Upper Hudson River Floodplain

Field Sampling Plan

Final

Prepared for:

General Electric Company

Albany, NY

Prepared by:

Quantitative Environmental Analysis, LLC

ARCADIS, Inc.

September 2008

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Table of Contents

List of Tables

List of Figures

List of Appendices

List of Acronyms

BBL	Blasland, Bouck and Lee, Inc.
cfs	Cubic Feet Per Second
COC	Chain-of-Custody
CSM	Conceptual Site Model
CSV	Comma Separated Value
DQO	Data Quality Objective
EDD	Electronic Data Deliverable
ELAP	Environmental Laboratory Accreditation Program

FEMA	Federal Emergency Management Agency
FSP	Field Sampling Plan
GE	General Electric Company
GPS	Geographical Positioning System
HASP	Health and Safety Plan
LCS	Laboratory Control Sample
MS	Matrix Spike
NLCD	National Land Cover Database
NOAA	National Oceanic and Atmospheric Administration
NYSCC	New York State Canal Corporation
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSORPS	New York State Office of Real Property Services
PCB	Polychlorinated Biphenyl
PE	Performance Evaluation
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QMP	Quality Management Plan
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RM	River Mile
ROD	Record of Decision
RS	River Section
SEAC	SEA Consultants, Inc.
SOP	standard operating procedure
UHR	Upper Hudson River
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency

SECTION 1
INTRODUCTION

1.1 PURPOSE OF FIELD SAMPLING PLAN

This Field Sampling Plan (FSP) describes the collection of additional data as part of a Remedial Investigation and Feasibility Study (RI/FS) for the Upper Hudson River (UHR) floodplain. It presents the details for the field mapping and sampling effort to be conducted during the remainder of 2008. Figure 1-1 presents the UHR floodplain study area for this sampling event.

This data collection effort is not intended to complete the sampling necessary to complete the full RI/FS. Subsequent sampling will be undertaken as appropriate and necessary for that purpose.[1]

1.2 FIELD SAMPLING PLAN ORGANIZATION

This FSP is organized as follows:

- **Section One** introduces the FSP, describes the history of the UHR and extent of the study area, summarizes prior UHR floodplain soil investigations, and presents the objectives of the FSP activities.
- **Section Two** presents the proposed sample locations.
- **Section Three** describes the sampling and analysis activities. These include field sampling reconnaissance, sample collection, record keeping, and laboratory procedures.

[1] The activities proposed in this FSP will be performed by General Electric Company (GE), assuming negotiation of an acceptable agreement with USEPA. Nothing in this FSP, however, nor any activity or communication that may be carried out or held in connection with this FSP is, or should be construed as, any admission of law, fact or liability, as to any matter whatsoever, including but not limited to any response actions for UHR floodplain areas, or for implementation of the RI/FS proposed in this FSP. GE reserves all of its rights and defenses, including but not limited to rights and defenses under the 1976 settlement signed by GE and duly authorized representatives of the NYSDEC.

- **Section Four** presents the applicable quality assurance/quality control (QA/QC) procedures.
- **Section Five** describes tasks to be conducted concurrently to confirm locations and types of vegetation and of human usage.
- **Section Six** presents the FSP work schedule.

1.3 BACKGROUND AND SETTING

This section briefly describes the extent of the study area, regulatory framework, and prior investigations in the UHR floodplain to provide background for the sampling design. More detailed information on these subjects is provided in the RI/FS Work Plan, submitted to the United States Environmental Protection Agency (USEPA) in draft form in December 2006 (QEA et al. 2006).

1.3.1 Upper Hudson River Floodplains Study Area

The Hudson River is located in eastern New York and flows approximately 300 miles in a generally southerly direction from its source, Lake Tear-of-the-Clouds in the Adirondack Mountains, to the Battery, located in New York City at the tip of Manhattan Island. For the purposes of this FSP, the study area is defined as the floodplains adjacent to the UHR, extending from the former location of the Fort Edward Dam to the Mohawk River confluence (approximate river mile [RM] 194.8 to approximate RM 156.3), including islands within the river. Summaries of the geology, hydrology, climate, habitats, human history, cultural resources, and land use of the region are provided in the RI/FS Work Plan.

The USEPA divided the UHR between Fort Edward and Troy into three river sections for the sediment remediation activities outlined in the Record of Decision (ROD; USEPA 2002). These same sections are utilized for the floodplain investigation. The approximate location of each river section (RS) is illustrated on Figure 1-1. The UHR has been further subdivided into eight reaches defined by dams or locks (Figure 1-1). The northernmost reach is Reach 8, also

known as Thompson Island Pool, and is equivalent to RS1. RS2 is comprised of Reaches 7 and 6, and RS 3 contains Reaches 5 through 1. The region downstream of the Mohawk River is excluded because of the low in-river polychlorinated biphenyl (PCB) concentrations and the potential influence of the Mohawk River.

1.3.2 USEPA 2002 ROD

The USEPA issued a ROD on February 1, 2002 calling for, among other things, the removal and disposal of targeted sediments containing PCBs from the UHR (USEPA 2002). The 2002 ROD did not select a remedy for the floodplains portion of the Site, but stated additional studies would be necessary.

1.3.3 Summary of Previous Investigations

This section lists prior investigations that formed the basis of the preliminary Conceptual Site Model (CSM) of PCB distribution in the UHR floodplain as presented in the RI/FS Work Plan. The CSM has been used to guide selection of the sample locations presented in this FSP. More detailed descriptions of these prior UHR investigations are provided in the RI/FS Work Plan.

- **2000 NOAA and NYSDEC Investigation** - SEA Consultants, Inc. (SEAC), under contract to the National Oceanic and Atmospheric Administration (NOAA) and New York State Department of Environmental Conservation (NYSDEC) collected floodplain soil samples along the UHR from Fort Edward to Stillwater, New York (i.e., within RS 1, 2, and 3) in September and October 2000 (Weston Solutions, Inc. 2005).
- **2004 USEPA Investigation** - The USEPA conducted floodplain soil sampling in RS 1, RS 2, and the upper portion of RS 3 in November 2004 (Weston Solutions, Inc. 2005).
- **2005 GE Investigation** - In June 2005, General Electric Company (GE) collected additional UHR floodplain soil samples in Reaches 6 and 8. The scope of this sampling effort was based on the results of field reconnaissance and land use assessment conducted jointly by representatives of GE, USEPA, NYSDEC, New York State Department of

Health (NYSDOH), and New York State Canal Corporation (NYSCC), as well as a review of previously collected data. Soil sampling locations were selected in the field on an area-by-area basis (in consultation with a representative from USEPA) in consideration of local topography and observed land use (Blasland, Bouck and Lee, Inc. [BBL] 2006).

- **Topographic Mapping** - In 2005 and 2006, Chas H. Sells, Inc., on behalf of GE, developed topographic mapping, 1-ft. (1 in. = 30 ft. scale) contour intervals from Fort Edward to the Troy Dam, generally within 150 feet of the river shoreline. These data compliment existing 5-ft. contour intervals previously developed by Chas H. Sells, Inc. on behalf of GE in 2002 out to 2,500 feet from the shoreline. The resulting contour maps have been used to guide sample placement in RS 3, where hydrodynamic model information is not yet available, and to model floodplain inundation which was used to guide sample placement in RS 1 and 2 (discussed below).
- **2006 GE Investigation** - In 2006 GE performed additional sampling at three of the properties previously sampled by the USEPA in 2004 and GE in 2005, to determine the necessity of response actions on those properties and to provide additional data for evaluation of general PCB distribution patterns in the UHR floodplain (ARCADIS 2007). These results are summarized in the Final Short-Term Response Action Implementation Plan, prepared by ARCADIS BBL in June 2007.
- **Floodplain Modeling** - A hydrodynamic model capable of simulating flow in both the main channel of the UHR and the floodplain areas that are adjacent to the channel has been developed. This model simulates the flow of water from the main channel into the floodplain areas and has been used to evaluate flooding in RS-1 and RS-2. The model was used to evaluate flooding during the period from 1976 to 2005 and for statistically based floods with return periods of 2, 5, 10, 20, 50, and 100 years. The model results were also used to produce maps showing floodplain contours for these return periods for Reaches 6, 7, and 8. This Model is still under review by USEPA and as of the date of this FSP has not been approved.
- **Aerial Photography** – An aerial photo survey from Fort Edward to Troy, was conducted on April 22, 2007 by Axis GeoSpatial, at a flow of approximately 18,000 cfs at Fort Edward, before the spring foliage bloom (leafless aerial survey). These images were geo-

referenced and used to aid identification of sample locations. Additional aerial photographs were taken on July 1 in 2006 between 9 AM and 10 AM from Glens Falls to Troy during a high-flow event (approximately 26,000 cfs at Ft. Edward) and on July 29, 2003 during low-flow event (approximately 3,800 cfs at Ft. Edward).

Table 1-1. Daily average flow rates at Fort Edward for statistical return periods.

Return Period [year]	Flow Rate [cfs]	Data Sources
2	23,000	USEPA
5	30,000	USEPA
10	34,500	USEPA
20	38,000	USEPA
50	44,000	USEPA
100	47,300	USEPA
100	52,400	FEMA

1.4 FIELD SAMPLING PLAN DATA QUALITY OBJECTIVES

The objective of this FSP is to collect data in support of the RI/FS. The specific data quality objectives of this FSP are identified below. As noted previously, this data collection effort is not intended to complete the collection of data needed to fully satisfy the RI/FS requirements.

- Further characterize PCB concentrations in UHR floodplain soils.
- Identify and map existing vegetation types within the UHR floodplain.
- Verify (ground-truth) information obtained from, Property Type Classification and Ownership Codes, Assessors Manual published by the New York State Office of Real Property Services (NYSORPS; NYSORPS 2006), and National Land Cover Database (NLCD; NLCD 2001).

SECTION 2
SAMPLING DESIGN

2.1 SAMPLE LOCATION SELECTION

This section describes the rationale for selecting the sample locations. Factors considered in sample location selection include how often the floodplain would be inundated, the distance from Fort Edward, existing data, human usage patterns, and vegetative cover type. After these factors were considered and preliminary sampling locations were selected, several meetings were conducted with the USEPA, NYSDEC, and NYSDOH, to review and finalize locations. Refer to Section 2.1.4 for a discussion of these meetings. Figures showing the agreed upon sample locations are presented and discussed in Section 2.2.

2.1.1 Expected PCB Distribution Patterns (Conceptual Site Model)

The PCB concentrations in the UHR floodplain soils may exhibit patterns that are the result of numerous factors, the most significant of which may be flood frequency. Soils inundated less frequently are expected to have lower PCB concentrations because eroded river sediments have been deposited on these soils less frequently. The concentration of PCBs in floodplain soils is also expected to depend on distance downriver, mirroring the general decline in river sediment PCB concentrations with distance downstream from the former Fort Edward Dam location.

These two basic assumptions, decline in PCB concentration with decreasing flood frequency and decline in PCB concentration with increasing distance downstream, form the basis of a preliminary CSM for PCB distribution in the UHR floodplain. However, other unknown factors that may have an impact on PCB distribution in the floodplains may need to be incorporated into the CSM. Therefore, this CSM and its assumptions are still under review by USEPA and as of the date of this FSP, have not been approved.

2.1.2 Location of Samples

This section explains the methods used to designate specific locations of soil samples to be collected. Determining factors included the preliminary CSM, the number and placement of samples from previous investigations, ease of access, human use categories, vegetation categories, historic dredge disposal locations, and remediation history.

2.1.2.1 Select Locations Based on Prior Sample Location

In order to provide representative coverage of the UHR floodplain, priority was given to areas where few or no samples have been collected. Figure 2-10, which shows proposed sample locations in one section of the UHR floodplain, also shows locations of samples in parts of the floodplain that have already been sampled.

2.1.2.2 Arrange Locations in Transects

As with the samples collected during prior investigations, proposed samples were primarily arranged as transects with the whole transect occurring within one tax parcel or in as few tax parcels as possible (Figure 2-10). This method of sample placement is intended to reduce the need to relocate samples due to property access constraints. If access to a proposed property is not granted, transects may be moved to an adjacent property or a nearby property with similar conditions.

2.1.2.3 Select Locations Based on Human Use and Vegetative Cover Classifications

Samples were distributed among areas likely to be subject to human use and areas with different types of vegetative cover within the floodplain. To initially select sample locations based on property classification codes samples were distributed among five surrogate property classification codes based upon the *Property Type Classification and Ownership Codes, Assessors Manual* published by NYSORPS (2006), which has developed classification and ownership codes for all real estate parcels. For ecological considerations, four condensed

vegetation categories were created based on 2001 land-cover mapping data (NLCD 2001). The condensed and expanded lists of property classification codes and vegetative cover categories and further refinement of sample location to accommodate these use considerations are described in Sections 2.1.2 (human) and 2.1.3 (ecological). The center panel of Figure 2-10 demonstrates placement of samples among the five surrogate property classification categories and the right panel of Figure 2-10 demonstrates the placement of samples among the four condensed vegetation categories.

2.1.3 Consideration of Human Use Areas

After choosing preliminary sampling numbers and locations, the locations were reviewed to determine whether sampling locations should be adjusted, in number or position, based on known or expected use patterns. This evaluation included the completion of preliminary identification of the likely uses of properties within each section of the floodplain. This was accomplished through the evaluation of the property classifications for each tax parcel in the floodplain combined with a detailed review of aerial photographs of the river. It also considered areas of the floodplain that the USEPA had identified as potential use areas during its 2007 reconnaissance of the floodplain. The steps taken to revise the sample locations are discussed below.

2.1.3.1 Preliminary Identification of Likely Usage Areas

A multi-step process was used to identify representative usage areas within the floodplain and to assign soil sample locations among those areas. These steps included the following:

- identification of individual tax parcels;
- identification of the property classifications associated with each tax parcel (as preliminary predictors of usage);
- selection of preliminary current and future uses based on property classifications;
- refinement of uses based on aerial photos to identify the actual extent and type of development; and

- modification of sampling locations to ensure that key use areas were not overlooked in the preliminary selection of sample locations.

The general property classification categories provided by NYSORPS (2006) were condensed into five surrogate property classification categories to assist in the identification of target areas for the selection of preliminary sample locations. The condensed categories were created as follows:

- **Recreational** - community services, public services, vacant land, recreation and entertainment classifications.
- **Residential** - residential classifications.
- **Agricultural** - agricultural classifications.
- **Commercial/Industrial** - commercial and industrial classifications.
- **Undeveloped** - wild/forested area classifications.

In all cases, assumed uses were modified as appropriate after considering the more specific property classification categories. However, it was recognized that even the property classification categories might not accurately reflect the type of usage currently occurring within given areas. As a result it was necessary to review aerial photographs of the parcels to determine whether other types of usage might be occurring in some areas. It must also be noted that use patterns may change over time.

2.1.3.2 Review of Aerial Photographs to Verify Uses of the Floodplain

Aerial photographs were obtained from two sources. First, the digitized leafless aerial photographs of the floodplain obtained by Axis GeoSpatial NE, LLC in April 2007 were used to provide a general overview of each floodplain area. Maps containing the photo layer, the parcel boundaries and identifiers, and the 100-year Federal Emergency Management Agency (FEMA) floodplain boundary, were used to observe the general land features (cleared areas, forest, etc.), the positions of buildings and cleared areas relative to the floodplain boundary, and level of maintenance within the floodplain boundary (e.g., wild land vs. maintained lawn) for each

parcel. These maps were used to confirm that the mapped parcels were being used consistently with their classifications (e.g., that there were no buildings or obvious signs of usage on parcels classified as vacant land).

Parcels for which signs of usage did not appear to be consistent with their classification (observed buildings on vacant land, wild undeveloped floodplain areas on commercial land, etc.) were subsequently reviewed in more detail using the "Birdseye" view photos available online from Windows *Live Search* (http://maps.live.com).

2.1.3.3 Evaluation of Proposed Sampling Locations

After the assigned land uses were compared with the preliminary sampling distribution among the five surrogate property classification categories, consideration was given to whether there was a need to add samples, move samples, or change the directions or sizes of transects, in order to provide better sample locations. For example, if several transects or sampling locations were located within a residential area but no sampling data were available for adjacent recreational land, then additional sampling points were added or transects were moved to ensure that there were adequate data in each reach of the river to represent the various types of property classifications. These location refinements were considered simultaneously with the needs for sampling areas with differing vegetative cover (Section 2.1.3), and with other criteria and considerations described in Section 2.1 and 2.1.5.

2.1.4 Consideration of Vegetative Cover

An attempt was made to place sampling locations within as many representative vegetative cover types as possible within the floodplain.

To accomplish this, vegetative cover was evaluated based on review of existing aerial photographs as well as the information provided in the NLCD (2001). The NLCD broadly classifies vegetative cover into several general categories. For the purpose of this evaluation, proposed sampling locations were plotted on maps along with a GIS layer depicting the relevant

NLCD categories. This information was then combined with review of existing aerial photographs and project personnel knowledge of specific areas to target soil samples across a range of vegetative cover types within each river mile. For the preliminary soil sample distribution, the 14 NLCD categories were condensed into four general vegetation categories. These categories will not be used in subsequent evaluations, including the vegetation mapping discussed in Section 5.2. The condensed categories were created as follows:

- **Forest** - deciduous forest, evergreen forest, mixed forest, shrub-land, orchard/vineyards.
- **Grass** - urban/recreational grasses, pasture/hay, low and high intensity residential.
- **Agricultural** - row crops.
- **Wetland** - woody wetlands, emergent herbaceous wetlands, open water.

Sample distribution among the four categories used to select preliminary sample locations was then modified on a sample-by-sample basis to provide better representation of the 14 NLCD categories. These location refinements were considered simultaneously with the overall needs of this FSP as described in Section 1.4.

2.1.5 Specific Human Use Areas Identified by USEPA and Finalization of Sampling Locations

In a series of meetings conducted from March through May of 2008, representatives of GE met with representatives of USEPA, NYSDEC, and NYSDOH to discuss proposed sample locations. During these meetings, USEPA presented parcel identification numbers for specific properties, identified during its 2007 field reconnaissance of the river and floodplain, as being potential use areas. These parcels included areas where obvious uses were occurring near the river (boat docks, rope swings, etc.). They also included properties where the bank of the river has a gentle slope and there was some evidence that those portions of the properties were being used for some purpose on a regular basis.

The potential use areas identified by the USEPA were identified on the sampling maps prepared by GE to determine whether the proposed sampling locations addressed the identified

use areas or whether additional sampling locations were required. During the meetings, representatives of GE, USEPA, NYSDEC, and NYSDOH reviewed the parcel boundaries, the floodplain boundaries, floodplain unit information, and aerial photographs to determine the appropriate sampling locations. In some cases, the areas identified by USEPA had already been targeted for sampling. In other cases it was determined that the usage area selected by USEPA did not actually fall within the 100-year floodplain of the UHR and thus did not need to be sampled as part of this FSP. Finally, there were a number of potential use areas identified by USEPA that fell within the 100-year floodplain but had not previously been targeted for sampling. In this situation, all parties evaluated the proposed sampling locations in proximity to those parcels to determine whether they would be likely to provide some information on those properties based on similarities in topographic characteristics and uses. If it was determined that the proposed sample locations would not meet those needs, additional samples were added to provide information about those areas. Once agreement was reached on sampling locations, final figures illustrating proposed sampling locations were prepared (Section 2.2).

It was also evident during these meetings that in some areas, additional field reconnaissance would be necessary prior to finalizing the specific sample location. However, the sampling locations shown represent the areas targeted for sample collection even though the actual location may be adjusted based on a site visit prior to or during sample collection.

2.1.6 Other Considerations

This section describes other factors considered in selecting sample locations.

2.1.6.1 Dredge Spoils Areas

Specific areas of the UHR floodplain have been used for the disposal of dredge spoils generated through maintenance dredging performed by others. Documented locations include Old Moreau, New Moreau, Special Area 13, southern Rogers Island, Site 518, Buoy 212, the Buoy 204 Annex, and Newland Island (Figure 2-1; Malcolm Pirnie 1992). No samples were placed in these dredge spoil areas.

2.1.6.2 Previous Investigation and Remediation of Rogers Island

Multiple soil investigations were conducted by the NYSDEC and the USEPA on Rogers Island, a large island in RS 1, from 1990 through 1998, as detailed in the Draft RI/FS Work Plan. These investigations led to excavation and removal of approximately 3,530 tons of PCB-impacted soil and 910 tons of lead-impacted soil from properties on the southern tip of Rogers Island. Although GE has received a partial set of analytical data from Rogers Island, until the full data set is received it is not possible to determine if additional sampling is necessary. Therefore, Rogers Island is outside the scope of this FSP.

2.1.7 Sample Depth

At all sampling locations, samples will be collected from both the 0 to 6 in. and 6 to 12 in. bgs depth intervals. Samples will be collected from the 12 to 24 in. depth interval at a subset of the proposed sampling locations. Refer to Section 3.2.1 for additional discussion on sample depth.

2.1.8 Logistical Constraints

All proposed sample locations presented in this FSP are subject to modification before or during field reconnaissance. As agreed to by USEPA and GE, sample locations may be moved or eliminated for the following reasons:

- The property owner does not grant access to the site.
- Notification is received from Dig Safely New York of a buried utility line.
- The site is physically inaccessible and/or an adjacent area offers improved ease of access.
- The site is too close to an overhead utility line or other man-made structure.
- The presence of small-scale natural obstructions that make the proposed location unsuitable for sampling.

This list is not necessarily comprehensive. Items 1 and 2 will be resolved before mobilization, as will the other items to the fullest extent possible. Additional fine-scale adjustments will be made during field reconnaissance, after which final proposed geographical positioning system (GPS) coordinates will be logged for each sample.

To the extent possible, necessary relocations will be conducted without changing sample-type parameters including the tax parcel, surface elevation, type of human usage, or vegetation type sampled. If property access is denied, and if possible, alternative locations will be selected as close as possible to the prior planned location, preferably on an adjacent tax parcel.

2.2 PROPOSED SAMPLE LOCATIONS

Based on the considerations described above, the number of sample locations proposed for this FSP is provided in Table 2-1. The locations of all existing and currently proposed samples in the UHR floodplain study area are presented on the maps described below. These maps depict the properties, the number of samples per property, and the general location of where these samples are proposed to be collected. Precise placement of sampling locations will be determined based on discussions between the USEPA and GE representatives in the field. Any additional sample locations must be agreed to by both the USEPA and GE representatives, unless USEPA uses its discretionary samples as follows. USEPA, at its discretion can require that samples be collected from up to 100 locations not currently identified in this FSP. EPA may designate any locations for those discretionary samples (subject to access, see section 3.1.1, and remaining consistent with the intent of this FSP), that are at or above the 5,000 cfs line, as measured at the Fort Edward dam.

Table 2-1. Proposed sample numbers.

Reach	Sample Number			
	Target	Existing	Proposed	Total: Existing + Proposed
8	540	363	178	541
7	220	33	159	192
6	220	126	120	246
5	360	108	334	442
4 - 1	250	0	252	252
8 - 1	1590	630	1043	1673

2.2.1 Reach Overviews

Figures 2-2 to 2-9 show sample placement in river reaches 8, 7 and 6, 5A, 5B, 5C, 4 and 3, 2, and 1, respectively.

2.2.2 Three-Panel Close-Ups

Three-panel figures were made of approximately 2.5-mile segments for the length of the study area to provide better resolution of sample placement and to demonstrate how samples are distributed among inundation levels (left panel), among the five surrogate human use categories (center panel), and among the four ecological use categories (right panel). Figure numbers are as follows:

- **Reach 8**: Figures 2-10 to 2-11.
- **Reach 7**: Figure 2-12 (includes part of Reach 6).
- **Reach 6**: Figure 2-13.
- **Reach 5**: Figures 2-14 to 2-20.
- **Reaches 4 through 1**: Figures 2-21 to 2-26.

SECTION 3
SAMPLING AND ANALYSIS ACTIVITIES

This section provides a description of the floodplain soil sampling activities and laboratory analytical protocols for the FSP.

3.1 PRELIMINARY SITE ASSESSMENT AND FIELD RECONNAISSANCE

Prior to initiating sample collection activities, several pre-mobilization reconnaissance activities must first be completed as described below.

3.1.1 Property Access

GE will use its best efforts to obtain site access and sampling permission from property owners of all tax parcels containing proposed sample locations, not only for GE and its authorized representatives, but also for USEPA and the State and their contractors and oversight officials. GE's best efforts shall include contacting property owners by telephone and by mail, but shall not include payment to property owners. If the property owner refuses access or seeks to require payment, or if the property owner is non-responsive to GE's attempts to obtain access, GE shall notify USEPA. In its discretion, USEPA may seek access from such property owners. USEPA and GE will coordinate and cooperate as appropriate in making further contacts with non-cooperative or non-responsive property owners. If access is not granted, GE and USEPA will, to the extent practicable, agree to conduct sampling on an alternate location as discussed in Section 2.1.7.

Copies of all signed access agreements shall be provided to USEPA. GE will also provide regular updates (or upon request) to USEPA on properties with non-responsive or non-cooperative owners, as part of the effort between the parties to coordinate access.

3.1.2 Utility Markout

Dig Safely New York will be contacted prior to initiating the sampling activities to identify buried or above ground utility lines. Sampling locations will be moved as necessary based on the results of the utility markout.

3.1.3 Physical Accessibility

During the field reconnaissance, the ability to access all proposed sample locations by either land or water with the personnel and equipment needed to collect soil samples must be verified. If sample locations are inaccessible, sample locations will be moved and new locations documented as discussed in Section 2.1.7.

3.1.4 Record Indicators of Human Usage Patterns

As discussed in Section 5.1, during the field reconnaissance, indicators of potential human use will be recorded; this is in addition to the use as defined by the property type (residential, recreational, etc.). Field personnel will use a standardized data entry form that has been developed for recording human use indicators (Appendix A).

3.1.5 Field documentation of sample location changes and final selection

Following the above field reconnaissance procedures, final sample locations will be documented using a survey-grade GPS unit (or conventional survey equipment), and sample elevation will be recorded. Any changes to the original sample locations proposed in this FSP will be documented with the original coordinates, new coordinates, tax parcel change (if any), surface elevation, human and ecological use category change (if any), and reason(s) for relocation.

3.2 SOIL SAMPLE COLLECTION AND HANDLING

This section provides a description of the floodplain soil sampling activities and laboratory analytical methods.

3.2.1 Sample Collection Method and Equipment

At the designated sampling locations, soil samples will be collected manually using a Macrocore device advanced with a slide hammer. The Macrocore device consists of an outer steel barrel with an inner acetate liner (inside diameter = 1.5 in., providing enough soil volume for the specified analysis), that will be replaced for each new sample. Borings will be advanced to a minimum depth of two ft. bgs if possible. Once extracted, soil cores will be transported to a processing area for documentation, segmentation and sample collection. Documentation relative to the nature and condition of the ground surface and the soil profile at each soil sampling location will be recorded in the field logbook. Entries may include statements such as: disturbed soils, evidence of erosion or deposition, evidence of burrowing, evidence of cultivation, riparian vegetation, grassland, etc. Soil cores will be logged by the field representatives and sediments will be described according to the Primary\Some\Little\Trace types of grain sizes present (i.e., gravel\coarse sand\fine sand\clay). Other observations, including grain characteristics, sedimentary structures, organic matter, and moisture will be documented, if observed.

At each sampling location an attempt will be made to collect soil samples from the following depth intervals:

- 0 to 6 in. bgs; and
- 6 to 12 in. bgs.

Additionally, at approximately 50% of the sample locations in the 5,000 to 15,000 cfs floodplain unit in reaches 8, 7, 6, and 5, and 50% of the locations closest to the shoreline in reaches 4 to 1, and at approximately 10% of the remaining sample locations a sample will be

collected from the 12 to 24 in. bgs interval. The locations to be sampled at the 12 to 24 in. interval will be randomly selected.

Field personnel will collect and document the appropriate amount of quality control samples (blind duplicates, matrix spikes and matrix spike duplicates at a rate of one per twenty samples, field blanks at a rate of one per day or one per twenty samples).

3.2.2 Equipment Decontamination

Disposable nitrile gloves will be worn by sampling personnel and gloves will be changed between activities at each discrete sample collection location. Dedicated acetate liners will also be changed between sampling locations to prevent cross contamination of samples. Non-disposable sampling equipment (e.g., stainless steel bowls and spoons used for sample homogenization and MacroCore device nose cones) will be cleaned with Alconox detergent, rinsed with deionized water, and dried with disposable towels (as applicable) between each sample location.

3.2.3 Sample Custody, Storage and Shipping

Soil samples will be properly packaged in laboratory-supplied sample containers. Samples will be shipped on ice, under chain of custody, by overnight courier to the designated NYSDOH Environmental Laboratory Accreditation Program (ELAP) certified laboratory. All samples will be accompanied by a Chain-of-Custody (COC) form completed by the sampling personnel (COCs to be completed electronically whenever possible, otherwise completed manually). The sample IDs, dates and times will be listed on the COC forms. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time of receipt on the form.

Samples will be shipped with a separate COC record enclosed within each shipping container. Remaining COC copies will be retained in the project files. If samples are sent by common carrier, a bill of lading will be used. Receipts of bills of lading must be retained as part

of the permanent sample documentation. Shipping containers will be secured in at least two locations with strapping tape and custody seals attached at the front and back of each container.

3.2.4 Field Data Logging

At the time of soil sample collection, or soon thereafter, the survey coordinates and elevation of each sample location will be recorded and compared to values from the field reconnaissance. Other field data logged will include: weather, date, and start time of each day's activity; names and affiliations of personnel on site, names and affiliations of visitors to the site during sample collection, and processing, start, and end time at each discrete sampling location; and IDs of all samples and QA/QC samples. All field data will be entered into electronic field database.

3.2.5 Sample labels

Sample labels, will be prepared using the sample ID nomenclature system discussed in Section 3.3. Label attachment to sample jars will be reinforced by applying clear packaging tape over each label. In addition to the sample ID, labels will contain the following information: project title, date, and time of collection, sample matrix, and laboratory analyses requested.

3.3 SAMPLE NOMENCLATURE

Each sample will be identified with a unique designation using a system that facilitates sample tracking. The designation system will be flexible enough to allow sample identifications to be assigned during the sampling event and to allow for unforeseen events and conditions. If a sample is not collected at a specific location the unique sample identification will not be reused.

Each transect will have a unique prefix that will differentiate it from other NOAA, USEPA, and GE sampling events in the UHR. Each transect will begin with the prefix 'GE08' for General Electric 2008. The next symbol group will indicate reach number using 'Rx' with the x ranging from 1 to 8 for the reach number. The next symbol will be 'W' for west bank of

the river, 'E' for east bank of the river, or 'I' for island (due to the limited number, samples collected from islands will not have east and west bank designations). The next symbol group to follow will be the river mile range (e.g., 9495) that the transect will fall between. A two-digit numeric group will follow, to indicate the transect number within the river range, beginning with 01 and labeled in numerical order. A dash will follow the prefix and separate additional symbol groups. If multiple field crews are deployed at one time, each will have a range of transect number labels to use to avoid overlap. Transect numbers will not be duplicated during the 2008 sampling season. The symbol following the transect number will be a two digit number, typically assigned beginning at the shoreline, describing the sample station number along the transect. The next symbol will indicate top and bottom sample depths with a four-digit number indicating inches bgs, rounded to the nearest inch.

For example, if Transect 1, Sample 1, is in Reach 8 on the east bank of the river, between RMs 194 and 195, and has a depth range of 0 to 6 in., it will be designated as:

GE08-R8-E-9495-01-01-0006

Field duplicates will be submitted blind to the analytical laboratory. As such, the sample ID will follow a modified ID designation system and the sample date and time will be omitted from the sample label and chain of custody. Modifications to the sample ID designation system consist of replacing the sample station number designation with the letters "FD" indicating Field Duplicate and replacing the sample depth designation with a counter. For example, if a duplicate sample is made from the parent sample GE08-R8-E-9495-01-01-0006, the duplicate sample ID will be GE08-R8-E-9495-01-FD-0001. If a second duplicate was made from the parent sample GE08-R8-E-9495-01-04-0612, it would have sample id designation of GE08-R8-E-9495-01-FD-0002.

Rinse blanks will use the same coding scheme, except that the double-digit transect number, the double-digit sample number and depth indicator will be replaced by RB and the date, a Crew ID and a counter. For example:

3.4 LABORATORY ANALYSES

Samples will be analyzed for total PCBs and TOC as described in Section 4.1.6. Samples will be analyzed within the holding time specified by the analytical method. The laboratory will report data both electronically and in hard copy format.

SECTION 4
QUALITY ASSURANCE/QUALITY CONTROL

This section provides a summary of appropriate and applicable QA/QC elements and procedures for the UHR Floodplain RI activities.

4.1 PROJECT ORGANIZATION AND PROJECT MANAGEMENT

GE and its designated consultants and contractors will be responsible for implementing the activities and protocols described in this FSP, including field reconnaissance, surveying, floodplain soil sampling activities, and preparation of the specified deliverables. Laboratory analyses will be performed by a NYSDOH ELAP-certified laboratory or laboratories. Overall project direction will be provided by GE. The names of the contractors, consultants, and laboratories selected by GE to implement this FSP, as well as their respective Quality Management Plans (QMPs), will be provided to USEPA for approval once the firms have been selected by GE. In addition, GE will provide the following deliverables for the selected laboratory(ies) in electronic format on CD-ROM:

- copies of current accreditation certificate applicable to the parameters of interest (i.e., PCBs and TOC), including copy of current ELAP certification; and
- copies of SOPs relevant to all proposed sample methods, including procedures for sample preparation and cleanup.

4.2 QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

The data quality objective (DQO) process, as described in the USEPA QA/G-4 Quality Assurance Project Plan (QAPP) instructions document, is intended to provide a logical framework for planning field investigations (USEPA 2000). The following section addresses, in turn, each of the seven sequential steps in the USEPA QA/G-4 QAPP DQO process which pertain specifically to the Remedial Investigation (RI) activities described herein.

Step 1: Problem Statement

The objectives of the FSP activities are outlined in Section 1.4 of this FSP.

Step 2: Decision Identification

The initial use of the data is descriptive (distribution and concentration) and there is no decision point for this descriptive application. Subsequent to review of the descriptive information, an evaluation will be performed based on the findings of the FSP activities. The decision in this case is to determine the potential exposure pathways based on the distribution and concentrations of PCBs, and evaluate them within the framework of an RI/FS.

Step 3: Identifying Decision Inputs

Decision inputs incorporate both concentration and distribution of PCBs in floodplain soils. A fundamental basis for decision-making is that a sufficient number of data points of acceptable quality are available from the investigation to support the decision. Thus, the necessary inputs for the decision are: 1) the proportion of non-rejected (usable) data points; and 2) the quantity of data needed to evaluate floodplain soil PCB concentrations.

Step 4: Defining the Study Boundaries

The study area boundaries are defined in Section 1.3 of this FSP.

Step 5: Developing a Decision Rule

The decision on whether data can be used in the evaluation will be based on the data validation results. Following validation, the data will be flagged, as appropriate, and any use restrictions noted in a Data Validation Report. The field sampling program has been devised so that the loss of any single data point will not hinder description of the distribution of PCBs. Given this, a reasonable decision rule would be that 90% of the data points not be rejected and deemed unusable for evaluation purposes. Applicable actions would be evaluated, if needed, based on the results of the data evaluation.

Step 6: Limits on Decision Errors

Specifications for this step call for: 1) giving forethought to corrective actions to improve data usability; and 2) understanding the representative nature of the sampling design. This FSP has been designed to meet both specifications for this step.

Step 7: Design Optimization

The overall quality assurance objective is to develop and implement procedures for soil sampling, sample custody, laboratory analyses, and reporting that will provide results to support the evaluation of the site data consistent with the RI/FS. Specific procedures for sampling, sample custody, laboratory instrument calibration, laboratory analysis, data reporting, internal quality control, audits, preventive maintenance of field equipment, and corrective actions are described in the remainder of Section 4 and in Section 3 of this FSP.

4.3 SPECIAL TRAINING REQUIREMENTS/CERTIFICATIONS

Personnel performing field activities associated with this FSP will have completed the training and certification requirements as outlined in the Health and Safety Plan (HASP). The selected contractor would be required to develop their own HASP that is at least as stringent as the generic HASP included in the Short Term Implementation Plan.

4.4 FIELD INSTRUMENT CALIBRATION AND MAINTENANCE

Based upon the scope of work detailed in this FSP, it is anticipated that the use of field instrumentation will be limited to GPS units and conventional survey equipment. Field personnel will be responsible for verifying that the GPS units, as well as any other instrumentation that may be deemed necessary, are properly calibrated and maintained in accordance with the manufacturer's specifications. The field personnel will also be responsible for ensuring that a master calibration/maintenance log is maintained following the procedures specified for each measuring device. Instruments and equipment used to gather, generate, or measure environmental data will be calibrated at the intervals specified by the manufacturer or

more frequently, and in such a manner that the accuracy and reproducibility of results are consistent with the manufacturer's specifications. In the event that an internally calibrated field instrument fails to meet calibration/checkout procedures, it will be returned to the manufacturer for service. Equipment found to be out of tolerance during the period of use shall be removed from the field.

Equipment which requires charging or batteries will be fully charged and have fresh batteries. Appropriate spare parts will be made available for field instrumentation, as practicable.

4.5 FIELD DOCUMENTATION

Field personnel will provide appropriate documentation covering various aspects of field reconnaissance, sample collection, and sample custody. This documentation consists of a record that allows reconstruction of field events to aid in the data review and interpretation process. Documents, records, and information relating to the performance of the field work will generally consist of the following items:

- Daily Documentation - A field logbook will contain a record of the daily activities.
- Photo/Video Documentation – Field personnel may document activities and conditions using a camera or videotape recorder.
- Sampling Information - Notes and survey measurements will be made as to the sampling location and physical observations.
- Sample Custody – COC forms will provide the record of responsibility for sample collection, transport, and submittal to the laboratory. The original COC form will accompany the samples to the laboratory, and copies will be placed in the project files.

4.6 ANALYTICAL METHOD REQUIREMENTS

The sample analyses performed will include Total PCBs and TOC by analytical methods USEPA SW-846 8082 and the Lloyd Kahn Method, respectively. As discussed with USEPA and

described in the *Responses to USEPA Comments on the Draft RI/FS Work Plan*, the proposed PCB analytical method is a different method than was used for previous floodplain investigations (CLP SOW OLM04.3 [modified]). However, the proposed SW-846 8082 Method is a USEPA-approved, industry-standard method, is routinely performed by numerous commercial laboratories, contains laboratory QA/QC requirements similar to the previous method, and will result in comparable data. Laboratory analytical requirements are presented in Table 4-1 through Table 4-5. Table 4-1 provides requirements for analysis of field and laboratory quality control samples. Table 4-2 presents the laboratory quantitation limits for the PCB analyses. Table 4-3 provides requirements for analytical parameters, sample containers, preservation methods, and holding times. Table 4-4 provides a summary of laboratory quality control limits. Table 4-5 provides a summary of the QA/QC acceptance criteria to be reviewed by the laboratory and personnel performing the data validation, as well as actions to be taken by the laboratory when the criteria have been exceeded, for the PCB analyses based on the analytical methods performed. QA/QC and reporting deliverables compliant with CLP requirements, such as those listed below will be used for the PCB and TOC analyses.

- *Aroclor Data*
    - QC Summary
        - Surrogate Recovery Summary (Similar to Form II ARO-1 ARO-2);
        - Matrix Spike/Matrix Spike Duplicate Summary (Similar to Form III ARO-1 and ARO-2);
        - Laboratory Control Sample (LCS) Recovery (Similar to Form III ARO-3 and ARO-4); and
        - Method Blank Summary (Similar to Form IV ARO).
    - Sample Data
        - TCL Results - Organics Analysis Data Sheet (Similar to Form I ARO);
        - Chromatograms (Primary Column);
        - Chromatograms from second GC column confirmation;
        - GC Integration report or data system printout; and

  - Manual work sheets For Aroclors by GC/MS Copies of raw spectra and copies of background-subtracted mass spectra of target compounds (samples and standards).

- Standards Data
  - Aroclors Initial Calibration (Similar to Form VI ARO-1,ARO-2, and ARO-3);
  - Calibration Verification Summary (Similar to Form VII ARO-1);
  - Analytical Sequence (Similar to Form VIII ARO);
  - Identification Summary for Multi-component Analytes (Similar to Form X ARO); and
  - Chromatograms and data system printouts. A printout of Retention Times and corresponding peak areas or peak heights.

- Raw QC
  - Data Blank Data;
  - Matrix Spike/Matrix Spike Duplicate (MS/MSD) Data; and
  - LCS Data.

- Miscellaneous Data
  - Original preparation and analysis forms or copies of preparation and analysis logbook pages.
  - Internal sample and sample extract transfer chain-of-custody records.
  - Screening records.
  - All instrument output; including strip charts from screening activities (describe or list).

- Shipping/Receiving Documents
  - Airbills (No. of shipments);
  - Chain of Custody Records;
  - Sample Tags Sample Log-in Sheet; and

- Miscellaneous Shipping/Receiving Records.

4.7 FIELD AND LABORATORY QUALITY CONTROL REQUIREMENTS

The overall quality assurance objective for the RI is to develop and implement procedures for sampling, laboratory analysis, and data validation to ensure that valid and useable data will be generated. The field sampling and laboratory SOPs have been developed to ensure that this objective will be achieved. Procedures for the collection of field quality control data necessary to evaluate the quality of the field environmental data are summarized in the following sections. The frequency of QA/QC samples to be collected is presented in Table 4-1.

4.7.1 Field Quality Control

4.7.1.1 Sample Containers

Certified-clean sample containers (I-Chem 300 Series or equivalent) will be supplied by the laboratory for all sampling conducted as part of the Work Plan activities.

4.7.1.2 Field Duplicates

Field duplicates will be collected to verify the reproducibility of the sampling methods. Field duplicates will be prepared by placing well-homogenized aliquots from the same sample location into individual sample containers, which will be submitted blind to the laboratory. In general, field duplicates will be analyzed at a 5% frequency (every 20 samples) for PCBs and TOC.

4.7.1.3 Rinse Blanks

Rinse blanks will be used to monitor the cleanliness of the sampling equipment (e.g., non-disposable sampling equipment such as stainless steel bowls and spoons used for

sample homogenization, MacroCore device nose cones), and effectiveness of the cleaning procedures. Rinse blanks will be prepared by filling sample containers with analyte-free water (supplied by the laboratory) that has been routed through a cleaned sampling device. Rinse blanks will be prepared and submitted for analysis at a minimum rate of once per day or once per 20 samples per matrix. When dedicated sampling devices are used or sample containers are used to collect the samples, rinse blanks will not be necessary.

4.7.2 Laboratory Quality Control

Internal laboratory quality control checks will be used to monitor data integrity. These checks will include method blanks, matrix spikes (and matrix spike duplicates), surrogate samples, calibration standards, and LCSs. Laboratory quality control limits for duplicates and matrix spikes are identified in Table 4-4. Table 4-5 provides a summary of the QA/QC acceptance criteria, as well as actions to be taken when the criteria have been exceeded, for the PCB analyses. Laboratory control charts will be used to determine long-term instrument trends. Laboratory quality control procedures will be conducted in a manner consistent with relevant regulatory guidance. The laboratory will have current NYSDOH ELAP certification. The laboratory will prepare and submit both electronic and full CLP-type reporting deliverables. The hard copy deliverable will contain the supporting documentation necessary for the data to be validated to ensure that proper quality assurance procedures were followed and that the data are of sufficient quality.

In addition to the above laboratory QA/QC requirements, the selected laboratory will analyze Performance Evaluation (PE) samples twice per year as part of the requirements for NYSDOH ELAP certification. Based on the level of data verification and validation proposed as described in Section 4.10, and based on the fact that site-specific MS/MSDs and batch-specific LCSs will be analyzed per the analytical method SOP (minimum of one per 20 samples or one per sample delivery group), analysis of batch-specific Performance Evaluation samples is not warranted.

4.8 DATA MANAGEMENT

The following subsections present an overview of the project information management system. This includes the field sample data collection process, the required specifications of the Electronic Data Deliverable (EDD), definitions of the EDD loading and evaluation phases, definitions of the electronic data verification process, and the storage, review, and retrieval of analytical data.

All data used for analysis, presentation, and reporting on the project will be stored in a central electronic database and will be used for data collection, data evaluation, and data integration as described below:

- Field Sample Data Collection System – A field data collection system will capture, manage, and maintain field data information including electronic COC creation, sample ID creation, and sample label creation.
- Laboratory data checks – EDDs submitted to the data management system will be checked to ensure data reliability by comparing the data to several criteria including valid values, data types, and format.
- Data verification – Analytical data submitted by the laboratory will be reviewed against the performance specifications, (refer to Section 4.10.2), evaluated, exception reports will be produced, and qualified results will be entered in the project database.

4.8.1 Purpose/Background

All field-generated data will be entered into a field database. Forms that will facilitate data entry and management of the collected field data will be developed primarily to limit the possibility of data entry/transcription errors. Valid value lists will be defined for each of the data fields thereby restricting possible entries made by the user. Additionally, several features will be programmed to occur automatically (e.g., field sample IDs will be created based on the date and location of sample collection, further limiting the possibility of user error).

The data entry forms discussed above will be uploaded to laptop computers that will be used by sampling personnel. In all cases, to guard against computer damage or loss, data collected in the field will also be recorded on hard copy field logs. In cases of inclement weather, when the use of a computer may not be possible, data from hard copy field logs will later be entered into the field database. After all necessary information has been entered into the field database, sample labels and COC reports will be generated.

At the end of each day of sampling, electronic field data will be uploaded to the file server. The file will be checked for valid values and required fields; field data will be uploaded to the data management system once analytical results are received.

Analytical laboratories will email EDDs in the format described below in Section 4.1.8.2, for loading into the data management system. The EDDs will undergo checks to verify that the EDD adheres to structural requirements, that the valid values used by the laboratory are in accordance with project standards, and that a check of 10% of each laboratory's electronic data loaded for the day compares with the hard copy without error, (if there is a discrepancy between the EDDs and the hard copy data, the discrepancy will be evaluated and a determination made as to which dataset is erroneous; the laboratory will re-submit either the EDD or hard copy data to correct the error). The data verification process and data validation will be performed as described below. A manual review of the data and electronically-generated qualification flags will be performed. The resulting approved data will then be made available to the appropriate project team members for review and data analysis.

4.8.2 Analytical Results

Digital files will be used to populate the appropriate database tables. This format specifies that there be one data record for each constituent for each sample analyzed. Specific fields include:

- sample identification number;
- date sampled;

- date analyzed;
- parameter name;
- analytical result;
- units;
- detection limit; and
- qualifier(s).

The individual EDDs, supplied by the laboratory in either an ASCII comma separated value (CSV) format or in a Microsoft Excel worksheet, will be loaded into the appropriate database table. After entry into the database, the EDD data will be compared to the field information previously entered into the database to confirm that all requested analytical data have been received. Any analytical data that cannot be provided by the laboratory in electronic format will be entered manually; however, at this time it is not anticipated that any manual data entry will be performed.

4.8.3 Document Control and Inventory

Each consultant designated by GE to work on the RI/FS will maintain a set of project files for the floodplain soil sampling activities.

4.9 CORRECTIVE ACTIONS

Field audits will be performed on an as-needed basis. Based upon a review of the data validation reports, laboratory audits may also be required. It should be noted that the laboratory selected by GE will be ELAP-certified; therefore laboratory audits will be performed a minimum of once every two years per NYSDOH requirements for ELAP certification. These audits will verify that protocols are being followed in accordance with the quality procedures detailed in this FSP and in the laboratory's standard operating procedures (SOPs). Should deficiencies be noted in the field or laboratory audits, appropriate corrective actions will be taken to ensure that the

quality of the data is sufficient. Corrective actions may include procedures to promptly investigate, document, evaluate, and correct data collection and/or analytical procedures.

4.10 DATA REDUCTION, REVIEW, AND VALIDATION

After field and laboratory data are obtained, the data will be subject to:

- reduction, or manipulation mathematically or otherwise, into meaningful and useful forms;
- review;
- organization, interpretation, and reporting; and
- validation.

4.10.1 Laboratory Data Reduction/Data Review

The calculations used for data reduction will be in accordance with the designated analytical methods presented herein. Whenever possible, analytical data will be transferred directly from the instrument to a computerized data system. Raw data will be entered into permanently bound laboratory notebooks. The data entered will be sufficient to document all factors used to arrive at the reported value.

Concentration calculations for chromatographic analyses will be based on response factors. Quantitation will be performed using either internal or external standards.

Non-aqueous values will be reported on a dry-weight basis. Unless otherwise specified, all values will be reported uncorrected for blank contamination.

4.10.2 Data Validation

Electronic data verification and data validation will be conducted after samples have been collected and analyzed. Verification and validation will provide an understanding of the data quality and usability. If correctable data quality issues are discovered as a result of the data verification and validation activities, the findings must be immediately provided to the appropriate data generator such as the field samplers or laboratories so that appropriate corrective action can be taken to prevent the problem from recurring. The data verification program will utilize the information contained in the laboratory EDDs and will provide information on data quality very quickly after the data generation.

Sample analysis and batch quality control results will be delivered in an EDD for batch loading into the project database. Analytical results for all samples will also be provided in a full data package in a scanned electronic media (Adobe® Acrobat® .pdf).

The usability of the analytical data will be assessed by using a tiered approach. Data will initially undergo an electronic data verification, which will provide the first test of the quality of the results. This process will assess data usability by evaluating batch quality control results. The term verification is used because criteria-based checking of the laboratory-reported QC results against the limits defined will be used to qualify data. Electronic data verification will be performed on 100% of the data. The specific measures evaluated during verification and the associated criteria will include:

- holding times;
- accuracy (by evaluating LCS recovery and MS recovery);
- precision (by evaluating laboratory duplicate results);
- field duplicate sample precision;
- blank contamination (laboratory method blanks and field generated blanks); and
- surrogate compound recoveries.

This electronic verification process will provide an understanding of the data quality based on those QC indicators that have the most influence on qualification of data. Any calibration deviations (e.g., initial calibration %RSD and the continuing calibration %D) will be required to be documented in the laboratory case narrative. The verification step will also include the data validator's review of the laboratory case narratives along with the reports generated by the electronic verification process. Therefore any calibration deviations will also be addressed during the verification step. The electronic verification process will be automated so that the quality of the data can be determined soon after the laboratory reports it.

Full data validation (i.e., manual qualitative and quantitative checking) will be performed on 10% of all data as well as any other analytical results that are subject to question.

The name(s) and qualifications of the firm(s) performing the electronic data verification and data validation activities described herein will be provided to USEPA for review and approval once they have been selected by GE.

4.11 INTERIM DATA REPORTING

Data collected will be summarized in a data summary report following completion of this phase of the sampling program, according to the schedule provided in Section 6. Preliminary data will also be provided in monthly progress reports until the data summary report has been submitted.

SECTION 5
CONCURRENT ACTIVITIES IN PREPARATION FOR THE HUMAN AND ECOLOGICAL RISK ASSESSMENTS

During implementation of the sampling activities described in this FSP, additional field activities will be undertaken to verify human usage patterns and vegetation types that have been assumed in developing this FSP, based on the publicly available property classifications and NLCD maps. These activities will be conducted by field personnel concurrently with the collection of floodplain soil samples.

5.1 VERIFICATION OF HUMAN USE AREAS AND TYPES

The work conducted in preparation for the submission of this FSP allowed for the preliminary identification of likely human usage for each parcel, based on property classifications and aerial photos, and the subsequent selection of representative sampling locations. As discussed in Section 2.1.5.1, there are a number of parcels for which it cannot be determined with certainty whether the usage that has been assumed based on current information is the most appropriate usage or the property type with the highest potential for exposure to floodplain soil. For those parcels, it will be important to gather on-site information about the observed uses of each parcel, its physical characteristics, and the location and characteristics of specific activities (types of waterfront usage, agricultural crops being grown, etc.).

It is anticipated that this task will require the following steps:

- Identify official and unofficial recreational areas including established parks, areas with trails, dirt biking paths, bank fishing locations, hunting locations, picnicking locations, camping areas and boat launches. The identification of official recreational areas will be completed through a review of state, county and city maps, discussions with representative of the fish and wildlife services, and contact with sporting organizations. Finally, additional information will be gathered by visiting the floodplain areas by boat and by land for signs of recreational usage to determine if there are other unofficial

recreational areas that have been overlooked. USEPA identified many of the unofficial recreational areas along the river during its 2007 reconnaissance of the UHR floodplain. This additional reconnaissance by land and by boat will be conducted to identify any other areas that are regularly used for recreation.

- Conduct a site visit to verify use areas. Preparation for the site visit will include a review of available maps and photos and the identification of discrepancies between the property classifications assigned to individual tax parcels and indicators of usage observed in aerial photographs. A checklist has been developed (Appendix A) to assist field personnel in identifying the types of usage that are occurring, the locations where those uses are occurring, and the physical characteristics of the properties, including slopes and areas and types of vegetation that may affect access.
- Identify types of farming activities that are occurring in each area that is zoned for agricultural usage, including the types of crops grown and their final usage. This can be accomplished through discussions with state and county extension services/cooperatives, review of agricultural publications and statistics, and site-specific observations. In addition, agricultural land will be observed to determine whether the land is being used for residential purposes as well as for crop production.
- Evaluate areas that have been classified as vacant or residential land, but for which aerial photographs indicate that farming or regular cultivation is occurring, to confirm whether they are being used for agricultural purposes. Those areas that are being cultivated will be noted and the types of crops being grown on them will be documented.
- Field personnel will conduct on-site observations to ground-truth the information that has been collected and/or assumed concerning usage patterns. During the site-visit, the field personnel will collect additional site-specific information about the usage of the UHR floodplain including identifying trails, documenting debris or other signs of potential activity, buildings, and previously unidentified use areas not apparent on existing digital photographs.

5.2 VEGETATION MAPPING

For the purpose of selecting the sampling locations presented in this FSP, information regarding land cover and vegetation categories within the floodplain was based on existing aerial photographs and the NLCD (2001). However, while sufficient for planning the initial sampling effort, these data sources are coarse, and therefore this section outlines the proposed approach for developing a more detailed vegetation map.

5.2.1 Summary of Proposed Approach for Vegetation Map

The goal of this mapping process will be to produce a high-resolution GIS vegetation type map in ARCMAP format. To achieve this goal, polygons for expected vegetation types will be delineated on 0.5-foot-resolution leafless aerial color photographs using supervised classification in ERDAS/IMAGINE in ARCGIS. Delineation will be supplemented with the classification information from the 30-m resolution pixels of the NLCD (2001) maps, and infrared photographs from the New York State GIS datasets (http://www.nysgis.state.ny.us/gateway/mg/). Generally, the minimum resolution will be 10 m to ensure wooded edges are captured, but polygons will typically be much larger, circumscribing vegetation communities. For the purpose of developing these polygons, the study area will be defined as extending approximately 0.6 miles on either side of the river.

Once the initial polygons are defined by ERDAS/IMAGINE, the boundaries and classifications will be corrected and adjusted as needed by a biologist familiar with the study area. Adjustments will be discussed with USEPA. This preliminary adjustment will rely primarily on site knowledge, however, available information (NLCD, aerial photographs, information from USEPA biologists, etc.) will be considered to the extent necessary to identify potential discrepancies or misclassifications. Following this preliminary adjustment, a subset of polygons for each vegetation type will be ground-truthed and errors in classification of the vegetation type will be corrected. The final boundaries and classifications will be submitted to USEPA for review and approval prior to finalizing the maps.

5.3 DELIVERABLE

The human use area and vegetation mapping will be included in the revised RI/FS Work Plan.

SECTION 6
SCHEDULE

The schedule for the activities specified in this FSP is presented in Table 6-1, below.

Table 6-1. Project schedule.

Activity	Timeframe/Comments
1) Initiate property access requests.	Within 14 days of USEPA approval of the FSP or execution of the Administrative Order, whichever occurs latest.
2) Field Reconnaissance to confirm sampling locations.	Prior to sample collection.
3) Complete soil sampling and verification of type and extent of vegetative cover and type and location of human usage.	Where access has been granted, within 75 days following initiation of this task or December 15, 2008, or when weather conditions do not allow additional fieldwork, whichever occurs first.
4) Complete Laboratory Data Validation.	Laboratory data validation will be performed as the hard copy data packages are received from the laboratory. All data validation will be complete within 45 days following receipt of the last hard copy data package from the laboratory.
5) Submit Data Summary Report.	Within 90 days following completion of laboratory data validation or March 31, 2009, whichever occurs latest.

SECTION 7
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