain Canal

Calculations: The mass equivalent of the listed concentrations for Cadmium, Chromium, Lead, and Copper, respectively, may be discharged up to the maximum mass flow rate listed. For example, 0.21 mg/l of Chromium may be discharged at any discharge flow rate up to 10.8 MGD, which equates to 18.9 lb/day at 0.21 mg/l. At discharge flow rates greater than 10.8 MGD, GE may discharge no more than 18.9 lb/day of Chromium (resulting in proportionally lower concentrations). The mass flow rate is determined using the calculation:

Load = [flow, MGD] x [concentration, mg/l] x [8.34]

Substantive Requirements of State Pollutant Discharge Elimination System Permit for Potential Discharge to the Hudson River

During the period beginning with the effective date of discharge (EDD) and lasting until the completion of the project, the discharges from the treatment facility to water index number H, Class B/C, Hudson River shall be limited and monitored by GE as specified in Table 8-3 below.

Table 8-3: Limits to Discharges from the Treatment Facility to Water Index Number H, Class B/C, Hudson River

Outfall Number and Parameter	Discharge Limitations		Units	Minimum Monitoring Requirements		Foot-note
	Daily Avg.	Daily Max		Measurement Frequency	Sample Type	
Outfall 001 - Treated Remediation Discharge for Hudson River PCB Site:						
Flow	Monitor	Monitor	GPD	Continuous	Meter	
pH (range)	6.0 to 9.0		SU	Monthly	Grab	
Solids, Total Suspended	Monitor	50	mg/l	Weekly	Grab	8
Total Organic Carbon	Monitor	Monitor	mg/l	Weekly	Grab	8
PCBs, Aroclor 1016	Monitor	0.3	µg/l	Weekly	Runtime composite	1,8
PCBs, Aroclor 1221	Monitor	0.3	µg/l	Weekly	Runtime composite	1,8

Outfall Number and Parameter	Discharge Limitations		Units	Minimum Monitoring Requirements		Foot-note
	Daily Avg.	Daily Max		Measurement Frequency	Sample Type	
Outfall 001 - Treated Remediation Discharge for Hudson River PCB Site:						
PCBs, Aroclor 1232	Monitor	0.3	µg/l	Weekly	Runtime composite	1,8
PCBs, Aroclor 1242	Monitor	0.3	µg/l	Weekly	Runtime composite	1,8
PCBs, Aroclor 1248	Monitor	0.3	µg/l	Weekly	Runtime composite	1,8
PCBs, Aroclor 1254	Monitor	0.3	µg/l	Weekly	Runtime composite	1,8
PCBs, Aroclor 1260	Monitor	0.3	µg/l	Weekly	Runtime composite	1,8
PCBs, Total	Monitor	Monitor	µg/l	Weekly	Runtime composite	1,8
Cadmium, Total	Monitor	0.04	mg/l	Weekly	Grab	2,8
Chromium, Total	Monitor	0.21	mg/l	Weekly	Grab	2,8
Copper, Total	Monitor	0.136	mg/l	Weekly	Grab	2,8
Lead, Total	Monitor	0.038	mg/l	Weekly	Grab	2,8
Mercury, Total	Monitor	0.0002	mg/l	Weekly	Grab	2,3,8
Dissolved Oxygen	Monitor	Monitor	mg/l	Weekly	Grab	8

Additional Conditions and Footnotes:

(1) PCBs:

a. GE must monitor this discharge for PCBs using EPA laboratory Method 608. The laboratory must make all reasonable attempts to achieve the Minimum Detection Levels (MDLs) of 0.065 µg/l for each of the subject Aroclors. Monitoring requirements may be modified in the future if EPA approves a method different from Method 608.

b. Non-detect at the MDL of 0.065 µg/l is the discharge goal. GE shall report all values above the MDL. If the level of any Aroclor is above its listed MDL, GE must evaluate the treatment system and identify the cause of the detectable level of PCBs in the discharge. Following three consecutive months that include analytical results above any MDL, GE shall prepare an approvable report identifying the measures undertaken to eliminate the detections and propose additional steps to be taken to eliminate the recurrence of such detections. This report shall be submitted to EPA within 28 days following receipt of sampling results from the third monitoring period.

c. If EPA determines that effluent monitoring results above the MDL of 0.065 µg/l can be prevented by implementation of additional measures, GE shall propose such measures for EPA review and approval, and then implement the approved measures.

d. The treatment technology for this discharge shall be the maximum feasible treatment technology for treatment of PCBs. As treatment technology improvements become available, GE shall, at its own initiative or EPA's request, review the available technology and submit for EPA approval, plans to improve the treatment technology and/or Best Management Practices employed to remove maximum feasible amount of PCBs from the wastewater discharge.

e. This limit is a phased Total Maximum Daily Loading limit, prepared in accordance with 6 NYCRR 702.16(b). Discharge is not authorized until such time as an engineering submission showing the method of treatment is approved by EPA. The discharge rate may not exceed the effective or design treatment system capacity.

(2) Mass based effluent limits for these metals will be developed when the final effluent flow rate is determined.

(3) Mercury, Total shall be analyzed using EPA Method 1631.

(4) All monitoring data, engineering submissions and modification requests must be submitted to:

Doug Garbarini
Hudson River Team
EPA
290 Broadway, 19th Floor
New York, NY 10007
(212) 637-3952

With a copy sent to:

William Daigle, Hudson River Unit
Division of Environmental Remediation
NYSDEC, 625 Broadway, Albany, New York 12233-7010
(518) 402-9770

(5) Only site generated wastewater related to the Hudson River PCBs Site Remedial Action is authorized for treatment and discharge.

(6) Both concentration (mg/l or µg/l) and mass loadings (lbs/day) must be reported for all parameters except flow and pH.

(7) Any use of corrosion/scale inhibitors or biocidal-type compounds used in the treatment process must be approved by EPA prior to use.

(8) In accordance with CERCLA Sections 121(d)(2) and 121(e), no permits are required for on-site CERCLA response actions. This discharge and the administration of this discharge shall comply with the substantive requirements of 6 NYCRR Part 750.

With respect to Footnote 1, EPA will not require a modification to the PCB method or treatment technologies that are not being required at other facilities by NYSDEC.

GE shall not be required, during a Phase 1 or Phase 2 field season, to make equipment modifications or additions for that season that are not reasonably available from a schedule or cost standpoint, recognizing that substitutions during a field season for major equipment approved in the Phase 1 or 2 *Final Design Reports* or being used in Phase 1 or Phase 2 may be impractical. (If necessary, more significant changes in equipment, operations, or processes may be required for subsequent seasons, subject to Paragraphs 15 and 20 of the Consent Decree.) However, in the event reasonable changes can be made to address achievement of the performance standards during any dredge season, GE will propose (either on its own initiative or at EPA's request) such changes to equipment or operations for EPA review and approval. The Parties agree that what is considered "reasonable" or "reasonably available" in a given situation, for the purposes of this paragraph, may depend on the circumstances and will need to take account of what is necessary in order for the project to be done in a way that does not jeopardize public health or safety. During Phase 1, EPA will consider any information that GE may submit regarding impacts to schedule and project costs when the Agency reviews GE's proposals, if any, for modification of the EPA-approved *Phase 1 Final Design Report* based on field conditions or experience. This paragraph shall not be construed to affect or limit any rights EPA has under Paragraph 15 or 20 of the Consent Decree.

8.2 Discharge Monitoring

GE shall monitor the above discharges in accordance with the discharge monitoring requirements set forth in the WQ requirements and Section 8 of the RA Monitoring Scope. Further details will be specified in the *Environmental Monitoring Plan* (to be prepared as part of the RD) and the Phase 1 RAM QAPP to be included in the RA Work Plans in accordance with the RA SOW.

The monitoring shall be consistent with the substantive requirements identified in EPA's letter to GE dated January 7, 2005.

8.3 Response Actions

In the event of an exceedance of the discharge limitations (which include a detection of Aroclors above the MDL), GE shall perform an engineering evaluation and propose, for EPA approval, appropriate corrective action in an *Engineering Evaluation Report* to be submitted to EPA and NYSDEC. The corrective action may

include additional testing to assess the problem, carbon (or other media) change-out, repairs to equipment, operational modifications (e.g., modifying additive dosages, more frequent backwashing, lead/lag changes of activated carbon, reducing flow rate), modifications to or replacement of treatment equipment, or, if necessary, temporary cessation of operations. In addition, if the level of any PCB Aroclor is above the MDL, GE shall perform an investigation into the cause of the detectable level of PCBs in the discharge and provide the results in a report to EPA. If 3 consecutive months include PCB results above the MDL, GE shall prepare and submit to the EPA a report that identifies the corrective measures undertaken and proposes additional steps to eliminate the recurrence of such detections. GE shall submit the report to the EPA within 28 days from GE's receipt of the sampling results from the third monitoring period. GE shall implement any additional corrective measures in accordance with the EPA-approved report recommending such corrective measures.

8.4 Notifications and Reporting

GE shall submit to EPA and NYSDEC a monthly report that includes the routine monitoring results for discharges to the Hudson River and the Champlain Canal (Land Cut above Lock 7). Both concentration [mg/L or µg/L] and mass loadings [lbs/day] shall be reported for all parameters except flow and pH. In the event of an exceedance of the discharge limitations or PCB detection, GE shall prepare and submit to EPA and NYSDEC a separate report, as described in subsection 8.3 of this PSCP Scope. Monitoring data, engineering submissions and modification requests shall be submitted to EPA with a copy sent to NYSDEC.

Attachment D to the Statement of Work

Hudson River PCBs Site

Remedial Action Community Health and Safety Program Scope

September, 2005

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1. Introduction and General Requirements

This *Remedial Action Community Health and Safety Program Scope* (RA CHASP Scope) provides a description of the elements to be included in the *Phase 1 Remedial Action Community Health and Safety Plan* (RA CHASP) that will be submitted with the *Phase 1 Final Design Report* for the Remedial Action (RA) for the Upper Hudson River. This RA CHASP Scope also provides a more detailed description of certain key elements of the community health and safety program to be designed and implemented for Phase 1 of the RA. The RA CHASP shall be consistent with this RA CHASP Scope, subject to the fact that the United States Environmental Protection Agency (USEPA) and the General Electric Company (GE) agree to consider comments submitted by the public on the RA CHASP Scope and, as appropriate, take such comments into account in the preparation of the RA CHASP.

1.1 Background

In August 2003, GE and the USEPA executed an Administrative Order on Consent for Hudson River Remedial Design and Cost Recovery (RD AOC), effective August 18, 2003 (Index No. CERCLA-02-2003-2027), under which GE agreed to design the RA provided for in the Record of Decision issued by the USEPA in 2002 for the Hudson River PCBs Superfund Site. That RA will be conducted in two phases – Phase 1, which will consist of the first year of dredging (at a reduced rate), and Phase 2, which will consist of the remainder of the dredging project. The *Remedial Design Work Plan* (RD Work Plan) that was attached to the RD AOC requires, among other things, that GE submit an RA CHASP with its *Final Design Reports* for Phase 1 and Phase 2. The RD Work Plan specifies, in subsection 4.4, that the RA CHASP will apply to on-site activities and will include a number of specified elements. Each of the elements specified in the RD Work Plan is listed below, along with additional details on the information to be included with each element.

1. Introduction, listing plan objective, site background, and site description, including:
   - Description of the purpose of the RA CHASP;
   - Description of the RA CHASP organization;
   - Summary of associated documents (e.g., *Final Design Report*, *RA Monitoring Quality Assurance Project Plan* [QAPP], worker *Health and Safety Plan* [HASP]) and their relationship to the RA CHASP;
   - Statement that this is a "stand alone" document and that, where appropriate, information from other documents is presented in an abbreviated form for completeness and readability; and

- Statement that the RA CHASP has taken full account of and has been developed based on the requirements outlined in the Quality of Life Performance Standards (QoLPS), and other relevant documents.

2. Summary of the RA program, including:
   - Description of each major program element and the activities associated with those elements, indicating which activities are associated with river operations (e.g., dredging) and which are associated with facility operations (e.g., transfer/processing); and
   - Description of how these elements provide the basis for the hazard analysis.

3. Project schedule and operations schedule, including:
   - Summary of activities by season;
   - Description of typical hours of operation;
   - Description of duration of activities (e.g., number of days within specific geographic areas);
   - Description of foreseeable reasons why work schedule may change; and
   - Description of notification plans in the event that there are significant changes to the schedule.

4. Description of potential hazards to the surrounding community associated with RA activities, including:
   - For each activity, description of associated hazards (both physical and chemical), potential impacts and measures to be taken to manage the hazards. Hazards will be prioritized based on potential seriousness and relevance to the local community. Information on how these hazards may impact the community will be discussed.

5. Site security plan, including:
   - General information regarding security for project areas, discussing river activities separately from facility activities; and
   - Details regarding access control for the processing site and active dredge areas.

6. Contingency plan for spills and releases during RA field activities, including:
   - Description of requirements for prevention (including best management practices), containment, cleanup, and notification for spills and releases that may affect the community; and
   - Information regarding emergency response (i.e., hospitals, lists of contacts, etc.).

7. Description of how each public hazard will be managed, including actions to be taken if the environmental monitoring indicates the need for corrective action, including:
   - Description of each activity, associated hazards assessed, potential impacts to the community identified, and measures to be taken to manage the hazards, primarily through prevention;
   - Discussion of the relevance and severity of the potential hazard to the community; and
   - Discussion of best management practices for hazard prevention.

8. Overview of the QoLPS as they relate to community health and safety, including:
   - Description of how the RA CHASP is related to the QoLPS.

9. Discussion of protection of water supplies and references to the attendant monitoring program, including:
   - Description of the program for addressing all river water uses (e.g., house water intakes, agricultural intakes, public drinking water intakes); and
   - A listing of all known water intakes.

10. Section identifying the site safety personnel and their qualifications, responsibilities, and contact information, including:
    - Definition of the role and responsibilities of emergency response organizations.

11. Emergency procedures, including emergency contact telephone numbers, hospital directions, medical and fire emergency procedures, and list of emergency equipment located on-site, including:
    - Description of how the emergency contacts and responder information was developed, with appropriate references to the worker HASP.

12. Figures, including:
    - Flow charts of complaint process; and
    - Flow charts of notification process.

In spring 2004, the USEPA issued Engineering Performance Standards (EPS) and QoLPS for Phase 1 of the RA. The EPS address resuspension during dredging, residual concentrations of polychlorinated biphenyls (PCBs) in sediments after dredging, and dredging productivity. The QoLPS address impacts related to air quality, odor, noise, lighting, and navigation. In accordance with the QoLPS, the RA CHASP will identify equipment, personnel, and specific procedures for protecting residents and workers, and educating and informing the public

on project progress. In addition as the QoLPS state further (page 5-3), the RA CHASP will provide information for the public on the following:

- Worker education and monitoring (including a summary of the HASP);
- Air monitoring (including a summary of routine, control, and exceedance monitoring);
- Contingency plan (including a summary of the design elements intended to control exceedances);
- Complaint management program (including a summary of the program, with flow charts to define the process); and
- Site health and safety personnel contact information.

As part of the RA Consent Decree for this project, GE and the USEPA have agreed on this RA CHASP Scope, which is an attachment to the RA Consent Decree. This RA CHASP Scope specifies the required contents of the RA CHASP, as well as some of the key elements to be included in GE's community health and safety program for Phase 1 of the RA.

1.2 General Requirements

The RA CHASP shall contain the elements listed in subsection 4.4 of the RD Work Plan, as specified above. In addition, the RA CHASP shall set forth contingency plans and actions, to be developed during Phase 1 Remedial Design (RD) and to be implemented during Phase 1 of the RA, for responding to and mitigating adverse impacts on air quality, odor, noise, lighting and navigation, which are the subject of the QoLPS. The RA CHASP shall also describe a complaint management program for responding to complaints relating to these parameters, as well as to water quality. It shall also provide site health and safety personnel contact information as part of a directory of emergency contacts. The RA CHASP shall be developed as a stand-alone document, containing relevant information affecting community health and safety. The community shall be involved in the development of the RA CHASP.

Where provisions addressing community health and safety are set out in other documents, the information will be summarized or re-iterated in the RA CHASP, as appropriate. Items that will be covered in documents other than the RA CHASP include the following:

- Worker education and monitoring will be addressed in the HASP to be provided as part of the *Phase 1 Remedial Action Work Plan* (Phase 1 RAWP) in accordance with the *Statement of Work for Remedial Action and Long-Term Monitoring* (RA SOW), which is Appendix B to the RA Consent Decree. The

separate standards applicable to workers with regard to issues such as air, lighting, noise, and safe operation of project-related watercraft will be summarized in the HASP.

- Routine, as well as contingency, monitoring requirements for surface water, air quality, hydrogen sulfide (H_2S) odor, noise, and lighting are described in the *Remedial Action Monitoring Scope* (RA Monitoring Scope) provided in Attachment B to the RA SOW, and will be discussed further in the *Phase 1 Environmental Monitoring Plan* (Phase 1 EMP) and the *Phase 1 Remedial Action Monitoring Quality Assurance Project Plan* (Phase 1 RAM QAPP).

- Contingency actions (other than increased monitoring) for responding to exceedances of the action levels specified in the Resuspension Performance Standard and the water quality certification (WQC) requirements for in-river releases of constituents not subject to performance standards are described in the *Performance Standards Compliance Plan Scope* (PSCP Scope) provided in Attachment C to the RA SOW, and will be discussed further in the *Performance Standards Compliance Plan* (PSCP) to be provided as part of the Phase 1 RAWP in accordance with the RA SOW.

The following sections of this RA CHASP Scope provide a further explanation and description of certain components of the Phase 1 community health and safety program. Section 2 describes the design and implementation of contingency plans and actions to address exceedances of the quantitative standards (or Control Levels) set forth in the QoLPS for air quality, odor, noise, and lighting and deviations from the substantive requirements in the QoLPS for navigation. Section 3 describes the community notification program and the process to be followed in managing and responding to public complaints related to air quality, odor, noise, lighting, and navigation, as well as water quality. The Phase 1 design reports (insofar as they address these issues) and the Phase 1 RA CHASP shall be consistent with this Scope.

Consistent with the RD Work Plan, this Scope is, and the RA CHASP shall be, limited to addressing potential community hazards and impacts that occur in the vicinity of the Upper Hudson Work Area (as defined in the Consent Decree) and are associated with RA activities in this area. Hazards relating to off-site transport and disposal of dredged material, as well as those relating to delivery of raw materials and equipment prior to arrival at the Upper Hudson Work Area, are the responsibility of the transporters and disposal facilities and will not be addressed in the RA CHASP. However, the RA CHASP shall include anticipated local traffic routings and a description of the transportation requirements which would apply to these shipments (e.g., DOT regulations, appropriate licensing of carriers/drivers, labeling, and placarding). In addition, GE will work with local first responders in an effort to establish appropriate response protocols to include in the RA CHASP.

In addition, this Scope is, and the RA CHASP shall be, related to the activities to be performed during Phase 1 of the RA. If changes or modifications are warranted during Phase 1 (e.g., additional activities or hazards are identified), GE shall develop and submit to the USEPA addenda to the Phase 1 RA CHASP. Once approved, these addenda will be available for review on site and at public repositories. Following the completion of Phase 1, an evaluation will be conducted to determine whether modifications to the CHASP are needed for Phase 2.

2. Contingencies for Exceedances of or Deviations from Quantitative Quality of Life Standards

This section describes the activities that GE shall perform to address exceedances of the quantitative standards or Control Levels in the QoLPS, or deviations from other substantive requirements in the QoLPS, during Phase 1 of the RA. This section describes both the activities that GE shall perform during Phase 1 design to plan for such contingencies and the activities that GE shall perform during implementation of Phase 1 to respond to such contingencies.

As provided in Paragraph 35 of the RD AOC, GE shall design Phase 1 of the RA to be consistent with, and fully take account of, the QoLPS (as well as the EPS). The *Phase 1 Intermediate* and *Final Design Reports* shall document the engineering bases and assumptions for the design to demonstrate that the equipment and processes to be used in Phase 1 are expected to meet the QoLPS, as described in the PSCP Scope and to be provided in the PSCP and RA CHASP. The RA CHASP shall include a summary of these analyses. The basis of design will be the Concern Level for ambient air concentrations of PCBs, the Control Level for noise, and the quantitative standards for opacity, H_2S odor, and lighting, all as set forth in the QoLPS, as well as the substantive legal requirements referenced in the QoLPS for navigation.

In addition, during Phase 1 design, GE shall develop contingency plans for addressing potential exceedances of or deviations from those standards for air quality, odor, noise, lighting, and navigation. The mitigation methods and contingency plans developed during Phase 1 design to manage specific situations (as determined during potential hazard evaluations) shall be included in the RA CHASP. These plans shall be developed for potential contingencies that are reasonably foreseeable at the time of Final Design, taking into account the degree of confidence that the standards will in fact be achieved. Contingency actions to be planned in design will broadly include:

- Increased monitoring, as needed;
- Routine maintenance;
- Engineering controls;
- Equipment or process modifications;
- Operational modifications;
- Substitution of process components that are readily available and cost-effective; and
- Temporary shutdown of source of the exceedance and inter-related processes.

As noted above, only contingencies for scenarios that may affect the communities surrounding the Upper Hudson Work Area will be addressed in the RA CHASP.

During Phase 1, GE will conduct monitoring to determine whether the various performance standards are being met. The monitoring program and numerical levels of the standards are described in the RA Monitoring Scope and will be summarized in the RA CHASP.

During implementation of Phase 1, in the event that there is an exceedance of the quantitative QoLPS or a deviation from other substantive requirements in the QoLPS (i.e., the substantive navigation requirements), GE shall implement contingency actions, as set forth in the RA CHASP. Such activities may include routine maintenance, operational changes, equipment or process modifications, additions of equipment, or, in extreme cases, a temporary shutdown of certain operations – all depending on the circumstances.

GE shall not be required, during a Phase 1 or Phase 2 field season, to make equipment modifications or additions for that season that are not reasonably available from a schedule or cost standpoint, recognizing that substitutions during a field season for major equipment approved in the Phase 1 or 2 *Final Design Reports* or being used in Phase 1 or Phase 2 may be impractical. (If necessary, more significant changes in equipment, operations, or processes may be required for subsequent seasons, subject to Paragraphs 15 and 20 of the Consent Decree) However, in the event reasonable changes can be made to address achievement of the performance standards during any dredge season, GE will propose (either on its own initiative or at EPA's request) such changes to equipment or operations for EPA review and approval. The Parties agree that what is considered "reasonable" or "reasonably available" in a given situation, for the purposes of this paragraph, may depend on the circumstances and will need to take account of what is necessary in order for the project to be done in a way that does not jeopardize public health or safety. During Phase 1, EPA will consider any information that GE may submit regarding impacts to schedule and project costs when the Agency reviews GE's proposals, if any, for modification of the EPA-approved *Phase 1 Final Design Report* based on field conditions or experience. This paragraph shall not be construed to affect or limit any rights EPA has under Paragraph 15 or 20 of the Consent Decree.

The following sections discuss in more detail the contingencies to be considered for air quality, odor, noise, lighting, and navigation.

2.1 Air Quality Contingencies

Potential air quality issues that will be evaluated during the design are:

- PCBs in ambient air;
- The following pollutants subject to National Ambient Air Quality Standards (NAAQS) (criteria pollutants): nitrogen oxides (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), particulate matter with a median diameter of 10 micrometers or less (PM_{10}), particulate matter with a median diameter of 2.5 micrometers or less ($PM_{2.5}$), and ozone (O_3); and
- Opacity.

The USEPA established standards for total PCB concentrations in ambient air concentrations are 24-hour average concentrations of 0.11 micrograms per cubic meter ($\mu g/m^3$) for residential areas, with a Concern Level of 0.08 $\mu g/m^3$, and 0.26 $\mu g/m^3$ in commercial/industrial areas, with a Concern Level of 0.21 $\mu g/m^3$. The *Phase 1 Final Design Report* shall include emission inventories and air dispersion modeling to predict PCB concentrations in ambient air at receptors (e.g., nearby residences or businesses). The results of this design analysis will be summarized in the CHASP. If the design predictions exceed the applicable standard at a receptor for any given uncontrolled source, the design shall be modified such that predictions are below the applicable standard. The basis of design will assume that the quantitative standards are protective of the health of the community, and therefore, the project shall be designed to meet those standards. Scaling or dispersion factors shall be developed so that concentrations can be predicted at the receptor (e.g., a residence) based on data from monitoring stations that are closer to the source (e.g., a site fence line). Compliance with the standard shall be demonstrated at the monitoring station. In the event that the monitoring station location is not representative of any receptor, conservative modeling shall be used to assess compliance at the receptor, with approval of the USEPA.

During Phase 1 operations, air monitoring shall be conducted as described in the RA Monitoring Scope, with additional details to be provided in the Phase 1 EMP and Phase 1 RAM QAPP. In the event that monitoring (or modeling, if used to assess compliance at the receptor, with approval of the USEPA) shows an exceedance of a Concern Level, GE shall: 1) promptly notify the USEPA, but no later than 24 hours after receipt of the analytical results; 2) investigate the cause of increased emissions; 3) implement increased monitoring as described in the RA Monitoring Scope; and 4) as necessary, implement mitigation measures as outlined in the RA CHASP, provided that any equipment modifications or additions that are part of such measures are

reasonably available from a schedule and cost standpoint, recognizing that substitutions for major equipment approved in the Phase 1 Final Design and being used in Phase 1 may be impractical (subject to the more detailed discussion of this issue on page 2-2).

In the event that the monitoring (or modeling, if used to assess compliance at the receptor) shows an exceedance of a standard, GE shall: 1) notify the USEPA, as well as the New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH), immediately upon receipt of the analytical results; 2) investigate the cause of the exceedance; 3) implement increased monitoring as described in the RA Monitoring Scope; 4) work with USEPA field staff to develop an action plan and implement additional mitigation (subject to the same proviso regarding mitigation measures as noted in the preceding paragraph); 5) continue monitoring and provide daily monitoring reports to the USEPA, NYSDEC, and NYSDOH until the standard is achieved; and 6) provide a corrective action report to the USEPA in accordance with the RA CHASP.

With respect to criteria pollutants, the design analysis is expected to demonstrate compliance with the NAAQS; therefore, no contingencies for monitoring or control of these pollutants are expected to be provided in the RA CHASP. If the initial design analysis does not demonstrate achievement of the NAAQS, the design will be modified to demonstrate compliance with the NAAQS.

The opacity standard states that opacity must be less the 20% (as a 6-minute average), except that there can be one continuous 6-minute period per hour of not more than 57% opacity. Routine maintenance of diesel engines, generators, and other equipment is expected to achieve the opacity standard. Opacity monitoring shall verify this expectation and reasonably foreseeable contingencies will be specified in the RA CHASP in the event of an exceedance.

2.2 Odor Contingencies

For this project, the airborne chemicals that have the potential to be a public health concern via inhalation pathway are PCBs and H_2S. PCBs are odorless, and the USEPA has established the air quality standard for PCBs to be protective of public health. As indicated in the QoLPS for odor, the quantitative standards for H_2S have been established to control nuisance odors, and thus also conservatively protect public health. The odor threshold for H_2S is much lower than the level of potential concern to health; therefore adherence to the standard should alleviate both odor and exposure concerns. Odor is not otherwise expected to be a public health concern.

The RA CHASP will address H_2S, as well as other odors that "unreasonably interfere with the comfortable enjoyment of life and property" (QoLPS, page 6-18).

The contingency plan for odor shall be triggered by the identification of uncomfortable project-related odors by RA workers or by complaints from the public; the complaint process is described in subsection 3.2 below. If the odor is identified as H_2S (i.e., rotten eggs), H_2S monitoring shall be conducted as described in the RA Monitoring Scope, with further details in the Phase 1 EMP and the Phase 1 RAM QAPP. If the monitoring shows an exceedance of the H_2S standard (14 $\mu g/m^3$ as a one-hour average), GE shall: 1) promptly notify the USEPA, but no later than 24 hours after receipt of the analytical data; 2) investigate the cause of the odor to verify that it is project-related; 3) if so, work with USEPA field staff to develop an action plan and implement mitigation measures, provided that any equipment modifications or additions that are part of such measures are reasonably available from a schedule and cost standpoint, recognizing that substitutions for major equipment approved in the Phase 1 Final Design and being used in Phase 1 may be impractical (subject to the more detailed discussion of this issue on page 2-2); 4) continue regular monitoring until the standard is achieved; and 5) provide a corrective action report to the USEPA in accordance with the RA CHASP.

Procedures for addressing complaints regarding odors other than H_2S are described in Section 3.2 below.

2.3 Noise Contingencies

The applicable quantitative Control Level and standards for noise are set forth in the QoLPS and listed in subsection 5.2 of the RA Monitoring Scope. The Phase 1 RD shall include an evaluation of noise intensity generated by equipment or processes and traffic associated with site operations. Attenuation modeling shall be completed during the design to predict noise intensity at receptors (e.g., nearby residences or businesses), and the results will be summarized in the RA CHASP. If the design predictions exceed the applicable standard at a receptor for any given uncontrolled source, the design shall be modified such that predictions are below the applicable standard. The quantitative levels specified in the QoLPS shall be assumed to be protective of the community and will be used as the basis of design. Attenuation factors, defined by site-specific conditions, shall be developed so that intensities can be predicted at the receptor (e.g., a residence) based on data from monitoring stations that are closer to the source (e.g., a site fence line). These predictions shall be validated by a noise study during the startup of RA operations, as described in the RA Monitoring Scope. Compliance with the standard shall be demonstrated at the monitoring station if the station location is representative of a receptor. In the event that the monitoring station location is not representative of any receptor, temporary monitoring stations may be established at or closer to receptors or modeling may be used to assess compliance at the receptor.

Contingency actions for noise shall be triggered by a measurement of noise intensity above a prescribed quantitative limit or by a complaint. The complaint process is described in subsection 3.3 below. In the event that monitoring (or modeling, if used to assess compliance at the receptor) shows an exceedance of the Control Level (which applies only to residential areas and only during the daytime), GE shall: 1) investigate the cause of the noise increases to verify that they are project-related; 2) if so, implement increased monitoring as described in the RA Monitoring Scope; and 3) consider mitigation measures, as outlined in the RA CHASP.

In the event that the monitoring (or modeling, if used to assess compliance at the receptor) shows an exceedance of an applicable noise standard, GE shall: 1) promptly notify the USEPA, but no later than 24 hours after discovery of the exceedance; 2) investigate the cause of the exceedance to verify that it is project-related; 3) if so, implement increased monitoring as described in the RA Monitoring Scope; 4) work with USEPA field staff to develop and implement an action plan for mitigation measures, provided that any equipment modifications or additions that are part of such measures are reasonably available from a schedule and cost standpoint, recognizing that substitution for major equipment approved in the Phase 1 Final Design and being used in Phase 1 may be impractical (subject to the more detailed discussion of this issue on page 2-2); 5) continue monitoring and provide daily monitoring reports to EPA until the standard is achieved; and 6) provide a corrective action report to the USEPA in accordance with the RA CHASP.

2.4 Lighting Contingencies

The quantitative lighting standards that the USEPA has established are 0.2 footcandle in rural and suburban areas, 0.5 footcandle in residential areas, and 1.0 footcandle in commercial/industrial areas. The Phase 1 RD shall include an evaluation of light intensity generated by illumination of active dredge areas, processing areas, loading and staging areas, and administration areas and other work areas on and near the river to provide a safe and secure work place. Light intensity calculations at receptors shall be used to assess and confirm compliance. The design basis shall assume that the quantitative standards are protective of the community. Lighting shall be directed towards work areas and shall be compliant with worker safety practices and United States Coast Guard (USCG) and New York State navigation laws.

Contingency actions for lighting impacts, such as position adjustments, shall be triggered by a measurement of light intensity (footcandle) above an applicable standard or by a complaint. The complaint process is described in subsection 3.3. In the event that monitoring shows an exceedance of the Concern Level (in which lighting levels are above the standard but the exceedance can be easily and immediately mitigated), GE shall: 1)

investigate the cause of the lighting problem to verify that it is project-related; 2) if so, implement increased monitoring as needed; 3) implement mitigation measures as outlined in the RA CHASP, provided that any equipment modifications or additions that are part of such measures are reasonably available from a schedule and cost standpoint, recognizing that substitutions for major equipment approved in the Phase 1 Final Design and being used in Phase 1 may be impractical (subject to the more detailed discussion of this issue on page 2-2); and 4) submit a follow-up report to the USEPA in accordance with the RA CHASP.

In the event that the monitoring shows an exceedance of an applicable lighting standard that is not easily and immediately mitigated, GE shall: 1) promptly notify the USEPA, but no later than 24 hours after discovery of the exceedance; 2) investigate the cause of the exceedance to verify that it is project-related; 3) if so, implement regular monitoring as described in the RA Monitoring Scope; 4) develop and implement an action plan for mitigation measures (subject to the same proviso regarding mitigation measures as noted in the preceding paragraph); 5) continue regular monitoring until the standard is achieved; and 6) provide a corrective action report to the USEPA in accordance with the RA CHASP.

2.5 Navigation Contingencies

The Phase 1 RD shall confirm that the river-based elements of the project comply with the substantive requirements of the federal and New York State regulations governing the navigation of commercial vessels. The New York State Canal Corporation (NYS Canal Corporation) shall be consulted during the design and development of the Phase 1 RAWP on issues relating to navigation.

The design basis shall assume that compliance with these regulations will constitute compliance with the substantive requirements of the QoLPS for navigation. Hazard analyses will also be conducted to assess potential navigation hazards to the public.

Navigational logistics are not related to health and safety and will not be addressed in the RA CHASP. Navigation-related complaints are addressed in subsection 3.4 below.

In the event that on-river operations deviate from the relevant federal and state navigation regulations listed in the QoLPS for navigation or from the design plans relating to navigation and such deviation can be easily and immediately mitigated, GE shall: 1) promptly notify the USEPA and the NYS Canal Corporation, but no later than 24 hours after discovery of the deviation; 2) implement mitigation measures as outlined in the RA CHASP, provided that any equipment modifications or additions that are part of such measures are reasonably available

from a schedule and cost standpoint, recognizing that substitutions for major equipment approved in the Phase 1 Final Design and being used in Phase 1 may be impractical (subject to the more detailed discussion of this issue on page 2-2); and 3) submit a follow-up report to the USEPA and NYS Canal Corporation in accordance with the RA CHASP.

In the event that there is a deviation from the relevant federal and state navigation regulations or the design plans relating to navigation and such deviation cannot be easily and immediately mitigated, GE shall: 1) notify the USEPA and NYS Canal Corporation immediately; 2) identify the cause of the deviation; 3) develop and implement an action plan for mitigation measures (subject to the same proviso noted in the preceding paragraph); and 4) provide a corrective action report to the USEPA and NYS Canal Corporation in accordance with the RA CHASP.

In addition, contingency plans for navigation accidents related to the project shall be included in the RA CHASP. GE shall work with appropriate emergency response agencies (e.g., police, sheriff, fire departments, etc.) during design to establish the contingency plans.

3. Community Notification and Complaint Management Programs

The RA CHASP shall include a community notification program and a complaint management program to address community health and safety concerns.

3.1 General

The community notification process summarized in the RA CHASP shall consist of notifications to mariners regarding on-river activities, and a website where the general public can obtain project status information, such as information on active dredge areas, anticipated dredge schedule and standard hours of operation, dredged material transport traffic patterns, safety and security information for non-project vessels, monitoring results for QoLPS parameters, and responses to frequently asked questions. In addition, a toll-free phone number, the website, and a mailing address shall be established for project inquires and complaints; the phone number shall be activated and continuously staffed during processing facility construction and remedial operations. There are also a number of additional sources of specific information for this project. The website will provide references to them. The RA CHASP will summarize the plan for communications with the public.

The complaint management process shall address all project-related complaints, including those associated with air quality, odor, noise, lighting, navigation, and water quality. When a phone call, electronic mail communication, or written correspondence is received, it will first be determined whether the individual is making an "inquiry" or a "complaint." For this purpose, an "inquiry" shall mean a communication in which the individual is requesting project-related information and is not requesting that corrective action be taken. No regulatory notification or follow-up shall be necessary for an inquiry. However, inquiries made through the toll-free phone number, electronic mail, and the mail will be documented in a log noting the time received, subject matter, name of inquiring party, and any follow up required (e.g., if any agencies need to be engaged). A "complaint" shall mean a communication in which the individual is requesting that corrective action be taken regarding some aspect of the project, including those associated with a quality-of-life issue (air, odor, noise, lighting, navigation, or water quality).

During Phase 1 of the RA, complaints shall be managed in accordance with the following procedure:

- When a complaint is received (as opposed to an inquiry), it shall be recorded in a log noting the time the complaint was received, the subject of the complaint, the name of the complainant and how he or she can be reached.

- Following receipt of the complaint, GE shall conduct an investigation to determine whether the subject of the complaint – i.e., air quality, odor, noise, lighting, navigation, or water quality – is project-related.

- If the complaint is project-related and it pertains to a parameter for which the QoLPS specify numerical standards (or Control Levels) – i.e., PCB concentrations in air, opacity, H_2S concentrations in air, noise, lighting, or surface water concentrations of constituents addressed by the Resuspension Performance Standard or the non-PCB water quality requirements provided by the USEPA to GE in January 2005 (WQ requirements) – GE shall conduct monitoring (and/or modeling) as necessary to determine whether the applicable standard or limit has been exceeded in the area referred to in the complaint.

- If the monitoring (and/or modeling) does not show an exceedance of the applicable numerical standard, GE shall not be required to take any further mitigation action; however, GE shall work with the USEPA to evaluate potential mitigation measures, and if both parties agree, GE shall implement such measures. Preliminary monitoring results will be reported to regulatory agencies as described in Section 2.

- If the monitoring (and/or modeling) shows an exceedance of the applicable numerical standard or control level, GE shall implement contingency mitigation actions in accordance with the procedures and requirements specified in Section 2 of this RA CHASP Scope. Preliminary monitoring results will be reported to regulatory agencies as described in Section 2.

- If the complaint is project-related and pertains to a parameter for which the QoLPS do not specify a numerical standard – e.g., odors other than H_2S, navigation impacts, or water quality impacts not addressed by the Resuspension Performance Standard or WQ requirements – GE shall evaluate the complaint and, if appropriate, take contingency mitigation measures, as described further in subsequent sections of this RA CHASP Scope.

- Reporting to USEPA regarding complaints, as well as follow-up communications with the complainant to inform him/her of progress in resolving the complaint, shall be described in the RA CHASP.

The RA CHASP shall describe the reasonably foreseeable contingencies that are likely to generate complaints about air quality, odor, noise, lighting, navigation and water quality and summarize the range of responses to complaints. Where there are numerical standards and project activities have not caused an exceedance of the applicable numerical standard, complaints shall be addressed as set out in the above procedure. Additional elements of complaint management applicable to particular types of complaints are set out below and will be described further in the RA CHASP.

3.2 Odor Complaints

If an odor complaint is received and the odor is identified as potentially H_2S, GE shall implement the response procedure discussed in Section 2.2. In the event that an odor complaint is received that is identified as project-related but is not H_2S, the odor shall be investigated to determine whether it is uncomfortable, rather than simply discernible. For this purpose, an uncomfortable non-H_2S odor shall be defined, in accordance with New York State Law (6 NYCRR § 211.2), as an odor which "unreasonably interfere[s] with the comfortable enjoyment of life or property." In making this investigation, further discussion will be held with the complainant regarding the nature and intensity of the odor, and if necessary, the odor intensity will be objectively assessed. Further details will be provided in the RA CHASP. If a project-related uncomfortable odor is identified, GE shall take contingency mitigation actions consistent with those described in Section 2.2. In applying these requirements, multiple complaints regarding the same potential odor source shall be treated as one complaint.

The QoLPS for odor defines the Exceedance Level to include "frequent, recurrent odor complaints" related to project activities. For this purpose, "frequent, recurrent odor complaints" will be defined on a case-by-case basis, as will be provided in the RA CHASP. However, the occurrence of "frequent, recurrent odor complaints" shall trigger the same responses discussed above.

3.3 Noise and Lighting Complaints

The QoLPS for noise and lighting also define the Exceedance Level to include "frequent, recurrent" complaints related to project activities. For this purpose, "frequent, recurrent" complaints will be defined on a case-by-case basis, as will be provided in the RA CHASP. However, the occurrence of "frequent, recurrent" complaints shall trigger the same responses discussed in Section 3.1 above.

3.4 Navigation Complaints

If a navigation complaint relating to health or safety is received from the public relating to the project, an investigation shall be conducted to determine whether the project is in compliance with all substantive federal and state navigation regulations and whether and the extent to which the project has interfered with other river traffic. The NYS Canal Corporation shall be notified of each complaint and will be consulted if necessary in this investigation. If it is determined that the project is in compliance with all substantive federal and state navigation regulations listed in the QoLPS for navigation and that GE has taken appropriate steps to minimize interference with river traffic consistent with the efficient operation of the project, then no mitigation action shall be required to respond to the complaint; however, GE shall work with the USEPA, in coordination with the NYS Canal Corporation, to evaluate potential mitigation measures, and if both parties agree, GE shall implement such measures. If the foregoing criteria are not met, then GE shall take contingency mitigation actions as described in Section 2.5.

The QoLPS for navigation defines the Exceedance Level to include "frequent, recurrent complaints indicating project activities are unnecessarily hindering overall non-project-related vessel movement." Such complaints shall be handled in the same manner described above.

3.5 Water Quality Complaints

If a water quality complaint is received from the public regarding the quality of river water in the Upper Hudson Work Area, the USEPA, NYSDEC and NYSDOH shall promptly be notified, but no later than 24 hours after receipt of the complaint, and an investigation shall be conducted as to the nature of the complaint. If the complaint relates to resuspended sediments from dredging activities, the available water quality monitoring data shall be reviewed to determine whether the complaint is project-related and to determine whether there has been an exceedance of any of the action levels set forth in the Resuspension Performance Standard or the WQ requirements for releases of other constituents. If review of these data indicates an exceedance of such an action level, GE shall conduct the increased monitoring specified in the RA Monitoring Scope and the other contingency actions specified in the PSCP Scope. If the data do not show such an exceedance, no mitigation action shall be required and any further action will be implemented at GE's discretion.

If the complaint investigation identifies a spill, the spill contingency and emergency response actions (including timeframe for such actions), which will be included in the RA CHASP, shall be implemented.

Attachment E to Statement of Work

Hudson River PCBs Site

Operation, Maintenance, and Monitoring Scope

September, 2005

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SECTION 1
BACKGROUND

1.1 INTRODUCTION

This *Operation, Maintenance, and Monitoring Scope* (OM&M Scope) describes the post-construction operation, maintenance, and monitoring (OM&M) program that the General Electric Company (GE) shall carry out under the Remedial Action (RA) Consent Decree. This OM&M Scope sets forth the requirements that GE shall meet in conducting post-construction monitoring and maintenance of Phase 1 of the remedy and, if GE notifies the United States Environmental Protection Agency (USEPA) that it will perform Phase 2 of the RA pursuant to the Consent Decree, the overall remedy. Specifically, this OM&M Scope covers the following activities:

- Water column, fish, and sediment monitoring following the completion of all remedial activities conducted by GE under the Consent Decree, so as to assess long-term recovery;
- Activities to support evaluation of fish consumption advisories;
- Monitoring and maintenance of sediment caps installed in particular dredge areas in accordance with applicable requirements to implement the Residuals Performance Standard (USEPA 2004) and the USEPA-approved design documents, beginning upon installation of such caps; and
- Monitoring and adaptive management of habitat replacement/reconstruction measures implemented in particular river reaches, beginning upon implementation of such measures.

Under Section 4 of the *Statement of Work for Remedial Action and Long-Term Monitoring* (SOW), which is Appendix B to the Consent Decree, following completion of the Phase 1 field activities that occur in the first construction season of remedial dredging, GE will submit to USEPA an *Operation, Maintenance, and Monitoring Plan for Phase 1 Caps and Habitat Replacement/Reconstruction* (Phase 1 Cap/Habitat OM&M Plan). That plan will specify the activities that GE will perform for OM&M of the caps installed in areas dredged in Phase 1 of the RA and of any habitat replacement/reconstruction measures installed in those areas. That

plan shall be based on and be consistent with Sections 3 and 4 of this OM&M Scope, which specify the requirements for monitoring and maintenance of caps and habitat replacement/reconstruction measures. In addition, GE will submit to USEPA, within 90 days after completion of installation of all additional habitat replacement/reconstruction measures in the Phase 1 areas in the following construction season, an addendum to the Phase 1 Cap/Habitat OM&M Plan, which will set forth the requirements for OM&M of those measures. If GE notifies USEPA that it will implement Phase 2 of the RA under the Consent Decree, and if dredging occurs in the construction season that immediately follows the year in which Phase 1 dredging is performed, then GE may submit such addendum as part of the first *Operation, Maintenance and Monitoring Plan for Phase 2 Caps and Habitat Replacement/Reconstruction* (Phase 2 Cap/Habitat OM&M Plan) submitted by GE, as described in the next paragraph.

As provided in Section 3 of the SOW, if GE notifies USEPA, pursuant to the Consent Decree, that it will perform Phase 2 of the RA under the Consent Decree, GE will submit to USEPA, on an annual basis during Phase 2, a Phase 2 Cap/Habitat OM&M Plan, or an addendum to a previously approved Phase 2 Cap/Habitat OM&M Plan, which will specify the activities that GE will perform for OM&M of the caps and habitat replacement/reconstruction measures installed in that construction season. That plan or addendum shall be consistent with Sections 3 and 4 of this OM&M Scope, with any modifications specified, with USEPA approval, following Phase 1.

As provided in Section 3 of the SOW, if GE notifies USEPA, pursuant to the Consent Decree, that it will perform Phase 2 of the RA under the Consent Decree, GE will submit to USEPA, by March 15 of the last year of Phase 2, an *Operation, Maintenance, and Monitoring Plan for Water, Fish and Sediment Monitoring* (Water, Fish and Sediment OM&M Plan), which will specify the water column, fish, and sediment monitoring programs that GE will conduct following completion of all remedial activities under the Consent Decree (excluding OM&M) to assess PCB levels in those media. That plan shall be consistent with Sections 1 and 2 of this OM&M Scope.

1.2 OVERALL OBJECTIVES FOR OM&M PROGRAM

The overall objectives for the OM&M program are as follows:

Overall

- Conduct long-term monitoring in the water column and in fish to provide data on PCB levels over time to assess whether the Remedial Action Objectives (RAOs) and Remediation Goals (RGs) set forth in the ROD are being achieved.

Water Column

- Provide data to assess post-remediation PCB concentrations in surface water and downstream transport of PCBs in the water column over time, and to assess whether the RAOs and the RGs are being achieved.

Fish

- Provide data to assess post-remediation PCB concentrations in fish on a River Section-wide basis, over time and to assess whether the RAOs and the RGs are being achieved.
- Provide data for evaluation of fish consumption advisories.

Sediments

- Provide data on post-remediation PCB levels in sediments in undredged areas of the Upper Hudson River.
- Provide data on Select Areas that exceeded the MPA removal criteria that were not targeted for removal because they were buried by cleaner sediments to assess whether the deposits have experienced erosion.

Capping

- Confirm that the physical integrity of the caps placed in areas that did not achieve the applicable numerical residuals standard (including both caps designed to physically isolate such residuals and caps designed to physically and chemically isolate remaining inventory) is maintained; and if not, perform appropriate maintenance.

Habitat

- Evaluate whether and the extent to which the replacement/reconstruction of habitat in a given extent of the river is achieving the goal of replacing the habitat functions, as measured by certain specified parameters (listed in Section 4.2.3 below), to within the range of functions found in similar physical settings in the Upper Hudson River, given changes in river hydrology, bathymetry, and geomorphology resulting from the remedy and other factors; and if not, take appropriate adaptive management measures.

SECTION 2
MONITORING SHORT AND LONG-TERM RECOVERY

This section describes the short-term and long-term water column, fish, and sediment monitoring programs that GE shall conduct under the Consent Decree to assess long-term recovery of PCB levels. The requirements of this section shall apply only if GE notifies EPA that it will implement Phase 2 pursuant to this Consent Decree. These programs shall commence upon completion of all remedial activities conducted by GE under the Consent Decree. Prior to that time, the monitoring of the water column and fish shall be conducted as part of the Remedial Action Monitoring Program (RAMP), as described in the RA Monitoring Scope (BBL 2005).

2.1 WATER COLUMN MONITORING

2.1.1 Data Quality Objectives

The objectives of the water column monitoring are to:

- provide water column PCB concentration data, over time to assess whether the RAOs and the following RGs are being achieved (0.5 µg/L [500 ng/L] (federal MCL); 0.09 µg/L [90 ng/L] (NYS standard for protection of human health and drinking water sources); 0.03 µg/L [30 ng/L] criteria continuous concentration (CCC) Federal Water Quality Criterion (FWQC) for saltwater; 0.014 µg/L [14 ng/L] CCC FWQC for freshwater);
- determine whether the remedy has been effective in minimizing long-term downstream transport of PCB load; and
- determine the level of PCB concentrations entering the river from upstream of the project area and from the Mohawk River.

To achieve these objectives, GE shall implement the water column monitoring program described below. Sections 2.1.2 through 2.1.5 describe the initial scope of that program, which shall continue for a minimum of three years after the completion of all remediation that is carried out under the Consent Decree. Section 2.1.6 specifies procedures and criteria for modifying the

program at the end of that three-year period and/or at any time thereafter, as well as procedures and criteria for termination of the program.

2.1.2 Sampling Locations

In general, sampling locations were identified to coincide with the Baseline Monitoring Program (BMP) locations and at a scale at which the remedy effectiveness was evaluated in the Feasibility Study (FS; USEPA 2000) and the ROD.

The primary water column monitoring location shall be at Waterford (at approximate River Mile [RM] 156.0). This station will monitor transport of PCB mass to the Lower Hudson River and PCB concentrations attained at the end of the Upper Hudson River. Flow rates also will be measured at this station. Secondary monitoring locations shall be established at Thompson Island (~ RM 187.5) and Schuylerville (~ RM 181.4). These stations will monitor transport of PCB mass and PCB concentrations attained at the end of River Section 1 and River Section 2 (as defined in the ROD), respectively. In addition, flow rates shall be monitored at Schuylerville to calculate summer PCB load (PCB loads are highest in summer based on historical data). Additional monitoring stations shall be established at Rogers Island (~ RM 194.2) and Bakers Falls (~ RM 196.9). Monitoring at these locations shall also satisfy the requirements of the consent decree for the Post-Construction Monitoring Program of the Remnant Deposits (*United States v. General Electric Company*, No. 90-CV-575, April 6, 1990) and to assess PCB concentrations from upstream source areas, including the Remnant Deposits. If GE notifies EPA that it has elected not to perform Phase 2 of the RA pursuant to the Consent Decree, GE shall continue to monitor the water column to satisfy the requirements of the consent decree for the Post-Construction Monitoring Program of the Remnant Deposits. The Stillwater station (~ RM 168.4) shall be monitored for diagnostic purposes if the other monitoring stations indicate that PCB concentrations in the river are not declining as expected. Two additional stations shall be located in the Lower Hudson River at Albany (RM 140) and Poughkeepsie (RM 77) to provide an indication of PCB concentration trends in the non-saline portion of the Lower Hudson River. A third station at the Mohawk River at Cohoes shall be monitored to assess PCB

concentrations from other sources. The specific locations of these monitoring stations shall be as close as practical to the comparable BMP stations, although some modifications to those locations may be made based on conditions at the time, with USEPA approval, or if GE decides to collect the water column samples using the automated stations installed for the remedial action.

2.1.3 Sampling Frequency and Duration

Sampling frequency was based on the seasonal variability in PCB concentrations and the downstream transport of PCBs during high flow events.

Sampling shall occur weekly at Waterford throughout the year, with additional rounds of sampling during high flow events meeting the definition of high flow events in the BMP QAPP (QEA 2004). Sampling at Thompson Island shall occur weekly from March to November. Sampling at Schuylerville shall occur weekly from March to November and every two weeks from December to February. Sampling at Rogers Island shall occur weekly from March to April and every two weeks from May to February. Sampling at Bakers Falls shall occur monthly from April to November. The sampling frequency for Rogers Island and Bakers Falls may need to be revised (i.e., increased) if PCB concentrations observed at those stations during the RA or OM&M period are significantly higher than the current levels. The two Lower Hudson River stations shall be sampled monthly from May to November, and the Mohawk River station shall be sampled every other month from May to October every other year.

2.1.4 Measurements

The routine measurements on water samples shall include PCBs and total suspended solids (TSS). Suspended solids analysis shall be conducted using USEPA Method 160.2, with modifications to be consistent with American Society for Testing and Materials (ASTM) Method D 3977-97. Analysis of whole water PCBs shall be conducted using the modified Green Bay Method (mGBM) and extraction protocols used during the BMP (QEA 2004). During the course

of long-term monitoring, specific analytical protocols and sampling procedures may be updated by GE based on the latest available technologies and implemented upon USEPA approval.

Surface water samples shall also be measured for temperature, specific-conductivity, pH, turbidity, and dissolved oxygen (DO) using a probe at each sampling station. Associated measurements shall be made for river flow at both Waterford and Schuylerville.

In addition, the OM&M monitoring program may, upon agreement between USEPA (after consultation with the New York State Department of Environmental Conservation [NYSDEC]) and GE, be modified to include monitoring for metals on a monthly basis during the first year of the OM&M program at stations to be agreed upon by USEPA and GE. If such monitoring is conducted, it shall be evaluated at the end of the first year of the OM&M program and may, upon agreement of the parties, be continued thereafter.

2.1.5 Sampling Protocol

Sampling shall consist of single-day upstream to downstream sampling. A single composite sample shall be generated for each station. At the Upper Hudson River stations, samples shall be collected using the equal discharge increment (EDI) protocol, similar to that used in the BMP. Sampling shall occur at 6 equal-flow locations over the cross section at the Thompson Island and Schuylerville stations and 5 locations at the other stations [Note: If the location of a station is changed so the station is not located at or near an island, only 5 EDI locations per station will be needed]. The entire sample volume from each location along the transect shall be combined to generate a single composite sample for each of these monitoring stations. As an alternative to manual sampling, automated samplers may be used at these stations for this long-term monitoring program.

At the two Lower Hudson River stations and at the Mohawk River station, sampling shall be conducted using the manual BMP sampling protocol, which consists of vertically integrated sampling at a centroid location at each station.

2.1.6 Modifications to Program and Program Termination

Sampling shall be conducted at the stations and frequencies specified above, using the above-described protocols, for a three-year period after the completion of all remediation under the Consent Decree. At the end of that three-year period, GE shall review the data collected under this program and evaluate whether reductions or modifications to the program could cost-effectively achieve the data quality objectives set forth in Section 2.1.1. It is the parties' expectation that the scope of the program may be reduced at the end of that three-year period. At that time, GE may submit a written proposal to reduce the number of sampling stations and/or the sampling frequencies, or to make other modifications to the sampling program, for a subsequent period. Any such proposal will be reviewed by USEPA to determine whether the above data quality objectives can be achieved with such a reduction in stations or frequencies or other modifications. USEPA will notify GE of its determination; GE shall continue to implement the water column monitoring program with any such modifications that USEPA has approved.

At any time following this three-year review, if GE concludes that further reductions or other modifications to the monitoring program are warranted and can achieve the above data quality objectives, GE may submit a written proposal for such further reductions or modifications; and it will implement such changes upon USEPA approval. At the end of 20 years of monitoring or at any time thereafter, if GE concludes that further reductions or other modifications to the monitoring program are warranted and can achieve the above data quality objectives or that monitoring is no longer necessary to achieve those objectives, GE may submit a written proposal for such further modifications or a termination of the program, as appropriate. GE will implement such changes or termination upon USEPA approval. Otherwise, monitoring shall continue until USEPA determines that the relevant RAOs and RGs set out in the ROD have been achieved.

2.2 FISH MONITORING

2.2.1 Data Quality Objectives

The objectives of the fish monitoring are to:

- provide data on PCB concentrations in fish over time to assess whether the RAOs, RGs and target levels set forth in the ROD for reducing the cancer risks and non-cancer health hazards for people eating fish from the Hudson River (0.05 mg/kg PCBs in fish fillet; 0.2 mg/kg PCBs in fish fillet; and 0.4 mg/kg PCBs in fish fillet) and the risks to ecological receptors (from 0.3 to 0.03 mg/kg PCBs fish [largemouth bass, whole body]; and 0.7 to 0.07 mg/kg PCBs in spottail shiner [whole fish]) are being achieved; and
- provide data on PCB levels in Hudson River fish to the New York State Department of Health (NYSDOH) for evaluation of fish consumption advisories.

To achieve these objectives, GE shall implement the fish monitoring program described in Sections 2.2.2 through 2.2.8. Sections 2.2.2 through 2.2.6 describe the initial scope of that program, which shall continue for a minimum of three years after the completion of all remediation under the Consent Decree. Section 2.2.7 specifies procedures and criteria for modifying the program at the end of that three-year period and/or at any time thereafter, as well procedures and criteria for termination of the program. In addition, Section 2.2.8 describes a supplemental fish monitoring program that GE shall conduct for the specific purpose of providing PCB data to NYSDOH to evaluate whether existing fish consumption advisories should be modified.

2.2.2 Sampling Locations

This section describes the fish sampling locations that will be monitored during the first three years of the program to document the response of the river to remediation. These locations will continue to be monitored unless the program is modified as described in Section 2.2.7.

In the Upper Hudson River, fish sampling shall be conducted at locations identified to coincide with the BMP and RAMP fish sampling locations and to evaluate spatial trends in PCB concentrations observed from sampling during baseline and RA conditions. Specifically, fish sampling shall be conducted in the Upper Hudson River from each of the river sections at the stations listed below:

- Feeder Dam (representative of reference conditions);
- Thompson Island Pool (representative of River Section 1);
- Northumberland/Fort Miller Pools (representative of River Section 2); and
- Stillwater Pool (representative of River Section 3).

In the Lower Hudson River, fish monitoring shall be conducted at the following stations:

- Albany/Troy (location shall coincide with the BMP and the RAMP fish sampling locations);
- Catskill; and
- Tappan Zee area.

2.2.2.1 Upper Hudson River

Sampling shall occur initially in areas of Feeder Dam, Thompson Island, Northumberland/Fort Miller, and Stillwater pools that provide a representation of the River Section-wide average levels in the targeted species. Data obtained during baseline and RA monitoring shall be used to establish the sampling locations. During the sampling period, the sampling will occur at the BMP and RAMP sampling locations to the extent practical. Sampling

locations shall be adjusted, as necessary, in consultation with USEPA, to reflect changes that occur as habitat replacement/reconstruction progresses. The guiding principle shall be to use a sufficient number of sampling locations to produce representative samples to determine River Section-wide average PCB concentrations in fish.

2.2.2.2 Lower Hudson River

One location each shall be sampled at Albany/Troy, Catskill, and the Tappan Zee area to monitor PCB levels in Lower Hudson River fish. The species to be sampled at these stations are listed in Section 2.2.4.2 below.

2.2.3 Sampling Frequency

During the first three years of the fish monitoring program (and unless the program is modified following the initial three-year period as described in Section 2.2.7), sampling shall be conducted annually at the Upper Hudson River stations. At the Lower Hudson River stations, fish sampling during this period shall be conducted annually at Albany/Troy and once every two years at Catskill and Tappan Zee.

2.2.4 Species and Sampling Methods

This section specifies the species to be sampled for the first three years of the fish monitoring program (unless the program is modified following the initial three year period as described in Section 2.2.7).

2.2.4.1 Upper Hudson River

In the Upper Hudson River, the same species groups as are sampled in the BMP shall be collected. These species groups are:

- black bass (largemouth and/or smallmouth bass, with a goal of half of each species but in whatever combination is available to meet the applicable sample size specified in Section 2.2.5);
- ictalurids [bullhead (brown and/or yellow) and/or channel catfish (white and/or channel), with a goal of half of each species but in whatever combination is available to meet the applicable sample size specified in Section 2.2.5);
- yellow perch;
- yearling pumpkinseed; and
- forage fish (spottail shiner and/or alternative).

Standard sampling methods, including netting, electroshocking, and angling, shall be used to collect target species. The samples to be processed for analysis shall be standard fillets for bass, bullhead, catfish, and perch; individual whole body samples for yearling pumpkinseed; and whole body composites for spottail shiners or other forage fish species.

2.2.4.2 Lower Hudson River

At the Lower Hudson River stations, the following species groups shall be sampled as part of the fish monitoring program (with additional species to be collected as part of the supplemental sampling program described in Section 2.2.8):

- At Albany/Troy the same species groups as are sampled in the BMP shall be collected, with the addition of striped bass. Specifically, striped bass, black bass (largemouth and/or smallmouth bass, 10 of each, or in whatever combination is available for a total of 20), ictalurids [10 bullhead (brown and/or yellow) and/or 10 catfish (white and/or channel), or in whatever combination is available for a total of 20], and perch (white and/or yellow, 10 of each, or in whatever combination is available) shall be collected annually; and yearling pumpkinseed and forage fish (spottail shiner and/or alternative) shall be collected annually for the first three years and once every two years thereafter.

- At Catskill, striped bass, black bass (largemouth and/or smallmouth bass, 10 of each, or in whatever combination is available), and ictalurids [10 bullhead (brown and/or yellow) and/or 10 catfish (white and/or channel), or in whatever combination is available] shall be collected once every two years.
- At Tappan Zee area, striped bass shall be collected once every two years.

These samples shall be processed as standard fillets for bass, bullhead, catfish, and perch; individual whole body samples for yearling pumpkinseed; and whole body composites for spottail shiners or other forage fish species.

2.2.5 Sample Size

Sample size within each pool in the Upper Hudson River shall be the same as described in the BMP QAPP (QEA 2004). For locations where individual fish will be submitted for analysis, the number of fish to be collected shall consist of a maximum of: 20 individuals per species group at Feeder Dam; 25 individuals per species group at Northumberland/Fort Miller pool; and 30 individuals per species group at each of the Thompson Island and Stillwater pools; provided that more of one species in a group may be collected than another in order to achieve the total if one species is present in smaller numbers or not at all. The individuals may be collected from multiple stations within the pool, as necessary to achieve a representative River Section-wide average. In addition, where forage fish will be sampled, ten whole body composites of forage fish shall be collected from each pool (two composites per location).

At each of the Lower Hudson River stations, a maximum of 20 individuals of each target species or species group shall be collected.

2.2.6 Measurements

PCBs and percent lipid shall be measured to monitor PCB levels in fish. All fish samples shall be analyzed for total PCBs using a modification of the USEPA Method 8082 Aroclor Sum Method, as specified in the BMP QAPP (QEA 2004), unless USEPA determines that the data quality objectives set forth in Section 2.2.1 can no longer be assessed by that method. Analysis by the mGBM will be performed on 5 percent of the total number of samples during every other sampling event that is conducted at a given sampling location, in order to verify that the Aroclor method is accurately quantifying the Total PCB concentrations in fish, as the congener pattern in fish may change as a result of the remediation, which may affect the quantification by the Aroclor method. The weight and length of collected fish also shall be measured to assess fish condition. Captured fish shall be visually inspected for external abnormalities (e.g., tumors, lesions). Sex of fish will be determined, if possible, prior to processing in the analytical laboratory.

2.2.7 Modifications to Program and Program Termination

The fish sampling program described in the preceding subsections shall be conducted for a three-year period after the completion of all remedial activities conducted by GE under the Consent Decree. At the end of that period, GE shall review the data collected under this program and evaluate whether reductions or other modifications to the program for either the Upper or Lower Hudson River (or both) could cost-effectively achieve the data quality objectives set forth in Section 2.2.1. It is the parties' expectation that the scope of the program may be reduced at the end of this three-year period. At that time, GE may submit a written proposal to reduce the number of sampling locations, the species sampled, and/or the sampling frequencies, or to make other modifications to the sampling program, for a subsequent period. Any such proposal will be reviewed by EPA in consultation with NYSDEC and NYSDOH to determine whether the above data quality objectives can be achieved with such reductions or other modifications. USEPA will notify GE of its determination; GE shall continue to implement the fish sampling program, with any such modifications that USEPA has approved.

At any time following this three-year review, if GE concludes that further reductions or other modifications to the above monitoring program are warranted and can achieve the above data quality objectives, GE may submit a written proposal for such further reductions or other modifications; and it will implement such changes that are approved by USEPA, upon consultation with NYDEC and NYSDOH. At the end of 20 years of monitoring or at any time thereafter, if GE concludes that further reductions or other modifications to the monitoring program are warranted and can achieve the above data quality objectives or that monitoring is no longer necessary to achieve those objectives, GE may submit a written proposal for such further reductions or modifications or a termination of the program, as appropriate. GE will implement such changes or termination that are approved by USEPA after consultation with NYSDEC and NYSDOH. Otherwise, fish monitoring shall continue until USEPA determines that the relevant RAOs and RGs set out in the ROD have been achieved.

2.2.8 Supplemental Fish Sampling Program for Fish Consumption Advisory Assessment

In addition to the fish monitoring program described above, GE shall conduct a supplemental fish sampling program to provide PCB data to the NYSDOH for use in evaluating whether existing fish consumption advisories should be modified. This supplemental program shall involve collection of the following samples (in addition to those described in prior sections):

- At Albany/Troy, collection of 10 individual samples each of walleye, carp, and herring (alewife and/or blueback);
- At Catskill, collection of 10 individual samples each of white perch, walleye, carp, catfish (white and/or channel) (not required if collected as a part of fish monitoring under Sections 2.2.4 - 2.2.6) and herring (alewife and/or blueback);
- At Poughkeepsie, collection of 20 individual samples of striped bass and 10 individual samples each of white perch, carp, catfish (white and/or channel), American eel, black bass (largemouth and/or smallmouth), and herring (alewife and/or blueback); and

- In the Tappan Zee area, collection of 10 individual samples each of white perch, catfish (white and/or channel), carp, American eel, and bluefish.

This supplemental sampling shall be conducted on three occasions – once in the first, second, and third years of the fish OM&M program. The samples shall be processed for analysis as standard fillets, and shall be analyzed for PCBs (using the same method described in Section 2.2.6) and percent lipids.

At any time after completion of the three supplemental sampling rounds described above, if the NYSDOH notifies GE and USEPA that (a) it (NYSDOH) has determined that additional sampling is necessary in order to evaluate whether to modify its fish consumption advisories for PCBs at one or more locations in the Upper or Lower Hudson River, (b) additional fish data on levels of PCBs that are present in or may have migrated from the Upper Hudson River are necessary for that evaluation, and (c) it proposes that GE collect such additional data for particular species and locations, then GE shall conduct additional supplemental fish sampling of those species, and at those locations, that are agreed upon by GE and USEPA or, in the absence of such an agreement, that are determined by USEPA after consultation with NYSDOH and NYSDEC. The geographic scope of this additional supplemental fish sampling program shall be from the Tappan Zee area north to Bakers Falls, as appropriate. Additional sampling and analysis, if necessary, will only be required where the primary source of PCBs is reasonably expected to be from the Upper Hudson River. (For the purpose of this agreement, the sampling stations identified in this plan for years 1 through 3 meet this criterion.) In the event that the parties do not agree on such supplemental sampling, USEPA will provide GE with the rationale for its determination that additional sampling is warranted to provide the data necessary to enable NYSDOH to evaluate whether fish consumption advisories applicable to the foregoing geographic area may warrant a change.

2.3 SEDIMENT MONITORING PROGRAM

2.3.1 Data Quality Objectives

The objective of the sediment monitoring are to:

- determine post-remediation PCB levels in sediments in undredged areas of the Upper Hudson River.
- provide data on Select Areas that exceeded the MPA removal criteria that were not targeted for removal because they were buried by cleaner sediments to assess whether the deposits have experienced erosion.

2.3.2 Non-Dredge Area Sediment Sampling

2.3.2.1 Sampling Locations and Frequency

Twenty-six undredged locations shall be sampled from each of the three River Sections. Six sediment cores shall be collected from each location. The target locations and the areal coverage of the six cores within each location will be detailed in the Fish, Water and Sediment OM&M Plan. EPA can specify the locations to be sampled under this program. The sampling shall be conducted in the first and ninth years following completion of the Phase 2 dredging program.

2.3.2.2 Sampling Methods

The samples shall be collected from the undredged areas by coring, vibracoring, or manual coring techniques. Each core will be segmented into 0- to 2-inch and 2- to 12-inch segments. The core segments taken from the same depth interval in each of the six cores will be combined to from a single composite sample. This will result in two composite samples per six coring sites and a maximum of 52 composites per River Section.

2.3.2.3 Measurements

Sediment samples shall be analyzed for Aroclor-based PCBs using Method GEHR8082, the same method used during the SSAP (ESI and QEA 2002). The PCB Aroclor data shall be converted from Total PCBs to Tri+ PCBs using a regression model to be specified in the Phase 1 RAM QAPP, which shall be established using paired data analyzed by Method GEHR8082 and the mGBM. A portion of the sediment samples shall be analyzed by the mGBM at a rate of 4 percent in order to confirm the accuracy of the Tri+ PCB equation. All sediment samples shall be analyzed for Total Organic Carbon (TOC) using the method specified in the SSAP QAPP (ESI and QEA 2002).

2.3.3 Bathymetric Survey of Select Areas

2.3.3.1 Locations and Frequency

Bathymetric surveys of Select Areas that exceeded the MPA removal criteria but were not targeted for removal because they were buried by cleaner sediments shall be conducted in the first and ninth years following completion of the Phase 2 dredging program. These areas will be identified in the Phase 2 Dredge Area Delineation Report.

2.3.3.2 Methodology

Bathymetry surveys will be conducted in conformance with National Oceanographic Service (NOS) *Hydrographic Surveys Specifications and Deliverables* (NOS, 2003) and U.S. Army Corps of Engineers (USACE) standards for navigational dredging and, where applicable, modified procedures will be used to provide as detailed a riverbed elevation map as possible in near-shore, shallow areas. Depending on the nature of the Select Areas (e.g., water depth, density of aquatic vegetation, obstructions), multibeam and/or single-beam technology may be used to conduct these surveys. Multibeam survey techniques, if applicable, will be consistent with those performed under *Addendum 1, Supplemental Engineering Data Collection Work Plan*

(BBL, 2005). Single-beam techniques will be consistent with *SSAP QAPP* (ESI and QEA, 2002), with the exception that the space between survey lines may be reduced to sufficiently capture bottom elevation variability for the purposes of meeting survey DQOs (e.g., lines every 25' to 50').

2.4 REPORTING

GE shall provide the data from the water column and fish monitoring programs to USEPA in the monthly reports and monthly database updates under the Consent Decree. In addition, GE shall provide annual Data Summary Reports (DSRs) that document the data collected in each calendar year in both the water column and fish monitoring programs. These reports shall be submitted by March 15 of the following year. Each DSR shall fully document the prior calendar year's work, including a summary of the work performed, a tabulation of results, field notes, processing data, chain-of-custody (COC) forms, copies of laboratory audits, data validation results, copies of laboratory reports, and a compact disk version of the project database.

SECTION 3
CAP MONITORING AND MAINTENANCE

3.1 PROGRAM OBJECTIVES

3.1.1 Backfill

Under the Residuals Performance Standard (USEPA 2004), backfill, as opposed to an engineered cap, may be placed in a dredge area when the appropriate numerical residuals standard, as set forth by USEPA (2004), has been met, subject to the requirements of the USEPA-approved Final Design, which may identify certain areas where backfill will not be installed (e.g., navigation channel) when the requirements of the Residuals Performance Standard have been met. Since, in such cases, the numerical residuals standard has been achieved, monitoring of backfill shall consist of verifying that backfill has been installed in accordance with the design specifications (i.e., use of materials with acceptable physical and chemical characteristics placed to the design elevations). Such backfill monitoring shall be specified in the Final Design documents and Phase 1 Construction Quality Assurance Plan (Phase 1 CQAP) and will not be part of the OM&M program. No long-term monitoring of the backfill for containment purposes shall be required. However, the habitat monitoring and maintenance activities shall include monitoring of backfill as necessary and appropriate for purposes of the habitat replacement/reconstruction program, as discussed further in Section 4.

3.1.2 Engineered Caps

Monitoring and maintenance shall be conducted for engineered caps. The monitoring and maintenance objectives consist of the following:

- determine whether the physical integrity of individual cap layers/components has been maintained; and
- determine whether there is a need for additional protective measures and institutional controls (e.g., additional controls for caps in the navigational channel, notifications to boaters regarding actions in capped areas, etc).

Two types of engineered caps are being designed: an "Isolation Cap Type A" and an "Isolation Cap Type B." Definitions for these types of engineered caps are provided in the *Critical Phase 1 Design Elements*.

The OM&M program for engineered caps shall commence with USEPA approval of the cap installation in a given CU. In practice, this program will be implemented on an annual basis – i.e., the caps which are installed in a given season will be monitored and maintained as a group.

3.2 OM&M PROGRAM

As part of construction, upon satisfactory completion of cap installation (as specified in the Phase 1 CQAP), record drawings (plans and cross-sections) will be developed. These drawings will verify that the engineering specifications for the cap (as specified in the *Final Design Report*) have been achieved in the field. This verification will include a bathymetric survey to document cap elevations after placement. Following construction, GE shall implement a tiered monitoring program for each cap type, using a similar framework (described below) to that recommended by the U.S. Army Corps of Engineers - Waterways Experiment Station in *Guidance for Subaqueous Dredged Material Capping* (USACE-WES 1998), and by USEPA in *Guidance for In-Situ Subaqueous Capping of Contaminated Sediments* (USEPA 1998), with the primary objective of verifying that the physical integrity of the caps is being maintained. This framework is set out below.

The first tier of monitoring shall be to determine whether the caps remain in place over time. Bathymetric surveys shall be used as the primary means to evaluate the integrity of the cap. A bathymetric survey shall be performed one year following placement of the cap. This bathymetric survey shall be referred to as the "Year 1 Survey" and shall be performed for all areas that are capped during the prior dredging season, regardless of size of the capped area. The Year 1 Survey may be used as the baseline for subsequent cap measurements to account for any consolidation and associated settlement, the majority of which would be expected to take place within the first year following placement of the cap. If the Year 1 Survey does not indicate that

any settlement has occurred since the cap was installed, the record drawings of the cap shall be used as the baseline for subsequent cap measurement. However, if the Year 1 Survey shows areas of suspected cap loss, compared to the record drawings of the cap, such data shall be confirmed through visual investigation (underwater camera, diver, side-scan sonar where appropriate, etc.). If it is confirmed that those areas have lost more than three inches of thickness over 4,000 square feet (sf), or 20% of the cap area, whichever is less, of a contiguously capped area, the cap shall be repaired as necessary.

Subsequent bathymetric surveys shall be performed at intervals of five, 10, 20, 30 years after construction of the cap. In addition, if a flood event with a magnitude at or exceeding the design recurrence interval for the cap (i.e., a 10- or 50-year recurrence interval for a Isolation Cap Type A, depending on the design, or a 100-year recurrence interval for an Isolation Cap Type B) occurs at any time during the 30-year monitoring period, the cap shall be inspected through a bathymetric survey as soon as practical after the event. If such an event occurs in the same year in which routine periodic monitoring of the cap is scheduled, the event-based monitoring shall replace the routine monitoring survey for that year. Following the completion of dredging, the routine 10-year, 20-year and 30-year monitoring events shall be consolidated so that they are performed for all cap areas at intervals of 10 years, 20 years and 30 years after installation of the last cap installed by GE as part of the RA.

Based on the results of the surveys, sediment elevations from the current monitoring event shall be compared to those shown on the record drawings and/or the Year 1 Survey, as appropriate, and to the prior monitoring event using an "elevation difference" plot. The goal will be to determine whether there is a measurable loss in cap material elevation since the cap was installed and between monitoring events. This shall be defined as a measurable loss of greater than three inches in cap thickness over a contiguous 4,000 sf area or 20% of the cap area, whichever is less, considering both the accuracy of the measurement technique and the nature of the cap surface (e.g., irregular rock surface). If a measurable loss in elevation is observed, a second tier of monitoring shall be conducted, including visual investigation (underwater camera, diver, side-scan sonar where appropriate, etc.) of the cap area, followed by confirmatory physical investigations to ascertain whether there is a significant loss of cap material (defined as greater

than three inches in thickness over a contiguous 4,000 sf area or 20% of the cap area, whichever is less).

If the investigation confirms that there is significant cap loss, those sections of the cap shall be repaired as needed. A survey shall follow the cap repair to confirm that the repair was performed satisfactorily and shall be used as the new "baseline" survey. Following cap repair, results from the monitoring event survey shall be compared to the post-cap repair survey, and the same cap loss metrics identified above shall be used to assess cap integrity. If a cap is placed over a contiguous area that is less than a half-acre in size, it shall be considered individually for the above evaluation purposes. If a significant cap loss of a particular cap type is identified during any monitoring event, all caps of the same type (or lesser) that were installed in similar physical settings but not monitored in that event will be reviewed to determine if there is more widespread damage.

3.2.1 Elevation Surveys/Hydrographic Surveys

Multi-beam hydrographic surveys shall be the preferred method of survey. Such surveys shall be conducted using USACE Hydrographic Survey standards (USACE 2002). Transect spacing will be varied with water depth to allow for sufficient coverage of the capped area being surveyed (estimated coverage is approximately 3.4 times water depth for each boat pass). In many instances, multi-beam surveys can produce vertical accuracy of approximately three inches, although performance at any given site under unknown conditions cannot be guaranteed.

3.2.2 Visual Investigations

If a measurable loss in cap elevation is observed based on comparison of the current bathymetric survey to the elevation of the cap as shown on the record drawings and/or the Year 1 Survey, as appropriate, and elevations previously measured, then visual investigations shall be conducted by underwater camera, diver(s), or other techniques to confirm the condition of the cap. A visual notation of the thickness and physical description of the materials shall be used to determine the thickness of the cap, including isolation layer and armor (if any). If the investigation shows significant loss of the cap armor material (i.e., > 3 inches in thickness over a contiguous 4,000 sf area, 20% of the cap area, whichever is less), cores of the cap isolation layer shall be retrieved for visual evaluation of any potential loss in isolation layer thickness.

3.2.3 Duration of Program

If there is no significant cap armor loss at the last monitoring event, cap monitoring under this OM&M program shall be discontinued after 30 years following installation of the last cap installed by GE as part of the RA. Should repairs be required for a cap or armor layer in the last monitoring event, the OM&M duration for such cap(s) will extend to include follow-up monitoring three years after repair and OM&M shall be discontinued at that time.

3.3 REPORTING

Data collected in conjunction with the cap monitoring shall be included in GE's monthly reports under the RA CD. If repairs are necessary based on the monitoring, GE shall submit a letter report to USEPA, within two weeks of determining the need for such cap repairs, setting forth the proposed scope and schedule for such repairs. The objective will be to be complete the repairs in the same year that monitoring is performed (i.e., before the canal closes in early November, if possible). In addition, GE shall provide annual cap OM&M summary reports to USEPA that document the prior year's OM&M activities. The annual reports shall include data

collected from the cap OM&M field activities (including bathymetric survey results, critical field observations, and other analyses conducted) and any repair actions undertaken. The annual reports shall be submitted by April 1 of the year following the monitoring and maintenance activities described. In addition, following the end of the overall cap OM&M period (described in Section 3.2.3), GE shall submit a final report on cap OM&M activities to USEPA.

SECTION 4
MONITORING AND MAINTENANCE OF HABITAT REPLACEMENT/RECONSTRUCTION

4.1 INTRODUCTION

As stated in the ROD (USEPA 2002, p. A-3), "a habitat replacement program will be implemented in an adaptive management framework to replace SAV communities, wetlands, and river bank habitat" that are impacted by implementation of the remedy. Adaptive management is an iterative process of monitoring and natural engineering designed to bring habitat replacement and reconstruction activities to closure. The habitat replacement/reconstruction program includes replacement or reconstruction of four habitat categories: unconsolidated river bottom, aquatic vegetation beds (submerged aquatic vegetation [SAV] and floating aquatic vegetation), shoreline (river banks), and riverine fringing wetlands.

As stated in the Habitat Delineation and Assessment (HDA) Work Plan (BBL 2003a), which is part of the August 2003 Administrative Order on Consent for Remedial Design (RD AOC), "[t]he primary goal of the habitat program is to replace the functions of the habitats of the Upper Hudson River to within the range of functions found in similar physical settings in the Upper Hudson River, in light of the changes in river hydrology, bathymetry, and geomorphology that will result from the implementation of the USEPA selected remedy" (page 1-2). The range of functions will be defined by parameters monitored at appropriate reference locations. The overall goal of the adaptive management process is to return a range of conditions in the replacement and reconstruction areas that overlaps with the range in the reference areas.

In accordance with the HDA Work Plan, the range of functions found in the Upper Hudson River is being assessed during remedial design through measurement, in the four above-referenced habitat types, of certain parameters that are related to the ecological functions provided by those habitat types. These assessments involve direct measurements of certain

specified physical and biological parameters that will be used to quantify the selected habitat functions. Those parameters are listed in Section 4.2.3 below (taken from Table 2 of the HDA Work Plan, with certain additional parameters added). The concept that these types of parameters can be used to quantify ecological functions is one of the foundations of the hydrogeomorphic (HGM) approach (Shafer and Yozzo, 1998; Ainslie et al., 1999; Smith and Wakeley, 2001; Clairain, 2002) and habitat evaluation procedures (e.g., Habitat Suitability Indices [HSIs]), and is established in the HDA Work Plan. It should be noted that while these parameters consist largely of structural parameters, some of them can serve as functional parameters as well. For example, the biomass of aquatic vegetation is not only a structural parameter, but also a functional parameter demonstrating aquatic vegetation bed productivity. Similarly, plant species composition measured in aquatic vegetation, shoreline, and fringing wetland habitats is a structural parameter, but is also a functional parameter relating to habitat diversity.

The habitat assessment program will establish the range of the parameters listed in Section 4.2.3 in the Upper Hudson River habitats prior to dredging, by measuring those parameters both in areas that will be directly impacted by dredging and those that will not. Based on those data, the specific parameters (from among those measured) to be used as design criteria for the habitat replacement and reconstruction program will be selected to achieve the above objective. These parameters will generally include parameters such as substrate type, shoot/stem density, percent cover, plant species composition, slope, water depth, etc., and exclude parameters that cannot be "designed" (e.g., those related to water quality, such as pH, temperature, specific conductivity, dissolved oxygen, turbidity). Design parameters will be specified in the *Final Design Reports*.

Further, the habitat assessment data will be used to develop "bounds of expectation" for the replaced and reconstructed habitats for use in design, and a suite of adaptive management techniques will be identified for use in the long-term monitoring and adaptive management program (discussed below). The habitat replacement and reconstruction program will be designed to establish, through active and/or passive methods, an overall mix of habitats in the remediated portions of the river, taking account of physical constraints in the post-dredging

environment, that is similar to the mix of habitats types in the pre-dredging and nondredged (reference) portions of the river, and to return the overall distribution of the relevant parameters within the dredged areas to be similar to the overall distribution of such parameters in the reference areas (as described in Section 4.3 below), accounting for habitat size. The overall mix of habitats will be established during the design. It is anticipated that comparisons of the range of conditions in reference and remediated areas will be made by statistical tests appropriate for the collected data. A "spatially-weighted average" and use of negative null hypotheses are possible techniques that will be considered. The appropriate spatial scale for these comparisons will be determined by the data, and may consist of comparisons on a reach basis or on an overall river section basis. The spatial scale for these comparisons and the specific statistical techniques to be used in the comparisons will be included in the *Adaptive Management Plan*, which will be part of the *Final Design Report*, for each phase of dredging.

4.2 MONITORING COMPONENTS

Following dredging, habitat replacement/reconstruction designs shall be implemented in accordance with the approved Final Design. Upon certification of completion of the remedial activities in each CU, including implementation of the habitat replacement/reconstruction measures, where necessary, the post-remediation monitoring and adaptive management process shall commence.

4.2.1 Data Quality Objective

In the post-remediation environment, habitat monitoring and adaptive management become complementary, as these two processes serve to gauge the recovery of habitat for each river reach. When combined, monitoring and adaptive management form the mechanism for making management changes, as such changes are warranted, to the course of habitat recovery. In this context, the data quality objective for the post-construction monitoring of habitat replacement/reconstruction measures is to evaluate whether, and to what extent, the replacement/reconstruction of habitat in a given river reach is achieving the goal of replacing the

habitat functions, as measured by the parameters listed in Section 4.2.3, to within the range found in similar physical settings in the Upper Hudson River, given changes in river hydrology, bathymetry, and geomorphology resulting from the remedy, as well as from other factors.

Sampling of the replaced and reconstructed unconsolidated river bottom, aquatic vegetation bed, shoreline, and riverine fringing wetland habitats shall be conducted annually, between June 1 and September 30, focused on peak growth times for aquatic vegetation and wetlands and appropriate times for identification of riparian plant species in shoreline habitat. The habitat-specific sampling windows are specified in the HDA Work Plan (on pages A-3, B-5, C-3 and D-4). Contract compliance inspections to determine percent survival of planted vegetation shall be a component of the habitat replacement and reconstruction contract specifications. These contract compliance inspections shall be conducted (which may be up to twice a year) at such a time to allow for replanting during the appropriate planting windows, if necessary. Contract specifications will be specified in the *Final Design Reports*.

4.2.2 Data Collection

Data shall be collected from both target (dredged) and unimpacted (nondredged) stations for the four habitat categories in accordance with the standard operating procedures provided in the HDA Work Plan. Collected data shall be evaluated on an ongoing basis (at a minimum, annually) to determine if modifications to the sampling design are warranted. The following parameters shall be sampled in each habitat, including backfilled areas:

- Unconsolidated river bottom
  - Substrate type;
  - epifaunal substrate and cover;
  - total organic carbon;
  - temperature;
  - dissolved oxygen;
  - specific conductivity;

- pH;
- turbidity;
- percent fines;
- embeddedness; and
- downfall.

- Aquatic vegetation beds
  - Total organic carbon;
  - shoot density;
  - percent cover;
  - shoot biomass;
  - plant species composition (including percent nuisance species);
  - sediment nutrient availability;
  - light availability;
  - water depth;
  - current velocity;
  - temperature;
  - dissolved oxygen;
  - specific conductivity;
  - pH;
  - turbidity;
  - percent fines; and
  - downfall.

- Shoreline
  - Downfall;
  - bank vegetation protection;
  - bank stability;
  - slope;
  - substrate components;
  - riparian edge cover; and

- plant species composition and percent cover (by vegetation strata).

- Riverine Fringing Wetlands
  - Stem density;
  - stem length;
  - stem thickness;
  - soil properties;
  - percent cover;
  - shoot biomass;
  - plant species composition (including percent nuisance species);
  - slope;
  - water depth/inundation;
  - water temperature;
  - dissolved oxygen;
  - specific conductivity;
  - pH;
  - turbidity;
  - area;
  - wetland edge
  - area of buffer; and
  - percent contiguous with other habitats.

In addition to the above-listed parameters, fish and wildlife observational and other data may be collected in all four of the above-habitats, as direct measurements of habitat functions, to serve as the basis for applying secondary success criteria (as discussed in Section 4.3 below), if GE elects to rely on such criteria. Additional parameters may also be added under the adaptive management framework.

4.2.3 Sampling Locations

Data shall be collected from both dredged and nondredged locations. To evaluate success of the habitat replacement and reconstruction program after its implementation, given the changes in river hydrology, bathymetry, and geomorphology that will occur in the meantime both from the dredging and from other, unrelated factors, areas within the Upper Hudson River that are not directly impacted by the dredging shall be used as post-remediation reference sites. In addition, one or more off-site reference stations within the upstream Upper Hudson River (Sherman Island hydroelectric plant to west city limits of Glens Falls) and the Lower Mohawk River (Lock 7 to Route 9 Marina) will be included as reference sites in the database for the project area. These areas will not serve as a substitute for the use of reference areas within River Sections 1, 2, and 3 in evaluating habitat replacement/reconstruction success. Rather, the off-site reference areas will be used to evaluate the impacts (if any) of potential broad, watershed-wide or regional changes unrelated to the remediation project that may extend beyond the 40-mile project area, and to determine whether these changes have had an effect on habitat replacement/reconstruction.

The overall sampling design described in the HDA Work Plan, including the number and location of target and nondredged stations, shall provide the basis for post-remediation monitoring activities. As described in the HDA Work Plan, the number and location of sampling stations shall be based on the final location and extent of dredging within each River Section. As such, the final number and location of sampling stations for the OM&M plan cannot be determined until the Phase 1 dredging is complete. However, for the purposes of Phase 1 OM&M, the number of sampling stations shall not exceed the total number of sampling stations in Phase 1 areas being used to complete the habitat assessment program. The final number and location of sampling stations shall be submitted to USEPA prior to the initiation of post-remediation monitoring.

4.3 SUCCESS CRITERIA

Success criteria shall be developed based on the range of conditions found in reference areas. This range of conditions defines the bounds of expectation for habitat replacement and reconstruction. Bounds of expectation and success criteria shall be developed for:

- conditions within specific habitats – e.g., an area anticipated to be replaced as unconsolidated river bottom will be expected to have sediment with grain size falling within the range of grain sizes defined by reference sites; and
- the overall distribution of habitat functions, taking habitat size into consideration, over each river section or reach – i.e., for each river section or reach, the mosaic of post-remediation habitats will be expected to fall within the range of habitats supported by areas of similar physical conditions, such as water depth, flow, substrate, bank conformation, etc., as in reference areas.

It is the parties expectation that the success criteria will not be biased to the high or low ends of the bounds of expectations. As stated in the HDA Work Plan, monitoring of the reference areas after the completion of the remediation will allow for modifications of the "bounds of expectation" for the parameters listed in Section 4.2.3. Post-dredging comparisons of those listed parameters in the dredged areas to those in the reference areas shall provide the primary basis for judging the success of the habitat replacement and reconstruction program based on the success criteria to be established. For this purpose, data from reference areas will include not only measurements in the specific non-dredge areas selected as post-remediation reference areas, but also data from on-site target and reference areas prior to remediation. The specific listed parameter measurements taken for each habitat type shall be used to develop Functional Capacity Indices (FCIs) for the relevant functions for that habitat (as listed in Table 2 of the HDA Work Plan; BBL 2003a). FCIs are values calculated from the field and laboratory measurements that provide a site-specific basis for describing the functions being performed by that habitat at a specific location and for comparing functional capacity among locations.

As stated in GE's *Habitat Assessment Report for Candidate Phase 1 Areas* (Phase 1 HA Report; BBL and Exponent 2005b), to the extent that site-specific field data is or will be collected, the FCI models for the Upper Hudson River will be calibrated, verified and/or validated. Such data may include existing data from prior studies; direct functional data (such as fish and wildlife observations) being collected under the habitat assessment and other programs, to the extent available; and data collected from other ongoing sampling programs being conducted by GE or by the natural resource agencies (to the extent such data are made available to GE) – all as further described in Section 6.3 of the Phase 1 HA Report. As such, the collection of such data is part of the habitat assessment and other sampling programs and is not a component of the OM&M program. Additionally, if studies to evaluate relationships between structural parameters and habitat functions specific to the Upper Hudson River are conducted as part of the adaptive management program, they are likewise not a component of the OM&M program, although the two programs may have temporal overlap.

Habitat Suitability Index (HSI) models shall also be used, in conjunction with a subset of the site-specific FCI models, to quantify the fish and wildlife habitat functions for selected indicator species, as listed in GE's *Habitat Delineation Report* (BBL and Exponent 2005a) and its Phase 1 HA Report. The HSIs were developed by the U.S. Fish and Wildlife Service (USFWS) as a tool for evaluating impacts on fish and wildlife habitat resulting from water or land use changes (USFWS 1981).

When parameter(s) from target areas within an appropriate spatial scale (i.e., River Section or reach) are within the range of parameter(s) from reference areas, considering overall distribution of values within habitats and within the relevant river section or reach, the habitat replacement/reconstruction within those target areas shall be considered successful. Narrative success criteria consistent with the above principle will be developed and incorporated into the *Final Design Reports* or *Adaptive Management Plans*. Given the changes in river conditions that will result from the dredging, the objective for a specific dredged area cannot be established *a priori* as either the "low end" or the "high end" of the range of parameters based on reference areas, since physical conditions in each area will determine where the post-dredging habitat falls within these bounds. GE will establish a mix of habitats, taking account of physical conditions

in the post-remediation environment, and that habitat mix shall be evaluated against the mix of habitats in reference sites with similar physical conditions. This evaluation of success shall be made for each habitat type and shall be based on comparing the overall distribution of the relevant parameters from the dredged areas within a given spatial extent of the river to the overall distribution of such parameters in the pertinent reference areas, using appropriate statistical tests. The spatial extent at which these comparisons will be made and the statistical tests to be used will be identified in the *Adaptive Management Plans* that will accompany the *Final Design Reports*.

The primary success criteria for Phase 1 shall be based on the specific parameters listed in Section 4.2.3 and on functional equivalence defined by habitat-specific FCI and/or HSI models (which are calculated from those parameters), as follows:

- Unconsolidated river bottom
  - substrate type; and
  - FCIs and HSIs.

- Aquatic vegetation beds
  - stem density;
  - percent cover;
  - plant species composition; and
  - FCIs and HSIs.

- Shoreline
  - bank assessment components;
  - plant species composition; and
  - FCIs and HSIs.

- Wetlands
  - percent cover;
  - plant species composition; and

- FCIs and HSIs.

FCIs and HSIs shall be calculated directly from measurements of the listed parameters in both target and reference stations to evaluate the functional equivalency of targeted and reference habitats. When FCI and HSI values in replaced/reconstructed habitats within an appropriate spatial extent of river fall within the range of FCI/HSI values in the pertinent reference habitats (again considering the overall distribution of values), the overall habitat replacement/reconstruction within that spatial extent will be considered successful. The length of time over which the values in the replaced/reconstructed habitat must be within the range of conditions in the reference areas for the habitat replacement/reconstruction to be considered successful will be described in the *Adaptive Management Plans* and may differ by habitat.

If the primary success criteria based on the above-listed parameters and FCI/HSI models are not met within the appropriate spatial extent, data that directly measure the relevant functions (e.g., presence and abundance of fish and/or wildlife species), to the extent available, may be used as secondary success criteria. As stated in the HDA Work Plan (page 1-5), such secondary criteria will not be used in the first instance to judge success – i.e., if the parameters listed in Section 4.2.3 in the dredged areas fall within the range of conditions in the reference areas, the habitat replacement/reconstruction shall be considered successful, without further consideration of the secondary criteria. However, if the listed parameters in the dredged areas do not fall within the range of conditions in the reference areas, the available data directly measuring functions (e.g., fish and/or wildlife presence) shall be reviewed as a secondary measure for evaluating success; and if those data in dredged areas fall within the range of those in the reference areas, and if the data are sufficient to indicate that such conditions are likely to be sustainable, then the habitat replacement/reconstruction shall be considered successful. The information on the presence of biota including fish and wildlife shall be obtained from observations conducted under the HDA program (if any), biological data collected under other remediation programs (e.g., fish information from the BMP), or additional data, that are agreed upon by GE and USEPA as appropriate, collected under the OM&M program.

General narrative descriptions of success criteria and hypotheses will be provided in the *Adaptive Management Plans* that will accompany the *Final Design Reports*. Specific numerical criteria will be developed when post-remediation monitoring is initiated, to account for contemporaneous conditions in the reference areas as well as pre-remediation conditions throughout each river section. If neither the primary success criteria nor the secondary criteria based directly on functional data (if used) are met, GE shall undertake adaptive adjustment measures, as described in Section 4.4. Once success criteria are met and the habitat conditions meeting those criteria are considered sustainable, GE shall have no further obligation for OM&M of, or other further actions relating to, the habitat replacement/ reconstruction in these areas. It is anticipated that habitats will be well established within a period of 20 years or less, and considerably shorter periods for some habitat types or areas.

4.4 ADAPTIVE ADJUSTMENT MEASURES

Natural engineering, including self-design (by which the ecosystem itself optimizes its recovery, Mitsch 2000), is fundamental to the success of the adaptive management program. As noted above, the parameters listed in Section 4.2.2 shall be the primary measures to define habitat replacement and reconstruction and control the recovery trajectories. Active and passive habitat replacement/reconstruction shall be incorporated into the design documents. In some situations, initial active or passive approaches may be insufficient to achieve success criteria or the recovery trajectory may be below expectations. In such situations, corrective action measures may need to be implemented in the form of adaptive management measures.

In the short term, if monitoring or observations indicate that specific measures are necessary to prevent or halt specific problems such as bank slope failure where structural integrity is needed to support infrastructure or habitat, GE shall implement such measures. In the longer term, adaptive adjustments may be necessary to support the natural engineering process. Evaluations to determine whether any longer-term adaptive adjustments are needed will be made on a yearly basis. In deciding whether, how, and when to undertake such adjustments, the adaptive management program shall incorporate a logical sequence of iterative assessment and adjustment steps intended to maximize habitat recovery while minimizing human interference

with natural engineering processes. In summary, the sequence shall: (1) acknowledge and account for lag times following implementation, i.e., that habitat recovery may take one or more years to reach the intended trajectory due to ecological processes, habitat type, and/or the extent of changes that the river will undergo during remediation; (2) determine if a problem exists; and (3) determine the appropriate action. The appropriate actions shall be based on the nature and extent of the identified problem(s) (e.g., shoot density in replaced/reconstructed aquatic vegetation bed is below that in the reference beds), and may include continuation of monitoring, adjustment of site-specific goals (e.g., a portion of the site may no longer be suitable for aquatic vegetation and thus the goals for that area would need to be altered, and if warranted, corrective measures would be taken), or implementation of a field response action. For the OM&M activities under this Scope, field response actions shall consist of the following, plus any additional actions that are agreed upon by GE and USEPA as appropriate for adaptive management, based on field experience:

- Bank stabilization measures, including use of vegetated material or placement of riprap, if necessary, to stabilize riverbanks. Natural shorelines shall be maintained where practicable. Regrading banks shall only be considered if access has been or is obtained for the area in question.

- Invasive species management in replaced/reconstructed areas to maintain the extent of invasive species below specific levels (percent of a site) as specified in the *Final Design Reports*. This field response action does not include the complete elimination of invasive species from replaced/reconstructed areas. Acceptable species for planting will be included in the contract specifications. The invasive species management program will be fully described in the *Adaptive Management Plans* that will accompany the *Final Design Reports*.

- Targeted plantings in aquatic vegetation beds, wetlands, and shoreline habitats. This field response action does not include complete replanting of a site unless the cause(s) for the initial failure of the plantings has been identified and corrected/controlled. This field

response action will be fully described in the *Adaptive Management Plans* that will accompany the *Final Design Reports*.

- Maintenance of habitat replacement/reconstruction structures consistent with design specifications and as appropriate under the applicable *Adaptive Management Plan* (e.g., anchoring three-dimensional structures).

- Actions to respond to the impacts of unforeseen anthropogenic (i.e., non-natural events), as agreed upon by GE and USEPA and as appropriate under, and consistent with, the applicable *Adaptive Management Plan*.

This OM&M program shall not require the implementation of changes in the type of habitat from the types designed and implemented as part of the habitat replacement/reconstruction program. Further details on the adaptive adjustment measures will be provided in the *Adaptive Management Plans*.

4.5 REPORTING

Habitat monitoring data that are collected as part of this OM&M program shall be used, in part, to evaluate the success of habitat recovery through evaluation of that recovery with primary, or as needed secondary, success criteria. During this OM&M program, GE shall provide the data from the program to USEPA, inclusive of data files, shape files, and photodocumentation, in the monthly reports and monthly database updates under the Consent Decree. In addition, GE shall submit annual *Adaptive Management Reports* to USEPA by January 31 of each year. Each such report shall present the habitat monitoring data collected during the previous calendar year(s) and the results of the adaptive management evaluations (including trend analysis) and actions (if any) performed during that year.

SECTION 5
REFERENCES

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Attachment F to the Statement of Work

Hudson River PCBs Site

Certification Unit Completion Approval/ Certification Forms

September, 2005

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

Hudson River
PCBs SUPERFUND SITE

Region 2: NJ, NY, PR, VI • 290 Broadway, New York, NY 10007

EPA Settlement with GE on Hudson River Dredging

October 2005

Highlights

The US Environmental Protection Agency (EPA) has reached an agreement with the General Electric Company (GE) to conduct and pay for the first phase of Hudson River dredging, scheduled for the 2007 spring through fall dredging season. Under the terms of a consent decree lodged in Federal District Court on October 6, 2005 by the U.S. Department of Justice (DOJ) on behalf of EPA, GE will construct the sediment transfer/processing facility needed for the project and perform Phase 1 of the dredging according to design plans developed under a prior agreement. The agreement also calls for GE to pay EPA up to $78 million for the Agency's past and future costs. EPA has already collected $37 million from GE through past settlements.

SETTLEMENT PROVISIONS

The October 2005 agreement with GE includes provisions that cover Phase 1 dredging, the construction of the sediment transfer/processing facility needed for the cleanup project, independent peer review of Phase 1, and the remaining dredging work. *The following are key elements of the consent decree:*

Construction of the Sediment Processing/Transfer Facility

Under the terms of the consent decree, GE has agreed to construct the sediment processing/transfer facility needed for the Hudson River cleanup. The layout of the facility, which will be built in Fort Edward, New York, was detailed in the Intermediate Design Report for Phase 1 of the cleanup released by GE for public comment in August 2005. Construction of the sediment processing/transfer facility is expected to be completed in time for GE to begin the first phase of dredging in the spring of 2007.

Phase 1 Dredging

The 2002 Record of Decision (ROD) for the site divides the dredging into two phases. The agreement with GE calls for the company to conduct Phase 1 of the dredging. Phase 1 will remove about 10 percent of the total volume of PCB-contaminated sediment slated for dredging during the full cleanup project and, together with the construction of the sediment transfer/processing facility, is expected to cost between $100 million and $150 million. Phase 1 dredging will be conducted during the 2007 construction season.

Phase 1 Evaluation

During late 2007 and early 2008, following the conclusion of Phase 1 dredging, EPA and GE will each evaluate whether the engineering performance standards developed for the project will need to be changed for Phase 2. Evaluation reports prepared by EPA and GE will be provided to the public and to an independent peer review panel of scientific experts.

EPA will then consider the conclusions of the peer review panel and make a decision about whether any changes to the engineering performance standards, the quality of life performance standards, or the way the Phase 2 work is to be performed, are needed. The Agency expects to inform GE in the spring of 2008 of any modifications that would be required during Phase 2 of the dredging program, which is expected to take five years.

Phase 2 Dredging

Under the agreement, after EPA informs GE of any modifications needed for Phase 2, GE has a fixed period of time in which to notify EPA whether it agrees to conduct Phase 2 of the dredging. If the company agrees to conduct Phase 2, that work will be carried out under the terms of the consent decree. Because the settlement is comprehensive and addresses both phases of the project, it allows for a seamless transition in the event that GE agrees to perform Phase 2. If GE does not agree to conduct the Phase 2 dredging, EPA has fully reserved all of its enforcement authorities. These include its right to direct the company to perform Phase 2 dredging and/or sue the company in district court to require it to perform the Phase 2 dredging or to reimburse EPA for its costs if EPA conducts Phase 2 using government funds.

Transition between Phase 1 and Phase 2

The agreement contains a provision to help ensure that there is no delay in the transition between Phase 1 and Phase 2 of the project. It requires GE to spend up to $5 million, between the end of the Phase 1 dredging and the date of GE's decision whether or not to voluntarily conduct Phase 2, to prepare for the initiation of the second phase of dredging during the fall of 2008.

Reimbursement of Past and Future Costs

The agreement calls for GE to pay EPA about $78 million for the Agency's past and future costs at the site if GE agrees to take on Phase 2, and about $43 million for such costs if GE does not agree to Phase 2. With the approximately $37 million collected under previous settlements, the Agency could ultimately receive a total of $115 million from GE for its work at the site. If GE does not choose to conduct Phase 2 under the consent decree, EPA will be free to seek the recovery of Agency costs associated with Phase 2 from GE.

Support for State Fish Consumption Advisories

The agreement includes a provision that helps to ensure that people are fully aware of state restrictions on eating Hudson River fish. Although New York State is not a party to the settlement, the agreement requires GE to pay the state $3 million to support its efforts to assist the public in understanding and complying with state fish consumption advisories. GE will provide an additional $1 million to this effort if it decides to conduct the Phase 2 dredging under the consent decree.

Public Comment

EPA and DOJ will accept public comments on the consent decree during a 30-day public comment period. Copies of the consent decree can be found on EPA's Web site at www.epa.gov/hudson. Hard copies are available for review at information repositories in Glens Falls, Fort Edward (EPA Hudson River Field Office), Ballston Spa, Albany, Poughkeepsie, New York City (EPA Region 2 offices), and Edgewater, New Jersey.

Cleanup Project Milestones

EPA has made substantial progress toward cleaning up the Hudson River since the February 2002 ROD for the project. The Agency has reached two previous agreements with GE under which the company agreed to conduct the extensive sediment sampling needed to identify the areas to be dredged, and to design the project. Other milestones include the collection and analysis of more than 48,000 samples from the river bottom, the completion of strict engineering and quality of life performance standards to protect public health and minimize impacts from the project, and the selection of a site for the sediment transfer/processing facility.

In August 2005, GE submitted the Intermediate Design Report for Phase 1 of the cleanup to EPA for review. This document contains key information about the cleanup of the river, including the type of dredging equipment that can be used, hours of operation, and the layout of the sediment transfer/processing facility in Fort Edward, New York.

In addition, under the previous agreements, GE has paid a total of $20 million in partial reimbursement of EPA's outstanding past costs, and over $15.5 million toward the costs incurred by EPA in performing activities for which it has lead responsibility and in overseeing GE's performance of the work. These payments, plus approximately $1.5 million received under earlier agreements, account for the $37 million EPA has received from GE to date.

Background

EPA's cleanup plan for the Hudson River PCBs Superfund site was selected through the Agency's February 1, 2002 ROD for the site. The ROD calls for targeted environmental dredging and removal of approximately 2.65 million cubic yards of PCB-contaminated sediments from the Upper Hudson River, between Fort Edward and the Federal Dam in Troy.

As PCB-contaminated sediments are dredged, the sediments will be transported to the dewatering/transfer facility by barge. The sediments will then be processed to remove water and stabilized using cement or fly ash to harden the material, as necessary, for shipment. The water will be sent to an on-site plant for treatment before it is released back into the river.

For More Information

Visit, call toll-free **(1-866-615-6490)**, or write to the Hudson River Field Office at the address below or log on to **www.epa.gov/hudson**.

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The Field Office hours are Monday - Friday 8:00 am - 4:30 pm, with evening hours by appointment. Email hrfo@capital.net.

EPA Regional Public Liaison

EPA Region 2 has designated a public liaison as a point-of-contact for community concerns and questions about the federal Superfund program in New York, New Jersey, Puerto Rico, and the U.S. Virgin Islands. To support this effort, the Agency has established a 24-hour, toll-free number that the public can call to request information, express concerns, or register complaints about Superfund. The public liaison for EPA's Region 2 office is: George H. Zachos, U.S. EPA, Region 2, 2890 Woodbridge Avenue MS-211 Edison, New Jersey 08837, (732) 321-6621, Toll-free (888) 283-7626.

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