

# BBL<sup>®</sup>

 an ARCADIS company

*Transmitted Via Federal Express*

November 1, 2006

Mr. Gardiner Cross  
Engineering Geologist 3  
New York State Department of Environmental Conservation  
Division of Environmental Remediation  
625 Broadway  
Albany, New York 12233

Re: Central Hudson Gas & Electric Corporation  
Newburgh Former Manufactured Gas Plant, Newburgh, New York  
Order on Consent, Index #D3-0001-95-06, dated October 1995  
BBL Project #: 0205.20537 #5

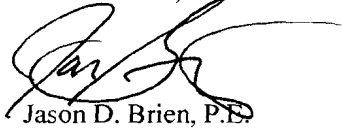
Dear Mr. Cross:

On behalf of Central Hudson Gas & Electric Corporation (CHGE), Blasland, Bouck & Lee, Inc., an ARCADIS company (BBL), is submitting three copies of the Areas B and C Pre-Design Investigation Work Plan Addendum for CHGE's former manufactured gas plant (MGP) in Newburgh, New York.

Please contact Tera Stoner of CHGE at (845) 486-5464, or me at (315) 671-9114 if you have any questions.

Sincerely,

BLASLAND, BOUCK & LEE, INC.



Jason D. Brien, P.E.  
Senior Project Engineer II

JDB/jlc  
Attachment

cc: J. Clock, Central Hudson Gas & Electric Corporation  
T. Stoner, Central Hudson Gas & Electric Corporation  
N. Kowalczyk, Central Hudson Gas & Electric Corporation  
N. Gensky, Blasland, Bouck & Lee, Inc.  
M. Gravelding, Blasland, Bouck & Lee, Inc.  
D. Weeks, Blasland, Bouck & Lee, Inc.

**RECEIVED**

NOV 01 2006

 Remedial Bureau C  
Division of Environmental Remediation

**WORK PLAN**

---

*Areas B and C Pre-Design  
Investigation Work Plan  
Addendum*

**RECEIVED**

NOV 02 2006

Remedial Bureau C  
Division of Environmental Remediation

**Central Hudson Gas & Electric Corporation  
Newburgh, New York**

**October 2006**

**BBL**<sup>®</sup>  
an ARCADIS company

---

# Table of Contents

---

<b>Section 1. Introduction.....</b>	<b>1-1</b>
1.1 General.....	1-1
1.2 Background.....	1-1
<b>Section 2. Proposed Additional Area B PDI Activities.....</b>	<b>2-1</b>
2.1 Additional Delineation of NAPL Impacted Soil.....	2-1
2.2 Waste Characterization.....	2-1
2.3 Survey.....	2-2
<b>Section 3. Proposed Additional/Revised Area C PDI Activities.....</b>	<b>3-1</b>
3.1 Revised Horizontal Delineation of PAH-Impacted Sediments.....	3-1
3.1.1 Sampling Approach.....	3-1
3.1.2 Sample Collection and Analysis.....	3-1
3.2 Bathymetric Survey.....	3-1
<b>Section 4. Schedule.....</b>	<b>4-1</b>
4.1 Revised Horizontal Delineation of PAH-Impacted Sediments.....	4-1

## Figures

- 1 Area B Pre-Design Investigation Locations
- 2 Area C Pre-Design Investigation Locations – PAH-Impacted Sediment Delineation

## Appendices

- A RETEC – October 30, 2006 Work Plan Addendum

# 1. Introduction

---

## 1.1 General

This document presents an addendum to the *Areas B and C Pre-Design Investigation Work Plan* (Work Plan) prepared by Blasland, Bouck, & Lee, Inc. an ARCADIS company (BBL), August 2006 for the Central Hudson Gas & Electric Corporation (CHGE) former manufactured gas plant (MGP) site located in Newburgh, New York. This Addendum has been prepared to add, revise, or clarify the following activities to be completed as part of the Pre-Design Investigation (PDI) for Areas B and C:

- Addition of TarGOST borings to identify the potential presence of non aqueous-phase liquid (NAPL) west of the NAPL barrier wall area;
- Clarification of the confirmation boring selection rationale for NAPL delineation;
- Clarification of the waste characterization soil sampling protocols for soils in Area B;
- Revision of the approach for delineating the extent of a potential sediment cap in the Hudson River east of the site;
- Revision of the coordinate systems and datum for surveying activities to be completed at the site; and
- Revision of the bathymetric surveying methodology.

A revised schedule is also included as part of this addendum.

The organization of this addendum is presented below.

Section	Purpose
Section 1	Introduction
Section 2	Proposed Additional Area B PDI Activities
Section 3	Proposed Additional/Revised Area C PDI Activities
Section 4	Schedule

## 1.2 Background

The overall objective of the PDI is to collect additional data necessary to facilitate preparation of the remedial design for Areas B and C. Following review of the August 2006 Work Plan, NYSDEC prepared an October 3, 2006 comment letter presenting comments on the Work Plan. CHGE subsequently coordinated with NYSDEC to discuss the comments and formulate a revised plan to complete the PDI for Areas B and C of the Newburgh site. This addendum documents the revisions agreed to by CHGE and NYSDEC.

## **2. Proposed Additional Area B PDI Activities**

This section presents the scope of work for additional and or revised PDI activities to be completed in Area B relative to the scope of the PDI presented in the Work Plan (BBL, August 2006)

### **2.1 Additional Delineation of NAPL Impacted Soil**

Up to five additional TarGOST borings will be completed to identify the potential presence of NAPL adjacent to the northern portion of the NAPL barrier wall area. Sampling will be performed in accordance with protocols previously set forth in the Work Plan. The proposed additional probing locations are located in Area B, adjacent to the chlorine contact tank and north to previous soil boring TB-29 as shown on Figure 1.

The findings of the TarGOST probing will be confirmed with soil boring using direct push technology (DPT) at a minimum of 25% of the probing locations. The intent of these confirmation locations is primarily to verify the presence of NAPL where indicated by the TarGOST probing. Further, these confirmation borings will be preferentially selected based on the following:

- areas where less borings were completed during RI (i.e. north of chlorine tank and near the proposed STP aeration tank expansion); and
- areas where the NAPL distribution based on the TarGOST probing efforts appears to be different than the NAPL distribution as delineated based on the approximately 20 borings and wells completed between former Renwick Street and the chlorine contact tank along the river.

As such, DPT confirmation borings will be completed at a minimum of 25% and up to 50% of the TarGOST probing locations (as appropriate) to verify the presence and location of NAPL in the subsurface.

### **2.2 Waste Characterization**

The primary purpose of waste characterization sampling is to provide information required to support the selection of a treatment and/or disposal facility for soil that may be removed during the Area B remediation activities. As a clarification to the waste characterization sampling protocol, three separate composite soil samples will be collected from the following locations in Area B:

- One sample along the barrier wall area;
- One sample from the area west of the barrier wall area; and
- One sample from the proposed STP aeration tank expansion area.

Each of these separate samples will be comprised of a minimum of three aliquots collected from the soil cuttings generated during the soil boring activities. The composite soil samples will be collected from borings where NAPL is observed in order to document the worst-case scenario for disposal. If NAPL is not encountered, the samples will be collected from borings evenly dispersed throughout the respective areas. Analytical parameters for the soil waste characterization samples are presented in Table 2-1 of the Work Plan.

---

### 2.3 Survey

As per the request of the NYSDEC, the survey data associated with the RI and PDI will be measured and/or converted (as appropriate) to UTM Zone 18 coordinates referenced to North American Datum of 1983 (NAD83). Vertical survey measurements will be relative to the North American Vertical Datum of 1988 (NAVD88).

## **3. Proposed Additional/Revised Area C PDI Activities**

---

This section presents the scope of work for additional and/or revised activities to be completed in Area C relative to the scope of the PDI presented in the Work Plan (BBL, August 2006).

### **3.1 Revised Horizontal Delineation of PAH-Impacted Sediments**

As indicated in the Work Plan, the objective of this task is to collect the additional data necessary to refine the horizontal extent of PAH-impacted sediment that may require capping. The general revised sampling approach for this task is presented below followed by a description of the sample collection and analysis protocols.

#### **3.1.1 Sampling Approach**

As a initial step in delineating the limits of PAH-impacted sediments potentially requiring capping, 28 surface sediment samples will be collected as shown on Figure 2.

#### **3.1.2 Sample Collection and Analysis**

Surface sediment samples will be tested for total PAHs on a 24-48 hour turn around time basis. Based on the results obtained for the analysis of these samples, the limits of the area containing surface sediment at concentrations greater than 20 ppm will be delineated. Following delineation, the data and interpreted limits of the area containing total PAHs at concentrations exceeding 20 ppm will be submitted to NYSDEC for review and concurrence.

Following NYSDEC concurrence with the limits of impacted-sediment containing total PAHs at concentrations greater than 20 ppm, sediment samples will be collected on an approximate 100 foot (north – south) by 50 foot (east – west) grid laid over the interior portion of the area defined by the greater than 20 ppm total PAH concentration line (as agreed to with NYSDEC). Samples will be collected to a depth of approximately three feet below the sediment surface using the protocols presented in Section 3.2.3 of the Work Plan. Additionally surface sediment samples will be collected at each sampling location for toxicity and benthic community testing. Further, a subset of these also submitted for bioavailability testing. The toxicity, benthic community, and bioavailability testing will be conducted in accordance with the *Sediment Sample Collection and Analysis Work Plan for Evaluating Bioavailability* prepared by the RETEC Group, Inc (RETEC) as presented in Appendix B of the Work Plan and with an October 30, 2006 memorandum addending RETEC's Work Plan (included as Appendix A to this addendum).

### **3.2 Bathymetric Survey**

A 2-D bathymetry survey at 0.5 meter spacing will be conducted in Area C dredging and potential capping areas.

## 4. Schedule

---

### 4.1 Revised Horizontal Delineation of PAH-Impacted Sediments

This section presents the anticipated schedule for implementing the Work Plan activities. It is currently anticipated sediment sampling for the horizontal delineation of PAH-impacted sediments will begin during the week of October 30. Land TarGOST probing and sediment sampling for toxicity within the 20 ppm boundary will begin the week of November 6. Delineation of NAPL-impacted sediments as well as land based geotechnical sampling will begin the week of November 13. River based geotechnical sampling will begin the week of November 20. The following chart provides the anticipated schedule for Work Plan activities.

Activity	Anticipated Schedule
PAH Sediment Sampling	Week of October 30, 2006
Toxicity Sediment Sampling	Week of November 6, 2006
Land NAPL Delineation Activities	Week of November 6, 2006
River NAPL Delineation Activities	Week of November 13, 2006
River Geotechnical Boring	Weeks of November 20, 2006 and November 27, 2006
Land Geotechnical Boring	Weeks of November 13, 2006 and November 20, 2006

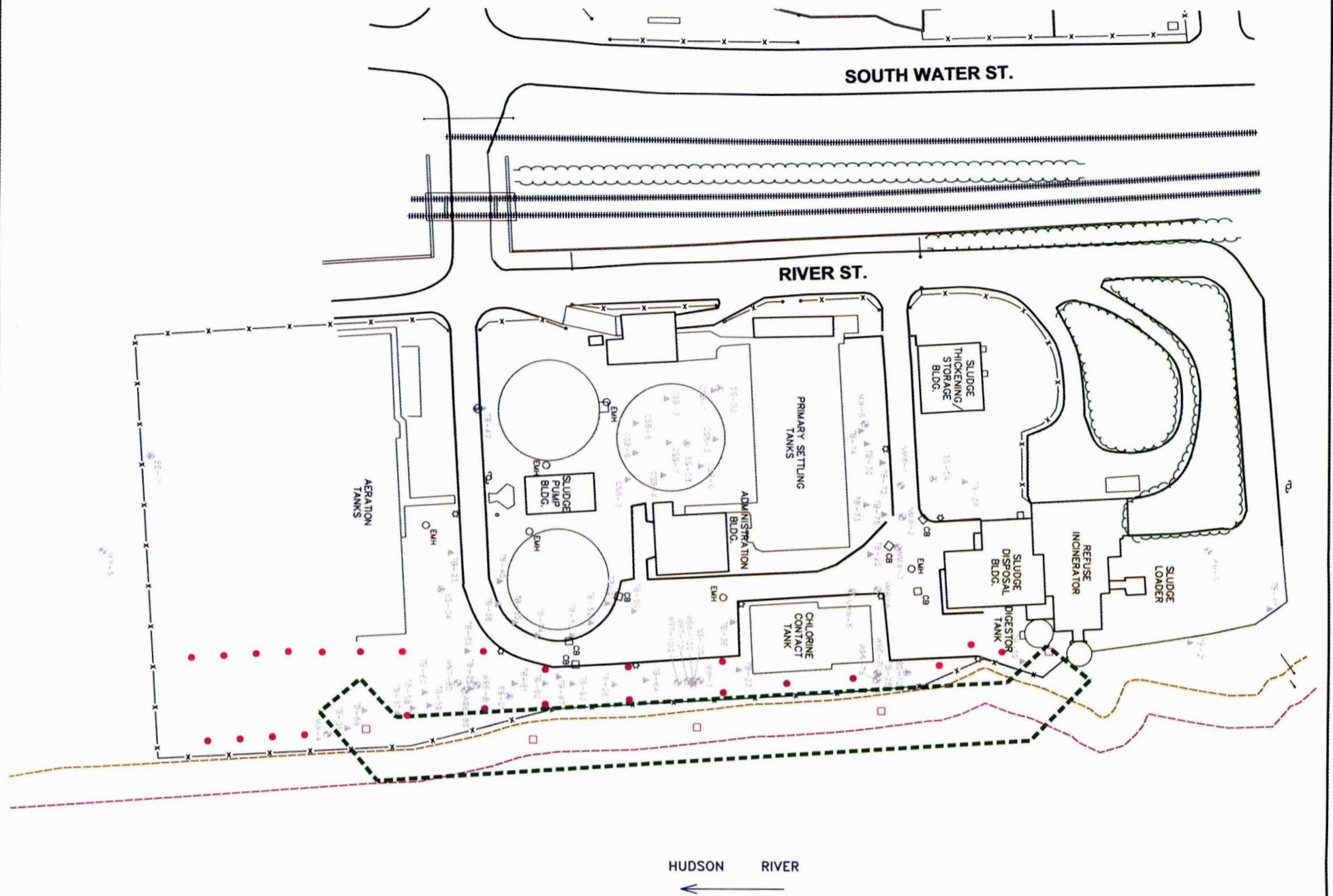
Remaining activities (e.g. report submittals) are not anticipated to significantly change from the schedule presented in the Work Plan.



# *Figures*

---

PROJECTNAME:-----  
 XREFS: IMAGES:  
 20537X00  
 20537X01



HUDSON RIVER  
 ←



- LEGEND:**
- ▲ EXISTING SOIL BORING
  - △ EXISTING SURFACE SOIL SAMPLE
  - EXISTING MONITORING WELL (OVERBURDEN)
  - PROPOSED TARGET PROBE/SOIL BORING LOCATION
  - PROPOSED GEOTECHNICAL SOIL BORING/PIEZOMETER CLUSTER
  - ▬ NAPL BARRIER WALL AREA
  - APPROXIMATE SHORELINE AT HIGH TIDE
  - - - APPROXIMATE SHORELINE AT LOW TIDE
  - ⊙ LIGHTPOLE
  - CATCH BASIN (CB)
  - ELECTRICAL MANHOLE (EMH)
  - ⊕ UTILITY POLE

- NOTES:**
1. BASE MAP DEVELOPED FROM SITE SURVEY CONDUCTED BY BLASLAND, BOLCK AND LEE, INC. BETWEEN DECEMBER 14, 1995 AND JANUARY 5, 1996 WITH DEEP SNOW CONDITIONS. DUE TO THE SNOW CONDITIONS SOME FEATURES MAY BE APPROXIMATE.
  2. PROPOSED PRE-DESIGN INVESTIGATION LOCATIONS ARE PRELIMINARY AND SUBJECT TO CHANGE IN THE FIELD.
  3. CONE PENETROMETER TEST (CPT) WILL BE ADVANCED AT SIX LOCATIONS WITHIN THE BARRIER WALL AREA. CPT PROBING LOCATIONS TO BE DETERMINED IN THE FIELD WITH CONSULTATION BETWEEN FIELD PERSONNEL AND SENIOR GEOTECHNICAL ENGINEERING PERSONNEL IN THE OFFICE.



CENTRAL HUDSON GAS AND ELECTRIC CORP.  
 NEWBURGH, NEW YORK

**AREA B AND C PRE-DESIGN  
 INVESTIGATION WORK PLAN**

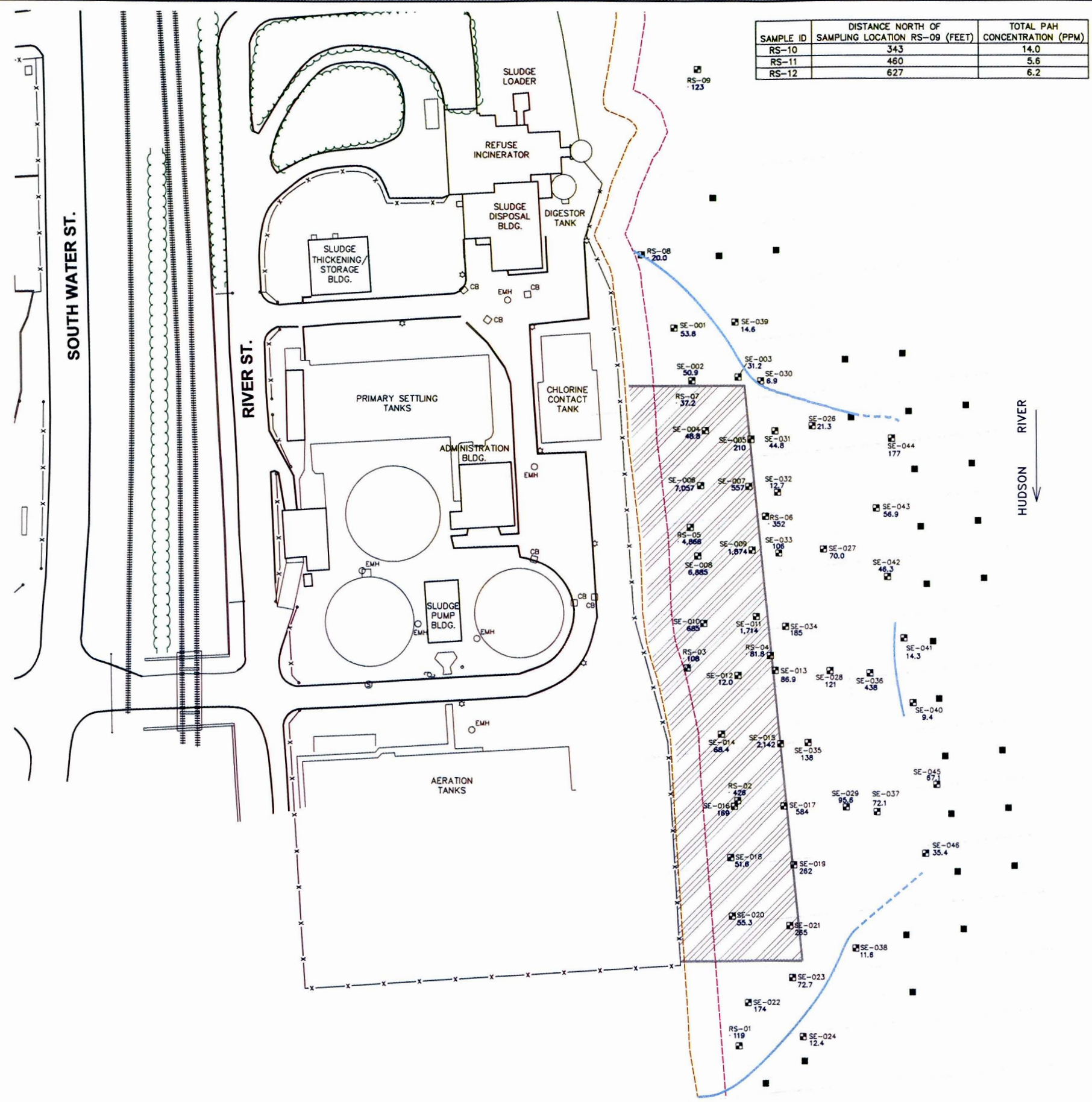
**AREA B PRE-DESIGN INVESTIGATION  
 LOCATIONS**



FIGURE

1

[SYN-85-LAF] SYN-85-RGB AUS RGB LAYER: ON\* OFF=REF: (FRZ)  
 F:\ACTIVE\DWG\ACT\20537003\20537004.DWG SAVED: 11/7/2006 10:04 AM LAYOUT: Layout11  
 PAGESETUP: DL2B-7300N-SYR PENTABLE.PLT\ULL.CTB PRINTED: 11/7/2006 10:36 AM BY: RBASSETT  
 PROJECT NAME: 20537000 IMAGES: 20537000 20537001



- LEGEND:**
- EXISTING SEDIMENT SAMPLING LOCATION
  - 177 TOTAL PAH CONCENTRATION IN SURFICIAL SEDIMENTS (mg/kg)
  - PROPOSED SEDIMENT SAMPLING LOCATION FOR PAH ANALYSIS
  - PREVIOUSLY IDENTIFIED PAH-IMPACTED SEDIMENT CAPPING LIMITS (DASHED WHERE INFERRED)
  - - - APPROXIMATE SHORELINE AT HIGH TIDE
  - - - APPROXIMATE SHORELINE AT LOW TIDE
  - ▨ PREVIOUSLY IDENTIFIED NAPL-IMPACTED SEDIMENT DREDGING LIMITS
  - ☆ LIGHTPOLE
  - CATCH BASIN
  - MANHOLE
  - ⊕ UTILITY POLE

- NOTES:**
1. BASE MAP DEVELOPED FROM SITE SURVEY CONDUCTED BY BLASLAND, BOUCK AND LEE, INC. BETWEEN DECEMBER 14, 1995 AND JANUARY 5, 1996 WITH DEEP SNOW CONDITIONS. DUE TO THE SNOW CONDITIONS SOME FEATURES MAY BE APPROXIMATE.
  2. PROPOSED PRE-DESIGN INVESTIGATION LOCATIONS ARE PRELIMINARY AND SUBJECT TO CHANGE IN THE FIELD.
  3. LIMITS OF THE PREVIOUSLY IDENTIFIED NAPL-IMPACTED SEDIMENT DREDGING AREA WERE ESTABLISHED TO REMOVE ALL SEDIMENT CONTAINING VISIBLY NAPL-IMPACTED SEDIMENT. THE LIMITS OF THE PREVIOUSLY IDENTIFIED PAH-IMPACTED SEDIMENT CAP COVERS THE EXISTING SEDIMENT SURFACE IN AREAS WHERE SURFICIAL PAH LEVELS EXCEED 20 PARTS PER MILLION (ppm).
  4. SEDIMENT SAMPLES FOR TOXICITY TO BE COLLECTED AT THE CENTER POINTS FORMED BY A 50' X 100' GRID INTERIOR TO THE LIMITS OF IMPACTED SEDIMENT CONTAINING PAHs AT CONCENTRATIONS GREATER THAN 20 ppm FOLLOWING DELINEATION BASED ON INITIAL SAMPLING.



CENTRAL HUDSON GAS AND ELECTRIC CORP.  
 NEWBURGH, NEW YORK

**AREA B AND C PRE-DESIGN INVESTIGATION WORK PLAN**

---

**AREA C PRE-DESIGN INVESTIGATION LOCATIONS - PAH-IMPACTED SEDIMENT DELINEATION**

---

**BBL**  
 an ARCADIS company

FIGURE  
**2**



***Appendix A***

---

**RETEC – October 30, 2006  
Work Plan Addendum**



# MEMORANDUM

607.277. 5716 Phone  
607.277. 9057 Fax  
www.retec.com

**TO:** Tera Stoner  
**FROM:** Nick Azzolina  
**DATE:** 30 October 2006

**CLIENT:** Central Hudson Gas & Electric Co.  
**TASK:** 100: Project Setup and Planning  
**RE:** Work Plan addendum to address NYSDEC request for two test organisms

---

## BACKGROUND

The following memorandum is an addendum to the Work Plan dated 26 June 2006, that was developed to provide the basis for assessing the bioavailability and toxicity of polycyclic aromatic hydrocarbons (PAHs) in aquatic sediments associated with Central Hudson Gas and Electric (CHGE) Company's historic manufactured gas plant (MGP) site located on the Hudson River in Newburgh, New York. This memo addresses comment 5 by the New York State Department of Environmental Conservation (NYSDEC), which requested that all sediment samples should be submitted for 28-day toxicity tests on *Hyalella* and *Chironomus* measuring for survival, growth, and reproduction.

Discussions were held between The RETEC Group, Inc. (RETEC), Gardiner Cross and Liz Lukowski of NYSDEC, and Rebecca Quail of Fish & Wildlife (FW) on 27 Oct 2006 at 12:30. NYSDEC and FW recommended the 28-d test for *Hyalella azteca* measuring survival, growth and reproduction, and the 20-d test for *Chironomus tentans* measuring survival and growth.

## SEDIMENT SAMPLE COLLECTION

Approximately 5 gallons of surface sediment, obtained from 0 to 6 inches below the sediment surface, will be collected from each sample station using 2 clean plastic buckets, as specified in the original Work Plan. However, the laboratories will require approximately 5.0 L of sediment that passes through a #5-mesh (4 mm openings) screen. Therefore, sediment texture will ultimately determine the amount of sediment that will need to be collected at each sample location.

## ANALYSIS AND TESTING METHODS

The original Work Plan specified that survival and growth would be assessed using the standard 28-d chronic toxicity test for *H. azteca*. In order to accommodate running both test species, RETEC will subcontract AquaTOX Research, Inc. (AquaTox) for *H. azteca* as initially proposed. However, AquaTOX cannot support running both test organisms simultaneously. Therefore,

30 October 2006  
Page 2



RETEC will subcontract the 20-d chronic toxicity test for *C. tentans* to the U.S. Army Engineering Research and Development Center (ERDC) in Vicksburg, MS.

Table 3-1 provides a revised summary of the chemical, physical, and bioavailability tests to be performed as part of the initial sample screening and detailed characterization. Table 3-2 provides the revised method references for the testing and the laboratories conducting the analysis. *H. azteca* will be evaluated for survival, growth and reproduction at the 28-d endpoint. *C. tentans* will be evaluated for survival and growth at the 20-d endpoint and will not be evaluated for the 65-d endpoint for reproduction.

Sediment chemistry/physical testing and benthic macroinvertebrate surveys will be conducted as specified in the original Work Plan.

If you have any questions or require any additional information, please call me at 607-277-5716.

Sincerely,

The RETEC Group, Inc.

Nick Azzolina  
Environmental Scientist

Attachments: Tables 3-1 and 3-2

cc: D. Weeks/D. Rigg/J. Brien/N. Gensky – BBL

**Table 3-1  
Analytical Testing Program**

Sample Type	Matrix	Parameter	Purpose	Quantity	Laboratory <sup>1</sup>
Initial Characterization	Sediment	PAH Screen - PAHs (34 compounds) GC/MS Sonication	Data to be used to select samples for detailed	22	EERC EERC
Bioavailability Characterization	Sediment	Amphipod toxicity ( <i>Hyalella azteca</i> ) 28-day chronic test	Direct Measurement of PAH bioavailability	22: 20 field samples, 2 reference samples	AquaTOX
		Midge toxicity ( <i>Chironomus tentans</i> ) 20-day chronic test			ERDC
Chemical/Physical Characterization	Sediment	Total and rapidly available PAHs (parent & alkylated 34 compounds)	Chemical test for estimating bioavailability	15	EERC
		Soot Organic Carbon (SOC)	Characterization of sediment organic matter	15	EERC
		Total Solids	Potential confounding factors affecting interpretation of toxicity data	15	STL
		Grain size		15	STL
		pH		15	STL
	Pore Water	Ammonia	15	STL	
		Dissolved Organic Carbon (DOC)	15	EERC	
		Freely dissolved PAHs (parent compounds and estimate of alkylated)	Chemical test for estimating bioavailability	15	EERC
Benthic Macroinvertebrate Survey	Sediment	Sorting, counting, and identifying down to the lowest feasible taxonomic level.	Measurement of benthic community abundance and diversity	Up to 22	Aquatec
Field Measurement	Surface Water	Temperature	General environmental quality parameters	22	YSI 6820 Field Meter or Equivalent
		pH		22	
		Dissolved oxygen		22	
		Conductivity		22	
		Salinity		22	
		Turbidity		22	

Note 1. EERC - Energy & Environmental Research Center  
ERDC - U.S. Army Corps of Engineers Engineering Research and Development Center  
STL - Severn Trent Laboratories, Inc., Burlington, VT  
Aquatec - Aquatec Biological Sciences, Inc., Williston, VT  
AquaTOX - AquaTOX Research, Inc., Syracuse, NY



**Table 3-2  
Laboratory Methods  
Newburgh, NY Site**

PARAMETER	METHOD	METHOD REFERENCE(S)	LABORATORY <sup>1</sup>
Total PAH extraction and analysis – screening level	Sonication in 1:1 methylene chloride:acetone mixture for 18 hrs followed by GCMS analysis.	[Hawthorne, 2005, in review], [U.S. EPA EPA/600/R-02/013, 2003], [NOAA, 1998]	EERC
Total PAHs parent & alkylated (34 compounds)	Sohxlet extraction in methylene chloride:acetone after SFE, followed by GC/MS using Selective Ion Monitoring (SIM) for measuring parent and alkylated PAHs	[Hawthorne, 2005, in review], [U.S. EPA EPA/600/R-02/013, 2003], [NOAA, 1998]	EERC
PAH extraction – pore water	Centrifugation and flocculation followed by solid phase microextraction and GCMS analysis for measuring parent and estimating alkylated PAHs	[Hawthorne et al., 2005], [Hawthorne, 2005, in review], [NOAA, 1998]	EERC
Dissolved Organic Carbon	SM 5310C Persulfate-Ultraviolet Oxidation Method	[APHA Standard Methods, 1992]	MVTL
Total Organic Carbon (TOC)	Sample acidified to remove carbonates, followed by analysis using a Leeman CE44 Elemental Analyzer modified for sediment analysis. (triplicate analyses on sediments)	[Hawthorne, 2001]	EERC
Soot Organic Carbon (SOC)	Heat stable TOC following pretreatment at 375° C for 24 hrs.	[Gustafsson et al., 1997]	EERC
Percent Solids	STL SOP IN623	[U.S. EPA, 1983], [U.S. EPA, CLP SOW OLM04.2/4.3], [U.S. EPA, CLP SOW ILM05.2]	STL
Grain Size	ASTM Methods D422-63 and D421-85	[ASTM, 1990]	STL
pH in Sediment	U.S. EPA SW-846 Method 9045C	[U.S. EPA, 1996]	STL
Ammonia	U.S. EPA Method 350.2	[U.S. EPA, 1983]	STL
Sediment toxicity test	Amphipod ( <i>H. azteca</i> ) toxicity 28-day chronic test (U.S. EPA 100.4)	[U.S. EPA, 2000a]	AquaTOX
Sediment toxicity test	Midge ( <i>C. tentans</i> ) toxicity 20-day chronic test (U.S. EPA 100.5)	[U.S. EPA, 2000a]	ERDC

**Note 1: Laboratories**

AquaTOX – AquaTOX Research, Inc., Syracuse, NY

ERDC – U. S. Army Engineering Research and Development Center, Vicksburg, MS

EERC – Energy & Environmental Research Center, Grand Forks, ND

STL – STL Burlington, VT