



General Electric Company

Phase 1 Performance Standards Compliance Plan

Appendix D of the Remedial Action Work Plan for
Phase 1 Dredging and Facility Operations

Hudson River PCBs Superfund Site

Revision 1 - May 2009

**Phase 1 Performance
Standards Compliance Plan**

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Action Work Plan for Phase 1
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Site

Revision 1

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General Electric Company

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Acronyms and Abbreviations	1
1. Introduction	6
1.1 Overview	6
1.2 Document Organization	9
1.3 General Qualification	10
2. Resuspension Performance Standard	12
2.1 Overview of Standard	12
2.1.1 Near-Field Criteria	12
2.1.2 Far-Field Criteria	13
2.2 Routine Control Measures	15
2.3 Routine Monitoring	17
2.4 Contingency Monitoring	18
2.5 Contingency/Response Actions	18
2.5.1 Evaluation Level	20
2.5.2 Control Level	21
2.5.3 Standard Level	22
2.5.4 Potential Engineering Solutions	23
2.6 Reporting and Notifications	24
2.6.1 Routine Reporting	24
2.6.2 Contingency Reporting	25
2.7 Special Studies	26
3. Water Quality Requirements for In-River Releases of Constituents Not Subject to Performance Standards	28
3.1 Overview of WQ Requirements	28
3.1.1 Aquatic Acute Water Quality Standards at Near-Field Stations	28
3.1.2 Health (Water Source) Standards at Far-Field Stations	29
3.2 Routine Monitoring	30
3.3 Contingency Monitoring	30

3.4	Contingency/Response Actions	31
3.5	Responses to Observations of Distressed or Dying Fish	32
3.6	Reporting and Notifications	33
4.	Residuals Performance Standard	34
4.1	Overview of Standard	34
4.2	Sampling and Analysis Requirements	36
4.2.1	Sampling Grid	37
4.2.2	Sample Collection	37
4.2.3	Sample Analysis	37
4.3	Evaluation of Sampling Data	37
4.3.1	Arithmetic Average of CU	38
4.3.2	20-Acre Arithmetic Average	39
4.4	Required Actions	40
4.4.1	Verification of Design Dredging Cut Lines	41
4.4.2	Required Response Actions	41
4.4.3	Extent of Non-Compliant Area	45
4.5	Reporting	47
4.6	Special Study	48
5.	Productivity Performance Standard	51
5.1	Overview of Standard	51
5.2	Design Analyses and Routine Control Measures	53
5.2.1	Design Analyses	53
5.2.2	Comparisons of Production Rates to Production Schedule	53
5.2.3	Routine Control Measures	54
5.3	Routine Monitoring and Reporting	55
5.4	Contingency/Response Actions	57
5.4.1	Actions in Event of Concern Level Shortfall	57

5.4.2	Actions in Event of Control Level Shortfall	58
5.4.3	Actions in Event of Standard Level Shortfall	58
5.4.4	Potential Contingency Actions to Increase Productivity	58
6.	Air Quality Performance Standard	60
6.1	Overview of Standard	60
6.1.1	PCBs	60
6.1.2	Opacity	61
6.1.3	NAAQS	61
6.2	Design Analyses and Routine Control Measures	62
6.2.1	PCBs in Ambient air	62
6.2.2	Opacity	63
6.2.3	NAAQS	64
6.3	Routine Monitoring	64
6.4	Contingency Monitoring	65
6.5	Contingency/Response Actions	65
6.5.1	Actions in Event of Exceedance of PCB Air Quality Concern Level	65
6.5.2	Actions in Event of Exceedance of PCB Air Quality Standard	66
6.5.3	Actions in Event of Exceedance of Opacity Standard	67
6.5.4	Actions in Event of Air Quality Complaint	67
6.5.5	Potential Additional Engineering Controls and Mitigation Measures	67
6.6	Reporting and Notifications	68
7.	Odor Performance Standard	70
7.1	Overview of Standard	70
7.2	Design Analyses and Routine Control Measures	70
7.3	Routine Monitoring	71
7.4	Contingency Monitoring	71
7.5	Contingency/Response Actions	71

7.5.1	Actions in Event of Exceedance of Hydrogen Sulfide Standard	72
7.5.2	Actions in Event of Odor Complaint	72
7.5.3	Potential Additional Engineering Controls and Mitigation Measures	73
7.6	Reporting and Notifications	74
8.	Noise Performance Standard	76
8.1	Overview of Standard	76
8.2	Design Analyses and Routine Control Measures	78
8.2.1	Dredging Operations	78
8.2.2	Sheet Pile Installation	79
8.2.3	Processing Facility Operations	80
8.3	Routine Monitoring	82
8.4	Contingency Monitoring	82
8.5	Contingency/Response Actions	82
8.5.1	Actions in Event of Exceedance of Residential Control Level	83
8.5.2	Actions in Event of Exceedance of Noise Standard	83
8.5.3	Actions in Event of Noise Complaint	84
8.5.4	Potential Additional Engineering Controls and Mitigation Measures	85
8.6	Recordkeeping, Reporting and Notification	86
9.	Lighting Performance Standard	88
9.1	Overview of Standard	88
9.2	Design Analyses and Routine Control Measures	89
9.3	Routine Monitoring	90
9.4	Contingency Monitoring	90
9.5	Contingency/Response Actions	90
9.5.1	Actions in Event of Exceedance of Lighting Standard	90
9.5.2	Actions in Event of Lighting Complaint	92
9.5.3	Potential Additional Engineering Controls and Mitigation Measures	93

9.6	Recordkeeping, Reporting and Notifications	93
10.	Navigation Performance Standard	95
10.1	Overview of Standard	95
10.2	Design Analyses and Routine Control Measures	96
10.3	Routine Notices	98
10.4	Routine Monitoring	99
10.5	Contingency/Response Actions	99
10.5.1	Actions in Event of Deviation at Concern Level	99
10.5.2	Actions in Event of Deviation at Exceedance Level	100
10.5.3	Actions in Event of Navigation Complaint	100
10.5.4	Potential Mitigation Measures	102
10.6	Reporting and Notifications	102
11.	Substantive Water Quality Requirements for Discharges to Champlain Canal and Bond Creek	104
11.1	Effluent Limitations	104
11.1.1	Effluent Limitations for Dewatering Facility (Outfall 001)	104
11.1.2	Effluent Limitations for Non-Contact Stormwater through Outfalls 002 and 003	109
11.2	Discharge Monitoring	113
11.2.1	Discharge Monitoring from the Dewatering Facility (Outfall 001)	113
11.2.2	Discharge Monitoring for Non-Contact Storm Water (Outfalls 002 and 003)	113
11.3	Response Actions	113
11.3.1	Response Actions for Dewatering Facility (Outfall 001)	114
11.3.2	Response Actions for Non-Contact Water Discharge (Outfalls 002 and 003)	114
11.4	Reports and Notifications	115
12.	References	116

Tables

Table 2-1	Summary of Resuspension Criteria	13
Table 4-1	Summary of the Performance Standard for Dredging Residuals	33
Table 5-1	Minimum and Target Volumes Based on Productivity Performance Standard	49
Table 5-2	Productivity Standard Action Levels	49
Table 11-1	Effluent Limits for Discharge from Outfall 001 to the Champlain Canal	101
Table 11-2	Outfall 1 Discharge Limits for Flows Above 0.1 MGD	105
Table 11-3	Effluent Limitations for Non-Contact Storm Water Discharge from Outfall 002	107
Table 11-4	Effluent Limitations for Non-Contact Storm Water Discharge from Outfall 003	108

Acronyms and Abbreviations

BBL	Blasland, Bouck & Lee, Inc. (now ARCADIS)
Cd	cadmium
CD	Consent Decree
CD-ROM	compact disc – read only memory
CDE	Critical Phase 1 Design Elements (Attachment A to the SOW)
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CHASP	Community Health and Safety Plan
cr	chromium
Cu	copper
CU	Certification Unit
cy	cubic yards
cy/day	cubic yards per day
dba	Decibels using A-weighted scale
DO	dissolved oxygen
DQAP	Dredging Construction Quality Control/Quality Assurance Plan
DSR	Data Summary Report

EDD	effective date of discharge
eDMS	electronic data management system
EGIA	East Griffin Island Area
EPA	U.S. Environmental Protection Agency
EPS	Engineering Performance Standards
FDR	Final Design Report
g/day	grams per day
GE	General Electric Company
H ₂ S	hydrogen sulfide
Hudson EPS	<i>Hudson River PCBs Superfund Site Engineering Performance Standards</i>
Hudson QoLPS	<i>Hudson River PCBs Superfund Site Quality of Life Performance Standards</i>
Kg	kilogram
kg/year	kilogram per year
lb(s)/day	pound(s) per day
m	meter
MCL	maximum contaminant level
MDL	minimum detection level
MGD	million gallons per day
µg/L	microgram per liter



Phase 1 Performance Standards Compliance Plan

Appendix D of the Remedial Action Work Plan for Phase 1 Dredging and Facility Operations

$\mu\text{g}/\text{m}^3$	microgram per cubic meter
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MGD	million gallons per day
NAAQS	National Ambient Air Quality Standards
ng/L	nanograms/liter
NTIP	Northern Thompson Island Pool
NYSCL	New York State Consolidated Laws
NYCRR	New York Codes, Rules and Regulations
NYS Canal Corporation	New York State Canal Corporation
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PCBs	polychlorinated biphenyls
Pb	lead
Phase 1 FDR	Phase 1 Final Design Report
Phase 1 RA CHASP	Phase 1 Remedial Action Community Health and Safety Plan
Phase 1 RAM QAPP Plan	Phase 1 Remedial Action Monitoring Quality Assurance Project Plan
Phase 1 PSCP	Phase 1 Performance Standards Compliance Plan
ppm	parts per million



Phase 1 Performance Standards Compliance Plan

Appendix D of the Remedial Action Work Plan for Phase 1 Dredging and Facility Operations

PSCP	Performance Standards Compliance Plan
PSCP Scope	Performance Standards Compliance Plan Scope (Attachment C to the SOW)
QEA	Quantitative Environmental Analysis, LLC
QoLPS	Quality of Life Performance Standards
RA	Remedial Action
RA CHASP	Remedial Action Community Health and Safety Plan
RA CHASP Scope	Remedial Action Community Health and Safety Program Scope (Attachment D to the SOW)
RAM Scope	Remedial Action Monitoring Scope (Attachment B to the SOW)
RAWP # 1	Remedial Action Work Plan for Phase 1 Facility Site Work Construction
RAWP # 2	Remedial Action Work Plan for Phase 1 Processing Equipment Installation
RAWP # 3	Remedial Action Work Plan for Phase 1 Dredging and Facility Operations
SOW	Statement of Work for Remedial Action and Operations, Maintenance and Monitoring (Appendix B to the CD)
SP1	sediment profile imagery
Substantive WQ Requirements	Substantive Water Quality Requirements issued by EPA
TAL	target analyte list
Tri+ PCBs	PCBs with three or more chlorine atoms



**Phase 1 Performance
Standards
Compliance Plan**

Appendix D of the Remedial
Action Work Plan for Phase 1
Dredging and Facility
Operations

TSS	total suspended solids
USCG	United States Coast Guard
WQ Requirements	water quality requirements

1. Introduction

1.1 Overview

This Phase 1 Performance Standards Compliance Plan (PSCP) has been prepared on behalf of the General Electric Company (GE). It applies to the Phase 1 portion of the remedy selected by the U.S. Environmental Protection Agency (EPA) to address polychlorinated biphenyls (PCBs) in sediments of the Upper Hudson River, located in New York State, as described in EPA's February 2002 Record of Decision for the Hudson River PCBs Superfund Site (EPA 2002). This PSCP describes the actions that GE will take during Phase 1 to implement the Engineering Performance Standards (EPS), the Quality of Life Performance Standards (QoLPS), and the substantive water quality requirements (WQ Requirements) issued by EPA for Phase 1 of the Remedial Action (RA).

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

The QoLPS consist of performance standards applicable to air quality, odor, noise, lighting and navigation. These standards are described in a document titled *Hudson River PCBs Superfund Site Quality of Life Performance Standards*, issued by EPA in May 2004 (EPA 2004b, cited as Hudson QoLPS).

The WQ Requirements consist of: (1) requirements relating to in-river releases of constituents not subject to the EPS, as set forth in the *Substantive Requirements Applicable to the Release of Constituents not Subject to Performance Standards*; and (2) the substantive requirements for discharges to the Hudson River and/or 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 Discharges to the Hudson River*. These WQ Requirements were provided by EPA to GE on January 7, 2005 (EPA 2005, cited as Hudson Substantive WQ Requirements). In addition, on September 14, 2006, EPA provided to GE a set of substantive requirements relating to stormwater discharges to Bond Creek (EPA 2006).

This PSCP was prepared pursuant to the Consent Decree (CD) executed by the United States of America and General Electric Company, dated October 2005 and entered by the United States District Court for the Northern District of New York on November 2, 2006

(EPA and GE 2005). The CD includes, as Appendix B, a Statement of Work for Remedial Action and Operations, Maintenance and Monitoring (SOW). The SOW requires GE to submit a number of work plans for implementation of various aspects of Phase 1 of the RA. Among other things, it requires GE to submit a Remedial Action Work Plan for Phase 1 Dredging and Facility Operations (RAWP #3), and it requires that this work plan include a Phase 1 PSCP to set forth the actions that GE will take to address the EPS, QoLPS and WQ Requirements during Phase 1. In addition, the SOW contains, as Attachment C, a Performance Standards Compliance Plan Scope (PSCP Scope), which provides a general description of the actions that GE will take during Phase 1 to implement the EPS, QoLPS and WQ Requirements; and the SOW requires that this PSCP be consistent with the PSCP Scope.

The SOW also references various other submittals that GE is required to make for Phase 1 of the RA that are relevant to GE's implementation of the EPS, QoLPS and WQ Requirements. For example, the SOW contains, as Attachment B, a Remedial Action Monitoring Scope (RAM Scope), which describes the environmental monitoring and sampling program that GE will carry out during Phase 1 to implement those standards and requirements. It also requires GE to submit a Phase 1 Remedial Action Monitoring Quality Assurance Project Plan (Phase 1 RAM QAPP), which specifies those monitoring and sampling requirements in greater detail. In addition, the SOW contains, as Attachment D, a Remedial Action Community Health and Safety Program Scope (RA CHASP Scope), which describes certain key elements of GE's community health and safety program for Phase 1, including actions to address the QoLPS. The RA CHASP Scope also notes that GE would submit a more detailed Phase 1 Remedial Action Community Health and Safety Plan (Phase 1 RA CHASP) along with its Phase 1 Final Design Report (Phase 1 FDR). The SOW provides that if any items required to be included in the PSCP are set forth in one of those other documents, as approved by EPA (or in another EPA-approved document), such requirements may be incorporated by reference into this PSCP.

In January 2009, GE and EPA agreed to a modification of the Consent Decree (CD Modification No. 1), which was filed with the court and became effective on March 23, 2009. CD Modification No. 1, among other things, added to the CD provisions relating to reimbursement by GE of costs incurred by EPA in providing an alternate water supply or water treatment to certain downstream water suppliers. It also set forth, in Attachment A thereto, revisions to the SOW, the RAM Scope, the PSCP Scope, and the CHASP Scope to reflect a modified scope of the water quality monitoring program agreed upon by EPA and GE, along with certain associated changes.



GE submitted the initial Phase 1 RA CHASP (Parsons 2006) on March 21, 2006, as part of its Phase 1 FDR (Blasland, Bouck & Lee [BBL] 2006). The Phase 1 RA CHASP was subsequently updated to address EPA comments and feedback received from local emergency responders as well as to incorporate relevant information from the Remedial Action Work Plan for Phase 1 Facility Site Work Construction (RAWP #1; Parsons 2007a) and the Remedial Action Work Plan for Phase 1 Processing Equipment Installation and Remaining Site Work (RAWP #2; Parsons 2007b). That revised Phase 1 RA CHASP was submitted in April 2007 (Parsons 2007c) and was approved by EPA in a letter dated January 25, 2008, along with EPA's final approval of the Phase 1 FDR (EPA 2008). The Phase 1 RA CHASP has been revised again to reflect the agreements embodied in Consent Decree Modification No. 1, as well as other more recent developments. That further revised CHASP was submitted to EPA in February 2009, accepted by EPA in April 2009 subject to certain minor changes, and submitted in final form in May 2009 (Parsons 2009).

In addition, GE initially submitted the Phase 1 RAM QAPP on December 1, 2006 (Quantitative Environmental Analysis, LLC [QEA] 2006), as required by the CD and SOW. That plan was initially revised in February 2009 and has been further revised based on comments from EPA as well as to reflect the revised water column monitoring program set forth in the modified version of the RAM Scope included in Attachment A to CD Modification No.1. The final Phase 1 RAM QAPP was submitted to EPA in May 2009 (Anchor QEA 2009).

As required by the SOW, this Phase 1 PSCP has been prepared to be consistent with the PSCP Scope, as amended by Attachment A to CD Modification No.1. To avoid undue repetition, this Phase 1 PSCP references or incorporates by reference portions of the Phase 1 RAM QAPP and Phase 1 RA CHASP, as also revised by Attachment A to CD Modification No. 1. (The references herein to those documents refer to those revised versions.) In addition, this PSCP references Phase 1 FDR and/or RAWP #3 (to which this PSCP is an appendix), where appropriate.

The activities of Phase 1 will be evaluated to assess, among other things, whether the EPS, QoLPS and WQ Requirements can be achieved. Under the CD, this evaluation will include a Peer Review that will assess whether the three EPS, including their respective monitoring programs, can be consistently achieved, individually and simultaneously, and if not, whether and how they should be modified for Phase 2.

Following the completion of Phase 1, EPA will discuss with GE the changes that the Agency believes are appropriate, if any, to the EPS, the QoLPS, the WQ Requirements, the SOW

and/or the scope of Phase 2. Potential changes will be reviewed with GE before EPA makes its decision regarding such changes. Following EPA’s decision regarding such changes, GE will notify EPA, in accordance with the CD, whether it will implement Phase 2 of the RA pursuant to the CD. If it elects to do so, GE will prepare and submit, as part of the Phase 2 RA Work Plan, a Phase 2 PSCP which will incorporate any modifications to the PSCP that are needed to account for EPA’s changes, if any, to the EPS, the QoLPS, the WQ Requirements, the SOW and the scope of Phase 2.

1.2 Document Organization

This PSCP includes the following sections:

Section 1 – Introduction: This section presents general information about the report.

Section 2 – Resuspension Performance Standard: This section summarizes the Resuspension Performance Standard as set forth in the Hudson EPS. It covers routine resuspension control measures and monitoring, contingency monitoring, other responses in the event of an exceedance of an action level, reporting and notification procedures, and the five special studies to be conducted in connection with this standard.

Section 3 – Water Quality 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, as set forth in the Hudson Substantive WQ Requirements. It covers routine control measures and monitoring, responses in the event of an exceedance of an applicable standard or an observation of distressed or dying fish, and reporting and notification procedures.

Section 4 – Residuals Performance Standard: This section discusses the Residuals Performance standard as set forth in the Hudson EPS. It covers sampling and analytical procedures following initial inventory dredging, evaluation of the sampling data, the responses to be taken based on the sampling data, reporting procedures, and the special study under this standard.

Section 5 – Productivity Performance Standard: This section discusses the Productivity Performance Standard as set forth in the Hudson EPS. It references the Phase 1 dredging production schedule presented in RAWP #3, developed to meet EPA’s Productivity Performance Standard, and discusses productivity monitoring and reporting requirements and the actions to be taken in the event that production falls behind schedule.

Sections 6 through 9 – Performance Standards for Air Quality, Odor, Noise and Lighting: These sections relate to the quality-of-life standards for air quality, odor, noise and lighting, as set out in the Hudson QoLPS. They cover design analyses performed to assess achievement of these standards, the routine control measures intended to achieve these standards, routine monitoring during operations, contingency monitoring and other responses in the event of an exceedance of an applicable standard or other trigger level, procedures for responding to complaints, and reporting and notification procedures.

Section 10 – Navigation Performance Standard: This section discusses the QoLPS for river navigation during Phase 1 dredging. It describes the general requirements of the standard, the actions GE will take to meet the standard, the routine notice and monitoring procedures, contingency actions in the event of a deviation from the applicable requirements, procedures for responding to complaints, and reporting and notification procedures.

Section 11 – Substantive Water Quality Requirements for Discharges to Surface Water: This section addresses the effluent limitations and discharge monitoring requirements applicable to the discharges from the water treatment facility to the Champlain Canal (land cut above Lock 7) and the non-contact stormwater discharges to Bond Creek, as well as the associated response actions and reporting and notification procedures.

Section 12 – References: This section provides bibliographic references to documents referred to in this Phase 1 PSCP.

1.3 General Qualification

In accordance with the PSCP Scope, the following paragraph applies to all sections of this Phase 1 PSCP and qualifies GE's obligations to take actions to achieve the EPS, QoLPS and WQ Requirements during Phase 1.

GE will not be required, during the Phase 1 field season, to make equipment modifications or additions for that season that are not reasonably available from a schedule or cost perspective, recognizing that substitutions during a field season for major equipment approved in the Phase 1 FDR or RAWP #3 or being used in Phase 1 may be impractical. (If necessary, more significant changes in equipment, operations or processes may be required for Phase 2, subject to Paragraphs 15 and 20 of the CD.) However, in the event reasonable changes can be made to address achievement of the performance standards during Phase 1, GE will propose (either on its own initiative or at EPA's request) such changes to equipment or operations for EPA review and approval. GE and EPA have

agreed that what is considered “reasonable” or “reasonably available” in a given situation, for the purposes of this paragraph, will 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 Phase 1 FDR or RAWP #3, based on field conditions or experience. This paragraph will not be construed to affect or limit any rights EPA has under Paragraph 15 or 20 of the CD.

2. Resuspension Performance Standard

This section discusses the Resuspension Performance Standard, which is applicable to dredging operations in the river, and set forth in the Hudson EPS (Volume 1, Section 2.1, and Volume 2). The objectives of the Resuspension Performance Standard are to:

- Maintain PCB concentrations in the water column at or below the federal drinking water maximum contaminant level (MCL) of 500 nanograms per liter (ng/L) to protect downstream water supply intakes
- Minimize the release of PCBs from sediment during remedial dredging
- Minimize the export of PCBs to downstream areas, including the Lower Hudson River

2.1 Overview of Standard

The Resuspension Performance Standard specifies three action levels: evaluation, control and standard levels. The resuspension action levels are described in detail in the Hudson EPS (Volume 2, Section 4.1). These action levels apply to PCBs and/or total suspended solids (TSS) in surface water at either near-field monitoring stations (located within 300 meters [m] of the dredging activities) or far-field monitoring stations (located more than 1 mile downstream of dredging activities). The routine monitoring program at those stations is covered in Section 2.3 below. Table 2-1 summarizes the resuspension action levels as provided in the Hudson EPS (Volume 1, Table 2-1). Exceedance of these action levels will require additional monitoring or contingency actions beyond those required by the routine monitoring program. The contingency monitoring and actions are described in Sections 2.4 and 2.5 below. The monitoring program is described further in the Phase 1 RAM QAPP.

2.1.1 Near-Field Criteria

There are two near-field action levels: evaluation level and control level. These action levels were specified the Hudson EPS (Volume 2, Section 4.1) and the PSCP Scope (Section 2.1), and are summarized below and in Table 2-1 with modifications based on Attachment A to CD Modification No. 1.

The evaluation level for Phase 1 includes: (a) a net increase in TSS (over upstream levels) of 100 milligrams per liter (mg/L), represented as a 6-hour average concentration, as measured in 6-hour composite samples; or (b) an average TSS concentration of 700 mg/L, as calculated from turbidity measurements made twice per days at certain monitoring

transects (with such calculations based on a TSS-turbidity relationship developed by GE and to be continually updated during Phase 1).

The near-field control level is now the same as the first of the above evaluation level criteria – i.e., a net increase in TSS of 100 mg/L, represented as a 6-hour average concentration, as measured in 6-hour composite samples.

2.1.2 Far-Field Criteria

There are three far-field action levels: evaluation level, control level and standard level. These action levels were specified in the Hudson EPS (Volume 2, Section 4.1), and the PSCP Scope (Section 2.1). However, as allowed by the Resuspension Performance Standard, certain of those action levels which are based on PCB loading have been adjusted for Phase 1, as described below. These action levels, with those adjustments as well as revisions resulting from Attachment A to CD Modification No, 1, are summarized below and in Table 2-1.

The evaluation level is the lowest action level. It includes both a net PCB load of 300 grams per day (g/day) Total PCBs or 100 g/day of PCBs with three or more chlorine atoms (Tri+ PCBs) as a 7-day running average and a net TSS concentration increase of 12 mg/L as a 6-hour running average or for the daily dredging period if less than 6 hours.

The control level is the middle action level. As described in the above documents, the control level originally included a Total PCB concentration of 350 ng/L as a 7-day running average, a net PCB load increase for the Phase 1 dredging season of 65 kilogram (kg) Total PCBs or 22 kg Tri+ PCBs, a net PCB load of 600 g/day Total PCBs or 200 g/day Tri+ PCBs as a 7-day running average, and a net TSS concentration increase (over upstream levels) of 24 mg/L as a 24-hour running average or for the daily dredging period if between 6 and 24 hours. However, the Resuspension Performance Standard allows the overall seasonal PCB load criteria to be adjusted for Phase 1 if the targeted Phase 1 mass removal differs from the assumptions on which those criteria were based – which was that 10% of the total PCB inventory subject to removal would be dredged in Phase 1 (Hudson EPS, Volume 2, pp. 95, 97). Comparing the total PCB mass in all dredge areas (as calculated in GE's Phase 2 Dredge Area Delineation Report) to the mass targeted for removal in Phase 1 indicates that the PCB mass targeted for removal in Phase 1 is actually 18% of the total inventory to be removed. Based on these estimates, using an equation presented in the Hudson EPS (Volume 2, p. 97), the control level criteria for the total net increase in PCB loading in Phase 1 have been adjusted to 117 kg/year of Total PCBs and 39 kg/year of Tri+ PCBs. In addition, given these adjustments to the seasonal load criteria, the 7-day average

daily load criteria have been correspondingly adjusted for Phase 1 to 1,080 g/d for Total PCBs and 361 g/d for Tri+ PCBs, based on the assumption of a dredging season of 108 dredge days (which was the annual Phase 1 load criterion in the EPS of 65 kg divided by the daily average load criterion of 600 g/d specified in the EPS). In addition, under the revised monitoring program, the 24 mg/L TSS criterion will be a 24-hour average concentration, as measured in 24-hour composite samples. These adjustments pertain only to the Total PCB and Tri+ PCB loads. The other criteria for this level remain unchanged.

The standard level is 500 ng/L Total PCBs, equal to the federal MCL for drinking water. Exceedance of this level will require a temporary cessation of dredging and will require additional actions including increased monitoring and notifications. To constitute a confirmed exceedance of the standard level, an initial result greater than or equal to 500 ng/L Total PCBs must be confirmed by the average concentration of triplicate samples collected within 24 hours of the first sample. The standard level does not apply to far-field station measurements if the station is within one mile of the dredging operations.



**Table 2-1
Summary of Resuspension Standard Criteria for Phase 1**

Parameter		Evaluation Level		Control Level		Standard Level	
		Limit	Duration	Limit	Duration	Limit	Duration
Far-Field PCB Concentration	Total PCBs			350 ng/L	7-day running average	500 ng/L	Confirmed occurrence
Far-Field Net PCB Load	Total PCBs			117 kg/year	Phase 1 dredging season		
	Tri+ PCBs			39 kg/year			
	Total PCBs	541 g/day	7-day running average	1,080 g/day	7-day running average		
	Tri+ PCBs	180 g/day		361 g/day			
Far-Field Net Suspended Solids Concentration	TSS	12 mg/L	24-hour average	24 mg/L	24-hour average		
Near-Field (300 m) Net Suspended Solids Concentration	TSS	100 mg/L	6-hour average net increase over background	100 mg/L	6-hour average net increase over background		
Near-Field (100 m and Channel-Side) Net Suspended Solids Concentration	TSS	700 mg/L	Calculated from discrete turbidity measurements made in 2 sampling events per day				

Notes:

g/day = grams per day

kg/year = kilogram per year

ng/L = nanograms/liter

2.2 Routine Control Measures

The Dredging Contractor will employ the following best management practices during dredging operations in an effort to meet the Resuspension Standard:

1. Dredging from upstream to downstream (except when precluded by field conditions)
2. Dredging from top of slope to bottom of slope at the shoreline (except when precluded by field conditions)

3. Avoiding the stockpiling of material on the river bottom
4. Refraining from using the dredge bucket to drag sediments
5. Raking debris only as a last course of action during debris removal
6. Refraining from grounding of barges
7. Using hydraulic clamshell dredging buckets to minimize resuspension and release of sediments
8. Using and maintaining a bucket positioning system based on a Real Time Kinematic-Global Positioning System (GPS) to control placement of dredge and bucket accurately with reference to target removal location and elevation
9. To the extent reasonably possible, removing debris prior to dredging
10. To the extent reasonably possible, ensuring bucket grabs are closed prior to retrieval through the water column
11. Operating a dredge plant that is appropriately sized for the operation
12. Performing on-site training of dredge operators to use care and control in dredging, barge loading and capping/backfilling operations to minimize resuspension and loss of sediments
13. Conducting tow boat operations in a location or manner that minimizes resuspension due to propeller wash
14. Avoiding barge overflow
15. Adjusting the rate of movement of the dredging equipment (e.g., movement of the equipment from location to location, movement of the equipment through the water column, or the sediment removal rate), where appropriate and directed by GE's Construction Manager to address potential resuspension issues

In accordance with the Critical Phase 1 Design Elements (CDE), which is Attachment A to the SOW, the need for installation of resuspension controls in Phase 1 dredge areas was determined in the Phase 1 Final Design. This determination was based on comparison of

resuspension modeling results using an assumed resuspension loss value of 0.35 percent of resuspendable material to the control level criteria (except in a portion of the East Griffin Island Area [EGIA] as noted below, where dredging will be performed without controls as a test). As specified in the Phase 1 FDR, resuspension control measures will be implemented in two locations as part of the Phase 1 project: the east channel of Rogers Island and the EGIA.

East Channel of Rogers Island

As specified in the Phase 1 FDR (Drawings D-0200 and D-0201), temporary resuspension control structures will be installed in the east channel of Rogers Island. At the northern end of the channel, a rock dike will be installed to limit flow into the channel. The rock dike will be installed before inventory dredging begins in dredge area NTIP02B. The dike will include culvert piping fitted with a flow control gate to control the flow of water through the dike into the east channel.

At the southern end of the channel, a silt curtain with an access gate will be installed and maintained. The silt curtain will be installed before dredging begins in dredge area NTIP02B and will include an oil absorbent boom next to the silt curtain.

East Griffin Island Area

As specified in the Phase 1 FDR (Drawings D-0202 and D-0203), routine resuspension control measures in EGIA will include a sheet pile wall and silt curtain that will be used in evaluating the effectiveness of resuspension controls. Sheet piling will be installed along the east bank of the river to control resuspension from dredge areas EGIA01A or EGIA01B. A silt curtain will be installed and connected to the sheet pile wall. In addition, at the outset of Phase 1, dredging will be conducted in dredge area EGIA01A without any resuspension controls for a two-week period as a test to examine resuspension of solids and PCBs using operational controls only.

2.3 Routine Monitoring

GE will conduct routine monitoring at near- and far-field stations to monitor attainment of the resuspension action levels presented in Section 2.1. This monitoring will be performed during dredging and associated operations that have the potential for resuspending a significant amount of sediment. As described in the Phase 1 RAM QAPP, monitoring will be performed for the remedial operations listed below:

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

Water will be sampled at near-field stations (300 m from dredging operations or 150 m from resuspension control measures such as silt curtains) and far-field stations (one mile or more downstream of active dredge areas). The sampling data from these stations will be compared to the three-tiered action levels specified in the Resuspension Performance Standard to determine if an exceedance of any of the action levels has occurred.

A complete description of the routine resuspension monitoring is included in the revised Phase 1 RAM QAPP (Section 2), which is incorporated herein by reference.

2.4 Contingency Monitoring

In the event of certain types of exceedances of the action levels (or other specified conditions) at near-field or far-field stations, GE will conduct additional, contingency monitoring. The conditions that will trigger such monitoring and the scope of the contingency monitoring to be performed are fully described in the revised Phase 1 RAM QAPP (Section 2), and are incorporated herein by reference.

2.5 Contingency/Response Actions

In addition to contingency monitoring, GE will take various contingency actions in response to exceedances of the resuspension action levels, depending on the location and level of the exceedance. These actions are subject to the general qualification specified in Section 1.3 above. In addition, as provided in the CDE, GE will not be required during the implementation of Phase 1 to install additional engineered resuspension containment barriers beyond those specified in the design and/or provided for below.



In addition to the routine control measures described in Section 2.2 above, the potential need for contingency control structures was determined during the Phase 1 Final Design based on comparison of resuspension modeling results using an assumed resuspension loss value of 0.70 percent of resuspendable material to the control level criteria. Specified contingency controls were evaluated and included in the Phase I Final Design. These controls were described in the Contract Drawings and Dredging Operations Technical Specifications dated December 17, 2007, as modified by revised specifications submitted to EPA on July 25, 2008. Subsequently, in September 2008, GE proposed certain revisions to the contingency controls specified in the Phase 1 FDR – namely, to utilize silt curtains in lieu of sheet piling in most locations for which contingency controls were specified. EPA approved that proposal, on a trial basis for Phase 1, in a letter of January 30, 2009, and revised specifications and drawings reflecting that change were submitted to EPA on February 3, 2009. If an engineering evaluation (described below) indicates that the source of an exceedance is associated with these areas, the specified contingent controls (as so revised) will be installed before dredging continues in those areas. In some cases, GE may also consider other (non-specified) contingency actions; however, in accordance with CDE, no additional engineered resuspension controls beyond those specified contingency controls will be required during Phase 1.

The time frames for engineering evaluations and implementation of engineering solutions (if any) in accordance with the Resuspension Standard will be variable, depending on the circumstances surrounding the exceedance. The actual schedule to be implemented in the field will be subject to EPA review. Engineering evaluations (where performed) will begin immediately upon receipt of data indicating the exceedance of an action level. The engineering contingencies, where required, will be implemented as soon as possible so as to minimize PCB releases. To the extent practical, engineering contingency actions will begin within 1 week of an exceedance, assuming conditions remain in exceedance. In the case of a temporary halt of the operations, an evaluation will be completed within 5 days. In the event of a temporary cessation, every effort will be made to correct the problem and minimize the length of time of the stoppage.

During implementation of Phase 1, in the event that there is an exceedance of the evaluation level, control level or standard level that requires or warrants an engineering solution (as described below), 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 and subject to the qualifications noted above.

2.5.1 Evaluation Level

If monitoring shows an exceedance of the evaluation level, GE will consider performing an engineering evaluation to determine the cause of the exceedance. If performed, the 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, they will be proposed and discussed with the EPA field representative. The selection of investigative measures will depend on specific project circumstances, and may include one or more of the following 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 barge loading system and barge integrity
- Examination of boat traffic patterns near dredges to assess the potential for resuspension associated with tugs, barges and other support vessels
- Additional monitoring or sampling

Following the evaluation (if conducted), if the cause of the exceedance can be identified and is project-related, GE will consider and may recommend potential engineering solutions. (Potential engineering solutions are discussed in Section 2.5.4.) If GE performs an evaluation, GE will prepare an Engineering Evaluation Report including the engineering evaluation and results and present it to EPA. That Engineering Evaluation Report will also 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 Phase 1 FDR or RAWP #3, 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 will implement the engineering solution in accordance with the Engineering Evaluation Report.

2.5.2 Control Level

If monitoring indicates an exceedance of a control level, GE will undertake the following actions:

1. Implement control level contingency monitoring (if any) described in the Phase 1 RAM QAPP in order to confirm the exceedance. As specified in the Resuspension Performance Standard (Hudson EPS, Volume 2, Section 4.5.2), a control level exceedance of a TSS criterion must be confirmed by far-field PCB measurements before actions other than increased monitoring are required.
2. Conduct an engineering evaluation in an effort to determine the cause of the exceedance. The engineering evaluation will be initiated upon receipt of data confirming the exceedance.
3. If investigative measures are warranted to determine the cause of the control level exceedance, 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.
4. Evaluate potential engineering solutions to address the exceedance, and 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 engineering solutions to be considered are discussed in Section 2.5.4.
5. Prepare and submit an Engineering Evaluation Report, which contains the results of the engineering evaluation, the proposed engineering solution (if any) 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 Phase 1 FDR or the RAWP #3, then GE will implement the solution in consultation with the EPA field representative and will document the implementation of that solution in the Engineering Evaluation Report. In all other cases, GE will implement the engineering solution in accordance with the Engineering Evaluation Report as approved by EPA. If the cause of the exceedance was not identified by the engineering evaluation, the Engineering Evaluation Report will include a course of action for

continued monitoring and evaluation to determine the cause of the exceedance. GE will 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.

2.5.3 Standard Level

If monitoring shows an initial occurrence of a PCB concentration in excess of the standard level, GE will perform the following actions:

1. Promptly notify EPA, the New York State Department of Environmental Conservation (NYSDEC), the New York State Department of Health (NYSDOH) and the downstream public water suppliers (i.e., Halfmoon and Waterford) but no later than 3 hours after receipt of the data. GE will make these laboratory data available to EPA, NYSDEC, NYSDOH, and these water suppliers.
2. Implement standard level contingency monitoring described in the Phase 1 RAM QAPP to confirm the exceedance.

If subsequent sampling confirms an exceedance of the standard level, GE will perform the following actions:

1. Again promptly notify EPA, NYSDEC, NYSDOH, and the downstream public water suppliers, but no later than 3 hours after data receipt.
2. Temporarily cease dredging or other river-based operations that caused the exceedance.
3. Perform an engineering evaluation, as described previously.
4. Develop an engineering solution as described above for the control level (considering the actions described in Section 2.5.4), including 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.
5. 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 the 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 Phase 1 FDR or RAWP #3, GE will 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 re-initiation of dredging. In all other cases, GE will implement the engineering solution in accordance with the Engineering Evaluation Report as approved by EPA.

6. Reinitiate dredging, upon EPA approval, once the exceedance has been mitigated, in accordance with the schedule in the Engineering Evaluation Report.
7. If the cause of the exceedance was not identified during the engineering evaluation, the Engineering Evaluation Report submitted to EPA will include a course of action for continued evaluation to determine the cause of the exceedance. GE will consult with EPA on a regular basis until the cause and solution are determined, or until EPA determines that further evaluation is not necessary.

2.5.4 Potential Engineering Solutions

In the event that the steps described above indicate the need for an engineering solution, the engineering solutions to be considered will include the following:

1. Implement adjustments to dredging operations. These may include one or more of the following (to the extent not already implemented as part of best management practices):
 - a. Slowing the rate of bucket descent. Slow the rate of approach of the bucket to the bed surface in order to minimize resuspension caused by the pressure wave effect
 - b. Slowing the rate of bucket ascent. Slow the rate of bucket retrieval to minimize losses in the water column of material sticking to the outside of bucket or if the bucket is not completely closed due to debris
 - c. Slowing the rate of dredge advance (repositioning) in a dredge lane to minimize resuspension caused by spud removal/engagement and barge transport mechanisms
 - d. Modifying the thickness of dredge cuts



- e. Performing on-site training for dredge and tug operators
2. If the contractor is implementing best management practices (as described in Section 2.2), install the contingency containment system(s) specified in the Contract Drawings and Dredging Operations Technical Specifications dated December 17, 2007, as subsequently modified by the revised contract specifications and drawings submitted to EPA on February 3, 2009, at locations where such contingent controls are called for in the design. Such contingent resuspension controls may be installed in up to four locations in the east and west channels of Rogers Island.

In addition to the contingency actions listed above and subject to the general qualification stated in Section 1.3 above, GE may consider the following additional measures on a case-by-case basis:

1. Changing dredge operation (including further reduction in sediment removal rates in the area in question, to the extent not already implemented) or dredging equipment
2. Installing silt curtains in additional locations to control transport of suspended solids
3. Installing floating booms for control of floating debris or oil
4. 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
5. Temporarily ceasing operations if required

2.6 Reporting and Notifications

2.6.1 Routine Reporting

GE will provide a weekly electronic data export to EPA, which contains the most recent version of the data available at the time the file was created. GE will provide a "readme" text file documenting data additions and corrections with the data export. Changes and/or updates to the project data will be documented by two methods. Data verification and validation changes will be detailed in the automated data verification module and validation reports, which will be provided electronically to EPA. Other significant changes to the database will be documented in corrective action memoranda, which also will be provided electronically to EPA.

Additional information regarding routine reporting associated with the Resuspension Standard is included in the revised Phase 1 RAM QAPP (Section 2.9.1), which is incorporated by reference herein.

GE will make monitoring data available to EPA through daily automated email data summaries. In addition, GE will provide monthly reports on the environmental monitoring program as part of the Monthly Progress Reports pursuant to the CD. These monthly status reports will provide information on monitoring activities and actions taken, but will not be the primary method of communicating monitoring data and information on exceedances to EPA.

All data collected during Phase 1 through the date on which GE completes 1 month of Phase 1 dredging at the full Phase 2 production rate will be included in GE's Phase 1 Data Compilation Report in accordance with Paragraph 13.a of the CD.

In addition, GE will provide an annual Data Summary Report (DSR) that documents the data collected in Phase 1 for the water column monitoring program. This report will be submitted April 1 of the year following completion of Phase 1. The DSR will fully document the prior calendar year's work, including a summary of the work performed, a tabulation of results, field notes, processing data, constituent of concern forms, copies of laboratory audits, data validation results, copies of laboratory reports and a compact disc-read only memory (CD-ROM) version of the project database.

2.6.2 Contingency Reporting

GE will report any single sample that shows a Total PCB concentration at or above the standard level of 500 ng/L to EPA, NYSDEC, NYSDOH and the downstream public water suppliers within the Upper Hudson River promptly, but no later than within 3 hours of receipt of the analytical data showing that result.

Exceedances of the Resuspension Performance Standard criteria and any corrective actions taken will be summarized in the weekly reports described in Section 2.6.1 above.

GE will submit any Engineering Evaluation Reports prepared in response to an exceedance to EPA, as described in Section 2.5.

2.7 Special Studies

As stated in the Hudson EPS (Volume 2, Section 4.4): “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. ”

The Resuspension Standard (Hudson EPS, Volume 2, Section 4.4) 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 and Full-Scale Studies)
- Non-Target, Downstream Area Contamination
- Automated Monitoring (referred to in the Hudson EPS as “Phase 2 Monitoring Plan”)

The special study that addresses the development of a TSS surrogate relationship and the special study on automated monitoring are described in separate work plans (QEA 2005a and 2005b) and have been performed. These studies are largely complete, although certain questions raised by EPA are being addressed. The results of the TSS surrogate relationship study are presented in the Phase 1 RAM QAPP (Appendix 19), and are incorporated herein by reference. The results of the automated monitoring study have been incorporated into Section 2 of the revised Phase 1 RAM QAPP, which is incorporated herein by reference.

The near-field PCB release mechanism and non-target downstream area contamination special studies will be performed in conjunction with the Phase 1 dredging operations. The scopes of work for these studies are presented in detail in the Phase 1 RAM QAPP (Section 9), which is incorporated by reference herein.

In addition to these studies, as part of the revised water column monitoring program, GE will conduct a special study on fixed-point near-field monitoring around a single dredging operation in Phase 1. Initially, the in-water remedial operations in the EGIA will be monitored by this study; and upon completion of the activities in the EGIA, operations within NTIP would be proposed by GE, for EPA approval, for continuing this special study for the remainder of Phase 1. This special study is described in Section 8.3 of the RAM Scope,



**Phase 1 Performance
Standards
Compliance Plan**

Appendix D of the Remedial
Action Work Plan for Phase 1
Dredging and Facility
Operations

which was set forth in Exhibit A-2 to Attachment A to CD Modification No. 1, and is described in more detail in Section 9.4 of the revised Phase 1 RAM QAPP.

3. Water Quality 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. As with the resuspension standard discussed above, the requirements discussed in this section are applicable to dredging operations. This section provides an overview of the substantive standards as set forth in EPA’s Hudson Substantive WQ Requirements (EPA 2005) 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 reporting and notification requirements. Where these requirements are specified in the Phase 1 RAM QAPP, this section incorporates those requirements by reference.

3.1 Overview of WQ Requirements

EPA, in consultation with NYSDEC and NYSDOH, has specified water quality standards for a number of constituents that are not subject to the Hudson EPS and that will be monitored during Phase 1 of the RA. 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
- Protection of drinking water supplies via NYSDOH action levels

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.

3.1.1 Aquatic Acute Water Quality Standards at Near-Field Stations

The Hudson Substantive WQ Requirements (pages 1 and 2) set forth the following standards for near-field monitoring 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 to 55 parts per million (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 micrograms per liter (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 (DO) are specified in New York Codes, Rules and Regulations (NYCRR) Title 6, Chapter X, Part 703.3 and summarized below.
 - pH shall not be less than 6.5 nor more than 8.5
 - DO for non-trout waters:
 - The minimum daily average shall not be less than 5.0 mg/L
 - At no time shall the DO concentration be less than 4.0 mg/L

3.1.2 Health (Water Source) Standards at Far-Field Stations

The Hudson Substantive WQ Requirements (pages 2 and 8) set forth the following water quality standards for far-field monitoring 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 far-field monitoring stations:
 - Cadmium (total): 5 µg/L
 - Chromium (total): 50 µg/L

- Mercury (total): 0.7 µg/L
- Lead (total): 15 µg/L (NYSDOH action level), with a “trigger level” of 10 µg/L at Stillwater and Waterford (as stated in 10 NYCRR Section 5-1.41)
- Determination of an exceedance requires a “confirmed occurrence” prior to any changes in operation, though the potential changes will be formulated after one exceedance (i.e., four subsequent samples exceeding the standard/action level, each representing a 6-hour composite, as specified in the Hudson Substantive WQ Requirements [page 7]).

3.2 Routine Monitoring

Routine near- and far-field monitoring for the metals subject to the WQ Requirements and the water quality parameters required by those requirements (i.e., pH, DO, temperature, turbidity, suspended solids, hardness and conductivity) will be carried out in conjunction with the near- and far-field resuspension monitoring programs referenced in Section 2.2 of this PSCP. A complete description of the routine monitoring program for these metals and water quality parameters is included in Section 2 of the revised Phase 1 RAM QAPP, and incorporated herein by reference. As discussed therein, after the first month of Phase 1 dredging, if the data show that metals concentrations are substantially below the applicable standards (based on criteria set forth in the Phase 1 RAM QAPP), the scope of the metals monitoring program will be reduced for the remainder of Phase 1, with the scope of such reduction subject to approval by EPA after consultation with NYSDEC.

It is anticipated that, for the routine metals monitoring during Phase 1 of the RA, lead and cadmium will serve as a surrogate for the metals subject to the WQ Requirements. During Phase 1, EPA, GE and NYSDEC will evaluate whether mercury and chromium concentrations are adequately represented by lead and cadmium concentrations, based on the Baseline Monitoring Program data, Treatability Study data, and any additional sediment data and water column data that become available. Based on evaluation of these data, these monitoring requirements may be modified upon agreement with EPA (after consultation with NYSDEC) and GE.

3.3 Contingency Monitoring

In the event that the routine monitoring shows an exceedance of an applicable standard (or the trigger level for total lead, where applicable), contingency monitoring will be conducted. The contingency monitoring requirements are set forth in Section 2 of the revised Phase 1

RAM QAPP, and are incorporated by reference herein. This monitoring will include more frequent sampling and analysis for all Target Analyte List (TAL) metals by EPA Method 200.8, plus mercury and hexavalent chromium, as described in the Phase 1 RAM QAPP.

3.4 Contingency/Response Actions

If any of the Acute Aquatic Standards are exceeded at a near-field station or if any of the health-based standards are exceeded at any of the Thompson Island, Schuylerville, or Waterford far-field stations, GE will undertake the following actions:

1. GE will promptly notify EPA and NYSDEC (and, for exceedances of the health standards at far-field stations, NYSDOH and the public water suppliers within the Upper Hudson River), but no later than 3 hours after receipt of the laboratory data. GE will make these laboratory data available to EPA, NYSDEC, NYSDOH and the water suppliers.
2. GE will evaluate the cause(s) of the exceedance. The nature of the evaluation will depend on specific project circumstances, and may include one or more of the actions described in Section 2.5.1.
3. GE will 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 (subject to the general qualification stated in Section 1.3 above), including those described in Section 2.5.4.
4. GE will 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 Phase 1 FDR or RAWP #3, then GE will implement the solution in consultation with the EPA field representative and will document the implementation of that solution in the Engineering Evaluation Report. In all other cases, GE will implement the engineering solution in accordance with the Engineering Evaluation Report as approved by EPA. If the cause of the exceedance was not identified by the engineering evaluation, the Engineering Evaluation Report will include a course of action for continued monitoring and evaluation to determine the cause of the exceedance. GE will 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.

In addition, if the trigger level of 10 µg/L total lead (~70 percent of the action level) is exceeded by a single water column sample at the Schuylerville or Waterford stations, GE will 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 will 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 Section 2.5.4.

3.5 Responses to Observations of Distressed or Dying Fish

If, during in-water activities, distressed or dying fish are observed, GE will promptly notify EPA and NYSDEC. GE will also assess the cause(s) of the situation. Specifically, GE will take the following actions in the event that a distressed or dying fish is observed:

- Conduct a visual observation in the immediate vicinity of the first observed distressed or dying fish to identify if other distressed or dying fish are present.
- Document the location of the fish in relation to the nearest project-related activity.
- To the extent possible, examine the fish to see if a cause can be determined – e.g., to assess whether the cause was physical damage (partly eaten, hit by a propeller, hurt during angling catch and release, etc.) or deformities or disease (parasites, sores, tumors, etc.).
- Document the occurrence, including observer’s name and company affiliation, date, time, location, fish’s condition and approximate size. Resume on-water activities and continue to look for additional distressed or dying fish.
- After the initial notification is made to EPA and NYSDEC, document any additional facts that will be needed to support an evaluation of the occurrence.

If the cause for the distressed or dying fish can be determined and is project-related, GE will conduct increased monitoring for metals and additional water quality parameters, where appropriate (as provided in the Hudson Substantive WQ Requirements, page 8), using the procedures for such monitoring provided in the Phase 1 RAM QAPP. In addition, GE will propose an appropriate response to EPA, following the same requirements and subject to

the same qualifications specified in Section 3.4 for an exceedance of water quality standards.

3.6 Reporting and Notifications

GE will routinely report the analytical data from the monitoring program for the WQ Requirements during Phase 1 in the same way as it reports the data from the Resuspension Performance Standard monitoring program, as described in Section 2.6.1 above. These reports will include email notifications, weekly electronic data exports, monthly reports, GE's Phase 1 Data Compilation Report and an annual DSR, all as described in Section 2.6.1.

In addition, as noted above, GE will report any near-field exceedances of the Acute Aquatic Standards to EPA and NYSDEC within 3 hours of receipt of the analytical data; and it will report any exceedances of the health (water source) standards or of the action or trigger levels for lead to EPA, NYSDEC, NYSDOH, and the downstream public water suppliers within the Upper Hudson River promptly, but no later than within 3 hours of receipt of the analytical data. Engineering Evaluation Reports will be submitted as described in Section 3.4. GE will promptly notify EPA and NYSDEC if distressed or dying fish are observed.

4. Residuals Performance Standard

This section discusses the Residuals Performance Standard, which was established “to detect and manage contaminated sediments that may remain after initial remedial dredging” (Hudson EPS, Volume 1, page 9). This standard is applicable to certain dredging operations, including dredging and backfilling/capping operations in the river. This section provides an overview of that standard as set forth in the Hudson EPS (Volume 3), and specifies the sampling and analytical procedures for sediments following initial inventory dredging, evaluation of the sampling data, the responses to be taken based on the sampling data, reporting procedures and the special study under this standard.

4.1 Overview of Standard

The Residuals Performance Standard applies to the collection and analysis of sediment samples representing dredging residuals in all Phase 1 target areas. Additionally, this standard describes the procedures by which the sediment sampling data will be used to characterize residuals and determine appropriate response actions to complete the remediation. Implementation of the Residuals Performance Standard includes the following tasks:

- Sampling grid establishment
- Sample collection, management and analysis
- Evaluation of the sampling data
- Performance of required follow-up actions
- Reporting

The program for residuals sampling and analysis is discussed in detail in Section 4 of the Phase 1 RAM QAPP.

The Residuals Performance Standard sets forth action levels for Tri+ PCBs in surface sediment that remains after dredging. The action levels will be applied to discrete areas termed Certification Units (CUs), which consist of dredge areas approximately 5 acres in size (with some exceptions) as described in the Phase 1 RAM QAPP. One exception consists of the shoreline areas along the edges of some CUs where the depth of dredging has been established using a 2-foot vertical measurement at the shoreline. In such

shoreline areas, in accordance with the CDE (Attachment A to the SOW), the depth of cut is then defined by a 3:1 slope away from the initial 2-foot cut, or a steeper slope if the bathymetric surface exhibits a steeper gradient, until the depth of cut intersects the dredge prism based on depth of contamination, as described further below. The CUs for Phase 1 dredge areas were defined in the Phase 1 FDR. The action levels set forth in the Residuals Performance Standard are summarized in Table 4-1 below.

**Table 4-1
Summary of the Performance Standard for Dredging Residuals**

Case	CU 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	Required Actions (when all conditions are met)*
A	avg. ≤ 1	≤ 1	0	N/A	Backfill CU (where appropriate); no testing of backfill required.
B	N/A	≥ 2	N/A	< 2	Re-dredge sampling nodes and re-sample those re-dredged nodes.
C	N/A	N/A	1 or more	< 2	Re-dredge sampling node(s) and re-sample the re-dredged node(s).
D	$1 < \text{avg.} \leq 3$	≤ 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	$3 < \text{avg.} \leq 6$	≤ 1	0	< 2	Construct sub-aqueous cap immediately OR re-dredge. Construct cap so that arithmetic avg. of uncapped nodes is ≤ 1 mg/kg Tri+ PCBs, no nodes > 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 re-dredge. If CU median > 6 mg/kg Tri+ PCBs, entire CU must be sampled for vertical extent. If CU median ≤ 6 mg/kg Tri+ PCBs, additional sampling required only in portions of CU 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.



Notes:

- * 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 re-dredging 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 15 mg/kg or 27 mg/kg Tri+ PCBs action levels.

N/A not applicable

avg. average

mg/kg milligram per kilogram

An exception to the above approach to evaluating CUs is the treatment of areas parallel to the shoreline in some CUs where the CUs extend to the shoreline and, due to slope stability considerations, the depth of dredging has been defined using a 2-foot vertical cut at the shoreline and a 3:1 slope away from that cut (or a steeper slope if existing bathymetry is steeper) in accordance with the CDE, resulting in dredging cut lines that are shallower than the estimated depth of contamination between the shoreline and the point at which the 3:1 (or steeper) slope intersects the depth of contamination. These areas are referred to herein as "shoreline areas with 2-foot cuts," and the treatment of such shoreline areas within CUs is discussed separately below.

In addition, there are circumstances where no backfill will be placed following dredging. As described below, these include certain navigation channel areas and other areas where EPA and GE agree that backfill is unnecessary.

4.2 Sampling and Analysis Requirements

The overall objectives of the residuals sampling program are to identify the extent (if any) of Tri+ PCB sediment inventory remaining in target dredge areas and to evaluate the post-dredging residual concentrations of Tri+ PCBs against the action levels in the Residuals Performance Standard in order to determine what additional work is required to complete the remediation in a CU. Following the completion of dredging in each CU, GE will verify that the design cut lines have been achieved and will then conduct the sampling and analysis of the remaining sediment residuals, as described in Section 4 of the Phase 1 RAM QAPP. Verification that dredge cut lines have been achieved will be based on multi-beam bathymetric survey within the CU, as described in the Phase 1 Dredging Construction Quality Control/Quality Assurance Plan (DQAP), provided as part of RAWP #3.



4.2.1 Sampling Grid

Section 4.4 of the Phase 1 RAM QAPP provides a description of the sampling locations and frequency in each CU, and is incorporated by reference herein. In general, a CU will be sampled at 40 locations on a triangular grid with certain exceptions as described in the Phase 1 RAM QAPP. In addition to the grid locations, shoreline areas with 2-foot cuts will be sampled every 80 feet along a transect parallel to the shoreline and approximately one-third of the distance from the shoreline to the point where the side slope meets the DoC. Sampling in a CU (including any such shoreline areas) will be completed within 7 days of completion of each dredging attempt in that CU.

4.2.2 Sample Collection

The residual sample collection methods are described in Section 4.5 of the Phase 1 RAM QAPP, which is incorporated by reference herein. Residual sediment samples will be collected via coring, using vibracoring or other manual coring techniques to recover representative sediment samples of the upper 6 inches of sediment or to refusal, whichever occurs first. In all cases, cores will be advanced to refusal or 4 feet, whichever comes first. Where difficult conditions (such as bedrock) occur, the node will be relocated within a 20-ft radius of the original location, and if the 20-ft radius area conditions preclude the use of sediment coring apparatus, small ponar samplers will be used. The dredging residuals sampling program, which describes the types of samples to be collected and analyzed for post-dredging residuals, post-dredging inventory and backfill, is summarized in Table 4-2 of the Phase 1 RAM QAPP.

4.2.3 Sample Analysis

Sediment samples will be extracted and analyzed via the analytical methods specified in Section 4.8 of the Phase 1 RAM QAPP, and incorporated by reference herein. The analytical results will be used for comparison to the action levels in the Residuals Performance Standard, as described below.

4.3 Evaluation of Sampling Data

The sediment sampling results will be used to evaluate a CU by: (1) converting the analytical results for Total PCBs to Tri+ PCBs, using the procedure described in Section 4.10 and Appendix 50 of the Phase 1 RAM QAPP; and then (2) comparing the values (rounded to whole numbers) to the action levels specified in Section 4.1 above. The



following calculated Tri+ PCB values will then be compared to the action levels shown in Table 4-1:

- Arithmetic average Tri+ PCB concentration in the CU (or portion of the CU) under evaluation
- Individual node sample Tri+ PCB concentrations in the CU (or portion of the CU) under evaluation
- Median Tri+ PCB concentration in the CU (or portion of the CU) under evaluation
- Area-weighted arithmetic average Tri+ PCB 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)

The calculation of the arithmetic average Tri+ PCB concentration in a given CU (or portion of a CU) and the calculation of an area-weighted arithmetic average concentration in the 20-acre area will be performed in accordance with the procedures set forth in Section 4.10.1 and 4.10.2 of the Phase 1 RAM QAPP. These calculations are summarized in Sections 4.3.1 and 4.3.2 below.

For shoreline areas with 2-foot cuts, the individual node sample Total PCB concentrations will be compared to a 50 mg/kg Total PCB level for a determination of the appropriate response, as discussed in Section 4.4 below. If all or a portion of such a shoreline area is to be re-dredged or capped under the criteria discussed below, the analytical data from that area will not be included in the evaluation of the sampling data for the remainder of the CU. Otherwise, GE will include those data in an overall assessment of the data from the CU to determine whether the CU would meet the criteria for backfilling without further response actions. In such a case, if the overall data from the CU including the shoreline area meet those criteria, GE may elect to place backfill instead of a cap in the shoreline area, as discussed in Section 4.4.

4.3.1 Arithmetic Average of CU

The arithmetic average Tri+ PCB concentration in the CU (or portion of the CU) under evaluation will be calculated by dividing the sum of the individual Tri+ PCB concentrations in the surface samples collected from the 0- to 6-inch depth increment by the total number of such individual sample locations. When calculating the CU arithmetic average, the following procedures will be applied:



- As noted above, sample results from a shoreline area with a 2-foot cut will be excluded if that area will be capped according to the CDE criteria.
- Non-detect sample results will 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 will be calculated without counting that sample node.
- Following re-dredging of all or part of a CU, the arithmetic average will be subsequently re-calculated by substituting the new sample results from the re-dredged nodes.
- If a sub-aqueous cap is constructed, the arithmetic average will 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 will be used to determine achievement of the criteria in the Residuals Performance Standard.
- EPA split sample data will be considered if they are available prior to EPA concurrence on the CU Dredging Completion Approval Form (Attachment F to the SOW) for the CU under evaluation.

4.3.2 20-Acre Arithmetic Average

The 20-acre arithmetic average Tri+ PCB concentration will be calculated, using the 20-acre area-weighted average equation from the Hudson EPS (Volume 3, page 54) 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 equation to be used is set forth below. Note that data and acreage for shoreline areas will not be included in this analysis.

$$m_{20,int} = \frac{\sum_{j=i}^n a_{1,i} m_{t,int,i}}{\sum_{i=j}^n a_{1,i}}$$



where:

n = the number of CUs included in the 20-acre average

$A_{i,j}$ = the area associated with the i th CU

$C_{i,j,int}$ = the Tri+ PCB average concentration associated with the i th CU in a single depth interval (int)

The 20-acre evaluation unit will 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 will 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 will be utilized (excluding sample results from a shoreline area with a 2-foot cut that is to be capped as described above). In CUs where a sub-aqueous cap is placed, for purposes of calculating the average Tri+ PCB concentration in the 20-acre unit, the capped CU's average concentration will be calculated based on the sample results from the nodes in the uncapped portion of the CU. The total acreage of the CUs will be used, excluding any shoreline areas with 2-foot cuts that will be capped. If a CU is entirely capped, it will not be included in any 20-acre averaging calculations. For the start-up of Phase 1, the cumulative mean will be calculated using the area-weighted average equation in lieu of the 20-acre, area-weighted arithmetic average, given that the first three CUs will not equal 20 total acres.

4.4 Required Actions

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 will be based on comparing the arithmetic average Tri+ PCB concentrations, CU median, individual node concentrations, area-weighted arithmetic average concentration in 20-acre areas (calculated according to the procedures described above in Section 4.3) and Total PCB concentrations in shoreline areas with 2-foot cuts to various criteria established in the Resuspension Performance Standard or by the CD, as described below.

4.4.1 Verification of Design Dredging Cut Lines

For the purposes of the response actions described below, removal to the design cut lines will be defined as those specified in the Phase 1 FDR and verified through bathymetric measurement, and will 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), the inventory removal steps will be considered complete. Subsequent removal will be referred to as residuals re-dredging.

4.4.2 Required Response Actions

Post-inventory dredging sampling results will dictate the appropriate response actions to be undertaken. The potential required response actions are as follows:

1. Backfill and demobilize (including testing of backfill if necessary)
2. Jointly evaluate a 20-Acre Average
3. Re-dredge or construct sub-aqueous cap at the CU
4. Re-dredging required
5. Capping

These actions are summarized in Table 4-1 and described in greater detail in Section 3.4 of the PSCP Scope, and are further discussed below.

Response 1 – Backfill and Demobilize

As outlined in Table 4-1, 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 will place backfill (where appropriate) and demobilize. As provided in the Phase 1 Final Design (Backfill Drawing B-0020), backfill will not be placed in the navigation channel where the resulting finished elevation would be 103 feet (NAVD88) or higher (i.e., thus allowing less than a minimum of 14.2 feet of water depth) or in other areas where EPA and GE agree that backfill is not necessary. In general, where backfill is placed, the backfill thickness will be 12 inches to address residuals (as measured in



accordance with Specification Section 13720 – Backfilling/Capping), although in some instances, the backfill thickness may be more or less than 12 inches. The details regarding the backfill type and thickness are specified in the Phase 1 Final Design (see Backfill Drawings B-0001 to B-0021). 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 Table 4-1, 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 will 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 CU under evaluation and the three previously dredged CUs (within 2 miles of the current CU) is ≤ 1 mg/kg Tri+ PCBs, GE will, where appropriate, place backfill. Again, backfill will not be placed in certain areas (i.e., certain areas in the navigation channel, as described above, or other areas where EPA and GE agree that backfill is unnecessary); and where placed, the backfill thickness will generally be 12 inches, although it may be more or less in some instances. The details regarding the backfill type and thickness are specified in the Phase 1 Final Design (Backfill Drawings B-0001 to B-0021). After placement, GE will sample the backfill to confirm that the average backfill surface Tri+ PCB concentration is ≤ 0.25 mg/kg. Sampling of backfill will follow the procedures described in Phase 1 RAM QAPP; and the development of an average concentration will follow procedures described in Section 4.3.2 above. If the concentration in the upper 6 inches of backfill is > 0.25 mg/kg Tri+ PCBs, GE will, 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 either of those actions, the backfill will be sampled again, and the area-weighted concentration of the CU under evaluation will be recalculated.

If the area-weighted arithmetic average of the individual means from the CU under evaluation and the three previously dredged CUs (within 2 miles of the current unit) is > 1 mg/kg Tri+ PCBs, GE will re-dredge or place a sub-aqueous cap at the specific areas within the CU that is under evaluation. GE will 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 will take into account potential impacts on dredging productivity as appropriate, consistent with the Hudson EPS (Volume 3, Section 3.5).

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

As outlined in Table 4-1, if the Tri+ PCB average is > 3 mg/kg but \leq 6 mg/kg, no Tri+ PCB sample result is \geq 27 mg/kg, and not more than one Tri+ PCB sample result is \geq 15 mg/kg, GE will either re-dredge or construct a sub-aqueous 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 will sample the surface sediment of the re-dredged area in accordance with the residuals sampling procedures in the Phase 1 RAM QAPP (including the advancement of sediment cores to a depth of 2 feet, where possible) and re-evaluate the CU. If sub-aqueous capping is selected, GE will 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 \geq 15 mg/kg. The uncapped nodes will be backfilled as described under *Response 1*.

Response 4 – Re-dredging Required

1. Specific Nodes with Discrete Exceedances

Regardless of the average Tri+ PCB concentration, if two or more samples within a CU (excluding shoreline nodes to be re-dredged or capped) have Tri+ PCB concentrations \geq 15 mg/kg, GE will re-dredge the non-compliant area and re-sample the non-compliant nodes. If one or more sample(s) has Tri+ PCB concentration \geq 27 mg/kg, GE will re-dredge such sampling node(s) and re-sample. Any re-sampling will be performed in accordance with the Phase 1 RAM QAPP. Under this response, no more than two

residual re-dredging attempts will be required. After these node-specific re-dredging efforts are completed, the average Tri+ PCB concentration for the CU will be re-evaluated as described above in Section 4.3.

For shoreline areas with 2-foot cuts, results from individual sample nodes will be compared to a level of 50 mg/kg Total PCBs. If a node has a total PCB concentration greater than or equal to 50 ppm, the area associated with that node will be re-dredged.

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 residuals re-dredging attempts will be performed in the non-compliant areas. If, after two residuals dredging passes, the CU average is still > 6 mg/kg Tri+ PCBs, GE may elect to petition EPA to cease re-dredging attempts and place a cap over the non-compliant area. GE will not cease dredging without concurrence from EPA under this response.

Response 5 – Capping

As outlined in Table 4-1, 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 \geq 15 mg/kg, or one or more samples show Tri+ PCB concentration \geq 27 mg/kg, GE may construct a sub-aqueous cap, where conditions allow. In such a case, GE will 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 \geq 15 mg/kg Tri+ PCB. The top elevation of caps in the navigation channel will not exceed 105 feet (NAVD88); however, if bedrock is present at this elevation, no cap will be installed (see EPA-approved Cap Drawing C-0001).

For shoreline areas with 2-foot cuts, results from individual sample nodes will be compared to a level of 50 mg/kg Total PCBs, as noted above. Where samples have Total PCB concentrations less than 50 mg/kg, GE may either perform additional dredging or place a cap over the area of those samples (at GE's election). However, if the overall data from the CU including the shoreline area meet the criteria allowing the placement of backfill without further response actions, the area will be backfilled. Thus, for example, if the arithmetic average Tri+ PCB concentration of the shoreline sediments together with the other sediments in the CU is less than 1 mg/kg, no node in the CU has a Tri+ PCB sample result \geq 27 mg/kg, and not more than one node has a Tri+ PCB sample result of \geq 15 mg/kg, the CU will be backfilled. Similarly, if the arithmetic average Tri+ PCB concentration



of the CU is greater than 1 mg/kg but less than 3 mg/kg and the weighted average of the associated 20-acre area is less than or equal to 1 mg/kg, and if no node in the CU 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, the CU may be backfilled (except where a portion of the CU will be capped, as noted below).

In cases where a cap is placed within a shoreline area with a 2-foot cut, the PCB data from that area will not be included in the evaluation of the sampling data for the remainder of the CU. Further, in cases where a portion of such a shoreline area has been identified for capping, the remainder of the CU must achieve a Tri+ PCB average of less than or equal to 1 mg/kg (with no nodes exceeding 15 mg/kg).

4.4.3 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 will follow the procedures discussed below.

The extent of a non-compliant area around a single node sample will be determined using the following equation (repeated for each surrounding node):

$$d_r = \frac{d * (C_1 - 1)}{(C_2 - C_1)}$$

where:

d_r = the distance (in feet) to the edge of the non-compliant area

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 adjacent to C_1

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



- The distance which defines the non-compliant area will be at least half the distance between the nodes.
- The non-compliant area will be contained within a boundary that has sides perpendicular to the axes between the sampled nodes.
- The non-compliant area will not extend beyond the polygon created by connecting the surrounding nodes.
- The non-compliant area will 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 will 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 will 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 will not be considered in calculating the average. The vertical extent of non-compliant areas will 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 will 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 will 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 will be followed: First, as described in Phase 1 RAM QAPP, deeper core samples (> 6 inches) will 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 will 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 will be taken from

areas throughout the CU. However, upon EPA approval, only a subset of the CU may be re-sampled if Tri+ PCB levels in the sampled nodes within the excluded portion of the CU are < 1 mg/kg. In this case, this discrete area will be considered a compliant area, and the remainder of the CU will be considered the non-compliant 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.

For shoreline areas with 2-foot cuts, the non-compliant area will be established using the equation above to determine the distance between compliant and non-compliant nodes (i.e., using 50 mg/kg Total PCBs), but the shoreline and inflection point between the stable slope and depth of contamination will form the remaining boundary.

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.

4.5 Reporting

GE will submit weekly progress reports and completed CU Certification of Completion forms to the EPA site manager, according to a schedule to be agreed upon by GE and EPA, for use in evaluating compliance with the Residuals Performance Standard. The weekly reports will summarize:

- The results of residual sediment sampling
- Exceedances of the Residuals Performance Standard criteria by CU (including any shoreline area with a 2-foot cut) and joint 20-acre evaluation area
- The course of actions taken
- Rationale for the actions taken

Laboratory data will be made available to EPA upon receipt from the laboratory.

Following the signing by both GE and EPA of a final CU Construction Completion Certification form (i.e. Form 3) for a given CU (and any adjacent shoreline area), GE will prepare and submit to EPA a CU Completion Report in accordance with Section 5.2.4 of the SOW. Each CU Completion Report will include, the following information:

- CU identification
- Description of type(s) of dredging equipment used
- Description of sediment type(s) encountered
- Residual sediment sampling results in the CU (including any shoreline area with a 2-foot cut)
- Written verification that the sampling data were validated, including a discussion of any data qualifiers applied
- Results of required comparisons to action levels for each dredging pass
- Discussion of any contingency actions taken
- Number of dredging passes for residual concentration reduction
- For each attempt, a map of the CU (including any shoreline area with a 2-foot cut) showing the concentration at each node and the non-compliant area to be re-dredged or capped
- A signed verification that the CU (including any shoreline area with a 2-foot cut) was closed (i.e., backfilled or, capped, etc. as appropriate) in accordance with the requirements of the PSCP Scope, the PSCP, the approved Phase 1 FDR, and any other applicable requirements under the CD (including the CU Certification of Completion Checklist)
- A signed verification that the initial habitat replacement/reconstruction was completed (as applicable) in accordance with the requirements of the approved Final Design and any other applicable requirements under the CD (including the CU Certification of Completion Checklist)

4.6 Special Study

The Hudson EPS (Volume 1, Section 5.6, Volume 3, Section 4.7 and Attachment B) requires a special study to characterize the physical structure of the disturbed sediment layer created during dredging. The Hudson EPS (Volume 3, page 62) indicates that “[t]he goal of the study will be to determine whether separate layers of redeposited sediment,

disturbed sediment and undisturbed underlying sediment can be readily examined and characterized through the use of sediment profile imagery [SPI] or other exploration techniques (e.g., coring).” The Hudson EPS (Volume 3, Attachment B, page 6) notes that the information collected during the special study will be used to answer the following two questions:

- Are the sample collection and management procedures appropriately designed to characterize the residual sediments?
- What are the type, stratigraphy and thickness of the disturbed and/or resettled layer and do they vary with target area sediment texture and/or dredge type?

As further indicated in the Hudson EPS (Volume 3, page 62), the results of this study will be used to inform the design of the sediment residuals sampling or evaluation program to be implemented during Phase 2.

Since the Residuals Performance Standard was issued, EPA and GE have agreed that there is no need for the use of SPI investigations for this special study. Rather, the special study will be conducted by observing and evaluating the sediment type, stratigraphy and thickness of disturbed and/or resettled layers found in the residuals sediment cores that will be routinely collected in Phase 1 to fulfill the requirements of the Residual Performance Standard. It involves several aspects of the routine sediment sampling methods specified in Section 4.5 of the Phase 1 RAM QAPP. These include:

- Use of clear Lexan tubes (or other appropriate semi-transparent tubes) for manual coring
- Advancement of sediment cores to a depth of 2 feet or to refusal (if less than 2 feet)
- Documentation of sediment recovery and visual classification of the sediment sample and the thickness of the residuals layer
- Photographing retrieved core sample
- Retention of any observed sediment “fluff” layer (the layer the measuring stick will go through to hit the sediment water interface), to be followed by homogenization of that layer with the 0- to 6-inch sample

- Documentation of any obvious disturbances to the sediment layer that may have been created due to dredging and recording of the thickness of discernable layers of redeposited sediments, disturbed sediment and undisturbed underlying sediment
- Recording of visual descriptions 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); approximate grain size; presence of observable biota, odor and color; and the nature and length of stratigraphy changes, if present

Visual texture characteristics will be documented by a field geologist or equivalent.

Through these techniques, information will be obtained and compiled on the sediment type, stratigraphy and thickness of the disturbed and/or resettled layer in the residual sediment cores collected during Phase 1. If a distinctive layer that can be attributed to residual sediment can be discerned, GE will determine at that time how that information and the underlying data will be interpreted and used to inform future the Phase 2 residuals program (in the event that GE elects to perform Phase 2 under the CD). The results of this special study and GE's analysis of the information and data obtained in this study, including implications for Phase 2, will be presented in GE's Phase 1 Evaluation Report under Paragraph 13 of the CD if the information is available by that time, or otherwise in an appropriate subsequent report.

5. Productivity Performance Standard

This section discusses the Productivity Performance Standard, which is applicable to both dredging operations and processing facility operations (sediment offloading, processing and rail yard operations). It provides an overview of the Productivity Standard, as set forth in the Hudson EPS, references the dredging production schedule established in the Phase 1 Remedial Design and revised in RAWP #3, summarizes the monitoring and reporting requirements for productivity and describes the response actions in the event that the production schedule is not being met.

5.1 Overview of Standard

The Productivity Performance Standard specifies 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. The Productivity Performance Standard is specified in the Hudson EPS (Volume 4, Section 4.1), with requirements relevant to Phase 1 quoted below:

“The minimum volume of sediment to be removed, processed and shipped off site during Phase 1 shall be 200,000 cubic yards (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.”

This PSCP only covers Phase 1. However, for completeness, Table 5-1 summarizes the minimum and target removal volumes for Phases 1 and 2 calculated based on the Productivity Performance Standard. Note that this table reflects changes in total project sediment volumes since the Hudson EPS were issued. Specifically, it is based on the dredge area delineation for Phase 2, and is taken from the Phase 2 Intermediate Design Report (ARCADIS 2008). Further, the minimum and target volumes set forth in this table do



not apply to any limited dredging that may occur in the first year following completion of Phase 1 pursuant to Paragraph 17 of the CD.

**Table 5-1
Minimum and Target Volumes Based on Productivity Performance Standard**

Project Phase and Year	Minimum Annual Volume (cy)	Minimum 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	319,000	519,000	340,000	605,000
Phase 2, Year 2	319,000	838,000	340,000	945,000
Phase 2, Year 3	319,000	1,157,000	340,000	1,285,000
Phase 2, Year 4	319,000	1,476,000	340,000	1,625,000
Phase 2, Year 5	319,000	1,795,000	170,000	1,795,000

The Productivity Performance Standard includes three action levels: concern level, control level and standard level. These action levels are to be based on a comparison of the actual production rate to what is referred to as the scheduled productivity, with the action levels summarized in Table 5-2 below.

**Table 5-2
Productivity Standard Action Levels**

Action Level	Situation
Concern	Monthly production rate falls 10 percent or more below scheduled rate.
Control	Production falls below scheduled production by 10 percent or more for two or more consecutive months.
Standard	Annual cumulative volume fails to meet minimum production requirements.

5.2 Design Analyses and Routine Control Measures

5.2.1 Design Analyses

Phase 1 dredging activities are scheduled to begin in mid-May of the Phase 1 dredging season – weather and river flow permitting – with inventory dredging ending by September 1 of the year of the Phase 1 dredging season and residual dredging continuing thereafter. Approximately 265,000 cy of sediment from initial inventory dredging are targeted for removal. To meet EPA’s Productivity Performance Standard, dredging is expected to occur 24 hours a day, 6 days a week. The seventh day will be reserved for maintenance, make-up time for unplanned project interruptions and as a contingency to catch up if productivity falls behind.

To achieve the target inventory removal volume of 265,000 cy, dredge prisms were developed for a subset of the Phase 1 dredge areas identified in the February 2005 *Phase 1 Dredge Area Delineation Report*, approved by EPA in March 2005. The areas targeted for removal in Phase 1 include parts of the Northern Thompson Island Pool (NTIP) (dredge areas NTIP01, NTIP02A through NTIP02G) and the EGIA (dredge area EGIA01). The development of these dredge prisms is described in Section 2.3.2 of the Phase 1 FDR.

Following development of the dredge prisms, CUs were defined. The CUs are identified on the dredge prism drawings included in the Phase 1 Contract Drawings for Dredging Operations, dated May 30, 2008. The dredge prisms are shown on these Phase 1 Contract Drawings for Dredging Operations included in the Phase 1 FDR.

The inventory dredging has been designed to meet the Phase 1 target removal volume of 265,000 cy, including a one-month period of dredging at the anticipated Phase 2 production rate, as defined in Specification 13801. The estimated one-month Phase 2 production rate, as presented in that specification and in the Phase 1 FDR (Section 1.4.2), is 89,000 cy.

The Phase 1 dredging production schedule prepared during design was presented as Table 3-1 in the Phase 1 FDR. The Phase 1 production schedule from the Dredging Contractor is presented in Section 4 of RAWP #3.

5.2.2 Comparisons of Production Rates to Production Schedule

The actual dredging production rate during Phase 1 will be compared to the production schedule provided in RAWP #3 to determine whether the concern, the control or the

standard action level has occurred. For purposes of establishing whether one of these action levels has occurred, the following rules will apply:

- The dredging productivity will be based on the actual volume dredged, measured as *in situ* cy, and will include the volume of sediment removed to achieve the removal limits specified in the design, including any volume associated with overcut, side-slope removal, overdredging allowance and dredging for navigational purposes.
- For comparison to the Productivity Performance Standard, the volume will not include sediment removed outside the dredge cut lines shown or specified in the approved Phase 1 FDR, 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 may be removed.
- For comparisons to the monthly production schedule, the actual *in situ* volume dredged that month will be compared to the *in situ* volume scheduled for that month in the monthly production schedule presented in Table 4-1 of RAWP #3. For comparisons to the annual production schedule, the actual *in situ* volume dredged and processed during Phase 1 will be compared to the scheduled volume and the 200,000 cy minimum removal volume for Phase 1 specified in the Productivity Performance Standard.

5.2.3 Routine Control Measures

The Phase 1 schedule provided in Section 4 of RAWP #3 incorporates a number of routine control measures intended to help in achieving the Productivity Performance Standard. These control measures include the following:

- Planning for adequate type, size and number of dredges, tow boats, material barges and support vessels. It should be noted that the number of dredges, barges and tugs incorporated into this schedule are greater than the number specified in the Phase 1 FDR.
- Following a detailed plan for work sequence and equipment to be used during each operation, including work order and days and hours of operation on a CU basis and scheduled weekly production rates for the inventory and residuals dredging periods.

- Performing concurrent CU dredging, when appropriate. The schedule includes a detailed description of equipment, operational procedures and other controls that will be used to prevent possible impacts to already dredged areas immediately downstream of, or adjacent to, CUs where inventory dredging is being conducted.
- Removing debris in advance of inventory dredging where reasonably possible.
- Utilizing available capacity at the sediment processing facility. The processing facility was designed for peak processing of 5,100 cubic yards per day (cy/day), while the target one-month test volume (89,000) would result in an average removal rate of 3,500 cy/day.
- Performing maintenance and repairs to equipment to maximize operating time.

5.3 Routine Monitoring and Reporting

Implementation of the Productivity Performance Standard will require certain monitoring, recordkeeping and reporting activities as described below:

Dredging productivity will be monitored, and detailed records will be maintained to document production throughout the duration of the project. Specific monitoring and recordkeeping requirements are discussed in Section 3 of RAWP #3 and Section 7 of the Phase 1 DQAP (Appendix A to RAWP #3). The data to be recorded will include the following for each dredge: dredge operating hours; downtime for repairs to the dredge plant; downtime waiting for support equipment (e.g., barge, tug, etc.); downtime due to project and non-project vessel traffic; downtime to move the dredge from location to location; 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 was provided in the Phase 1 FDR (Specification Section 13801) and is included in Attachment 3 to the DQAP. An additional form to detail the daily productivity data for the project (e.g., estimated total cy of material processed, tons shipped off-site and estimated cy staged on-site) is also included in Attachment 3 to the DQAP. Both forms will be available on-site.

GE will prepare and submit to EPA weekly reports with the following information:

- Locations dredged

- Number of hours of actual dredging time and gross volume dredged each day and each reporting period
- Cumulative amount dredged for the season
- Number of barges loaded and transported for off-loading and approximate volume in each
- Time required for off-loading barges
- 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 (to the extent known)
- Volume of water treated and returned to the river
- Delays encountered in the project, the reason for the delay and the hours lost to production due to the delays

In addition, GE will provide the above information in the CD Monthly Progress Report for each week during the month, the month, the dredging season and the overall Phase 1 project to date. Each such monthly report during Phase 1 also will compare productivity on a weekly, monthly and seasonal basis to the production schedule specified in Table 4-1 of RAWP #3.

On-site records will be kept for the following:

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

The Phase 1 Data Compilation Report, submitted pursuant to Paragraph 13.a of the CD, will provide all the productivity data collected during Phase 1 up to and including the date on which GE completes one month of Phase 1 dredging at the full Phase 2 production rate. The Phase 1 Evaluation Report will include an evaluation of the Phase 1 dredging operations with respect to the Phase 1 EPS, specifically evaluating dredging production. A summary of productivity data for Phase 1, including the total Phase 1 dredging production, will be provided in the Phase 1 Construction Report, submitted in accordance with Paragraph 56 of the CD and Section 5.4 of the SOW.

5.4 Contingency/Response Actions

The three action levels for the Productivity Performance Standard were described in Table 5-2. The required responses at each action level are summarized below and are subject to the qualification stated in Section 1.3 of this PSCP.

5.4.1 Actions in Event of Concern Level Shortfall

In the event of a production shortfall at the concern level (monthly dredging productivity falls below the scheduled productivity for that particular month by 10 percent or more), GE will notify EPA in the monthly report. GE will also complete an assessment to identify the cause of the shortfall and whether there are any practical means to make up the shortfall or otherwise increase productivity within the next two months (or by the end of Phase 1, whichever occurs sooner). This assessment will include an evaluation to identify bottlenecks in the dredging and processing operations that may be causing the low productivity. This evaluation will consider questions such as the following: Are dredges waiting for barges? Are barges waiting to be filled or unloaded? Is the dredging and offloading efficient and minimizing wait times? Are there bottlenecks at the lock? Are barges being delayed at the processing facility unloading wharf? Are resuspension containment devices installed efficiently so as to minimize dredge downtime? Is compliance monitoring being conducted efficiently and timely to minimize dredge downtime?

Based on this assessment, GE will consider various potential means to increase productivity, including the measures described in Section 5.4.4. To the extent practical, the steps identified to increase productivity will be intended to achieve the necessary production rate and erase cumulative shortfalls in productivity over the following two months or by the end of Phase 1, whichever occurs sooner. However, any such steps taken to increase production will need to conform to all other performance standards established for the project.



GE will submit the results of its assessment and, if warranted, a proposal for measures to increase productivity to EPA for approval. GE will implement measures, as approved by EPA, to make up the shortfall or otherwise increase productivity, to the extent practical and subject to the general qualification stated in Section 1.3.

5.4.2 Actions in Event of Control Level Shortfall

In the event of a production shortfall at the control level (monthly dredging productivity falls below the scheduled productivity by 10 percent or more for two or more consecutive months), GE will notify EPA in its monthly report, evaluate the causes of the shortfall and evaluate potential measures to erase the shortfall by the end of Phase 1 if practical, or otherwise to increase productivity. GE also will provide a written action plan to EPA explaining the reasons for the shortfall in production and describing the engineering and management steps taken, underway or to be taken to increase productivity. The objective of these actions will be to erase the shortfall by the end of Phase 1 if that shortfall can practically be erased. The actions that GE will consider as potential means to increase productivity in this situation will include the actions listed in Section 5.4.4 below, to the extent not already implemented.

Following EPA's review of GE's action plan, GE will implement measures as approved by EPA to make up the shortfall or otherwise increase productivity, to the extent practical and subject to the general qualification stated in Section 1.3.

5.4.3 Actions in Event of Standard Level Shortfall

The requirements specified in the PSCP Scope for response actions in the event of a standard level production shortfall (i.e., annual cumulative production in Phase 1 is less than the scheduled annual volume) apply only if GE notifies EPA that it will perform Phase 2 under the CD, and thus are not applicable to this Phase 1 PSCP. However, if the annual cumulative volume dredged during Phase 1 does not meet the Phase 1 productivity requirements described above, an explanation for that shortfall will be provided in the Phase 1 Evaluation Report; and if GE notifies EPA that it will perform Phase 2 under the CD, it will make recommendations to EPA regarding productivity for Phase 2.

5.4.4 Potential Contingency Actions to Increase Productivity

The actions that GE will consider as potential means to increase productivity during Phase 1 in the event of a production shortfall at the concern or control level will include the following:

1. Taking corrective action to address any bottlenecks in the operation, as identified above
2. Increasing work hours or work days per week to increase productivity (work up to 24 hours per day and/or work up to 7 days per week)
3. Adding equipment which is available at the site but not currently being used (dredges, barges, scows, support boats, etc), if practical
4. Adding manpower (i.e., adding workers to staff unused equipment or adding workers to make current operation more efficient and to allow more shifts)
5. Modifying the dredging sequence
6. Staging additional sediment at the processing facility or in available barges

As indicated above, any actions taken to increase productivity will need to conform to all other performance standards established for the project.

6. Air Quality Performance Standard

This section discusses the QoLPS for air quality, which is applicable to both dredging operations and processing facility operations. It includes an overview of the standard, as set out in the Hudson QoLPS; a summary of the design analyses conducted to assess achievement of the standard during Phase 1 and the measures included in the Phase 1 design to achieve the standard; a reference to the routine air quality monitoring to be conducted during Phase 1 and the contingency monitoring in the event of an exceedance of an applicable air quality standard or trigger level; a description of the other response actions to be taken in the event of such an exceedance or in response to an air quality complaint; and a description of the relevant reporting and notification procedures.

6.1 Overview of Standard

The Air Quality Performance Standard includes numerical standards for PCBs in ambient air and for opacity (the reduction of visibility from air emissions), and requires an analysis of achievement of the National Ambient Air Quality Standards (NAAQS) for several other air pollutants. Further information on each of these aspects of the standard is presented below.

6.1.1 PCBs

The QoLPS for air quality includes standards and “concern levels” (at 80 percent of the standard levels) for total PCB concentrations in the air during Phase 1 of the Remedial Action. There are separate concern levels and standards for residential and commercial/industrial areas. They are:

- For residential areas, a concern level of 0.08 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) and a standard of 0.11 $\mu\text{g}/\text{m}^3$, both as 24-hour average PCB concentrations
- For commercial/industrial areas, a concern level of 0.21 $\mu\text{g}/\text{m}^3$ and a standard of 0.26 $\mu\text{g}/\text{m}^3$, both as 24-hour average PCB concentrations

The points of compliance for attaining these standards and concern levels are the locations of residential or commercial/industrial receptors.

6.1.2 Opacity

Opacity is a quantification of the reduction in visibility resulting from air emissions. The air quality standard for opacity, based on New York State air regulations (6 NYCRR § 211.3), is that opacity during project operations must be less than 20 percent as a 6-minute average, except that there can be one continuous 6-minute period per hour of not more than 57 percent opacity.

This standard covers vessels, vehicles and equipment, unless otherwise exempt under 6 NYCRR § 211.3. This standard will not apply to the line-haul locomotive engines used by the rail carriers, which are subject to EPA's national standards governing opacity (40 Code of Federal Regulations [CFR] Part 92). However, it will apply to the locomotives used to operate the rail yard.

6.1.3 NAAQS

Under the Federal Clean Air Act, EPA has promulgated NAAQS for several pollutants (known as "criteria pollutants") to protect public health and welfare. These include:

- Respirable particulate matter (i.e., < 10 micrometers in diameter) (PM₁₀)
- Fine particulate matter (i.e., < 2.5 micrometers in diameter) (PM_{2.5})
- Carbon monoxide (CO)
- Sulfur dioxide (SO₂)
- Nitrogen oxides (NO_x)
- Ozone (O₃)

The Hudson QoLPS document requires an evaluation during design of the project's ability to achieve the NAAQS for these pollutants, and indicates that if the evaluation demonstrates that the project will achieve those standards, no further monitoring or evaluations of the criteria pollutants are necessary during project implementation.



6.2 Design Analyses and Routine Control Measures

The potential for air emissions of PCBs and criteria pollutants (or their precursors) during project activities was evaluated during design. Potential impacts on opacity of air were also considered. As summarized below, this evaluation assisted in the selection of appropriate engineering controls and contingency measures to prevent exceedances of the air quality standards and concern levels.

6.2.1 PCBs in Ambient air

Design Analyses

As part of the final design of Phase 1, GE conducted air quality modeling to assess whether the project would achieve the above-referenced concern levels and standards for PCBs in ambient air. The details of this modeling, including input parameters, methodologies and results, were presented in the Phase 1 FDR (Attachment I). The results are summarized below by project activity (assuming that no controls are in place), followed by a description of control measures included in the design to enable the project to meet the PCB criteria for air.

Dredging operations. Air quality modeling was performed to assess the impacts of PCB emissions from dredging operations. In particular, volatilization of PCBs from the river due to resuspension of sediments and emissions from open barges being loaded with dredged sediment was evaluated. The modeling indicated that PCB emissions from the river would be negligible. In the case of loaded barges, a very conservative screening model predicted that, in the absence of controls, EPA's air quality standards could be exceeded if the barges are carrying sediments with high levels of PCBs (anticipated in certain areas in the East Channel of Rogers Island and in the East Griffin Island Area) and only during high-wind conditions. A less conservative model predicted that this activity would not exceed EPA's standards. Actual PCB air monitoring data will be collected during dredging to measure achievement of EPA's standards.

Barge staging. Modeling also was conducted to assess potential PCB emissions from barges staged at Lock 7 (assumed to be up to three at a time) and from barges tied up at the sediment processing facility wharf (also assumed to be up to three at a time). The model predicted no exceedances of either the residential or the commercial/industrial concern levels or standards due to PCB emissions from barges in these locations.

Processing facility operations. Modeling also was conducted to assess operations at the sediment processing facility. The modeling predicted that, in the absence of any controls, emissions from the processing facility could cause exceedances of EPA's standards. The primary source of potential emissions is the two fine sediment stockpile areas. Additional potential sources include a gravity thickener and a process water recycle tank.

Routine Control Measures

With regard to the barge transport of dredged material, in areas where the barges will be loaded with sediments containing high levels of PCBs, wind screens will be fitted around the perimeter of barges or sufficient freeboard (i.e., depth between the top of removed sediment/water and the top of barge coaming) will be provided in the barges. In most cases, the wind screens or freeboard will be 5 feet high. Even the conservative air quality model used during design predicts that with such controls in place, there would be no PCB levels exceeding EPA standards or concern levels. For sediment barges with exposed sediment surface areas of less than 1800 square feet, as provided in the approved Phase 1 Final Design, a 2-foot high wind screen will be fitted. The specific dredge areas where these controls would be applied are specified in the EPA-approved Phase 1 Final Design (Contract 4 Specification Section 13897). These controls will substantially reduce wind speeds across the water covering sediments in the barges.

In addition, several preventive measures have been integrated into the Phase 1 Final Design to control the potential sources of PCB emissions associated with the processing facility operations. The fine sediment stockpile areas will be enclosed and ventilation systems will be installed to capture and treat PCB emissions before the air is discharged. The design also calls for covers over the gravity thickener and recycle water storage tanks to reduce PCB emissions. The modeling indicates that, with these controls in place, EPA's standards and control levels for PCBs should not be exceeded.

GE has also included some measures in the Phase 1 Final Design to prevent generation of elevated levels of particulate matter (dust) during operation of the sediment processing facility. For example, haul roads will be wetted down to minimize dust generation.

6.2.2 Opacity

The Phase 1 design is predicted to meet the numerical QoLPS for opacity. As required by the design, contractors will maintain and operate vessels and vehicles properly to prevent opacity problems, and will use pollution control systems for process equipment that are designed to prevent opacity concerns. Also, routine maintenance of diesel engines,

generators and other equipment will be required throughout the project. Opacity will be monitored by a certified visual observer at the beginning of use of each piece of equipment or if an opacity complaint is received. If this monitoring shows an exceedance of the opacity standard, appropriate repairs or other measures will be taken to prevent further exceedances.

6.2.3 NAAQS

Air quality modeling was performed during design to assess potential emissions of the criteria pollutants during Phase 1 in-river activities, as well as operations at the processing facility. Modeling results confirmed that the emissions of criteria pollutants from any of the in-river or processing facility activities are not predicted to cause exceedances of the NAAQS. Therefore, no provisions for monitoring or contingency actions regarding criteria pollutants were determined to be necessary during implementation of this project.

6.3 Routine Monitoring

The monitoring program to assess achievement of the air quality criteria for PCBs, including monitoring locations, frequency and sample collection and analytical techniques, is described in detail in Section 5.4 of the Phase 1 RAM QAPP, which is incorporated herein by reference. In summary, PCB air monitoring will be conducted at locations along the dredging corridor, at Lock 7, at unloading areas, and around the processing facility. In addition, monitoring will be conducted at a permanent background station situated upwind of the Phase 1 dredge areas, the unloading areas and the processing facility.

The results of the routine PCB air monitoring will be compared with the applicable PCB numerical criteria in the Air Quality Performance Standard. However, achievement of the applicable concern level or standard will be assessed at receptors (residential or commercial/industrial, as applicable), either via monitoring at the receptor locations or, where monitoring does not represent a given receptor, by modeling (with EPA approval) using the monitoring data from locations closer to the source to predict ambient air PCB levels at the receptor locations. GE will attempt to use monitoring data, where practical, in preference to modeling, in assessing achievement of the air quality standards.

Opacity monitoring is described in Section 5.5 of the Phase 1 RAM QAPP, which is also incorporated herein by reference. Opacity will be routinely monitored by a certified visual observer at the beginning of use of each piece of equipment that has visible emissions.

6.4 Contingency Monitoring

In the event of an exceedance of a PCB concern level or PCB standard, contingency monitoring for PCBs will be conducted. The contingency monitoring to be conducted in such situations is described in Section 5.4 of the Phase 1 RAM QAPP, and incorporated herein. For opacity, as provided in Section 5.5 of the Phase 1 RAM QAPP, additional opacity measurements will be made if an opacity complaint is received from the public.

6.5 Contingency/Response Actions

This section describes the actions that GE will undertake in the event of exceedance of the numerical criteria in the Air Quality Performance Standard or in response to an air quality complaint. These actions are also described in Section 4.2 of the Phase 1 RA CHASP, and are subject to the general qualification stated in Section 1.3 above.

6.5.1 Actions in Event of Exceedance of PCB Air Quality Concern Level

If monitoring (or modeling, if used to assess compliance at a given receptor, as discussed above) demonstrates that an applicable air quality concern level has been exceeded, GE will take the following steps:

1. Promptly notify EPA, but no later than 24 hours after receipt of the analytical results.
2. Investigate the cause of the exceedance, including, as appropriate, monitoring of background PCB concentrations (sampling-event-specific as well as baseline) and site-specific meteorological data to help identify the source of the exceedance.
3. Reduce turn-around time for analyzing air samples from 72 to 48 hours from receipt of the sample at the laboratory, until such time as PCB concentrations fall below the concern level.
4. If the source can be identified, is site-related and is not a temporary one-time event, implement engineering controls and/or mitigation measures (discussed in Section 6.5.5 below).
5. Provide a weekly report to EPA describing any corrective actions taken.

6.5.2 Actions in Event of Exceedance of PCB Air Quality Standard

If monitoring (or modeling, if used to assess compliance at a receptor, as discussed above) demonstrates an exceedance of an applicable air quality standard, GE will take the following steps:

1. Notify EPA, NYSDEC and NYSDOH immediately upon receipt of the analytical results.
2. Investigate the cause of the exceedance, including the additional monitoring described in Step 3 below.
3. Implement the following increased monitoring and related steps:
 - Establish additional monitoring stations as needed to evaluate the cause of the exceedance
 - Examine background PCB concentrations (sampling-event-specific as well as baseline) and site-specific meteorological data to help identify the source of the exceedance
 - Reduce turnaround time for analyzing air samples from 72 to 48 hours from receipt of the sample at the laboratory
 - Continue such monitoring, as appropriate
4. Develop an action plan, in coordination with EPA field staff, for implementing engineering controls and/or mitigation measures (discussed in Section 6.5.5 below), and upon EPA approval, implement those controls and/or measures.
5. Provide daily monitoring reports to EPA, NYSDEC and NYSDOH until the issue is resolved.
6. Provide a corrective action report to EPA within three working days of the discovery of the exceedance, including an analysis of the cause of the exceedance and a description of mitigation measures taken. This report also will include background and baseline monitoring data to help determine the source of the exceedance.

6.5.3 Actions in Event of Exceedance of Opacity Standard

If the opacity standard is exceeded, GE will notify EPA, NYSDEC and NYSDOH, and will take appropriate contingency measures (e.g., repair or, if necessary, upgrading or replacing equipment). A written report will be submitted to EPA identifying reasons for the exceedance and any mitigation measures taken to prevent future exceedances.

6.5.4 Actions in Event of Air Quality Complaint

If a complaint (as defined in Section 10.2.2.3 of the Phase 1 RA CHASP) relating to air quality is recorded, GE will take the following steps:

1. Investigate the cause of the complaint to verify that it is project-related.
2. If the complaint is project-related, conduct monitoring and/or modeling, as necessary, to determine whether the applicable concern level or standard has been exceeded in the area referred to in the complaint.
3. If the monitoring and/or modeling shows an exceedance of the applicable concern level or standard, implement the steps specified in Section 6.5.1, 6.5.2 or 6.5.3, as applicable.
4. If the monitoring and/or modeling do not show an exceedance of the applicable concern level or standard, report the preliminary monitoring results to EPA, work with EPA to evaluate potential mitigation measures to address the complaint, and if both GE and EPA agree, implement such measures.
5. Notify the person registering the complaint of the steps taken to resolve the complaint (as specified in Section 10.2.2.3 of the Phase 1 RA CHASP) and include a report on the complaint and response actions (if any) in the monthly reporting of complaints to EPA.

6.5.5 Potential Additional Engineering Controls and Mitigation Measures

In the event that the steps described above indicate the need for additional engineering controls or mitigation measures, GE will implement such measures, as appropriate. Selection of specific actions will be determined on a case-by-case basis. GE may consider the following, or other, as-yet-unidentified measures, depending on the specific circumstances and cause of the exceedance:



- Installing wind screens on barges loaded with sediments or providing additional freeboard (i.e., depth between top of removed sediment/water and top of barge coaming) in barges loaded with sediments, to the extent such actions have not already been implemented as described in Section 6.2.1
- Adding water to barges to increase the depth of water covering dredged sediment during transport
- Erecting wind screens around sediment processing operations
- Covering material stockpiles or controlling the shape and placement of piles
- Minimizing staging time for sediments containing PCBs
- Using larger excavation equipment to adjust the surface area/volume ratio during material handling
- Covering tanks or PCB-containing truck beds that prove to be a significant source of PCB emissions
- Performing additional equipment maintenance
- Spraying biodegradable foam (if determined to be compatible with the treatment system) over exposed dredged sediment or processed material
- Modifying operations to limit emissions

6.6 Reporting and Notifications

GE will submit regular weekly progress reports to EPA that include information related to PCB concentrations in air near the processing facility and dredging operations, ambient PCB levels (including background levels and baseline levels prior to start-up) and monitoring plan adjustments (if any). Weekly reports will be in a tabular format and will include the following information for the air samples collected for PCB analysis:

- Location (including northing and easting coordinates)
- Field sample and lab sample IDs



- Sample collection date
- Sample volume (m³)
- PCB results (µg/m³ or ng/m³)
- Whether the result exceeds an applicable concern level or standard

In the event of an exceedance of a 24-hour PCB air quality concern level, EPA will be notified promptly, but no later than 24 hours following the receipt of the analytical data. In this case, a weekly report will be provided to EPA describing any corrective actions taken.

In the event of an exceedance of a 24-hour PCB standard, EPA, NYSDEC and NYSDOH will be notified immediately upon receipt of the analytical data showing such an exceedance. In such a case, daily monitoring reports will be provided to EPA, NYSDEC and NYSDOH until the issue is resolved. In addition, in the event of such an exceedance, a written corrective action report will be developed that includes an analysis of the reasons for the exceedance and a description of any mitigation measures. This report will be provided to EPA within three working days of the discovery of the exceedance. This report will include background monitoring data, as well as pre-operations baseline 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) will also be provided in support of report findings and conclusions regarding the potential source(s) of the PCBs.

Exceedances of the opacity standard will be reported within 24 hours of observation. A report outlining the reasons for the exceedance and any mitigation measures taken will be submitted to EPA within 10 days of the event. A monthly report will be sent to EPA summarizing the monitoring activities for the previous month.

A report on air quality complaints, regardless of whether they involved exceedances of a standard or concern level, and on response actions taken (if any) or other resolution of the complaints will be included in the monthly reporting of complaints to EPA.

7. Odor Performance Standard

This section discusses the QoLPS for odor, which is applicable to both dredging operations and processing facility operations. It includes an overview of the standard, as set out in the Hudson QoLPS; a summary of the pertinent design analyses; a summary of the routine and contingency monitoring for odor; a description of the response actions to be taken in the event of an exceedance of the numerical odor standard or in response to an air quality complaint; and a description of the relevant reporting and notification procedures.

7.1 Overview of Standard

Odors may be generated by dredged sediments that contain decaying organic matter. Odors are difficult to measure because they vary depending on the concentration of the pollutant and the sensitivity of the person exposed to the odor.

The primary odor of concern during dredging and sediment processing activities would come from hydrogen sulfide (H₂S) released by decaying plants and other organic material found in the river sediments. PCBs are odorless.

The QoLPS for odor establishes a standard for H₂S to minimize unwanted odors from the project. The standard for H₂S is 14 µg/m³ or 0.01 ppm as a 1-hour average.

In addition, the QoLPS for odor specifies a “concern level” consisting of the presence of uncomfortable project-related odors identified by project workers or an odor complaint from the public, and an “exceedance level” consisting of an exceedance of the numerical H₂S standard or “frequent, recurrent odor complaints related to project activities.” (Thus, the “exceedance level,” as defined in the Hudson QoLPS, can occur even in the absence of a measured H₂S level exceeding the numerical H₂S standard – i.e., if there are “frequent, recurrent odor complaints related to project activities.”)

7.2 Design Analyses and Routine Control Measures

It is not anticipated that dredged sediments will generate odors that will reach the concern or exceedance levels in the QoLPS. As discussed in Section 3.11.2.2 of the Phase 1 Intermediate Design Report (Phase 1 IDR) (BBL 2005), hundreds of sediment cores previously collected from the river for physical and chemical analyses and treatability studies generally did not have offensive odors. Nevertheless, to minimize odors and prevent complaints, the following routine control measures will be employed:

- Debris from dredging operations, which is more likely than other types of dredged material to contain wood, vegetation, biota and other types of organic material, will be separated from the other dredged material at the waterfront area of the processing facility. If an offensive odor is detected from this debris, it will be moved as quickly as practical to the debris staging area in the center of the processing facility site.
- Filter cake solids will be covered using roll-off box covers if uncomfortable odors are encountered during filter cake drops prior to transportation to the filter cake storage enclosure.
- Air handling systems at the two filter cake staging enclosures will be operated and maintained while material is stored.

7.3 Routine Monitoring

Odor sampling will be performed in response to: (1) on-site worker notifications of odors; or (2) odor complaints received from the public in the immediate vicinity of the remediation zone. If the odor is identified as potentially H₂S, monitoring for H₂S will be performed upwind and downwind of the suspected source. A description of this monitoring, including monitoring locations, monitoring frequency and sampling techniques, is provided in Section 6 of the Phase 1 RAM QAPP, which is incorporated herein by reference.

7.4 Contingency Monitoring

Contingency monitoring for H₂S is also described in Section 6 of the Phase 1 RAM QAPP. As stated there, if odor monitoring shows that the 1-hour standard of 0.01 ppm (14 µg/m³) for H₂S is exceeded and/or if odor complaints are persistent, corrective actions may be warranted. Such actions may include, where warranted, additional (contingency) monitoring to further assess the source of the odor and/or to establish the effectiveness of the corrective actions taken.

7.5 Contingency/Response Actions

This section describes the actions that GE will undertake in the event of exceedance of the numerical standard for H₂S or in response to an odor complaint. These actions are also described in Section 4.3 of the Phase 1 RA CHASP, and are subject to the general qualification stated in Section 1.3 above.

7.5.1 Actions in Event of Exceedance of Hydrogen Sulfide Standard

If monitoring for H₂S is conducted (as described above) and demonstrates an exceedance of the H₂S numerical standard, GE will take the following steps:

1. Promptly notify EPA, but no later than 24 hours after receipt of the analytical data.
2. Investigate the source of the odor, to the extent possible, to determine if it is project-related. This investigation may include, as relevant, an inspection of the entire sediment processing areas to ensure that good housekeeping and operational practices are being followed. In such an inspection, checks will be made to see if material piles have been left uncovered, air handling systems are operating properly, equipment/systems malfunctions have occurred or any unsatisfactory work practices are observed that could promote the emanation of odors.
3. If the source of odor is project-related, develop an action plan, in coordination with EPA staff, to implement engineering controls and/or mitigation measures (discussed in Section 7.5.3), and upon EPA approval, implement those controls and/or measures.
4. Continue regular H₂S monitoring until the issue is resolved.
5. Provide a corrective action report to EPA within 10 days of discovery of the exceedance, including an analysis of the cause of the exceedance and a description of any mitigation measures taken.

7.5.2 Actions in Event of Odor Complaint

If a complaint (as defined in Section 10.2.2.3 of the Phase 1 RA CHASP) relating to odor is received and the odor is identified as potentially H₂S, GE will conduct the H₂S monitoring described in Section 6 of the Phase 1 RAM QAPP. If the monitoring shows an exceedance of the H₂S standard, GE will implement the steps defined in Section 7.5.1. If the monitoring does not show an exceedance of the H₂S standard, GE will report the preliminary monitoring results to EPA, work with EPA to evaluate potential mitigation measures to address the complaint, and if both GE and EPA agree, implement such measures. In addition, in either case, GE will notify the person who registered the complaint of the steps taken to resolve the complaint (as specified in Section 10.2.2.3 of the Phase 1 RA CHASP), and will include a report on the complaint and response actions (if any) in the monthly reporting of complaints to EPA.

If an odor complaint is received and the odor is not identified as H₂S, GE will take the following steps (multiple complaints regarding the same potential odor will be treated as one complaint):

1. Document the odor complaint and investigate the source of the odor to determine if it is project-related (as described above).
2. Notify EPA within 24 hours of receiving the complaint.
3. If the odor is project-related, investigate the odor to determine if it is “uncomfortable,” rather than simply discernible. (For this purpose, an “uncomfortable” odor is defined, in accordance with 6 NYCRR § 211.2, as an odor which “unreasonably interfere[s] with the comfortable enjoyment of life or property.”) This investigation will include further discussion of the nature and intensity of the odor with the person registering the complaint, and if necessary, obtaining an objective assessment of odor intensity.
4. If a project-related uncomfortable odor is identified, take mitigation measures as appropriate to reduce or eliminate the source of the odor (as discussed in Section 7.5.3).
5. Submit a follow-up report to EPA that describes any measures taken to reduce or eliminate the source of the odor.
6. Notify the person registering the complaint of measures taken to reduce or eliminate the source of the odor (as specified in Section 10.2.2.3 of the Phase 1 RA CHASP), and include a report on the complaint and response actions (if any) in the monthly reporting of complaints to EPA.

As noted above, the QoLPS for odor defines the “exceedance level” to include “frequent, recurrent odor complaints.” For this purpose, “frequent, recurrent complaints” will be defined on a case-by-case basis. However, the occurrence of such complaints will trigger the same responses described above, except that, in that case, the follow-up report will be submitted to EPA within 10 days of the frequent, recurrent complaints.

7.5.3 Potential Additional Engineering Controls and Mitigation Measures

In the event that the steps described above indicate the need for additional engineering controls or mitigation measures, GE will implement such measures, as appropriate. Selection of specific actions will be determined on a case-by-case basis. GE may consider

the following, or other, as-yet-unidentified measures, depending on the specific cause of the odor:

- Adjusting handling procedures or moisture content of dredged sediments
- Adding water to barges to increase the depth of water covering dredged sediment during transport
- Using tarps or covers at the processing facility to prevent odors from escaping from dredged sediments
- Applying a foam agent (if determined to be compatible with the treatment system) to cover materials or a chemical agent that will neutralize the odor
- Relocating piles to the filter cake staging enclosures or other areas
- After prompt transfer of debris with an offensive odor to the debris stockpile area near the rail yard (as discussed in Section 7.2), covering the debris or loading it directly into a rail car for transport off-site

7.6 Reporting and Notifications

During dredging operations, a monthly report will be submitted to EPA summarizing the odor monitoring activities for the previous month. The summary will be in tabular format and will include the reason for the monitoring, the date(s) and location(s), and the monitoring results. In addition, a log of any odor complaints, monitoring and the necessary information and follow-up actions needed to resolve the complaint will be included in the monthly reporting of complaints to EPA.

EPA will be notified of odor complaints from the public or of an exceedance of the numerical H₂S standard within 24 hours of receipt of the complaint or of the analytical data showing an exceedance. In the case of an exceedance or receipt of "frequent, recurrent odor complaints," a corrective action report outlining the reasons for the exceedance or recurring odor problems and any mitigation measures taken will be submitted to EPA within 10 days of the event. This report will contain:

- Copy of relevant odor complaint log (if applicable)
- Wind rose for applicable time period

- H₂S monitoring results (upwind/downwind of suspected source)
- Findings relating to cause of odor
- Corrective action taken/mitigation measures (if required)

For other complaints, a report on the complaints and on response actions taken (if any) or other resolution of the complaints will be included in the monthly reporting of complaints to EPA.

8. Noise Performance Standard

This section discusses the QoLPS for noise, which is applicable to both dredging operations and processing facility operations. It includes an overview of the Noise Performance Standard, as set out in the Hudson QoLPS; a summary of the design analyses conducted to assess achievement of the standard during Phase 1 and the measures included in the Phase 1 design to address potential exceedances of the numerical noise criteria in the standard; a reference to the routine and contingency noise monitoring to be conducted during Phase 1; a description of the response actions to be taken in the event of an exceedance of an applicable noise criterion or in response to a noise complaint; and a description of the relevant recordkeeping, reporting and notification procedures.

8.1 Overview of Standard

EPA established the Noise Performance Standard to limit the effects of project noise on the community. EPA categorized project activities that have the potential to generate noise as either short-term or long-term. Short-term activities include construction of the processing facility, dredging, operation of the Work Support Marina and backfilling/capping. Short-term activities could vary from several weeks to several months in a particular area. Long-term activities are expected to continue for the duration of the project and include sediment processing and rail yard operations at the processing facility.

In developing its QoLPS for noise, EPA considered the effects of daytime and night-time dredging and sediment processing activities near residential areas. For example, a lower residential noise standard has been developed for night-time hours, from 10 p.m. to 7 a.m. This lower standard also applies to mixed commercial and residential areas.

The numerical noise criteria set forth in the QoLPS are expressed in decibels using the A-weighted scale (dBA). They are as follows:

- Short-Term Criteria (applicable to facility construction, dredging, Work Support Marina operations and backfilling/capping activities):
 - *Residential Control Level* (maximum hourly average)

Daytime = 75 dBA

- *Residential Standard* (maximum hourly average)

Daytime = 80 dBA

Night-time (10:00 pm – 7:00 am) = 65 dBA

- *Commercial/Industrial Standard* (maximum hourly average)

Daytime and night-time = 80 dBA

- Long-Term Criteria (applicable to processing facility operations):

- *Residential Standard* (24-hour average)

Daytime and night-time = 65 dBA

- *Commercial/Industrial Standard* (maximum hourly average)

Daytime and night-time = 72 dBA

The points of compliance for attaining these numerical criteria are the locations of residential or commercial/industrial receptors.

The Hudson QoLPS for noise defines the “concern level” as an exceedance of the residential control level, an exceedance of an applicable noise standard that can be easily and immediately mitigated, or receipt of a project-related noise complaint. It defines the “exceedance level” as an exceedance of an applicable noise standard that cannot be easily and immediately mitigated or as “frequent, recurrent noise complaints related to project activities.” Thus, the term “exceedance” is used in two ways in this QoLPS – both to designate noise levels above an applicable numerical criterion and as one of the two action levels in the standard. It is important to keep this distinction in mind, because the “concern level” can include exceedances of the numerical noise criteria as well as complaints, and the “exceedance level” can include situations that do not involve exceedances of the numerical noise criteria (i.e., frequent, recurrent complaints). To avoid ambiguity, this PSCP uses the term “exceedance” for noise levels above a criterion and the term “exceedance action level” for the higher action level.

8.2 Design Analyses and Routine Control Measures

Final design analyses and predictive modeling have been conducted for various potential noise sources in the absence of any acoustic controls. The results for each short-term activity (i.e., dredging operations) and for long-term continuous activity (i.e., processing facility operations) are discussed below, along with routine noise control measures. Details of the noise modeling analyses, including input parameters, methodologies and results, are provided in the EPA-approved Phase 1 FDR (Attachment J). The routine control measures described in the following subsections incorporate information from the contractors' noise control plans.

8.2.1 Dredging Operations

Design Analysis

In-river dredging operations (which include debris removal, inventory and residual dredging, dredged material transport and cap and backfill placement) require the use of engine-driven dredges, tugboats and other equipment that unavoidably generate noise. As discussed in Attachment J of the Phase 1 FDR, the model predicts that these operations would meet the daytime residential and commercial/industrial standards of 80 dBA at a distance of approximately 35 feet or more, the daytime residential control level of 75 dBA at a distance of 60 feet or more, and the night-time residential standard of 65 dBA at a distance of 200 feet or more. These model results, in conjunction with the locations of assessment points, indicate that noise from dredging and barging operations would produce predicted exceedances of the applicable noise criteria only when these operations are within 200 feet of residences and only at night.

Routine Control Measures

Routine noise control measures to be implemented by the Dredging Contractor include the following:

- The contractor will check all equipment prior to the commencement of dredging operations to determine that it is running within the manufacturer's tolerances for proper equipment operations. The checks will include a visual inspection of machines and equipment in an idle and operational state. Since most equipment anticipated for use on this project is either new or nearly new, it is expected that late-model operational mufflers will be a part of the equipment.

- The contractor will perform routine maintenance in accordance with the manufacturer’s recommended intervals to help ensure that all equipment is operating efficiently.
- The contractor plans to use hydraulically operated buckets during the project, which will result in less noise than cable-operated buckets.
- The contractor will implement work procedures that reduce dredging noise. Standard operating procedures will be designed to minimize the potential for bucket-barge impacts. In specific areas where the potential for noise exceedences exist because of proximity to residences, barges will be positioned so that they shield shoreline receptors from tug noise, where possible. Spuds will be maintained and operated at appropriate speeds.
- Where possible, dredging operations in the nearest part of a CU impacting residences will be conducted during the daytime. Night-time operations in the same CU will be performed, where possible, in the furthest part of the CU.

As discussed in the Phase 1 RAM QAPP, a noise study will be conducted at the commencement of dredging to confirm the equipment sound levels and assumptions used in the modeling. If dredging activities are shown to exceed the noise criteria adjacent to residences, additional mitigation measures will be implemented as needed. These may include using the smaller of the available excavators or tugs already on site, a reduction in the amount of tug operations planned during the night-time hours, use of temporary portable noise shrouds around pumps and/or other operational adjustments on a temporary and as-needed basis.

8.2.2 Sheet Pile Installation

Design Analysis

Sheet piling will be used as a resuspension control measure in the EGIA, as discussed in the Phase 1 FDR (Section 2.3.4). Driving sheeting with a vibratory hammer generates noise. In addition, while much of the sheet piling can be installed with a vibratory hammer, an impact hammer will be needed for driving king piles into the rock. The Phase 1 FDR estimates that this work will include vibratory hammering approximately 80 percent of the time and impact hammering for the remaining 20 percent of the time.

The noise model predicts that: (1) the noise levels from vibratory hammering would exceed the daytime residential control level at three nearby residences and the daytime residential

standard at one of those residences; and (2) the noise levels from impact hammering would exceed the daytime residential control and standard level at the same three residences.

Routine Control Measures

During the design, several noise control/mitigation options were considered for sheet piling in the EGIA, as discussed in the Phase 1 FDR (Attachment J). However, the design team could not identify control or mitigation options that could practicably and reliably be implemented to reduce the noise levels from the sheet pile installation to levels below the applicable daytime criteria. The design included specifications for noise (Section 02930), requiring the contractor to prepare a noise control plan describing plans for complying with the noise standard. The contractor has identified the possible use of silenced hydraulic sources during sheet pile installation; otherwise noise control will be addressed on a contingency basis as described in Section 8.5.4 below.

8.2.3 Processing Facility Operations

Design Analysis

The dewatering and handling of dredged sediments at the processing facility will generate noise as the material is unloaded at the wharf, processed through a variety of pumps and mechanical equipment, and then transported by truck to the stockpiles for loading and off-site transport/disposal. Rail yard operations also will generate noise as locomotives maneuver rail cars and unit trains on and off the property. As discussed in the Phase 1 FDR, the noise modeling results indicate that the noise levels from processing facility operations would meet the applicable long-term noise standards at all commercial/industrial and residential locations around the facility, except two located across the canal from the unloading wharf. These include the house at the Par-3 golf course (which is designated as residential use for purposes of assessing attainment of the QoLPS) located between NYS Canal Corporation property and East Road, and one residence on the west side of East Road. The modeling results indicated that these locations may receive noise levels that may exceed the long-term day-night 24-hour average residential standard level of 65 dBA. The specifications for the processing equipment and operations included requirements for maintaining noise levels below thresholds where modeling indicates that the long-term standard could be achieved.

Routine Control Measures

The following routine control measures will be incorporated into the processing facility operations:

- Construction of a noise reduction berm along the south side of the processing facility site.
- Installation of broad-band backup alarms on non-stationary equipment.
- Selection of material-handling equipment at the processing facility with low noise emission features.
- Inspection and maintenance of equipment before it is delivered to the site.
- Regular maintenance of equipment according to manufacturer's recommendations.
- Installation and maintenance of sound reducing mufflers on air and fossil fuel-powered equipment.
- Prohibition of engine idling when equipment is not in use.
- Reduction of vehicle speed and avoidance of excessive engine throttling and gear shifting.
- Restriction of rail yard operations by the Rail Yard Operations Contractor (i.e., loading and moving rail cars) to daytime hours (pick-up and delivery of unit trains by the railroad is dependent on the railroad's schedule and may happen at any hour).
- Positioning of rail yard equipment to maximize natural or artificial features to attenuate noise.
- For dredging operations, planning night-time work to minimize the amount of noise. When possible, work in a CU closest to residential areas will be conducted during daytime hours to minimize the noise impacts to receptors.

8.3 Routine Monitoring

The routine noise monitoring program to be conducted during Phase 1, including monitoring locations, frequency and methods, is presented in detail in Section 7 of the Phase 1 RAM QAPP, which is incorporated herein by reference. In summary, noise monitoring will include a 2-week noise monitoring study at the beginning of Phase 1 to collect sound level data from the dredging operation at various distances, so as to validate the final design and confirm the equipment sound level assumptions in the Phase 1 FDR. During dredging, noise monitoring will be conducted at a minimum frequency of 1 hour every 4 hours at the shoreline nearest to each dredging and backfilling operation (subject to obtaining access) where there is a potential for exceedances of the noise criteria. In addition, noise monitoring will be performed continuously at the perimeter of the processing facility.

8.4 Contingency Monitoring

Contingency noise monitoring will be conducted in the event that the routine noise monitoring shows an exceedance (or potential exceedance) of the residential control level or a noise standard or in the event of a complaint. For example, if sound levels at shoreline noise monitors near dredging operations are above the numerical noise criteria for the type of receptor for which they were designed to monitor, monitoring will be performed at a location closer to the nearest receptor to the dredging operation (e.g., the nearest occupied building). In addition, as discussed in Section 8.5 below, in the event of an exceedance of the residential control level or a noise standard, additional monitoring will be conducted, as needed, to evaluate the cause of the noise increase, and will be continued until the issue is resolved. Similarly, as also discussed in Section 8.5, in the event of a noise complaint, monitoring will be performed, as necessary, to determine whether the applicable control level or standard has been exceeded in the area referred to in the complaint. These additional types of monitoring are referred to as contingency monitoring and are discussed further in Section 7 of the Phase 1 RAM QAPP.

8.5 Contingency/Response Actions

This section describes the actions that GE will undertake in the event of an exceedance of the numerical noise criteria or in response to a noise complaint. These actions are also described in Section 4.4 of the Phase 1 RA CHASP, and are subject to the general qualification stated in Section 1.3 above.

8.5.1 Actions in Event of Exceedance of Residential Control Level

If monitoring demonstrates that the daytime noise control level for residential areas has been exceeded at a monitor established for such an area, GE will take the following steps:

1. If the monitoring point is not representative of a residential receptor, attempt to collect noise data closer to the receptor.
2. Investigate the cause of the increased noise to verify that it is project-related.
3. If noise increase is project-related, implement additional monitoring, as needed, to evaluate the cause of the noise increase.
4. Continue such additional monitoring until it confirms that the issue is resolved.
5. Consider additional engineering controls and/or mitigation measures to prevent or minimize future exceedances (see Section 8.5.4 below) and, if appropriate, implement such controls and/or measures.
6. Submit a follow-up report to EPA describing the exceedance and any actions taken to address the exceedance.

8.5.2 Actions in Event of Exceedance of Noise Standard

If monitoring demonstrates an exceedance of an applicable noise standard at a monitor, GE will take the following steps:

1. Promptly notify EPA, but no later than 24 hours after discovery of the exceedance.
2. If the monitoring point is not representative of the receptor, attempt to collect noise data closer to the receptor.
3. Investigate the cause of the exceedance to verify that it is project-related.
4. If the noise increase is project-related, implement additional monitoring, as needed, to evaluate the cause of the noise increase and assess the potential impact of non-project-related noise on receptors.

5. Develop an appropriate action plan, in coordination with EPA field staff, for implementation of engineering controls and/or mitigation measures (discussed in Section 8.5.4 below) and, upon EPA approval, implement those controls and/or measures.
6. Continue additional monitoring and provide daily monitoring reports to EPA until the issue is resolved.
7. Provide a corrective action report to EPA within 10 days of the discovery of the exceedance, including an analysis of the cause of the exceedance and a description of mitigation measures taken.

Although, as noted in Section 8.1 above, the QoLPS for noise distinguishes between exceedances of a standard that are easily and immediately mitigated (concern action level) and those that are not (exceedance action level), the same actions described above will be taken in either case. However, the difficulties and time necessary to mitigate exceedances will obviously affect the response actions to be taken.

8.5.3 Actions in Event of Noise Complaint

If a complaint (as defined in Section 10.2.2.3 of the Phase 1 RA CHASP) relating to noise is recorded, GE will take the following steps:

1. Investigate the cause of the complaint to verify that it is project-related.
2. If the complaint is project-related, conduct monitoring to determine whether the applicable control level or standard has been exceeded in the area referred to in the complaint.
3. If the monitoring shows an exceedance of the applicable control level or standard, implement the steps specified in Sections 8.5.1 or 8.5.2, as applicable.
4. If the monitoring does not show an exceedance of the applicable control level or standard, report the preliminary monitoring results to EPA, work with EPA to evaluate potential mitigation measures to address the complaint, and if both GE and EPA agree, implement such measures.
5. Notify the person registering the complaint of the steps taken to resolve the complaint (as specified in Section 10.2.2.3 of the Phase 1 RA CHASP), and include a report on

the complaint and response actions (if any) in the monthly reporting of complaints to EPA.

As noted above, the QoLPS for noise defines the exceedance action level to include “frequent, recurrent noise complaints related to project activities.” For this purpose, “frequent, recurrent complaints” will be defined on a case-by-case basis. However, the occurrence of such complaints will trigger the same responses described above, except that, in the event of such complaints, GE will notify EPA within 24 hours of receipt of those complaints, will submit a plan to EPA specifying its proposed response and will submit a corrective action report to EPA with 10 days of the complaints. In such a case, the plan submitted to EPA will be consistent with # 3 and # 4 above (i.e., if the monitoring shows an exceedance of the control level, the plan will include any additional engineering controls and/or mitigation measures that GE considers appropriate; if the monitoring show an exceedance of an applicable standard, the plan will include a proposal for additional engineering controls and/or mitigation measures for EPA approval; and if the monitoring does not show an exceedance of any numerical criteria, the plan will include mitigation measures, if any, on which GE and EPA agree).

8.5.4 Potential Additional Engineering Controls and Mitigation Measures

In the event that the steps described above indicate the need for additional engineering controls or mitigation measures, GE will implement such measures, as appropriate. Specific actions will be selected on a case-by-case basis, and will only be used to the extent they do not impede safe operations. GE may consider the following, or other, as-yet-identified measures, depending on the specific cause of the noise: (the measures listed below incorporate information from the contractors’ noise control plans.)

- Using shrouds or noise-dampening devices on equipment
- Changing to the use of alternative equipment at certain times of the day or night
- Repairing or replacing stationary pieces of equipment found to be operating outside of its parameters
- Placing small portable barriers around the noise sources or between the noise sources and receptors, where practicable, to block or reduce sound propagation
- Installing noise-deadening construction materials to line roll-off boxes and debris staging areas and to quiet stationary/mobile equipment

- Reducing the speed at which material-handling equipment is operated
- Installation or replacement of noise mufflers on engines if compatible with manufacturers' recommendations
- Using distance and natural or artificial features to attenuate noise
- Placing operating restrictions on equipment, as appropriate (including, for pile driving, limiting pile driving activities to a certain number of minutes each hour)
- Making operational adjustments, including sequencing of pertinent operations, use of specific travel routes, and modification of normal backup locations
- Modifying hours of operation of construction (including pile driving) or dredging activities
- Utilizing sound-dampening blankets between sheet pile hammers and receptors, if possible while maintaining a safe operation
- Using silenced hydraulic (hydraulic power pack) during sheet pile installation
- Positioning empty material barges between a noise source and a receptor to deflect noise

8.6 Recordkeeping, Reporting and Notification

Records of noise measurements will be maintained, including the measurement location, time of measurement, meteorological conditions, identification of significant sound sources, model and serial numbers of equipment used, and calibration results. These results will be documented on daily noise monitoring field data sheets or by using automated data loggers during times when noise monitoring is being conducted.

A monthly report will be sent to EPA summarizing the monitoring activities for the previous month. The summary will include (in tabular format) the date, time, location, activity being conducted and results in dBA. GE will also submit, on a monthly basis, a report on complaints, including (in tabular format) a log of any noise complaints and the necessary information and follow-up action needed to resolve the complaint.

In addition, in the event of any exceedance of a noise standard or the receipt of frequent, recurrent noise complaints, EPA will be notified within 24 hours after the discovery of the exceedance or receipt of the complaints, and a corrective action report outlining the reasons for the exceedance or the recurrent complaints and any controls or mitigation employed will be submitted to EPA within 10 days of the event. In the event of any exceedance of the residential control level or receipt of any other complaint, a follow-up report will be sent to EPA describing the event and the response. This follow-up report will typically be included in the CD Monthly Progress Report on the project or (for complaints) in the monthly reporting of complaints.

9. Lighting Performance Standard

This section discusses the QoLPS for lighting, which is applicable to both dredging operations and processing facility operations. It includes an overview of the Lighting Performance Standard, as set out in the Hudson QoLPS; a summary of the design analyses conducted to assess achievement of the lighting standard during Phase 1; a reference to the routine and contingency noise monitoring to be conducted during Phase 1; a description of the response actions to be taken in the event of an exceedance of an applicable lighting standard or in response to a lighting complaint; and a description of the relevant recordkeeping, reporting and notification procedures.

9.1 Overview of Standard

To meet EPA's Productivity Performance Standard, in-river dredging and on-shore processing is expected to be performed 24 hours a day, 6 days a week, which will unavoidably require night-time lighting of work areas to protect worker safety and sufficiently illuminate equipment, transport routes, and operational areas. Lighting is measured in footcandles using a footcandle meter. The QoLPS for lighting establishes the following numerical standards for lighting, which vary depending on the type of area affected:

- For rural and suburban residential areas: 0.2 footcandle
- For urban residential areas: 0.5 footcandle
- For commercial/industrial areas: 1 footcandle

The Hudson QoLPS for lighting 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. It defines the "exceedance level" as an exceedance of an applicable lighting standard that cannot be easily and immediately mitigated or as "frequent, recurrent complaints related to project activities." (Thus, as with the noise standard, the term "exceedance" is used in the lighting standard both to designate light levels above an applicable standard and as one of the two action levels in the standard. The "concern level" can include exceedances of a numerical lighting standard as well as complaints, and the "exceedance level" can include situations that do not involve exceedances of the numerical lighting standards – i.e., frequent, recurrent complaints. This section attempts to make clear which situation it is discussing.)



9.2 Design Analyses and Routine Control Measures

Design Analyses

GE presented a modeling assessment in the Phase 1 IDR, summarized in the Phase 1 FDR (Section 4.4.4), for the potential lighting impacts from: (a) night-time on-water operations (dredging, backfilling/capping and barge transport); and (b) night-time processing facility operations. The results of this modeling indicated that these operations will meet the numerical lighting standards specified above.

Routine Control Measures

Although the modeling did not predict any exceedances of the lighting standards, a number of routine lighting control measures have been incorporated into the design of the processing facility, and are planned by the contractors who will execute both the dredging operations and the processing facility operations. These include the following:

- Permanent outdoor light fixtures have been installed at the processing facility to provide minimal lighting in select work areas such as the parking lot, security station, administrative/contractor trailers and other plant process locations. The lighting is directed towards the work areas and positioned to prevent the light from reflecting towards nearby homes. Lights are fitted with shielding to keep light from being directed away from work areas.
- Rail car loading operations by the Rail Yard Operations Contractor are planned to be conducted only during daytime hours, minimizing the need for artificial lighting in this area of the processing facility.
- Heavy equipment and trucks operating at night will have their headlights turned off when an operator exits the operator's compartment or when the equipment is idle.
- For dredging operations, night-time work will be planned to minimize the amount of lighting that would be needed. Lighting equipment will be checked prior to delivery to site to make sure that the equipment is well maintained within normal industry standards. Lighting on the river will be directed toward work areas and away from neighboring properties. When possible, work in a CU closest to residential areas will be conducted during daylight hours to minimize the impacts of light to receptors.



9.3 Routine Monitoring

A detailed description of the light monitoring program, including monitoring locations, frequency and techniques, is described in detail in Section 8 of the Phase 1 RAM QAPP, which is incorporated herein by reference. The light monitoring program is scheduled to begin at the commencement of dredging and will continue until the completion of Phase 1 dredging and processing facility operations. It will include light monitoring on the shoreline nearest dredging operations on the first night of dredging at a given area and whenever the dredging operation is moved to a different area. It will also include monitoring at the perimeter of the processing facility when the facility initially begins activities after dusk and when significant changes in lighting for the facility are made. EPA will evaluate and consider alternative methods for light monitoring on an ongoing basis.

9.4 Contingency Monitoring

Contingency light monitoring will be conducted in the event that the routine light monitoring shows an exceedance (or potential exceedance) of a lighting standard or in the event of a complaint. For example, if light levels at shoreline monitors near dredging operations are above the numerical lighting standard for the type of receptor for which they were designed to monitor, monitoring will be performed at a location closer to the nearest receptor to the dredging operation. In addition, as discussed in Section 9.5 below, in the event of an exceedance of a lighting standard, additional monitoring will be conducted in the affected area and will be continued until the issue is resolved. Similarly, as also discussed in Section 9.5, in the event of a lighting complaint, monitoring will be performed, as necessary, to determine whether the applicable standard has been exceeded in the area referred to in the complaint. These additional types of monitoring are referred to as contingency monitoring and are discussed further in Section 8 of the Phase 1 RAM QAPP.

9.5 Contingency/Response Actions

This section describes the actions that GE will undertake in the event of an exceedance of the numerical lighting standards or in response to a lighting complaint. These actions are also described in Section 4.5 of the Phase 1 RA CHASP, and are subject to the general qualification stated in Section 1.3 above.

9.5.1 Actions in Event of Exceedance of Lighting Standard

If light levels exceed an applicable standard at a monitor location, GE will initially verify that the monitoring point is representative of the receptor and, if not, will attempt to conduct

monitoring closer to the receptor. If light levels at a representative receptor location exceed the applicable standard and it is determined the exceedance can be easily and immediately mitigated, GE will take the following steps:

1. Notify EPA within 24 hours.
2. Investigate the cause of the lighting exceedance to verify that it is project-related.
3. If the exceedance is project-related, implement increased monitoring, as needed.
4. Implement mitigation measures, as appropriate (see Section 9.5.3).
5. Re-evaluate light levels at the receptor to confirm that the issue is resolved.
6. Submit a follow-up report to EPA, including a description of actions taken to resolve the exceedance.

If light levels exceed an applicable standard at a representative receptor location but it appears that the exceedance cannot be easily and immediately mitigated, GE will take the following steps:

1. Promptly notify EPA, but no later than 24 hours after discovery of the exceedance.
2. Investigate the cause of the lighting exceedance to verify that it is project-related.
3. If the exceedance is project-related, implement regular light monitoring in the affected area (i.e., monitoring beyond the initial monitoring described above).
4. Develop an action plan, in coordination with EPA field staff, for appropriate mitigation measures (see Section 9.5.3) and, upon EPA approval, implement that plan.
5. Continue the regular monitoring until the issue is resolved.
6. Provide a corrective action report to EPA within 10 days of discovery of the exceedance, describing the cause of the lighting exceedance and mitigation measures implemented, if any, to resolve the exceedance.

In addition, in the event of a deviation from the lighting requirements applicable to lighting on vessels, GE will follow the procedures for deviations from navigation requirements, as described in Section 10.5 below.

9.5.2 Actions in Event of Lighting Complaint

If a complaint (as defined in Section 10.2.2.3 of the Phase 1 RA CHASP) relating to lighting is recorded, GE will take the following steps:

1. Investigate the cause of the complaint to verify that it is project-related.
2. If the complaint is project-related, conduct monitoring as necessary, to determine whether the applicable standard has been exceeded in the area referred to in the complaint.
3. If the monitoring shows an exceedance of the applicable standard, implement the applicable steps specified in Section 9.5.1 above.
4. If the monitoring does not show an exceedance of the applicable standard, report the preliminary monitoring results to EPA, work with EPA to evaluate potential mitigation measures to address the complaint, and if both GE and EPA agree, implement such measures.
5. Notify the person registering the complaint of the steps taken to resolve the complaint (as specified in Section 10.2.2.3 of the Phase 1 RA CHASP), and include a report on the complaint and response actions (if any) in the monthly reporting of complaints to EPA.

As noted above, the QoLPS for lighting defines the exceedance action level to include “frequent, recurrent lighting complaints relating to project activities.” For this purpose, “frequent, recurrent complaints” will be defined on a case-by-case basis. However, the occurrence of such complaints will trigger the same responses described above, except that, in the event of such complaints, GE will notify EPA within 24 hours of receipt of those complaints, will submit a plan to EPA specifying its proposed response and will submit a corrective action report to EPA with 10 days of the complaints (i.e., if the monitoring shows an exceedance of the applicable standard, the plan will include a proposal for appropriate mitigation measures; and if the monitoring does not show such an exceedance, the plan will include mitigation measures, if any, on which GE and EPA agree).

9.5.3 Potential Additional Engineering Controls and Mitigation Measures

In the event that the steps described above indicate the need for additional engineering controls or mitigation measures, GE will implement such measures, as appropriate. Specific actions will be selected on a case-by-case basis, and will only be used to the extent they do not impede safe operations. GE may consider the following, or other, as-yet-identified measures, depending on the specific cause of the lighting issue:

- For dredging operations:
 - Repositioning of light plants, or installation of buffers, barriers or screens
 - Repositioning of material barges to block light from the work platforms
 - Re-sequencing of the work
- For processing facility operations:
 - Installing screens on the edge of heavily traveled roads within the facility to block errant lights
 - Repositioning of lights and/or the installation of shields or barriers as needed between specific light sources and receptors

9.6 Recordkeeping, Reporting and Notifications

Monitoring results will be documented on light monitoring field data sheets. Records of measurements will 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.

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

EPA will be notified of any exceedances of the lighting standard within 24 hours after the discovery of the exceedance. If the exceedance was easily and immediately mitigated, a follow-up report will be sent to EPA describing the response (typically in the CD Monthly

Progress Report). If not, a corrective action report outlining the reasons for the exceedance and any mitigation employed will be submitted to EPA within 10 days of the event.

In addition, if frequent, recurrent lighting complaints are received, EPA will be notified within 24 hours, and a corrective action report outlining the reasons for the recurrent complaints and any controls or mitigation employed will be submitted to EPA within 10 days of the event. In the event of receipt of any other complaint, a report on the complaint and on any response actions taken or other resolution of the complaint will be included in the monthly reporting of complaints.

10. Navigation Performance Standard

This section discusses the QoLPS for navigation during Phase 1 dredging. This standard is applicable to dredging operations, including debris removal, dredging, dredged material transport, and backfilling/capping of dredged areas. It sets forth the general requirements of the standard, the actions that GE will take to comply with the standard, the routine notice and monitoring requirements, contingency actions in the event of a deviation from the applicable requirements, requirements for responding to complaints and reporting and notification requirements.

10.1 Overview of Standard

The river will be used by public, commercial and project vessels during work activities. EPA developed the QoLPS for navigation, in consultation with the New York State Canal Corporation (NYS Canal Corporation), to regulate project-related vessel movement on the river. The Navigation Performance Standard requires that project vessels comply with the applicable provisions of federal and state navigation laws, rules and regulations. In addition, it contains a number of other requirements relating to the relationship between project-related vessel traffic and non-project vessels. These requirements include:

- Restricting access to work areas and providing safe access around them in the navigational channel, to the extent practical
- Notifying the NYS Canal Corporation of in-river project activities and providing information to the NYS Canal Corporation and/or United States Coast Guard (USCG) so as to allow them to issue Notices to Mariners
- Providing the public with a schedule of anticipated project activities
- Scheduling project river traffic so that non-project traffic is not unnecessarily hindered, while at the same time allowing efficient performance of the project and considering that project vessels will be considered commercial vessels for navigation purposes
- Coordinating lock usage with the NYS Canal Corporation and its lock operators
- Establishing temporary aids to navigation, such as lighting, signs and buoys, to maintain safe and efficient vessel movement

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.

The actions to be taken during Phase 1 to comply with the navigation performance standard are described below. Further discussion of these actions is provided in Section 4.4.5 of the Phase 1 FDR and Section 4.6 of the Phase 1 RA CHASP.

10.2 Design Analyses and Routine Control Measures

To meet the QoLPS for navigation, this project has been designed and will be implemented to maximize safety and productivity and to avoid unnecessary disruption of non-project navigation, while allowing efficient performance of the project. Specifically, as specified in the Phase 1 Final Design (see Division 13 specifications) and the Phase 1 RA CHASP, the following actions will be implemented during Phase 1 to comply with the QoLPS for navigation:

Obstructions: GE will, to the extent practical, consistent with meeting the goals of the project and complying with the other performance standards, comply with 33 U.S. Code 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.

Vessel lighting and signals: GE will 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



- NYS Canal Corporation regulations at 21 NYCRR 151.23 – lighting requirements for moored floats
- 33 CFR § 86, Annex III – requirements for technical details of sound signals
- 33 CFR § 87, Annex IV – requirements for distress signals
- NYS Canal Corporation regulations at 21 NYCRR 151.6 (draft marking on floats), 151.13 (buoys and lights displaced), 151.21 (warning signals approaching bends) and 151.24 (aids to navigation)

Piloting: GE will comply with the following requirements regarding the piloting and movement of vessels by qualified and properly trained personnel:

- 33 CFR § 88, Annex V – requirements for public safety activities, obtaining copies of rules and law enforcement vessels
- NYS Canal Corporation regulations at 21 NYCRR 151.1, 151.7, 151.8, 151.9, 151.15, 151.16, 151.17, 151.18, 151.19 and 151.22 – piloting requirements

Marine traffic control: All project vessels will be tracked via radio dispatch to schedule and control traffic in a way that minimizes interference with non-project vessels while optimizing productivity. For purposes of navigation, project-related vessels will be considered commercial vessels.

Use of lock: Use of Lock 7 on the Champlain Canal will be coordinated with the NYS Canal Corporation and will be reduced by staging and routing project support vessels (i.e., vessels other than barges and associated tugs) from the Work Support Marina on West River Road in Moreau.

Restricting access: Non-project access to active work areas will be restricted in coordination with the NYS Canal Corporation. Mariner notification will be used, and buffer zones and temporary aids (e.g., lighting, signage, buoys, etc.) will be established to allow safe passage of non-project traffic around active work areas.

A Work Support Marina is being constructed in the Town of Moreau on the west side of the river, across the river from canal Lock 7. This facility will be used to support dredging-related project vessels as well as those associated with monitoring activities. The use of the Work Support Marina will reduce traffic at Lock 7, thereby reducing project-related



navigation impacts. Dredging equipment and dredged sediments will not be transported to or processed at this marina.

While operations are occurring in the east channel of Rogers Island, limited passage of non-project vessels to and from the Fort Edward Yacht Basin will be allowed. To allow such limited passage, a gate has been designed in the silt curtain barrier to be installed at the southern end of the east channel of Rogers Island. Recreational vessels will be able to travel through this gate each day during a ½-hour period between the hours of 7 and 9 a.m., and again during a ½-hour period between 3 and 5 p.m. The specific ½-hour slot within these 2-hour time periods will be determined by the Dredging Contractor. Initially, this channel will be closed in order to complete dredging near the Fort Edward Yacht Basin. If closure of the navigation channel is required in other areas, EPA and the NYS Canal Corporation will be consulted.

Temporary aids to navigation: Safe and efficient navigation near active project areas will be facilitated by use of buffer zones and temporary aids to navigation, including lighting, signs buoys and other aids specified by the NYS Canal Corporation and USCG. This will include the installation of an automatically operated system of flashing lights on resuspension control devices (silt curtains and sheet pile structures) in the east channel of Rogers Island and the EGIA.

10.3 Routine Notices

In addition to the activities described above, GE will provide routine notices during dredging, to include the following:

- GE will provide the NYS Canal Corporation and USCG with verbal and written notices regarding project schedules. This will allow those agencies to issue Notices to Mariners regarding anticipated access restrictions, project vessel scheduling, lock scheduling, contingencies or other information.
- GE will 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
- Posting information about in-river activities on the project website

10.4 Routine Monitoring

Marine traffic will be routinely monitored after dredging operations begin. This routine monitoring will involve the recording in daily logs of information about river navigation activities in the vicinity of in-river project operations, along with any resulting navigation issues. The routine monitoring will include:

- Periodic monitoring of in-river activities that may have an impact on navigation of the river by commercial and recreational watercraft
- 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

A monthly navigation report will be submitted by GE to EPA and the NYS Canal Corporation, as described in Section 10.6 below.

10.5 Contingency/Response Actions

This section describes the actions that GE will take in the event that in-river operations deviate from applicable federal or state navigation regulations listed above or from the design plans relating to navigation, or in the event that a navigation-related complaint is received. These actions are also described in Section 4.6 of the Phase 1 RA CHASP and are subject to the general qualification stated in Section 1.3 above.

10.5.1 Actions in Event of Deviation at Concern Level

If in-river operations deviate from the applicable federal and state navigation regulations listed in the QoLPS for navigation or from the design plans relating to navigation, and GE determines that such deviation can be easily and immediately mitigated, GE will take the following steps:

1. Promptly notify EPA and the NYS Canal Corporation, but no later than 24 hours after discovery of the deviation.
2. Identify the navigation problem(s).
3. Implement mitigation measures, as appropriate (see Section 10.5.4 below).
4. Submit a follow-up report to EPA and the NYS Canal Corporation, including a summary of the navigation issues and mitigation actions taken.

10.5.2 Actions in Event of Deviation at Exceedance Level

If on-river operations deviate from the applicable federal and state navigation regulations listed in the QoLPS for navigation or from the design plans relating to navigation, and it appears that such deviation cannot be easily and immediately mitigated, GE will take the following steps:

1. Notify EPA and the NYS Canal Corporation immediately.
2. Identify the cause of the deviation.
3. Develop an action plan, in coordination with EPA field staff and the NYS Canal Corporation, for mitigation measures (discussed in Section 10.5.4) and, upon EPA approval, implement that plan.
4. Submit a corrective action report to EPA and the NYS Canal Corporation within 10 days of discovery of the deviation, including a description of the cause(s) of the navigation problem(s) and mitigation actions taken.
5. Continue monitoring until compliance with the standard has been confirmed, including submittal of daily logs and status.

10.5.3 Actions in Event of Navigation Complaint

If a navigation complaint (as defined in Section 10.2.2.3 of the Phase 1 RA CHASP) is recorded, GE will take the following steps:

1. Investigate the cause of the complaint to verify that it is project-related.



2. If the complaint is project-related, conduct an investigation to determine whether the project is in compliance with all substantive federal and state navigation requirements and if project activities have interfered with other river traffic.
3. Notify the NYS Canal Corporation of the complaint and consult with the NYS Canal Corporation, if necessary, in the investigation.
4. If it is determined that the project is not in compliance with all substantive federal and state navigation requirements or that GE has not taken appropriate steps to minimize interference with river traffic, implement the applicable steps described above, including notification to EPA and the NYS Canal Corporation, implementation of mitigation measures and submission of a follow-up report.
5. If it is determined that the project is in compliance with all substantive federal and state navigation requirements and that GE has taken appropriate steps to minimize interference with river traffic, work with EPA, in coordination with the NYS Canal Corporation, to evaluate potential measures to address the complaint, and if both GE and EPA agree, implement such measures.
6. Notify the person registering the complaint of the steps taken to resolve the complaint, and include a report on the complaint and response actions (if any) in the monthly reporting of complaints to EPA.

As noted above, the QoLPS for navigation defines the “exceedance level” to include “frequent, recurrent complaints indicating project activities are unnecessarily hindering overall non-project vessel movement.” Such complaints will be defined on a case-by-case basis. These complaints will be handled in the same manner described above, except that GE will notify EPA and NYS Canal Corporation immediately of these complaints, will submit a plan to EPA specifying its proposed response, and will submit a corrective action report to EPA with 10 days of the complaints. In such a case, the plan submitted to EPA will be consistent with # 4 and # 5 above (i.e., if the project is not in compliance with all substantive navigation requirements or GE has not taken appropriate steps to minimize interference with river traffic, the plan will include a proposal for mitigation measures; otherwise, the plan will include mitigation measures, if any, on which GE and EPA agree).

10.5.4 Potential Mitigation Measures

In the event that mitigation measures are required to address a deviation from applicable federal or state navigation regulations, the mitigation measures will consist of taking the necessary steps to comply with those regulations.

In the event that the steps described above indicate the need for additional mitigation measures, GE will implement such measures, as appropriate. Selection of specific actions will be determined on a case-by-case basis. GE may consider the following, or other, as-yet-unidentified measures, depending on the specific circumstances:

- Spacing in-river vessels to minimize channel encroachment
- Repairing or replacing aids to navigation
- Revising the schedule for work in dredge areas and/or times of project vessel and equipment movement in the river to reduce impacts on non-project navigation, including performing certain activities during off-peak hours, if practical
- Using passing lanes to allow non-project vessels to pass project vessels
- Allowing specific times during the day for non-project boat access to otherwise access-restricted areas (as is already planned in the east channel of Rogers Island for access to the Fort Edward Yacht Basin)

10.6 Reporting and Notifications

Under typical operations, GE will submit a monthly navigation report to EPA and the NYS Canal Corporation, as part of the CD Monthly Progress Report, summarizing navigation activities for the previous month, including daily records, as well as a log of navigation compliance and follow-up actions. It will also identify any in-river project activities not previously identified that may significantly affect navigation by commercial and recreational vessels. In addition, a report on complaints in tabular format and including a log of navigation complaints and follow-up actions taken to resolve the complaints will be included in the separate monthly report on complaints.

As discussed above, if there is a deviation from applicable navigation requirements that cannot be easily and immediately mitigated or if GE receives “frequent, recurrent complaints indicating project activities are unnecessarily hindering overall non-project

vessel movement,” GE will notify EPA and the NYS Canal Corporation immediately upon knowledge of the deviations or receipt of such complaints. In such situations, GE will submit daily navigation reports to EPA and the NYS Canal Corporation until the issue is resolved, and will submit a corrective action report within 10 days of discovery of the deviation or receipt of the complaints, describing the cause of the problem and the mitigation measures implemented. If there is a deviation from applicable navigation requirements that can be easily and immediately mitigated, or if GE receives a project-related navigation complaint (other than as described above), GE will notify EPA and the NYS Canal Corporation verbally within 24 hours, and will provide a follow-up report to EPA and the NYS Canal Corporation with a summary of the navigation issue and any mitigation conducted. This follow-up report will typically be included in the Monthly Progress Report on the project or (for complaints) in the monthly reporting of complaints.



11. Substantive Water Quality Requirements for Discharges to Champlain Canal and Bond Creek

This section addresses the WQ Requirements for discharges from the processing facility to surface water. Such discharges will occur at three outfalls. Treated water from sediment dewatering operations and Type I stormwater (i.e., stormwater draining from areas where PCB-containing sediment is managed) will be discharged at Outfall 001 to the Champlain Canal (land cut above Lock 7). During periods of overflow of the sedimentation basins at the processing facility, non-contact (Type II) stormwater will be discharged from Outfalls 002 and/or 003 to Bond Creek. WQ Requirements for the discharge from Outfall 001 were set forth in the Hudson Substantive WQ Requirements provided by EPA to GE on January 7, 2005 (EPA 2005). EPA provided GE with the substantive requirements for the Type II stormwater discharges to Bond Creek on September 14, 2006 (EPA 2006).

This section describes the effluent limits for these discharges, as well as the associated monitoring requirements, response actions, and reporting/notification requirements.

11.1 Effluent Limitations

11.1.1 Effluent Limitations for Dewatering Facility (Outfall 001)

During the period beginning with the effective date of discharge (EDD) and lasting until the completion of the project, the discharge of treated water from the sediment dewatering operations, as well as Type I stormwater, through Outfall 001 to the Champlain Canal (land cut above Lock 7) will be subject to a set of effluent limits and associated monitoring requirements specified in the January 2005 Hudson Substantive WQ Requirements. Table 11-1 summarizes the effluent limits for this discharge to the Champlain Canal.

**Table 11-1
Effluent Limits for Discharge from Outfall 001 to the Champlain Canal**

Outfall Number and Parameter	Discharge Limitations		Units	Minimum Monitoring Requirements		Footnote
	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	

Phase 1 Performance Standards Compliance Plan



Appendix D of the Remedial Action Work Plan for Phase 1 Dredging and Facility Operations

Outfall Number and Parameter	Discharge Limitations		Units	Minimum Monitoring Requirements		Footnote
	Daily Avg.	Daily Max		Measurement Frequency	Sample Type	
Outfall 001 - Treated Remediation Discharge for Hudson River PCB Site:						
Solids, Total Suspended	Monitor	50	mg/L	Weekly	Grab	9
Total Organic Carbon	Monitor	Monitor	mg/L	Weekly	Grab	9
PCBs, Aroclor 1016	Monitor	0.3	µg/L	Weekly	Runtime composite	2,9
PCBs, Aroclor 1221	Monitor	0.3	µg/L	Weekly	Runtime composite	2,9
PCBs, Aroclor 1232	Monitor	0.3	µg/L	Weekly	Runtime composite	2,9
PCBs, Aroclor 1242	Monitor	0.3	µg/L	Weekly	Runtime composite	2,9
PCBs, Aroclor 1248	Monitor	0.3	µg/L	Weekly	Runtime composite	2,9
PCBs, Aroclor 1254	Monitor	0.3	µg/L	Weekly	Runtime composite	2,9
PCBs, Aroclor 1260	Monitor	0.3	µg/L	Weekly	Runtime composite	2,9
PCBs, Total	Monitor	Monitor	µg/L	Weekly	Runtime composite	2,9
Cadmium, Total	Monitor	0.04	mg/L	Weekly	Grab	3,9
		0.62	lb/day			
Chromium, Total	Monitor	0.21	mg/L	Weekly	Grab	3,9
		18.9	lb/day			
Copper, Total	Monitor	0.136	mg/L	Weekly	Grab	3,9
		0.75	lb/day			
Lead, Total	Monitor	0.038	mg/L	Weekly	Grab	3,9
		0.31	lb/day			
Mercury, Total	Monitor	0.0002	mg/L	Weekly	Grab	4,9
Dissolved Oxygen	Monitor	Monitor	mg/L	Weekly	Grab	8

Additional Conditions and Footnotes:

1. During the period beginning with the EDD and lasting until the completion of the project, discharges from the treatment facility through Outfall 001 shall be limited and monitored by the operator. EPA will not require a modification to the PCB method or treatment technologies that are not being required at other facilities by NYSDEC.
2. PCBs:
 - A. GE will 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 will report all values above the MDL. If the level of any Aroclor is above its listed MDL, GE will 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 will 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 will 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 will 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 will 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.

3. Effluent limits for these metals include both a maximum concentration and a maximum mass flow rate. The actual limit will be either the maximum concentration or the mass flow rate, if the discharge flow rate from the outfall is such that a lower concentration is necessary to maintain mass flows below the allowable maximum. The allowable concentrations and corresponding mass flow rates are provided in Table 11-2, for discharge flows from 0.1 MGD to 15.0 MGD
4. Mercury, Total shall be analyzed using EPA Method 1631.
5. All monitoring data, engineering submissions and modification requests must be submitted to:

Doug Garbarini Chief, Special Projects Branch EPA, 290 Broadway, 19 th Floor New York, NY 10007 (212) 637-3952	Copy Sent To: William Daigle, Hudson River Unit Division of Environmental Remediation, NYSDEC, 625 Broadway, Albany, New York 12233- 7010 (518) 402-9770
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6. Only site-generated wastewater related to the Hudson River PCBs Site Remedial Action is authorized for treatment and discharge.
7. Both concentration (mg/L or µg/L) and mass loadings (lbs/day) must be reported for all parameters except flow and pH.
8. Any use of corrosion/scale inhibitors or biocidal-type compounds used in the treatment process must be approved by EPA prior to use.
9. 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 will comply with the substantive requirements of 6 NYCRR Part 750.

Table 11-2 lists the permitted discharges from Outfall 001 for chromium (Cr), cadmium (Cd), lead (Pb) and copper (Cu) concentrations (mg/L) and mass loadings (lbs/day) at various flow rates from 0.10 MGD to 15 MGD.



**Table 11-2
Outfall 001 Discharge Limits for Flows Above 0.1 MGD**

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



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

Notes:

1. 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.

EPA used the following basis for calculating the mass equivalent of the listed concentrations for cadmium, chromium, lead and copper which may be discharged up to the maximum mass flow rate listed.

- $\text{Load [lb/day]} = [\text{flow, MGD}] \times [\text{concentration, ppm}] \times [8.34]$

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 lbs/day at 0.21 mg/L. At discharge flow rates greater than 10.8 MGD, GE may discharge no more than 18.9 lbs/day of chromium (resulting in proportionally lower concentrations). Compliance for the metals in Table 11-2 will be determined by comparing the measured concentration in the effluent against the allowable concentration using the actual flow rates of discharge in Outfall 001.

11.1.2 Effluent Limitations for Non-Contact Stormwater through Outfalls 002 and 003

During the period beginning with the EDD and lasting until the completion of the project, the discharges from Outfalls 002 and 003 to Bond Creek will be limited and monitored as specified in Table 11-3 and Table 11-4.

**Table 11-3
Effluent Limitations for Non-Contact Storm Water Discharge from Outfall 002**

Outfall Number and Parameter	Discharge Limitations		Units	Minimum Monitoring Requirements		Footnote
	Daily Avg.	Daily Max		Measurement Frequency	Sample Type	
Outfall 002 - Stormwater Runoff Discharged from Stormwater Basin A:						
Flow	Monitor	Monitor	GPD	Daily	Estimate	
pH (range)	6.0 to 9.0		SU	Monthly	Grab	
Solids, Total Suspended	Monitor	50	mg/L	Once/2 Weeks	Grab	
Solids, Settleable	Monitor	0.1	ml/L	Daily	Grab	
Oil & Grease	Monitor	15	mg/L	Monthly	Grab	
Cadmium, Total	Monitor	13	µg/L	Once/2 Months	Grab	
Chromium, Total	Monitor	210	mg/L	Once/2 Months	Grab	
Copper, Total	Monitor	60	µg/L	Once/2 Months	Grab	
Lead, Total	Monitor	28	µg/L	Once/2 Months	Grab	
Mercury, Total	Monitor	0.20	µg/L	Once/2 Months	Grab	
Aroclor 1016	Monitor	0.30	µg/L	Monthly	Grab	2
Aroclor 1221	Monitor	0.30	µg/L	Monthly	Grab	2
Aroclor 1232	Monitor	0.30	µg/L	Monthly	Grab	2
Aroclor 1242	Monitor	0.30	µg/L	Monthly	Grab	2
Aroclor 1248	Monitor	0.30	µg/L	Monthly	Grab	2
Aroclor 1254	Monitor	0.30	µg/L	Monthly	Grab	2
Aroclor 1260	Monitor	0.30	µg/L	Monthly	Grab	2

**Table 11-4
Effluent Limitations for Non-Contact Storm Water Discharge from Outfall 003**

Outfall Number and Parameter	Discharge Limitations		Units	Minimum Monitoring Requirements		Footnote
	Daily Avg.	Daily Max		Measurement Frequency	Sample Type	
Outfall 003 - Stormwater Runoff Discharged from Stormwater Basin B:						
Flow	Monitor	Monitor	GPD	Daily	Estimate	
pH (range)	6.0 to 9.0		SU	Monthly	Grab	
Solids, Total Suspended	Monitor	50	mg/L	Once/2 Weeks	Grab	
Solids, Settleable	Monitor	0.1	ml/L	Daily	Grab	
Oil & Grease	Monitor	15	mg/L	Monthly	Grab	
Cadmium, Total	Monitor	13	µg/L	Once/2 Months	Grab	
Chromium, Total	Monitor	210	µg/L	Once/2 Months	Grab	
Copper, Total	Monitor	60	µg/L	Once/2 Months	Grab	
Lead, Total	Monitor	28	µg/L	Once/2 Months	Grab	
Mercury, Total	Monitor	0.20	µg/L	Once/2 Months	Grab	
Aroclor 1016	Monitor	0.30	µg/L	Monthly	Grab	2
Aroclor 1221	Monitor	0.30	µg/L	Monthly	Grab	2
Aroclor 1232	Monitor	0.30	µg/L	Monthly	Grab	2
Aroclor 1242	Monitor	0.30	µg/L	Monthly	Grab	2
Aroclor 1248	Monitor	0.30	µg/L	Monthly	Grab	2
Aroclor 1254	Monitor	0.30	µg/L	Monthly	Grab	2
Aroclor 1260	Monitor	0.30	µg/L	Monthly	Grab	2

Additional Conditions and Footnotes:

1. Bond Creek is water Index Number H-319 and is classified as a Class C waterbody.
2. 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

sedimentation basins and identify the cause of the detectable level of PCBs in the discharge. Following two consecutive sampling events 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 45 days following receipt of sampling results from the second 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.

This limit is a phased Total Maximum Daily Loading limit, prepared in accordance with 6 NYCRR 702.16(b).

- 3. All monitoring data, engineering submissions and modification requests must be submitted to:

Doug Garbarini Chief, Special Projects Branch EPA, 290 Broadway, 19 th Floor New York, NY 10007 (212) 637-3952	Copy Sent To: William Daigle, Hudson River Unit Division of Environmental Remediation, NYSDEC, 625 Broadway, Albany, New York 12233-7010 (518) 402-9770
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- 4. Only site-generated Type II stormwater runoff related to the Hudson River PCBs Site Remedial Action is authorized for discharge through Outfalls 002 and 003.
- 5. Any use of corrosion/scale inhibitors or biocidal-type compounds used in the treatment process must be approved by EPA prior to use.
- 6. 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.
- 7. Monitoring of outfalls 002 and 003 is not required during the period beginning 2 weeks after the cessation of sediment management activities in the Fall/Winter and ending when these activities resume in the Spring.
- 8. Compliance with the substantive requirements of State Pollutant Discharge Elimination System (SPDES) general permits GP-02-01 and GP-0-06-002 shall also be maintained.

9. Compliance with the Substantive Requirements of State Pollutant Discharge Elimination System Permit for Potential Discharges to Bond Creek is explicitly conditioned on the provisions contained in Exhibits 1 and 2 of Attachment A, GE Response to Comment 5 for Contract 3 dated September 11, 2006.
10. Mercury, Total shall be analyzed using EPA Method 1631.

11.2 Discharge Monitoring

The discharge monitoring program is described in Section 2.7 of the Phase 1 RAM QAPP, and is briefly summarized below.

11.2.1 Discharge Monitoring from the Dewatering Facility (Outfall 001)

Outfall 001 discharge monitoring will take place via sample taps in the treated water discharge line located in the eastern corner of the water treatment building. GE will monitor this discharge for the parameters listed in Tables 11-1 through 11-3. These include PCBs, mercury, chromium, cadmium, lead and copper, as well as flow, pH, TSS, total organic carbon and DO. The monitoring of these discharges will be performed in accordance with the requirements specified for Outfall 001 in Section 2.6 of the revised Phase 1 RAM QAPP, and the analyses will be conducted in accordance with the methods listed in Section 2.7.4 of that Phase 1 RAM QAPP – both of which are incorporated by reference herein. For PCBs, GE will instruct the laboratory to make all reasonable attempts to achieve a Minimum Detection Level (MDL) of 0.065 µg/L for each Aroclor.

11.2.2 Discharge Monitoring for Non-Contact Storm Water (Outfalls 002 and 003)

Outfalls 002 and 003 discharge monitoring will take place at the discharges from the two non-contact stormwater sedimentation basins. GE will monitor these discharges for the parameters listed in Tables 11-4 and 11-5 in accordance with the discharge monitoring requirements set forth for these outfalls in Section 2.6 of the revised Phase 1 RAM QAPP, using the analytical methods listed in Section 2.7.4 of that Phase 1 RAM QAPP – both of which are incorporated by reference herein.

11.3 Response Actions

This section specifies the response actions that GE will take during Phase 1 in response to an exceedance of any of the effluent limitations set forth in Section 11.1. These response actions are subject to the general qualification stated in Section 1.3 above.

11.3.1 Response Actions for Dewatering Facility (Outfall 001)

In the event of an exceedance of the discharge limitations for Outfall 001 (which includes a detection of Aroclors above the MDL of 0.65 µg/L), GE will 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 for water passing through the treatment system and Outfall 001 may include various changes and/or modifications such as:

- Additional testing to assess the problem
- Carbon 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
- If necessary, temporary cessation of operations

In addition, if the level of any PCB Aroclor is above the MDL, GE will 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 three consecutive months include PCB results above the MDL, GE will prepare and submit to EPA a report that identifies the corrective measures undertaken and proposes additional steps to eliminate the recurrence of such detections. GE will submit the report to EPA within 28 days from GE's receipt of the sampling results from the third monitoring period. GE will implement any additional corrective measures in accordance with an EPA-approved report recommending such corrective measures.

11.3.2 Response Actions for Non-Contact Water Discharge (Outfalls 002 and 003)

In the event of an exceedance of the discharge limitations for Outfalls 002 and 003 (which include a detection of Aroclors above the MDL of 0.065 µg/L), GE will 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 for non-contact water passing through the retention ponds and Outfalls 002 and 003 may include additional testing to assess the problem (with notification to EPA of the



anticipated additional testing), operational modifications, or, if necessary, temporary cessation of operations.

In addition, if the level of any PCB Aroclor is above the MDL, GE will 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 two consecutive sampling events include PCB results above the MDL, GE will prepare and submit to EPA a report that identifies the corrective measures undertaken and proposes additional steps to eliminate the recurrence of such detections. GE will submit the report to EPA within 45 days from GE's receipt of the sampling results from the second monitoring period. In the event of a PCB detection (of > 0.065 ug/L for any Aroclor) in two consecutive monitoring periods, GE will prepare and submit to EPA a separate report. In accordance with a letter from GE to EPA dated September 11, 2006 (GE 2006) (*GE Response to EPA Comment 5 for Contract 3*), this separate report will identify the monitoring data, engineering submissions and modification requests and corrective measures undertaken, and will propose additional steps to eliminate the recurrence of such detections. GE will implement any additional corrective measures in accordance with EPA-approved report recommending such corrective measures.

11.4 Reports and Notifications

GE will submit to EPA and NYSDEC a monthly report that includes the routine monitoring results for dewatering facility discharges to the Champlain Canal (Land Cut above Lock 7) through Outfall 001 and non-contact water discharges to Bond Creek through Outfalls 002 and 003. Both concentration [mg/L or µg/L] and mass loadings [lbs/day] will be reported for parameters with mass loading limits. For Outfalls 002 and 003, flow and settleable solids results will be available to EPA daily. The other sample parameters will be available to EPA upon receipt from the laboratory. Flow to Outfall 001 will be recorded continuously by the automatic data acquisition system.

In the event of an exceedance of the discharge limitations or PCB detection, GE will notify EPA upon receipt of the data showing the exceedance or PCB detection. In such cases, GE will also prepare and submit to EPA and NYSDEC a separate Engineering Evaluation Report, as described in Sections 11.3.1 and 11.3.2 of this PSCP for Outfall 001 and Outfalls 002/003, respectively.

All monitoring data and reports, engineering submissions, and modification requests will be submitted to EPA with a copy sent to NYSDEC.



12. References

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EPA. 2006. September 14, 2006 letter from EPA to GE regarding Substantive Requirements for Type II Stormwater Discharges to Bond Creek.

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