SCOPE OF STUDY

EASTERN PORTION OF ENGLISH STATION INTERIOR (PARTIAL): BOILER 1-12 AREA 510 GRAND AVENUE NEW HAVEN, CONNECTICUT

Prepared for:

The United Illuminating Company

180 Marsh Hill Road

Orange, Connecticut

TRC

Prepared by

Windsor, Connecticut

September 2018

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TRC Project No. 263951

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21 Griffin Road North
Windsor, Connecticut 06095
(860) 298-9692
Fax: (860) 298-6399

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Acronym/Abbreviation List

AEI	Advanced Environmental Interface, Inc.
AHERA	Asbestos Hazard Emergency Response Act
AIHA	American Industrial Hygiene Association
AOC	Area of Concern
ASNAT	ASNAT Realty, LLC
AST	Aboveground storage tank
ASTM	American Society for Testing and Materials
AWP	Alternate Work Practices
CET	Complete Environmental Testing, Inc.
cm	Centimeter
cm/sec	Centimeters per second
COC	Contaminant of concern
CSM	Conceptual site model
CTDEEP	Connecticut Department of Energy and Environmental Protection
CT DPH	Connecticut Department of Health
CTL	Connecticut Testing Laboratories, Inc.
DEC	Direct Exposure Criteria
DQA	Data Quality Assessment
DQO	Data Quality Objectives
DUE	Data Usability Evaluation
ECAF	Environmental Condition Assessment Form
ELLAP	Environmental Lead Laboratory Accreditation Program
ELUR	Environmental Land Use Restriction
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
ETPH	Extractable Total Petroleum Hydrocarbons
ftbgs	Feet below ground surface
GEI	GEI Consultants, Inc.
GWPC	Groundwater Protection Criteria
HPLC	High Performance Liquid Chromatography
I/C DEC	Industrial/Commercial Direct Exposure Criteria
LCS	Laboratory Control Sample
IDW	Investigation-Derived Waste
LEP	Licensed Environmental Professional
LF	Linear feet
LQG	Large Quantity Generator
MDL	Minimum Detection Limit
mg/cm^2	Milligrams per square centimeter
mg/kg	Milligrams per kilogram
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NAPL	Non-Aqueous Phase Liquids

NESHAP	National Emissions Standard for Hazardous Air Pollutants
NOB	Non-Friable Organically Bound
NTU	Nephelometric Turbidity Unit
NVLAP	National Voluntary Laboratory Accreditation Program
PAH	Polycyclic Aromatic Hydrocarbons
pc	Point counting
PCB	Polychlorinated Biphenyl
PCO	Partial Consent Order
PID	Photoionization Detector
PLM	Polarized Light Microscopy
PMC	Pollutant Mobility Criteria
PPE	Personal Protective Equipment
ppm	Parts per million
QA/QC	Quality Assurance/Quality Control
QE	Quinnipiac Energy, LLC
%R	Percent Recovery
RAP	Remedial Action Plan
RCP	Reasonable Confidence Protocols
RCRA	Resource Conservation and Recovery Act
RCSA	Regulations of Connecticut State Agencies
RES DEC	Residential Direct Exposure Criteria
RL	Reporting Limit
RPD	Relative percent difference
RSR	Remediation Standard Regulations
SEH	Significant Environmental Hazard
SOP	Standard Operating Procedure
SOS	Scope of Study
SPLP	Synthetic Precipitation Leachate Procedure
SVOC	Semi-Volatile Organic Compound
SWPC	Surface Water Protection Criteria
TCLP	Toxicity Characteristic Leaching Procedure
TEM	Transmission Electron Microscopy
TPH	Total Petroleum Hydrocarbon
TRC	TRC Environmental Corporation
UI	The United Illuminating Company
USCG	United States Coast Guard
USDOT	U.S. Department of Transportation
UST	Underground Storage Tank
vae	Visual area estimation
V	Volt
VC	Volatilization Criteria
VOC	Volatile Organic Compound
XRF	X-ray fluorescence

1.0 INTRODUCTION

1.1 Overview

TRC Environmental Corporation (TRC) has been retained by The United Illuminating Company (UI) to provide Licensed Environmental Professional (LEP) services as they relate to adherence to and completion of all tasks outlined in Partial Consent Order (PCO) COWSPCB 15-001, including the preparation of this Eastern Portion of English Station Building Interior Scope of Study (SOS) which focuses solely on the Boiler 1-12 area. On August 4, 2016, the PCO pertaining to environmental matters at the approximate 8.9-acre parcel of land located at 510 Grand Avenue in New Haven, Connecticut known as “English Station” (the “Site”), see Figure 1-1, became effective. For the purposes of the PCO, the Site includes the two main buildings (both the English Station and Station B buildings), several smaller buildings and all associated structures located on the 510 Grand Avenue parcel of land, as well as the soil, sediment, groundwater and surface water located within the confines of the perimeter of the Site as defined in Exhibit A to the PCO (provided herein as Figure 1-2).

As the Respondent, UI has committed to conducting the investigation and remediation of the Site in accordance with the provisions of the PCO within three years of the Access Date (with the exception of any post-remediation monitoring requirements), unless there is an alternate completion date approved in writing by the Commissioner of Connecticut’s Department of Energy and Environmental Protection (CTDEEP). Per the definition of the Access Date provided in the PCO, this means that the investigation and remediation shall be completed by August 10, 2019. Other general requirements of the PCO include:

- Development of the SOS and associated schedule;
- Implementation of the SOS once approved by the CTDEEP (and if required, any approved supplemental plans);
- Development and submission for review and approval by the CTDEEP an Investigation Report that fully describes the investigatory activities conducted, evaluates the results of analyses conducted for all sample media as identified in the PCO, evaluates remedial alternatives and proposes a preferred alternative;

- Development of plans and specifications for the approved remedial actions, including a list of permits required in order to complete the remedial actions;

- Implementation of the CTDEEP-approved remedial actions;

- Preparation of a report describing, in detail, the remedial actions performed at the Site and the proposed monitoring program designed to determine the effectiveness of the remediation; and

- Implementation and documentation of the results of the post-remediation monitoring activities.

There are two focal points of the investigation and remediation required by this PCO, namely environmental media and building materials. This SOS focuses specifically on the investigation of environmental media. Whereas the general requirements of the PCO were outlined above, the following section provides more detailed information about the objectives associated with the development of this SOS document for environmental media. The PCO is included for reference in Appendix A.

As indicated above, this SOS pertains specifically to the eastern portion of the interior of the English Station Building (the Boiler 1-12 area that until recently was undergoing asbestos abatement to complete the "make-safe" effort discussed below) and shall be considered a companion document to the SOS documents prepared by TRC (dated July 2017 and August 2018) that detail the proposed investigation activities exterior to the buildings and within the western portion of English Station, respectively. At the time of the development of the original SOS in 2016/2017, widespread friable and damaged asbestos conditions within the English Station building did not allow for adequate or safe inspection of the interior in order to develop a sampling plan and therefore, it was determined by all parties that areas of concern (AOCs) 16 (building interior), 17 (building drainage), 18 (loading docks/overhead door areas), and 19 (cooling water intake, distribution and discharge) would be addressed upon completion of the make safe abatement of the area.

In the time between the execution of the original SOS and the publishing of this current SOS (as well as the SOS for the western portion of English Station), an interim plan was developed for removal of asbestos waste/debris as part of a "make-safe" effort. This interim plan was developed to allow for later inspection of floor surfaces for stains or other evidence of spills/releases. The SOS development and interior investigation was originally scheduled to be conducted following the completion of the "make-safe" effort within the English Station building structure. Cold temperatures in January 2018 created conditions in the building that would not allow the "make-safe" effort to continue safely or efficiently, as the Contractor conducting the work was unable to consistently maintain containment temperatures above 32 degrees. As such, there was a delay in the project and safety clearances were not granted in the Boiler 1-12 portion of the English Station building until early summer 2018. The abatement activities inside the high-pressure boiler portions of the building (southeastern portion of the building that contains Boiler 13 and 14) continued through August of 2018. In order to mitigate overall schedule impact, TRC moved the scope of study development associated with the Boiler 1-12 area forward.

1.2 Objectives

The primary objective of this SOS document is to provide a framework for investigation/characterization of the eastern portion of the English Station building interior (low –pressure Boilers 1-12 only at this time), therefore allowing for the fulfillment of the obligations of the PCO. Specifically, the SOS objectives as they relate to environmental media (soil, surface water, groundwater, and sediment located within the perimeter of the Site, as shown on Figure 1-2) include:

- Identifying the existing and potential extent and degree of contamination (defining the three-dimensional extent and distribution of substances associated with each release) while complying with all prevailing standards and guidelines (including, but not limited to Connecticut's Site Characterization Guidance Document (CTDEEP, 2010a).
- Identify non-hazardous and hazardous wastes at the Site.

These objectives will be accomplished by presenting within this document the following:

- A summary of previous investigation efforts conducted by others within the western interior of English Station;

- An updated conceptual site model (CSM) related to the western portions of AOCs 16, 17, 18 and 19; and

- A proposed sampling and analytical program.

In support of all activities outlined in this SOS, data quality objectives (DQOs) will be specified, as well as the quality assurance/quality control (QA/QC) measures to be implemented to meet those DQOs.

2.0 SITE INFORMATION

2.1 Site Location and Description

The English Station Site is located at 510 Grand Avenue in the City of New Haven, Connecticut and consists of approximately 8.9 acres of land on the southern end of an island (Ball Island) located within the Mill River. Between 2000 when the Site was transferred from UI to Quinnipiac Energy, LLC (QE), and 2006 when QE sold a portion of the property to Evergreen Power, LLC (Evergreen) and another to ASNAT Realty, LLC (ASNAT), the Site was divided into two separate parcels. The portion of the Site identified as "Parcel A" (the northern portion) is approximately 3.58 acres in size. Parcel A (Owner ASNAT) is occupied by a portion of a former electrical generating plant, commonly referred to as Station B. Parcel A is not a subject of this SOS, rather the focus is on Parcel B, and more specifically, on the eastern portion of the English Station building interior.

The remainder of the property, identified as "Parcel B", encompasses the southern portion of the Site and is approximately 5.32 acres in size. Parcel B (Owner Evergreen) is occupied by the English Station power generating plant ("the Plant" or "English Station") which, again, is the subject of this SOS. The Site as a whole is bounded to the east, west and south by the Mill River (note that the water-facing sides of the Site are contained by a steel bulkhead) and to the north by Grand Avenue. The parcel boundaries and general Site layout are shown on Figure 1-2.

2.1.1 English Station

English Station is located on the southern portion of the Site and has an approximate footprint of 100,000 square feet. English Station is constructed of brick and concrete with steel reinforcement. The entire structure is supported on driven piles, which supports a 3-foot-thick reinforced concrete mat foundation slab that lies approximately 7 feet below the first floor slab. The northeastern portion of the Plant, which is the subject of this SOS, formerly housed twelve out-of-service low-pressure boilers and a fuel oil pump room. Two large, brick smokestacks are present extending through the roof in the southern portion of the former low-pressure boiler room.

The western portion of the first floor houses various pumps and equipment and also served as the Plant's main entrance. A second floor adjacent to the low-pressure boiler room formerly housed six turbines that were reportedly part of the older, low-pressure boiler system (Ibid.). Two cooling water intakes which directed water from the Mill River into the plant for once through non-contact cooling are located along the western side of the island, adjacent to the Plant. The intakes are addressed in the SOS for the western portion of the Plant. A single reinforced concrete tunnel beneath the mat foundation slab provides the outfall for the low-pressure boiler cooling water is located along the eastern side of the island, adjacent to the Plant.

Two separate rooms in the southeastern portion of English Station previously housed two large, high-pressure boilers and two turbines in the southwestern portion associated with the high-pressure system. Two large, steel smokestacks are present and extend through the roof over both high-pressure boiler systems. An oil and pump room and ash silo are located along the eastern side of the two high-pressure boiler rooms and were likely part of the fuel system that fed the high-pressure boilers. Two additional cooling water intakes for the high-pressure boiler systems are located along the southwestern portion of the island, adjacent to the Plant. Discharge outfalls for the high-pressure boiler cooling water are located along the southeastern portion of the island, adjacent to the Plant.

As indicated above, the area of focus for this SOS is the Boiler 1-12 eastern building interior, as shown on Figure 2-1.

2.1.2 Current Site Conditions

In June 2018, TRC personnel conducted reconnaissance of the eastern interior of English Station. This reconnaissance focused on the following general areas:

- Boiler 1-12 Area;
- Petroleum Storage/Handling Areas (Lube Oil Room, Former Temporary Oil Storage Area, and Fuel Oil Pump Room);
- Boiler Feed Pump Area;
- Skip Hoist Area;
- Forced Draft (FD) Fan Area;

- Motor Rooms (East and West Skip Hoist Mechanical Rooms); and
- Coal Conveyor Area;

At the time of the June 2018 site reconnaissance, exterior investigation activities proposed in the July 2017 Scope of Study had been completed; decontamination and removal of equipment left behind in the Turbine Hall by a previous contractor was complete; removal and off-site disposal of the demolition debris located in the Turbine Hall was complete; removal and off-site disposal of the abandoned bagged asbestos waste had been completed; and the containment system associated with asbestos abatement within the low-pressure boiler area of English Station had been removed based on air clearances. A critical barrier constructed of plywood and polyethylene sheeting remained along the southern wall of the Boiler 1-12 area and the wall separating Condenser Units #7 and #8 from Boilers 13 and 14. This critical barrier segregated the Boiler 13/14 area from the remainder of the building to allow for asbestos abatement work to be completed in the southeastern portion of the building.

Observations made by TRC personnel during Site reconnaissance are summarized in the sections that follow.

Boiler 1-12 Area

Just prior to the date of the Site reconnaissance, interim asbestos abatement activities had been completed in the Boiler 1-12 area. By the date of the reconnaissance, contractors were working to remove a significant scaffolding system that had been erected in support of the abatement activities.

The first floor of the low-pressure Boiler House (those areas not otherwise designated on historical drawings as rooms housing specific operations) was observed to be primarily devoid of any equipment. The floor throughout was generally moist given the infiltration of rainwater into the building through breaches in the roof. The trench drain system throughout the area was easily observed and it was noted that in some locations there were accumulated sediments in the trenches. Oil and other types of staining was also observed in various places throughout the first floor.

The second level of the Boiler 1-12 area is where the twelve low-pressure boilers are located and access to the bases of each boiler can be attained from this level. A small area of oil staining was observed on the second floor (in the vicinity of Boiler 5) on the date of the reconnaissance. The third and fourth levels of the boiler area consist of steel grating and steel diamond plate (respectively) catwalks that allow personnel access to the mid and upper levels of the boilers. The third level was not accessed during the Site reconnaissance given that the metal grate catwalks have been deemed unsafe by a structural engineer.

Petroleum Storage/Handling Areas (Lube Oil Room, Former Temporary Oil Storage Area, and Fuel Oil Pump Room)

All three of these petroleum storage/handling areas are located on the first floor of the Boiler 1-12 area. Of these three rooms, only the lube oil room at the northern end of the building was observed to still house petroleum product. There are aboveground tanks and what appear to be portable totes that contain petroleum products located in this room. Each of these rooms, however, did exhibit significant oil staining on the floors.

Boiler Feed Pump Area

There were historically seven boiler feed pumps housed in the western-most portion of the Boiler House. It was noted during the Site reconnaissance that the pumps are no longer present and only the pump pedestals remain. Other equipment that was previously housed in this area but that were not observed during reconnaissance efforts included air compressors and various other pumps. A bearing water return tank as shown on historical drawings was observed to be present in this area. In addition, floor drains were observed throughout this area, many with missing grates and that were filled with water (likely from rainwater infiltration from breaches in the roof). Localized staining was observed on the floor of the Boiler Feed Pump Area.

Skip Hoists

There are two large metal hoists in the northern portion of the low-pressure Boiler House that were observed during reconnaissance. The hoists were observed to extend to the height of the 5th level of this portion of the building. Based on historical drawings, these hoists brought ash from the bottoms of the boilers up to the tops of the ash bunkers located on the northern face of English Station. There are recessed pits in the first floor in which the skip hoist buckets sit and at the time of the reconnaissance, both pits were filled with water and sediment. The motors and cables associated with these skip hoists are located on the fifth level of the Boiler House.

Forced Draft (FD) Fan Area

The six forced draft fans associated with Boilers 1-12 were observed in the central portion of the Boiler Hall. Significant staining of the floor in this area was observed during the recent site visit and there was oil staining observed on portions of the fans themselves.

Motor Rooms (East and West Skip Hoist Mechanical Rooms)

There are two rooms located on the fifth level of the Boiler House that currently house motors and/or mechanicals associated with the two skip hoists. The cables associated with these systems were observed to be partially covered in oil/grease and there was staining on both pump motors, the floors around both pump motors, and around both control panels.

Coal Conveyor Area

The coal conveyor system located within the Boiler 1-12 area was observed to consist of two rooms on or about the 5th level of the building and the two long conveyor belts that run the length of the Boiler 1-12 House in a north-south direction. The two rooms at the northern end of the Boiler House contain remnant pieces of equipment from the former coal conveyance system that brought coal into English Station from the storage area on Parcel A. Specifically, "Room 1" housed a hoist, conveyor belts and the associated motors. Only the two motors are still located in this room and the former opening for the conveyors that brought in coal from the storage area on Parcel A was observed to be completed walled off with concrete block. There is a second room ("Room 2") located directly below Room 1 and it houses a portion of the two conveyors that run the length of the Boiler House (these portions of the belts sit at a slightly lower elevation than the remainder of the belts exposed on the 5th level). The two motors that drive the conveyor belts that run the length of the Boiler House are located at the southern end of the belt system. There was staining observed on the motors and on the floor areas surrounding the motors.

2.2 Site History

Construction of the English Station Power Plant commenced in 1924, with construction of the coal-fired, low-pressure boiler and turbine areas completed in 1929. In 1948 and 1952 two additional oil/coal-fired, high-pressure boilers/turbines were added to the southern end of English Station, with additional filling of the river to extend the southern Site boundary (Ibid.). Sometime in the mid-1950s to early 1960s, the Plant ceased using coal as a fuel source and was converted to an oil-fired plant.

English Station continued operation until 1992, when it was placed on deactivated reserve status; two additional gas-fired boilers for maintaining interior building temperatures during colder months were added at that time. In addition to the gas-fired boilers, temperature and humidity controls were installed, reportedly to "preserve" the existing equipment such that it could be reactivated, if needed, with minimal maintenance (Ibid.).

From 2008 to 2011, the Site was unused and no longer maintained as suitable for power generation. In 2011, Grant Mackay Company (Grant Mackay) and Classic Environmental, Inc. (Classic Environmental) were hired by the owners of the Site to commence demolition activities, including the removal of scrap metal and structural steel, with the objective of generating enough money to fund further environmental investigation and remediation, including asbestos abatement. This work appears to have been focused on the English Station building on Parcel B. Mishandling of PCB-containing oils, including inaccurate characterization and waste disposal led to a CTDEEP inspection of the Site in February 2012. Based on the potential for tracking and spreading PCB contamination from source areas to other, uncontaminated areas of the Site and the off-site recycling of potentially contaminated steel and metals, the State of Connecticut issued to Grant Mackay and the Site owners a Cease and Desist Order (CDOWSUST 12-001) on February 12, 2012 (Partner, 2015).

When the Cease and Desist Order was issued, demolition or asbestos abatement activities were halted, and equipment owned or leased by Grant Mackay and Classic Environmental was left on-site. In the summer of 2017 UI began a project to construct a clean corridor from the east entrance to facilitate decontamination and removal of the Grant Mackay and Classic Environmental equipment, remove and dispose of the Turbine Hall debris and perform the boiler house "make safe" interim measure abatement work.

2.3 Environmental Setting

2.3.1 Geology

According to the Surficial Materials Map of Connecticut (Stone et al, 1992), the Site is located in an area underlain by fill. According to the 1998 Phase II/III report by GEI Consultants, Inc. (GEI), fill material encountered during their investigation of the Site ranged in thickness from 9 to 16.5 feet and consisted of a variety of granular materials, including loose, poorly sorted sands with fine to medium gravel, moderately dense, slightly plastic silty sands, and anthropomorphic materials including brick, ash, cinders, wood, glass, metal and plastic fragments.

A slightly plastic silt and fine sand layer was reportedly encountered beneath the fill layer and generally ranged in thickness from 5 to 11 feet. Numerous mollusk shells, fine roots and other organic material were observed in this layer. Occasional 1- to 3-inch thick layers of well-sorted and sub-rounded fine to medium sands were observed interbedded with the siltier portions of this strata.

Interbedded fine to medium sand and slightly plastic silts were observed beneath the potential confining layer of slightly plastic silts. This stratum is interpreted to represent a transition from low to medium depositional environment energy, as suggested by the alternating strata types. Both materials are similar to those described in the overlying strata, except that individual layer thicknesses and spacing were greater than those observed in the strata above.

A reddish-brown, well-sorted, medium to coarse sand with less than 10 percent non-plastic fines and up to 15 percent sub-rounded fine gravel is present at approximately 35 feet below ground surface (ftbgs) (GEI, 1998b).

Others who have performed intrusive environmental work at the Site subsequent to the 1998 investigation have confirmed GEI's findings with respect to the presence of fill. In January 2003, AEI prepared a document titled Request for Variance for Widespread Polluted Fill for the

English Station Site and on behalf of QE. In this document, AEI indicated that the materials that comprise the bulk-headed island on which English Station is located are primarily Mill River dredge spoils generated between 1900 and 1936 (prior to environmental laws and controls) to maintain navigable shipping channels. The dredged sand and silt materials that comprise the island were referred to in the 2003 report as “native” only in that they were derived from the adjacent river, however, these dredged materials were subject to pre-dredging impact by various contaminants as a result of discharges to the river from the industries that lined its banks. These spoils were placed upon the native sand and silts of the marsh and tidal flat areas once present in the area (and exposed at low tide) to create the present-day Ball Island.

According to the Bedrock Geologic Map of Connecticut (USGS, 1985), the bedrock beneath the Site consists of New Haven Arkose. This bedrock is described as consisting of reddish, poorly sorted, coarse-grained, sandstone-like sedimentary rock.

2.3.2 Hydrogeology

In general, groundwater behavior beneath the Site is strongly influenced by the action of the tides in the Mill River, which is inferred to be a regional groundwater discharge zone. As the majority of the Site is paved, and therefore largely impervious to precipitation recharge, it is likely that the primary influence on groundwater flow is cyclical in response to the changing river stages (GEI, 1998b).

Shallow groundwater beneath the Site is strongly affected by tidal changes. According to the GEI Phase II/III report, a groundwater mound is evident in the northeastern portion of the Site, possibly resulting from a tidal head breaking through the old bulkhead line at a former intake tunnel. Groundwater flows in a northwesterly direction from this mound. An apparent groundwater sink is located in the central portion of the Site, where groundwater observations made during previous investigations determined that monitoring wells in this area are apparently isolated from tidal influences. The shallow groundwater table in the southern portion of the Site is relatively flat (Ibid.).

Based on the observed difference in groundwater elevations within the shallow and deep monitoring wells during previous investigations, the fine sandy silt horizon beneath the Site may be serving as a confining or semi-confining layer. GEI noted that the deeper aquifer appeared to have an upward gradient, as the head difference from the paired shallow and deep wells was between +1.5 and +2.0. In general, horizontal groundwater flow direction in the deep aquifer appears to be toward the west. GEI also surmised that the hydraulic gradient of the deep aquifer may also be influenced by the tidal stage.

Slug tests performed by GEI during their Phase II/III investigation of the Site identified hydraulic conductivity values of 7.2×10^{-2} centimeters per second (cm/sec), or 204.48 feet per day in the northern end of the Site, and 1.7×10^{-2} cm/sec, or 48.26 feet per day in the southern end of the Site. GEI concluded that the range of determined hydraulic conductivity values was consistent with the published values for the well-sorted medium to medium mixed with coarse sands screened by the wells tested (MW-3 and MW-17S). Using the groundwater data collected and an assumed soil porosity of 0.30, GEI calculated groundwater flow rates in the shallow aquifer beneath the Site as ranging from 6.43 feet per day to 61.34 feet per day and indicated that the average groundwater flow velocity would likely be on the lower end of the range.

To evaluate tidal influence on groundwater, GEI monitored groundwater level fluctuations in several wells on-site and in the Mill River over an 8-hour period during their 1998 Phase II/Phase III investigation. During the monitoring period, the reported tidal range in the river was 5.02 feet between high and low tides. According to the Phase II/III report, groundwater elevations responded most dramatically in the northwestern (MW-1) and southern (MW-16) portions of the Site, with observed changes in groundwater elevations of 1.7 and 2.22 feet, respectively. Lesser changes in elevation were observed in the interior portions (0.97 feet) and the northern half (0.25 feet) of the Site. Lag times, in response to the tide, were reportedly just under two hours at interior and northern portions of the Site, with shorter lag times noted at the southern and northwestern ends of the Site. Based on the observed tidal influences, GEI indicated that a groundwater flow reversal due to the relatively rapid tidal influences at the outer portions of the Site was likely and determined that the overall groundwater flow direction should not be greatly affected by the tide, but the overall groundwater table will rise and fall with the tide (Ibid.).

3.0 PREVIOUS ENVIRONMENTAL WORK

3.1 Previous Environmental Reports

The Site as a whole has been the subject of numerous investigations, cleanups, and remedial actions to evaluate its potential impacts to human health and the environment. These efforts were summarized in detail in the July 2017 SOS and are not reiterated herein. The investigations conducted interior to the English Station building have not been as numerous as those conducted exterior to the building, however, the results of the previous sampling interior to the eastern portion of the building (low-pressure Boiler 1-12 Area only) is summarized briefly below. As appropriate, a more detailed discussion of results as they relate to the specific AOCs that are the focus of this document are included in Section 4.0.

3.1.1 *1999 Asbestos and Hazardous Materials Survey*, GEI Consultants, Inc. (GEI, 1999)

In the fall of 1999, GEI was contracted by TLG Services, Inc. (TLG) to conduct an asbestos and hazardous building survey within the English Station building. The purpose of the survey was to identify materials that would require removal from the building and proper disposal in advance of building demolition activities. Based on the available information at the time, GEI also endeavored to estimate the quantities of hazardous building materials for the purposes of developing bid documents for the eventual demolition of the building. As these estimates are not germane to the current tasks taking place at English Station, these estimates will not be summarized herein.

GEI personnel collected asbestos samples in accordance with the EPA's Asbestos Hazard Emergency Response Act (AHERA) protocols and analyzed the suspect asbestos-containing materials (ACM) using polarized light microscopy (PLM) in combination with point counts. Consistent with the EPA's definition of ACM, materials exhibiting asbestos at 1% by weight were identified as ACM by GEI.

A total of 636 types of suspect ACM were analyzed throughout the entire building, with 164 of the total number of samples collected in the northeastern portion of the English Station building in the area in which boilers 1-12 are located. Thirty-one materials, including floor tiles, floor and other types of panels, pipe coating/wrap, mastics, gaskets, wallboard, glazing, window and door caulks (interior and exterior surfaces), and electric conduit were identified as ACM via laboratory testing. Further, other materials that were not accessible to sampling personnel were identified as suspect ACM based on reviews of information provided to GEI by UI, institutional knowledge, and other lines of evidence.

The hazardous materials survey portion of GEI's 1999 effort was carried out by inspecting all accessible areas of the building to assess building materials, equipment, and sludges/sediments/oils that were known or suspected to contain hazardous materials, examples of which included oil-filled equipment, mercury switches, stained concrete, ash and oil-filled pipes. Over 130 samples of various materials were collected throughout the entirety of the English Station building as part of this survey. Given the host of various materials sampled, various types of sampling equipment and methodologies were utilized, with care taken to decontaminate tools between the collection of samples in order to prevent cross-contamination. Depending on their suspected constituents of concern, these samples were analyzed for one or more of the following: total petroleum hydrocarbons (TPH) via EPA Method 418.1, polychlorinated biphenyls (PCBs) by EPA Method 8082, toxicity characteristic leaching procedure (TCLP) Resource Conservation and Recovery Act (RCRA) 8 metals, volatile organic compounds (VOCs) by EPA Method 8260 and/or semi-volatile organic compounds (SVOCs) via EPA Method 8270. As was the case for the asbestos survey, GEI personnel reviewed information provided to them by UI to develop a list of additional equipment or features that were not accessible for sampling as a means to identify other potentially impacted materials.

Of the total number of hazardous materials samples ("miscellaneous" samples as identified by GEI), 39 were collected in the low-pressure boiler portion of the building. Of those 39 samples, 30 were collected from locations throughout the first floor, three were collected from Boilers 5, 6 and 7 located on the second level, one sample was collected from an air compressor line located at the fourth level, and four samples were collected from the coal conveyor located at the fifth level. The most commonly sampled materials were oils or residual oils in or on various pieces of equipment, concrete chips from equipment pedestals and/or the floor adjacent to oil-filled equipment, and sediments. Other types of miscellaneous samples collected included sludge, ash, slag and oil-stained piping. Each of the 39 samples collected were analyzed for

PCBs. Additionally, 17 samples were also analyzed for VOCs, SVOCs and RCRA 8 metals. Eleven miscellaneous samples were also analyzed for TPH. Ten of the miscellaneous samples exhibited PCBs at concentrations between 1 part per million (ppm) and 10 ppm; three samples exhibited PCBs at concentrations greater than 10 ppm but less than 50 ppm; and one sample exhibited a PCBs at a concentration that exceeded 50 ppm. Sample 10-5-MISC-08 was a sediment sample collected from a trench drain in the eastern portion of the first floor (according to GEI's notes, in an area where drums had been stored) and exhibited a PCB concentration of 4,000 ppm. VOCs were not reported to be present in miscellaneous samples collected from the Boiler 1-12 portion of the building. SVOCs, TPH and metals were detected at various levels in the miscellaneous samples; these results will be discussed in greater detail in Section 4.

Lead testing by GEI was limited to the collection and analysis of painted building materials utilizing the Toxicity Characteristic Leaching Procedure (TCLP) (EPA Method 1311) to determine whether the future building debris with the attached paint would be classified as hazardous waste. These building materials consisted of structural steel, brick, concrete, and wood from wall, ceiling, and/or floor surfaces. Direct testing of paints to determine lead content was not conducted. Given that the method employed by GEI to evaluate LBP is not consistent with today's standards, the results of that sampling will not be summarized herein. A copy of the GEI report tables and figures are included as Appendix B.

3.1.2 *2011 Interior PCB Equipment Survey Results – Oil/Wipe/Paint Chip Samples; Western Side – English Station* (GeoQuest, 2011)

In August and September 2011, GeoQuest personnel conducted a survey of potential PCB-containing equipment remaining in the English Station building. In October of 2011, sampling of the equipment previously identified on the western side of English Station (not in the area covered by this Scope) commenced.

A letter from GeoQuest to the CTDEEP dated December 6, 2011, discusses the October 2011 PCB sampling event. Although the focus of the letter is primarily to convey PCB sample results from samples collected throughout the western portion of the English Station power plant, an associated table also identifies potential PCB sources identified throughout the eastern portion of the building. The table identifies a total of 45 potential PCB sources within the eastern, low-pressure boiler, portion of the building. To date, no laboratory data reporting PCB concentrations for the eastern locations has been identified. It is believed that although possible PCB locations were identified and inventoried, these areas have yet to be sampled for PCB analysis. The letter indicated that in general, most of the equipment that remained at the time in the western portion of the English Station building was determined to be non-PCB-containing. Further, it was stated in the letter that the equipment that was known to contain PCBs would need to remain at the Site until such time that it could be properly handled and that there was equipment that required to be cut open and tested. A copy of the potential PCB source inventory table prepared by GeoQuest is included as Appendix C.

4.0 CONCEPTUAL SITE MODEL

Development of a CSM for the eastern portion of the English Station building requires a thorough understanding of each of the AOCs. Therefore, the portions of each of the four primary AOCs that are the subject of this SOS are discussed below. Due to the fact that AOCs 16, 17, 18, and 19 are large and inclusive of the entire English Station building and the focus of this SOS is limited to the eastern portion, the AOCs have been split into more discrete areas for ease in tracking and evaluating historic and current data. The AOC descriptions are followed by the presentation of the CSM. Table 4-1 presents the CSM for the eastern portion of the English Station building (the low-pressure Boiler 1-12 area only). AOCs identified for the Boiler 1-12 portion of the building are depicted on Figures 4-1 through 4-4. Past investigation locations germane to this SOS are also shown on these figures.

4.1 AOC-16 English Station Interior – Eastern Portion of Building (Boiler 1-12 Area)

4.1.1 AOC-16S – First Floor Lube Oil Room

The Lube Oil Room is located on the first floor of English Station; specifically, at the northern end of the building. As its name suggests, this room was utilized for the storage of various lubricating oils/petroleum products for use throughout the plant. There is little recorded about the history of this AOC, other than what was noted in an equipment decontamination plan prepared by Partner Engineering and Science, Inc. (Partner) of Rocky Hill, CT in 2015. The Partner report indicated that there were leaking drums and "aboveground oil tanks" located in the Lube Oil Room at the time the eastern portion of the plant was under containment in support of asbestos abatement that was taking place in 2011/2012. The report further indicates that the asbestos "bag-out" was conducted through this room and it was unclear as to whether there was additional disturbance to the drums or tanks containing oil as this bag-out occurred. On the date of a recent Site reconnaissance, there were no drums observed in this area, however, there were aboveground tanks observed, as well as smaller containers that appear to be portable totes.

As part of GEI's 1999 investigation of the building interior, five miscellaneous samples were collected within this AOC (identified as 10-5-MISC-10 through 10-5-MISC-12, 10-6-MISC-32, and 10-6-MISC-33). Samples 10-5-MISC-10 through -12 were oil samples collected from the “DTE Oil Tank” (north, central and south). Samples were submitted to the laboratory for PCB analysis. The results indicated that PCBs were not detected in the oil samples at concentrations that exceeded the laboratory reporting limits. Miscellaneous samples 10-6-MISC-32 and -33 consisted of concrete chips that were collected from within the first-floor lube oil room. These samples were also submitted to the laboratory for PCB analysis. The results indicated that the concrete chip samples -32 and -33 exhibited PCB concentrations of 1 ppm and 2 ppm, respectively.

As indicated earlier in the text, in 2011, GeoQuest inventoried various pieces of equipment that were potentially PCB-containing within the eastern portion of the building, however, there is no detailed figure indicating specifically where each inventoried location is within the building. From the descriptions contained in the inventory list and general notes made on a map, it does appear that GeoQuest may have identified two drums, two motors and nine tanks in or in the vicinity of the first-floor lube oil room. As indicated above in the observations section, there are no drums currently located in this AOC.

4.1.2 AOC-16T – Boiler Feed (BF) Pump Area

The Boiler Feed Pump Area is located just to the south of the Lube Oil Room and extends the remainder of the length of the Boiler 1-12 Hall, with a small portion extending to along the southern portion of the Boiler Hall to the eastern extent of English Station. The north/south-running portion of AOC 16-T formerly housed seven boiler feed pumps, two air compressors, a smoot oil pump, a bearing water return tank and ash grate oil pumps. Most of the equipment formerly located in this area has been removed. Historical drawings do not indicate the former presence of equipment in the portion of AOC-16T that extends west to east along the southern portion of the Boiler 1-12 Area.

During GEI’s 1999 interior investigation, a total of 11 miscellaneous samples were collected within this AOC. These samples are identified as: 10-5-MISC-14, 10-6-MISC-23 through 10-6-MISC-28, 10-6-MISC-30, 10-6-MISC-31, 10-15-MISC-53 and 11-5-MISC-111. Of the 11 miscellaneous samples, six consisted of concrete chips (10-6-MISC-24, 10-6-MISC-26, 10-6-MISC-27, 10-6-MISC-30 and -31, and 11-5-MISC-111). These samples were submitted to the laboratory for PCB analysis. The results indicated that none of the concrete chip samples exhibited PCB concentrations above laboratory reporting limits. It should be noted that sample 10-6-MISC-24 was also submitted to the laboratory for TPH analysis, the results of which indicated the presence of TPH at a concentration of 1,416 ppm.

Three samples (10-6-MISC-23, -25 and -28) consisted of oil and/or residual oil collected from three separate locations within the area now designated as AOC-16T. Samples 10-6-MISC-23 and -25 were collected from oils contained within BF pumps 7 and 6, respectively. Sample 10-6-MISC-28 was collected from the "TELLEO Oil Tank" located in the northern portion of the BF Pump Area. All miscellaneous oil samples were submitted to the laboratory for PCB analysis. The results indicated that the samples, with the exception of 10-6-MISC-23, did not contain PCB concentrations above laboratory reporting limits. Sample 10-6-MISC-23 was reported to contain PCBs at a concentration of 2 ppm.

One sample, 10-5-MISC-14, consisted of sediment/sludge collected from what was identified by GEI as an elevator sump located in the southern portion of the north/south-oriented portion of AOC 16-T. This sample was submitted to the laboratory for analysis of VOCs, SVOCs, TPH, leachable RCRA 8 metals (by TCLP), and PCBs. The laboratory analytical results indicated neither VOCs nor PCBs were present in this sample. Three SVOCs, bis(-2 ethyl hexyl)phthalate, fluoranthene, and pyrene were reported to be present at concentrations of 1,606 parts per billion (ppb), 108 ppb, and 101 ppb, respectively. In addition, two metals (leachable cadmium and leachable lead) were reported to be present at concentrations of 0.049 ppm and 0.078 ppm, respectively.

Finally, sample 10-15-MISC-53, identified as an oily sludge, was collected from a holding tank located over the discharge tunnel in this area. This sample was subjected to VOC, SVOC, PCB, and leachable RCRA 8 metals (by TCLP) analyses. The results of the testing indicated that VOCs, PCBs and metals were not present in this sample, however, leachable barium and lead were reported at concentrations of 1.5 ppm and 0.151 ppm, respectively.

Based on the descriptions contained in GeoQuest's 2011 interior survey of potential PCB sources table, it does appear that they may have identified up to 12 items (identified as B-30 through B-41) that may contain PCBs. The pieces of equipment inventoried included pump assemblies, a bearing pump, two BF pumps, multiple pumps, gear motors and gear boxes.

4.1.3 AOC-16U – Skip Hoists

Two skip hoists are located along the northern end of English Station. The hoists were observed to extend to the height of the 5th level of this portion of the building. There are recessed pits in the first floor in which the skip hoist buckets sit. Based on historical drawings, these hoists brought ash from the bottoms of the boilers up to the tops of the ash bunkers located on the northern face of English Station. When full, the buckets would be raised to some elevation below the coal conveyor system and would dump ash into the ash bunkers at the front (northern wall) of English Station. Note that the motors/cables that drive the hoists are located on the fifth level of the building (above Boilers 1-12) and the rooms in which they are located are discussed below in the sections regarding AOCs 16-CC and 16-DD.

There were no samples collected from the first-floor skip hoist area as part of GEI's 1999 Hazardous Materials Survey. One miscellaneous sample (10-13-MISC-48) was collected from the eastern skip hoist motor located on the fifth level which will be discussed below in association with AOC-16CC.

As stated previously, a number of pieces of equipment that may have been PCB-containing were inventoried by GeoQuest in 2011, however, it is unclear if any of the equipment was located within AOC-16U.

4.1.4 AOC-16V – Former Temporary Oil Storage Area

This AOC is located in the north/central portion of the Boiler House (Boilers 1-12), immediately north of the FD Fan Area. Based on the labelling of this area on historical drawings for the facility, it appears that oil/lubricants for equipment was temporarily stored in this area; there was no documentation that provided additional details regarding operations or equipment housed within this AOC, however, significant staining of the floor was observed in this area during the recent Site reconnaissance.

As part of GEI's 1999 Hazardous Materials survey, two miscellaneous samples (10-6-MISC-34 and 11-3-MISC-110), both of which were comprised of concrete chips, were collected from the stained floor identified in this area. Miscellaneous sample 10-6-MISC-34 was submitted to the laboratory for analysis of VOCs, SVOCs, PCBs and leachable RCRA 8 metals (by TCLP).

The laboratory results reported that one SVOC, bis(2-ethyl hexyl)phthalate, was detected at a concentration of 1,946 ppb. This sample was also reported to contain PCBs at a concentration of 5 ppm. No additional compounds were reported to be present in this sample above laboratory reporting limits. Miscellaneous sample 11-3-MISC-110 was submitted to the laboratory for PCB analysis only. The results indicated that PCBs were not present in this sample above laboratory reporting limits.

Based on the descriptions of inventoried potential PCB-containing equipment prepared by GeoQuest as part of their 2011 effort, it is not clear if anything was identified within this AOC.

4.1.5 AOC-16W – Fuel Oil Pump Room

The Fuel Oil Pump Room is located in the southeastern portion of the low-pressure Boiler House. Based on information contained in a Phase I report prepared by GEI in 1998, the boilers in English Station were fuel-oil-fired as opposed to coal-fired as of 1970. As such, it is likely that the equipment formerly located in this room was used to pump fuel oil to the boilers. Significant staining of the floor was observed in this AOC during recent Site reconnaissance.

During GEI's 1999 Hazardous Materials Survey, a total of three miscellaneous samples were collected from this area. Sample 10-5-MISC-04 was comprised of sediment collected from a trench drain located within the Fuel Oil Pump Room. The sample was submitted to the laboratory for analysis of VOCs, SVOCs, TPH, PCBs and total RCRA 8 Metals. The laboratory results reported that neither VOCs nor SVOCs were present in this sample. However, TPH was reported to be present at a concentration of 4,586 ppm, PCBs were detected at a concentration of 4 ppm and three metals including barium, cadmium and lead were reported to be present at concentrations of 0.7 ppm, 0.039 ppm and 0.194 ppm, respectively.

Two concrete chip samples, 10-6-MISC-33 (thought to be mis-labeled as to the location it was collected on Table 4 of GEI's report and mis-labeled on the map as "10-7-MISC-37A") and 10-6-MISC-37, were collected from the Fuel Oil Pump Room. These samples were submitted to the laboratory for PCB analysis. The laboratory results indicated that PCBs were present in sample 10-6-MISC-33 at a concentration of 2 ppm. PCBs were not reported to be present in sample 10-6-MISC-37 at concentrations above laboratory reporting limits.

Based on the descriptions of inventoried potential PCB-containing equipment prepared by GeoQuest as part of their 2011 effort, it is not clear if anything was identified within this AOC.

4.1.6 AOC-16X – Forced Draft Fan Area

This AOC (located in the central portion of the low-pressure Boiler House portion of the building) houses the six FD fans associated with Boilers 1-12, a fan room and a number of floor drains that are connected to the trench drain system within the Boiler 1-12 Area.

There were no miscellaneous samples collected during the 1999 Hazardous Materials Survey conducted by GEI.

Based on the descriptions of inventoried potential PCB-containing equipment prepared by GeoQuest as part of their 2011 effort, it is not clear if anything was identified within this AOC. It is possible that the equipment identified as A-37 through A-43 in the inventory (oil-filled bearings, including those on motors) were located in this area, however, the description as to the locations of each of these is simply, “LL (lower level) eastern side”. The FD Fan Area is the eastern-most area on the first floor likely to have housed this type of equipment.

4.1.7 AOC-16Y – 1st Floor of Boiler House

This AOC captures those areas of the first floor of the Boiler House that are not otherwise designated as AOCs. This AOC is currently largely devoid of equipment and it unclear as to what equipment, if any, had been housed within this AOC in the past. Note that although no evidence of the following was observed during recent reconnaissance, as part of their 1999 interior efforts, GEI referenced two areas of note within the currently-designated AOC-16Y. One area, located in the eastern portion of AOC-16Y was identified as a former drum storage area and the other, located at the southern extent of AOC-16Y, was noted as the storage area for boiler water treatment chemicals. There were small areas of staining observed throughout various portions of this AOC during recent Site reconnaissance.

As part of GEI’s 1999 survey, a total of three miscellaneous samples were collected throughout what is now designated as AOC-16Y (note that the remainder of the miscellaneous samples collected throughout this portion of the building are discussed below in the discussion regarding AOC-17E – the drainage system beneath the low-pressure Boiler House). Two of these three samples, 10-5-MISC-01 and 10-5-MISC-15, were comprised of concrete chips that were collected in from an area identified by GEI as the eastern drum storage area and the boiler water treatment chemical storage room, respectively. These samples were submitted to the laboratory for analysis of VOCs, SVOCs, PCBs and leachable RCRA 8 metals (by TCLP). The results indicated that VOCs and SVOCs were not reported to be present in either sample at concentrations above the laboratory reporting limits. Leachable cadmium was detected in both samples -01 and -15 at concentrations of 0.007 ppm and 0.015 ppm, respectively. Leachable lead was also detected in sample -15 at a concentration of 0.03 ppm. In addition, PCBs were reported to be present in sample -01 at a concentration of 25 ppm.

Sample 10-5-MISC-02 was comprised of sewage sludge collected from a sanitary receptor located in the east/central portion of the first level of the boiler area. This sample was submitted to the laboratory for analysis of VOCs, SVOCs, TPH, PCBs and leachable RCRA 8 metals (by TCLP). Neither VOCs, nor PCBs were detected in the sample above laboratory reporting limits. TPH was reported to be present in the sample at a concentration of 693 ppm, several SVOCs were detected at concentrations ranging from 102 ppb to 555 ppb, and the metals barium and lead (leachable) were present at reported concentrations of 1.1 ppm and 0.026 ppm, respectively.

Based on the descriptions of inventoried potential PCB-containing equipment prepared by GeoQuest as part of their 2011 effort, it appears that one feature, a metal structure with a drain (B-49; perhaps a pump enclosure as noted by GeoQuest personnel), was identified within this AOC.

4.1.8 AOC-16Z – 1st Floor Storage Area

The 1st Floor Storage Area is located in the southeastern portion of the Boiler Hall, just to the north of the Fuel Oil Pump Room. No documentation was available for review to indicate what activities may have been conducted in this area. There were two small areas of oil staining noted on the floor of this AOC during Site reconnaissance.

There were no miscellaneous samples collected during GEI's 1999 Hazardous Materials Survey.

Based on the descriptions of inventoried potential PCB-containing equipment prepared by GeoQuest as part of their 2011 effort, it is not clear if anything was identified within this AOC.

4.1.9 AOC-16AA – Boiler 1-12 Area (Levels 2 through 4)

This AOC encompasses the 2nd level of the Boiler House (a concrete floor on which the 12 low-pressure boilers sit) and the third and fourth levels above it. In addition to the 12 low-pressure boilers that are located in this area, there is also a boiler control room located on the 2nd level of the building (between Boilers 3 and 5). It should be noted that the third level of the Boiler House consists solely of steel grate cat walks that allowed for plant personnel to get in close proximity to key portions of the boilers for inspection and maintenance purposes. There are no areas of chemical storage on the third level, nor are there anticipated to be pieces of electrical equipment that may have housed PCB-oils (note also, that these boiler systems pre-date the use of PCBs). Based on the structural evaluation that was conducted ahead of the "make safe" efforts within English Statin, the steel grates that are present within this third level of the low-pressure Boiler House have been deemed unsafe. The fourth level of the Boiler House consists primarily of diamond-plate steel catwalks that allowed workers to access the upper-most portions of each of the boilers.

As part of GEI's 1999 Hazardous Materials Survey, a total of four miscellaneous samples were collected from both the bottom and top sections of the boilers. Samples 10-7-MISC-44, 10-12-MISC-45, and 10-13-MISC-46 were collected from the second level in the area of Boilers 6 and 7. Samples -44 and -46 were comprised of ash and were submitted to the laboratory for analysis of VOCs, SVOCs, PCBs and leachable RCRA 8 metals (by TCLP). The results indicated that VOCs and SVOCs were not present in the sample -44. There were no VOCs reported to be present in sample -46, however, a number of SVOCs including: bis(2-ethyl hexyl)phthalate, butyl benzyl phthalate, chrysene, di-n-butyl phthalate, fluoranthene, phenanthrene, and pyrene were reported to be present in this sample. Leachable metals, including arsenic and cadmium, were detected in both ash samples. In addition, sample -44 exhibited detections of chromium and lead, and sample -46 exhibited a detection of mercury. Neither ash sample was reported to contain concentrations of PCBs above laboratory reporting limits.

Sample 10-12-MISC-45 was comprised of oil collected from the Boiler firing chamber. The sample was submitted to the laboratory for PCB analysis. PCBs were not reported to be present in this sample above laboratory reporting limits.

Sample 12-2-MISC-126 was collected from oil-stained pipe located adjacent to the top of Boiler 2 at approximately the fourth level of the Boiler House. This sample was submitted to the laboratory for PCB analysis. PCBs were present in this sample at a reported concentration of 1 ppm.

Although not formally documented on a map, it is likely that the second level is the location of the pieces of equipment inventoried by GeoQuest in 2011 that carry the identifications of C-1 through C-22. The equipment includes several valve operator motor and gear boxes, circulator pump motors, boiler controls and a motor. Those pieces of equipment are noted to be located on the “Main Floor – Boiler Room (Old Plant) which would seem to equate to the second level of the low-pressure Boiler House.

4.1.10 AOC-16BB – Coal Conveyor System

The coal conveyor system located within the Boiler 1-12 area was observed to consist of two rooms on or about the 5th level of the building and the two conveyor belts that run the length of the Boiler 1-12 House. The two rooms at the northern end of the Boiler House contain remnant pieces of equipment from the former coal conveyance system that brought coal into English Station from the storage area on Parcel A. Specifically, “Room 1” housed a hoist, conveyor belts and the associated motors. Only the two motors are still located in this room and the former opening for the conveyors that brought in coal from the storage area on Parcel A was observed to be completely walled off with concrete block. There is a second room (“Room 2”) located directly below Room 1 and it houses a portion of the two conveyors that run the length of the Boiler House (these portions of the belts sit at a slightly lower elevation than the remainder of the belts exposed on the 5th level. The two motors that drive the conveyor belts that run the length of the Boiler House are located at the southern end of the belt system.

During the GEI Hazardous Materials Survey, a total of four miscellaneous samples, 10-13-MISC-49 through 10-13-MISC-51 and 10-15-MISC-54, were collected from equipment associated with the coal conveyor. Samples 10-13-MISC-49 and-51 were comprised of residual oil and were submitted to the laboratory for PCB analysis. The results indicated that both samples -49 and -51 contained PCB concentrations of 4 ppm and 3 ppm, respectively.

Sample 10-13-MISC-50 was a concrete chip sample collected from the area of the coal conveyor motor. This sample was submitted to the laboratory for PCB analysis. PCBs were not reported to be present in this sample.

Sample 10-15-MISC-54 was a slag/aggregate sample that was collected from the top of the coal feed bunker for Boiler 2. It was submitted to the laboratory for VOCs, SVOCs, PCBs and leachable RCRA 8 metals (by TCLP). The laboratory results indicated that none of the compounds for which the sample was analyzed were present at concentrations above laboratory reporting limits.

Based on the descriptions of inventoried potential PCB-containing equipment prepared by GeoQuest as part of their 2011 effort, it is not clear if anything was identified within this AOC.

4.1.11 AOC-16CC – East Skip Hoist Mechanical Room

This AOC is located just to the south of the ash bunker on the northern side of the building and adjacent to the eastern-most coal conveyor belt. Based on historical drawings reviewed and observations made as part of the recent reconnaissance, this room houses the motor and cable associated with the skip hoist that shuttled ash from the first floor of the Boiler House to the ash bunker.

Miscellaneous sample 10-13-MISC-48 was collected by GEI personnel as part of their 1999 Hazardous Material Survey. Specifically, this was a sample of residual oil associated with the eastern skip hoist motor. It was analyzed by the laboratory for PCBs and was found to contain PCBs at a concentration of 20 ppm.

Based on the descriptions of inventoried potential PCB-containing equipment prepared by GeoQuest as part of their 2011 effort, it is not clear if anything was identified within this AOC.

4.1.12 AOC-16DD – West Skip Hoist Mechanical Room

This AOC is located just to the south of the ash bunker on the northern side of the building and adjacent to the western-most coal conveyor belt. Based on historical drawings reviewed and observations made as part of the recent reconnaissance, this room houses the motor and cable associated with the skip hoist that shuttled ash from the first floor of the Boiler House to the ash bunker.

There were no miscellaneous samples collected in this AOC by GEI personnel as part of their 1999 Hazardous Material Survey.

Based on the descriptions of inventoried potential PCB-containing equipment prepared by GeoQuest as part of their 2011 effort, it is not clear if anything was identified within this AOC.

4.1.13 AOC-17E – Drainage System Beneath Boiler 1-12 Area

A trench and floor drain system and associated piping is present beneath the majority of the Boiler 1-12 area. The floor and trench drain network in this area is connected to a sump located along the eastern side of the building that ultimately discharges to the open tunnel for the cooling water discharge from the low-pressure boiler system (see AOC-19A).

Six samples associated with the drainage in this area were collected as part of GEI's 1999 interior investigation. Samples 10-5-MISC-03 and 10-5-MISC 05 through 10-5-MISC-09 were sediments collected from trench drains associated with the drainage system beneath the low-pressure Boiler House. These samples were submitted to the laboratory for VOC, SVOC, TPH, PCB and leachable RCRA 8 metals (by TCLP) analysis. The results indicated that VOCs were not present in sediments collected from the drainage system. Several SVOCs including benzo(k)fluoranthene, benzo(b)pyrene, chrysene, bis(2-ethyl hexyl)phthalate, di-n-butyl phthalate and pyrene were reported to be present in samples -03, -06, -07 and -08. Sample -08 was reported to have an elevated concentration of bis(2-ethyl hexyl)phthalate. TPH was reported to be present in samples -03, -05, -06, -07, -08 and -09 at concentrations of 5, 258 ppm; 656 ppm; 12,144 ppm; 2,112 ppm; 668,710 ppm; and 297,924 ppm, respectively. In addition, PCBs were detected in samples -03, -06, -08 and -09 at concentrations of 3 ppm, 19 ppm, 4,000 ppm and 2 ppm.

Based on the descriptions of inventoried potential PCB-containing equipment prepared by GeoQuest as part of their 2011 effort, it is not clear if anything was identified within this AOC.

4.1.14 AOC-18D – Overhead Door to First Floor Boiler Area

An overhead door is present along the northeastern side of English Station, providing direct access into the low-pressure Boiler House. Former Site operations and past abatement/demolition activities may have caused spills or releases of contaminants in this area of the building.

One miscellaneous sample, 10-6-MISC-35, consisting of coal ash, was collected in this area in 1999 by GEI and was submitted to the laboratory for VOC, SVOC, TPH, PCB and leachable RCRA 8 metals (by TCLP) analysis. The results indicated that VOCs were not present in this sample. Several SVOCs including: anthracene, benzo(b)fluoranthene, benzo(a)pyrene, chrysene, fluoranthane, phenanthrene, and pyrene were detected in this sample (the benzo(b)fluoranthene concentration was elevated). TPH was reported to be present at a concentration of 3,388 ppm. Leachable cadmium, lead, and selenium were also detected in this sample at concentrations of 0.027 ppm, 0.087 ppm and 0.01 ppm, respectively. PCBs were not detected above laboratory reporting limits in this sample.

Based on the descriptions of inventoried potential PCB-containing equipment prepared by GeoQuest as part of their 2011 effort, it is not clear if anything was identified within this AOC.

4.1.15 AOC-19A – Cooling Water Intake, Distribution, and Discharge for the Low-Pressure Boiler Systems

A system of large tunnels and large-diameter piping (~36-inches) that withdrew water from the Mill River on the west side of English Station for use in the low-pressure boiler system, is present beneath the floor of the Turbine Hall. Cooling water for the low-pressure boiler system (Boilers 1-12) was withdrawn from the Mill River on the west side of the facility, through Screen Houses #1 and #2 (AOC-16C and AOC-16D) and directed into the west side of the Turbine Hall via two open tunnels. From the terminus of the tunnels, the cooling water was pumped through large diameter piping to the various condensers and equipment present on the first floor of the Turbine Hall. The cooling water was then discharged back into the Mill River on the eastern side of the Site.

There were no miscellaneous samples collected from this AOC as part of GEI's 1999 Hazardous Materials Survey.

Based on the descriptions of inventoried potential PCB-containing equipment prepared by GeoQuest as part of their 2011 effort, it is not clear if anything was identified within this AOC.

4.2 Presentation of the Conceptual Site Model (CSM) and Data Gap Identification

The CSM is presented in table format in Table 4-1. The CSM was prepared on an AOC-specific basis. For each AOC discussed in Section 4, the following information is summarized:

- a brief description of the AOC;
- the known or potential contaminants of concern (COCs);
- whether or not there is evidence of a release within a given AOC;
- known or potential release mechanisms;
- media affected or potentially affected; and
- fate and transport considerations.

It should be noted that not all potential COCs listed for a particular AOC are slated for evaluation during the initial investigation of English Station. Rather, the findings of a detailed field evaluation of conditions in any given area of the interior that is to be conducted as part of this investigation effort will dictate if further sampling for the full suite of potential COCs is warranted and/or there are other samples proposed for collection in other AOCs that will address the presence or absence of these other potential COCs. For example, AOC-16S 1st Floor Lube Oil Room, lists the following COCs:

- PCBs
- ETPH
- Metals
- VOCs

As indicated in Table 5-1, porous media and potentially non-porous media are the only media proposed for sampling within this AOC at this time, so the most appropriate analysis to run would be PCBs. The other constituents listed remain potential COCs for this AOC, but the only way they could impact the environment would be through the floor drain system (evaluated under AOC-17E Drainage Beneath Boiler 1-12 Area), or through other breaches in the floor. Releases from the floor drain system will be evaluated under AOC-17E, which has the same COC list and where sediment and surface water samples are proposed.

5.0 FIELD INVESTIGATION PLAN

5.1 Overall Approach

The overall approach to this investigation takes into consideration two elements; 1) evaluation of potential contaminant sources; and 2) tracking of contaminants through the building. It should be noted that the number and type of samples identified in the Figures and Tables of this document are approximate. There are many potential sources of contamination within the building, but much fewer known or documented sources. Evaluation of potential sources of contamination and the subsequent delineation of identified sources will involve sampling of multiple media types (e.g., porous media, wipe, sediment, surface water, soil). For most of the AOCs identified, it is not possible to specify the exact numbers/types of samples to be collected, and it is likely that some level of additional investigation will be necessary once a better understanding of conditions within the building has been achieved.

Similarly, the locations of the proposed samples are also approximate. Sampling will be tailored to identify and delineate releases inside the building and sample locations will be biased to staining and sources as needed to meet this goal.

With respect to the evaluation of tracking, there are two factors that have been considered in the placement of proposed samples; proximity to potential sources and spatial coverage.

5.1.1 Source Identification

The identification of potential contaminant sources will proceed in a step-wise manner where sampling of equipment and associated residuals (e.g., oils, greases), along with visually impacted supports and/or adjacent floor, wall and ceiling spaces will be completed first. As indicated in previous sections of this Scope, in 2011, GeoQuest personnel inventoried equipment throughout English Station (including the Boiler 1-12 area) that may potentially be PCB-containing. As there has been no record of sample results associated with equipment listed in the inventory for the low-pressure Boiler House identified for review to date, as part of this SOS, TRC personnel will attempt to locate the inventoried equipment and will collect samples accordingly. Additionally, equipment labeled as containing PCBs (at any level), will be considered potential sources of contamination. Sampling will be completed in the vicinity of any such equipment whether or not evidence of a release (i.e., staining) is observed.

5.1.2 Investigation of Drainage Structures

Where evaluation of drainage structures within English Station is concerned, the following approach will be taken:

- Floor drains, piping trenches, trench drains and sumps will be identified through field inspection.
- Floor drains, trench drains and sumps will be further inspected for the presence of sediments and liquids.
- If liquids and/or sediments are identified within the drainage structures discussed above, they will be sampled.
- For piping trenches, sumps and/or trench drains that are constructed of concrete, samples of the concrete will be collected, where accessible and safe to do so. For piping trenches, sumps and/or trench drains that are constructed of steel or other non-porous materials, wipe samples will be collected, again, where safe to do so. Note that there are areas within the building where sampling is proposed, yet obtaining samples from these areas (e.g., the condensers associated with the high-pressure boilers on the western side of the building) may present a significant risk to worker health and safety. Where this situation presents itself, field personnel will take copious notes and provide photo-documentation showing why a particular sample cannot be collected and will make every attempt to collect a sample from an alternative location that allows for data quality objectives to be met. Additional sampling may be conducted prior to or during remediation in areas requiring mitigation of safety hazards.

Any additional sampling (i.e., higher sample density/frequency) would be determined based on the results of the initial sampling effort.

5.1.3 Structures Associated with the Boiler 1-12 Cooling Water System

As indicated in Section 4.1.15, a cooling water discharge tunnel is present beneath the mat foundation slab of the low-pressure Boiler House. This tunnel accepts discharges from the cooling water system beneath the adjacent Turbine Hall and the floor drain and trench drain systems from both the Turbine Hall and the Boiler 1-12 area. The majority of the tunnel is inaccessible on the eastern side of the building as it is deep and below the mat foundation slab and not accessible via pull-panels as in the Boiler 13 & 14 area. Since the tunnel carried cooling water the only source of contaminants to the tunnel is from discharge of the floor/trench drain systems to the tunnel.

Sediment and surface water are present in most visible/accessible sections of the cooling water discharge tunnel located between the Turbine Hall and the 1st Floor of the Boiler 1-12 area. Samples of both sediment and surface water will be collected from the discharge tunnel where accessible. Where contaminants are identified, the surface of the pipe trenches will also be sampled.

5.1.4 Investigation Beneath English Station Floor and Foundation

Detailed drawings and as-builts for English Station indicate that construction of the building includes a steel-reinforced concrete floor underlain by up to approximately seven feet (thickness varies) of interstitial fill material, followed by a thick steel-reinforced concrete building mat approximately 3 feet thick that is supported by numerous piles.

The sampling of the fill material in the interstitial space between the building floor and the building foundation/mat will occur after the results of the contaminant source sampling have been evaluated. This will allow for more focused sampling in areas where impacts have been identified in the concrete above and the potential exists for impacts to have migrated to the underlying interstitial fill materials. This will also allow for sample locations to be planned for proper spatial distribution throughout the first floor.

In light of the construction of the building as indicated above, it is unlikely that materials spilled or released have ended up in the subsurface fill material beneath the concrete building mat given the substantial thickness of this migration barrier. However, should the sampling of the interstitial fill indicate the presence of impacts to that material, plans will be made to sample the building mat foundation.

5.2 Sample Procedures

The following sections provide a description of the approach that will be used to conduct the interior investigation, including a discussion of data quality objectives, sampling methodologies, and QA/QC procedures. Information on proposed sample locations is provided in Table 5-1. Proposed sample locations for each AOC are shown on Figures 4-1 through 4-4.

5.3 PCB Wipe Sampling

5.3.1 Data Quality Objectives for PCB Wipe Sampling

PCB wipe sampling will be conducted as part of the on-site environmental investigation in order to identify possible release areas at the Site. In addition to identifying new on-site release areas, wipe sampling will also aid in verifying previously identified release areas.

5.3.2 Wipe Sampling Methodology

Generally, wipe samples will be collected from non-porous surfaces. However, it may be necessary to wipe sample painted surfaces such as pumps and equipment where staining is observed. If necessary, painted surfaces that are wipe sampled will also be evaluated by collecting a paint chip sample from an area on the same piece of equipment or structure where no such staining is observed. This approach will be used to aid in the evaluation of PCB sources.

All wipe samples will be collected using the standard wipe test as defined at 40 CFR 761.123. Specifically, at each location selected for sampling, a disposable 10 centimeter (cm) by 10 cm template will be affixed to the location and the 10 cm x 10 cm section of the non-porous surface being sampled will be wiped with a gauze pad saturated with hexane. Once the surface is wiped completely, the gauze pads will be placed in clean, laboratory-supplied glass vials, capped and labeled.

5.4 Concrete/Porous Media Sampling

5.4.1 Data Quality Objectives for Concrete/Porous Media Sampling

Evaluation of porous surfaces throughout the interior of English Station will be conducted as a part of the on-site investigation and remedial activities. Though several porous materials may be evaluated, concrete is the most common porous material present throughout the building. The purpose of the porous media sampling will be to identify PCB-contaminated areas of concrete as well as to evaluate tracking of contaminants from source areas. Under the regulations at 40 CFR 761, concrete at the Site that has been contaminated by sources of PCBs at concentrations greater than 50 mg/kg would be considered a PCB remediation waste, as defined at 40 CFR 761.3.

5.4.2 Concrete Sampling Methodology

All concrete samples will be collected in accordance with the procedures described in the EPA Region 1 *Standard Operating Procedure for Sampling Porous Surfaces for Polychlorinated Biphenyls (PCBs)* (EPA, 2011). Each concrete sample will be collected from the surface of the floor to a depth of 1/2–inch into the floor utilizing a hammer-type drill to pulverize the concrete. Clean, dedicated plastic sample spoons will be used to scoop up the pulverized concrete, which will then be placed into properly labeled, laboratory-supplied sample jars and placed in a cooler with ice. The same sampling methodology will be used for sampling other solid media, such as asphalt and wood.

5.5 On-Site Surface Water Investigation

5.5.1 DQOs for Surface Water Samples

Data collected during the surface water investigation are intended to evaluate the current contaminant concentrations in on-site surface water for the purpose of creating a surface water disposal plan. In the case of this Site, surface waters are considered to be any ponded, pooled or sitting water that has collected in on-site structures that are able to retain water (e.g., condenser unit pits, floor drains, manholes, trenches, cooling water intakes and sumps). Surface water samples will be collected in those areas in which sitting water is observed on-site. Surface water analytical results will be used for waste characterization and disposal purposes.

5.5.2 Surface Water Sampling Methodology

Surface water samples will be collected utilizing a dip sampler, a peristaltic pump outfitted with dedicated tubing or directly into the laboratory-provided container. If not collected directly into the laboratory-provided container, the collected sample will be poured or pumped into the appropriate laboratory provided container from the sampling device and placed on ice in a cooler for delivery to the laboratory under proper chain-of-custody protocols.

5.6 On-Site Sediment Investigation

5.6.1 DQOs for Sediment Samples

Data collected during the sediment investigations are intended to evaluate the current contaminant concentrations in sediments for the purpose of ultimately creating a sediment disposal plan. In the case of this Site, sediments are considered as any sediment-like materials located within pits, manholes, floor drains, trenches, cooling water intakes and sumps located throughout the building. Sediment samples will be collected from those areas in which sediments are observed. Sediment sample analytical results will be used for waste characterization and disposal purposes.

5.6.2 Sediment Sampling Methodology

Sediment samples will be collected by means of a spade, shovel, trowel or scoop. The sediment sampling device will be chosen based on the depth of water at each specific sampling location. Once the appropriate sampling device is chosen, a sediment sample will be collected from a location that is representative of a sediment depositional area or in accordance with the site-specific work plan. Sediments will be characterized based on color, grain size, odors and stains. For sediment samples collected for VOC analysis, the sample will be placed directly into the appropriately preserved VOA vials. An aliquot will also be placed in an unpreserved glass container for moisture content analysis. For samples not being analyzed for VOCs, the sample will be transferred from the sampling device into a decontaminated stainless-steel bowl for homogenization. In the bowl, excess water will be decanted using measures that maintain fine sediments within the sample. Once the sample is homogenized, it will be placed in the appropriate laboratory-provided glassware and placed on ice in a cooler for delivery to the laboratory under proper chain-of-custody protocols.

5.7 Data Quality Objectives (DQOs) for Soil Samples

Data collected during the soil investigations are intended to evaluate the current contaminant concentrations for the purpose of creating a soil remedial strategy to complete the requirements of the CO. The number of environmental sampling locations proposed in each

AOC was determined based on previously collected soil data and Site observations (i.e., the presence of areas of staining, cracks in asphalt or concrete and low-lying areas), in combination with an evaluation of likely release mechanisms. Based upon the past use of the property and historic generation of hazardous waste, the property was deemed to be an Establishment as defined in the Connecticut Transfer Act Section 22a-134 and thus, is subject to the requirements of the Connecticut RSRs. The overall quality assurance objective for laboratory analysis of soil samples is to provide a laboratory QA/QC program that is sufficient to ensure that data quality objectives are achieved. The data collected from the property will be subjected to the Reasonable Confidence Protocol (RCP) (CTDEEP, 2010b) as well as additional data quality assessment and data usability evaluations conducted in accordance with the CTDEEP's *Laboratory Quality Assurance and Quality Control Data Quality Assessment (DQA) and Data Usability Evaluation (DUE)* (CTDEEP, 2010c).

5.7.1 Soil Sampling Methodology

The soil investigation activities will include the collection of soil samples using several different methods. Surface and/or shallow soil samples will be collected utilizing a hand/bucket auger, while deeper soil samples will be collected by means of direct-push GeoProbe® Macro-Core methods. In addition, in the event that soils samples need to be collected from beneath an area covered by a concrete surface, a concrete coring machine will be utilized to access sub-slab soils.

A hand or bucket auger may be employed for the purpose of collecting surface or shallow soil samples. Hand or bucket auguring is conducted utilizing a four-inch diameter stainless steel auger bucket with cutting heads which are attached to a stainless steel t-handle with extensions (as needed). Auger holes will be advanced one bucket at a time until the appropriate sample depth is achieved. Once the sample depth is reached, the bucket used to advance the hole will be removed and a decontaminated or clean bucket will be attached, placed in the hole, filled with soil, and then carefully removed. If VOC analysis is to be performed, the associated sample will be collected directly from the bottom of the boring and not from the auger bucket. If not within reach, the sample will be collected directly from the auger bucket or from minimally disturbed material immediately after the auger bucket is emptied.

For the collection of soils from depths greater than that which is practicable with the use of a hand-auger, direct-push sampling methods will engage a GeoProbe® Macro-Core. The Macro-Core sampler is a solid barrel, direct-push sampler equipped with a piston-rod point assembly used primarily for collection of either continuous or depth-discrete subsurface soil samples. A driller will advance the Macro-Core to the desired sample depth, at which time, a discrete sample will be collected from that interval. The Macro-Core will be split open by the driller and the soils contained within will be observed and characterized for amount of recovery, color, grain size, moisture content, odors and stains. All soils will be screened with a PID for volatile vapors being emitted from soils.

Soil samples submitted to the laboratory for VOC analysis will be collected in accordance with EPA Method 5035 and the CTDEEP's *Guidance for Collecting and Preserving Soil and Sediment Samples for Laboratory Determination of VOCs* (February 28, 2006). This method outlines the collection of soil samples (without homogenization and with minimal disturbance) into extraction solvents. Soil samples collected for all other analytical methods will be transferred from the hand-auger or Macro-Core to a dedicated, decontaminated stainless-steel bowl. The soil will then be homogenized by mixing with a dedicated, decontaminated stainless-steel spoon prior to placement in the appropriate laboratory-supplied sample containers. Sample intervals to be homogenized will generally not exceed 6-inches to 1 foot. All samples will be placed on ice in a cooler for delivery to the laboratory under proper chain-of-custody protocols.

5.8 Site Access

In an effort to reduce on- and off-site cross contamination due to personnel and equipment mobilizations, all on-site personnel, subcontractors and equipment that is to be used on the Site will enter and exit the Site from the eastern gate point of access, along the "clean corridor".

5.9 Investigation-Derived Waste (IDW) Management

An investigation-derived waste (IDW) storage area will be established and polyethylene tracking pads will be secured to the asphalt. In addition, on-site personnel, subcontractors and equipment mobilizations will be instructed to avoid or cover (by polyethylene sheeting) areas of observed surface staining.

IDW generated during field investigation activities are anticipated to include used personal protective equipment (PPE), plastic sheeting, and decontamination fluids. IDW will be handled and disposed of in accordance with applicable State and Federal regulations (e.g., 40 CFR 761 and 40 CFR 261).

5.9.1 Decontamination

A worker and equipment decontamination area will be constructed on the Site, likely in an area between the building and IDW storage, and the Site access point. However, the exact location of these areas will be subject to change based on Site conditions at the time of investigation activities. Decontamination procedures are discussed in more detail in Section 5.10.7.

Decontamination solutions generated as a result of cleaning investigation or sampling equipment that may come into contact with hazardous materials and PPE decontamination solutions will be segregated and then collected in U.S. Department of Transportation (USDOT) approved 55-gallon drums and shipped off-site for disposal following any necessary waste characterization by the receiving disposal facility.

5.9.2 Expendable Equipment

Used PPE that has been decontaminated will be collected and disposed of as a nonhazardous solid waste. PPE that cannot be decontaminated will be placed in a separate USDOT approved 55-gallon drum and disposed of in the same manner as the waste in which it has come into contact. Used disposable sample equipment will also be disposed of in the same manner as the waste in which it has come into contact. All used PPE and disposable sample equipment will be disposed of in accordance with all local, state and federal requirements.

All decontamination wastes, PPE, and polyethylene that comes in contact with PCB Remediation Wastes will be disposed of as PCB Remediation Wastes. These wastes will be segregated as to matrix (e.g., aqueous, non-aqueous liquids, or solid materials) and stored in drums or lined containers prior to transport from the Site for disposal.

5.10 Quality Assurance/Quality Control (QA/QC) Procedures

QA/QC procedures are discussed in the following sections. For the purpose of the discussions, the party conducting the sampling is referred to as the environmental consultant while the party conducting the chemical analyses is referred to as the laboratory. The discussion also includes references to the environmental consultant's Project Manager and Field Team Leader and to the laboratory's Project Manager, Section Leader and analyst or technician.

5.10.1 Measurement Quality Objectives

5.10.1.1 Precision

Precision is the agreement among a set of replicate measurements without consideration of the "true" or accurate value (i.e., variability between measurements of the same material for the same analyte). Precision is measured in a variety of ways including statistically, such as calculating variance or standard deviation. Field work and laboratory precision will follow the precision guidelines laid out in the CTDEEP Laboratory Quality Assurance and Quality Control Guidance Reasonable Confidence Protocols (RCP) Guidance Document dated November 2007 and revised December 2010 (CTDEEP, 2010b).

Field precision is assessed through the collection and measurement of field duplicates (one extra sample in addition to the original field sample). Field duplicates will be collected at a frequency of one per twenty investigative samples per analytical parameter for each environmental medium sampled. Precision will be measured through the calculation of relative percent difference (RPD). The resulting information will be used to assess sampling and analytical variability. Field duplicate RPDs must be <30% for aqueous samples and <50% for solid samples. These criteria apply only if the sample and/or duplicate results are >5x the reporting limit; if both results are <5x the reporting limit, the criterion will be doubled.

Laboratory precision will be assessed through the analysis of MS/matrix spike duplicate (MSD) samples and/or field duplicates. MS/MSD samples will be performed at a frequency of one per twenty investigative samples per matrix per parameter. Laboratory duplicate samples will be performed at a frequency of one per twenty investigative samples per matrix per parameter.

5.10.1.2 Accuracy

Accuracy is the closeness of agreement between an observed value and an accepted reference value. The difference between the observed value and the reference value includes components of both systematic error (bias) and random error.

Accuracy in the field is assessed through the adherence to all field instrument calibration procedures, sample handling, preservation, and holding time requirements, through the collection of equipment blanks prior to the collection of samples for each type of equipment being used, and through the use of trip blanks with each shipment of samples for VOC analysis.

Laboratories assess the overall accuracy of their instruments and analytical methods (independent of sample or matrix effects) through the measurement of "standards", materials of accepted reference value. Accuracy will vary from analysis to analysis because of individual sample and matrix effects. In an individual analysis, accuracy will be measured in terms of method blank results, the percent recoveries (%Rs) of surrogate compounds in organic analyses, or %Rs of spiked compounds in MSs and/or MSDs and/or LCSs in all analyses. This gives an indication of expected recovery for analytes tending to behave chemically like the spiked or surrogate compounds. Upon selection of a laboratory for this project, the laboratory will be asked to provide their accuracy control limits.

5.10.1.3 Representativeness

Representativeness is a qualitative parameter which expresses the degree to which data accurately and precisely represent either a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. To ensure representativeness, the sampling locations have been selected to provide coverage over a wide area and to highlight potential trends in the data.

Representativeness in the field is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the work plan is followed, that proper sampling, sample handling, and sample preservation techniques are used, and the use of field screening to allow for the collection of more samples in a specified area.

Representativeness in the laboratory is ensured by using the proper analytical procedures, appropriate methods, and meeting sample holding times.

5.10.1.4 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. "Normal conditions" are defined as the conditions expected if the sampling plan was implemented as planned.

Field completeness is a measure of the amount of (1) valid measurements obtained from all the measurements taken in the project and (2) valid samples collected. The field completeness objective is greater than 90 percent.

Laboratory completeness is a measure of the amount of valid measurements obtained from all valid samples submitted to the laboratory. The laboratory completeness objective is greater than 95 percent.

5.10.1.5 Comparability

Comparability expresses the confidence with which one data set can be compared to another. Field comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the work plan is followed and that proper sampling techniques are used. Maximization of comparability with previous data sets is expected because the sampling design and field protocols are consistent with those previously used.

Comparability in the laboratory is expected due to the use of recognized EPA or equivalent analytical methods and the reporting of data in standardized units.

5.10.1.6 Sensitivity

Sensitivity is the ability of the method or the instrument to detect the contaminants of concern at the level of interest. Project reporting limits (RLs) will be based on the lowest concentration calibration standard for organic parameters and the analysis of a low-level standard for metals analyses, as required by the analytical methods. The laboratory will utilize RCP methods, which should ensure that all laboratory RLs meet the Connecticut RCP and the most stringent levels of the applicable CT RSRs. For samples analyzed for waste characterization purposes, the RLs must meet the RCRA limits for hazardous waste determination (defined at 40 CFR 261.24).

5.10.2 Field Quality Control Samples

Field QC samples will include equipment blanks, field duplicates, MS/MSDs, cooler temperature blanks and trip blanks.

5.10.2.1 Equipment Blanks

Equipment blanks will be collected in order to determine the cleanliness of sample collection equipment. Equipment blanks will consist of pouring analyte-free water over decontaminated sampling equipment and will be used to check for procedural contamination at the Site that may cause sample contamination and to ensure that the decontamination procedure has been adequately carried out. The equipment blank will be collected by pouring laboratory-supplied, high performance liquid chromatography (HPLC)-grade, American Society for Testing and Materials (ASTM) Type II water over the decontaminated sample collection equipment and into the appropriate sample containers. Equipment blanks will be collected from equipment that is used for sample collection. One equipment blank will be collected for each type of equipment used, each day a field decontamination event is conducted. Equipment blanks will be collected at the beginning of the day's sampling event and will accompany the samples collected that day. Equipment blanks will be submitted for the same parameters as the associated sample matrix.

5.10.2.2 Field Duplicates

Field duplicates are an additional aliquot of the same sample submitted for the same parameters as the original sample. Field duplicates will be used to assess the sampling and analytical reproducibility. The procedure for collecting field duplicate samples consists of alternating the collection of the sample between the sample collection bottle and the duplicate bottle. Field duplicates will be submitted at a frequency of one per twenty investigative samples for each sampled medium for all parameters.

5.10.2.3 MS/MSDs

MSs and/or MSDs are an additional aliquot of the same sample submitted for the same parameters as the original sample. However, the additional aliquot is spiked with the compounds of concern. Matrix spikes provide information about the effect of the sample matrix on digestion and/or measurement methodology. MS/MSDs will be submitted at a frequency of one per every twenty investigative samples per matrix for each parameter.

5.10.2.4 Temperature Blanks

Cooler temperature blanks consist of a laboratory-supplied sample container filled with non-preserved water (potable or distilled) and are included in all coolers. The laboratory uses these temperature blanks to ensure that proper preservation of the samples has been maintained during sample shipment. The temperature of these blanks must be 4 º Celsius (C) ±2º to demonstrate that proper preservation has been maintained. The laboratory records the results of the temperature blanks on the chain-of-custody immediately upon receipt of the samples at the laboratory, prior to inventory and refrigeration.

5.10.2.5 Trip Blanks

Trip blank samples will be supplied by the laboratory and will consist of pre-preserved vials containing methanol. Trip blanks samples will be submitted to the laboratory with every cooler containing VOC soil samples and will only be analyzed for VOCs. Trip blanks will be used to evaluate contamination introduced during shipment.

5.10.3 Sample Sequence

An attempt will be made to coordinate a sampling sequence hierarchy from less likely to more likely contaminated locations to reduce the potential for cross-contamination between locations. Additionally, surface water and sediment samples will generally be collected in a downstream to upstream fashion to minimize impacts of water/sediment disturbances on subsequent sampling locations.

5.10.4 Sample Documentation Requirements

5.10.4.1 Field Notes

Field team members will keep a field logbook to document all field activities. Field logbooks will provide the means of recording the chronology of data collection activities performed during the investigation. As such, entries will be described in as much detail as possible so that a particular situation could be reconstructed without reliance on memory.

The logbook will be a bound notebook with water-resistant pages. Logbook entries will be dated, legible, and contain accurate and inclusive documentation of the activity. The title page of each logbook will contain the following:

- Person to whom the logbook is assigned,
- The logbook number,
- Project name and number,
- Site name and location,
- Project start date, and
- End date.

Entries into the logbook will contain a variety of information. At the beginning of each entry, the date, start time, weather, and names of all sampling team members present will be entered. Each page of the logbook will be signed and dated by the person making the entry. All notebooks will have consecutively numbered pages. All entries will be made in permanent ink, signed, and dated and no erasures or obliterations will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark which is initialed and dated by the sampler. The correction shall be written adjacent to the error.

Field activities will be fully documented. Information included in the logbook will include, but may not be limited to the following:

- Chronology of activities, including entry and exit times;
- Names of all people involved in sampling activities;
- Level of personal protection used;

- Any changes made to planned protocol;
- Names of visitors to the Site during sampling and reason for their visit;
- Sample location and identification;
- Changes in weather conditions;
- Dates (month/day/year) and times (military) of sample collection;
- Measurement equipment identification (model/manufacturer) and calibration information;
- Sample matrix (e.g., soil, sediment, surface water, etc.);
- Sample collection methods and equipment;
- Sample depths;
- Whether grab or composite sample collected;
- How sample is composited, if applicable;
- Sample description (color, odor, texture, etc.);
- Sample identification code;
- Tests or analyses to be performed;
- Sample preservation and storage conditions;
- Any field measurements made such as pH, temperature, conductivity, etc.;
- Equipment decontamination procedures;
- QC sample collection;
- Unusual observations;
- Record of photographs;
- Sketches or diagrams; and
- Signature of person recording the information.

Field logbooks will be reviewed on a daily basis by the environmental consultant's Field Team Leader. Logbooks will be supported by standardized forms. Documents that may be included in the project file for the investigations include: field documents, correspondence, photographs, laboratory data, reports, subcontract agreements, authorizations, logs, and sketches.

5.10.4.2 Chain-of-Custody Records

Chain-of-custody records are initiated by the samplers in the field. A chain-of-custody record will accompany the sample from initial sample container selection and preparation at the laboratory to the field for sample containment and preservation and through its return to the laboratory. If samples are split and sent to different laboratories, a copy of the chain-of-custody record will be sent with each sample. The environmental consultant will retain one copy of the chain-of-custody upon relinquishing the sample. The field portion of the custody documentation should include: (1) the project name; (2) signatures of samplers; (3) the sample number, date and time of collection, and whether the sample is grab or composite; (4) signatures of individuals involved in sampling; and (5) if applicable, air bill or other shipping number.

On a daily basis, samples will be transferred to the custody of the respective laboratories, via third-party commercial carriers or via laboratory courier service.

5.10.4.3 Sample Labeling

Each sample collected during field activities will be assigned a unique ID that distinguishes it from samples collected during previous field investigation activities. The sample identification will include information that reflects the general area from which the sample was collected, a sample number, the sample matrix, and reference to the depth interval from which the sample was collected, as appropriate.

The sample identification will first include a two or three letter abbreviation that refers to the consultant/entity collecting the sample. The remainder of the sample identification will include information that reflects the general area from which the sample was collected, a sample number, the sample matrix, and reference to the depth interval from which the sample was collected, as appropriate. For example, a wipe sample collected by TRC from the location identified as number 3 within the confines of AOC-16A as identified on the Site mapping (see

Figures 4-1 through 4-3) would be designated as TRC-AOC16A-WP-3 where the terminology indicates:

TRC:	indicates that TRC is the consultant collecting the sample
AOC16A:	indicates a sample collected from AOC-16A
WP:	indicates a wipe sample
3:	indicates the 3rd sequential sample of this media collected from AOC-16A as part of the current investigation

Where samples will be used to evaluate conditions at more than one AOC, the sample name shall bear the AOC number associated with the primary AOC being evaluated.

Should supplemental investigations be conducted within an AOC already investigated, supplemental samples will simply continue to be numbered sequentially (e.g., TRC-AOC16A-WP-4, TRC-AOC16A-WP-5, TRC-AOC16A-WP-6, etc).

The sample media elements of the nomenclature to be utilized for samples collected as part of the investigation are included as follows:

Sample Media:

WP:	Wipe Sample
CO:	Concrete
AS:	Asphalt
SED:	On-Site Sediment
SW:	On-Site Surface Water
SO:	Soil
GW:	Groundwater

QA/QC samples will also require specific identification and labeling. The following approach will be used when identifying QA/QC samples during the investigation:

- Field duplicate samples will be labeled as blind duplicates by giving them sample numbers indistinguishable from a normal sample.

- Cooler temperature blanks will be spelled out and included on one line of the chain-of-custody.

- Equipment blanks will be spelled out and the associated matrix will be identified (e.g. Equipment Blank, Sediment).

- Trip blanks will be spelled out and will include the date shipped (e.g., Trip Blank - 041618).

- MS/MSDs will be noted in the "Remarks" column of the chain-of-custody.

5.10.5 Sample Handling and Shipping

Appropriate sample containers will be used so no chemical alteration occurs between the collection of samples in the field and the receipt of samples at the laboratory. The sample bottles will be prepared and shipped to the field by the subcontracted analytical laboratory(ies) under the direction of the Laboratory QC Coordinator. The sample bottles will be transported to the Site within a sealed shipping cooler.

Sample containers will be selected to ensure compatibility with the potential contaminants and to minimize breakage during transportation. Sample bottles, holding times and preservation requirements for aqueous, soil and sediment samples are listed on Table 5-2. Other solid samples (e.g., concrete and asphalt) will meet the criteria specified for soil samples.

Sample labels will be filled out at the time of sampling and will be affixed to each container to identify the project name and/or sample location, sample number, sampler's initials, date and time of collection, number of containers per parameter (e.g., 1 of 2, etc.), preservatives added, and analyses requested for the sample. Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a logbook notation would explain that a pencil was used to fill out the sample label because the pen would not function in wet weather.

After the bottles for a given sample location have been filled, they will be immediately preserved and placed in a shipping cooler. Samples will be stored in such a way as to protect them from temperature extremes, light, breakage and water damage. Each glass sample container will be placed in an individual bubble wrap bag before being placed in the cooler.

Field personnel will add bags of crushed ice or ice packs to the shipping coolers as the samples are collected.

Samples will be delivered to the laboratory for analysis as soon as practical after the number of samples and sample containers are sufficient to comprise a shipment, preferably the same day the samples are collected. However, in most cases, surface water, soil, sediment and groundwater samples will be shipped within 24 hours of collection. Samples will be stored in coolers at a temperature of 4º C. During sampling and sample shipment activities, the environmental consultant's Project Manager (or his/her designee) will contact the laboratory daily to provide information about impending shipments.

5.10.6 Sample Custody

Custody is one of several factors that are necessary for the admissibility of environmental data as evidence in a court of law. Custody procedures help to satisfy the two major requirements for admissibility: relevance and authenticity. Sample custody is addressed in three parts: field sample collection, laboratory analysis, and final evidence files. A sample or evidence file is considered to be under a person's custody if:

- the item is in the actual possession of a person;
- the item is in the view of the person after being in actual possession of the person;
- the item was in the actual physical possession of the person but is locked up to prevent tampering; or
- the item is in a designated and identified secure area.

5.10.6.1 Field Custody Procedures

Samples will be collected following the sampling procedures documented earlier in Section 5.3 through 5.8 of this document. Documentation of sample collection is described in Section 5.10.4 of this document. Sample chain-of-custody and packaging procedures are summarized below. These procedures will ensure that the samples will arrive at the laboratory with the chain-of-custody intact.

- The field sampler is personally responsible for the care and custody of the samples until they are transferred or dispatched properly. Field procedures have been designed such that as few people as possible will handle the samples.

- All bottles will be identified by the use of sample labels with sample numbers, sampling locations, date/time of collection, and type of analysis. The sample numbering system is presented in Section 5.10.4.3 of this document.

- Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a logbook notation would explain that a pencil was used to fill out the sample label because the pen would not function in wet weather.

- Samples will be accompanied by a properly completed chain-of-custody form. The sample numbers and locations will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents the transfer of custody of samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage location.

- All shipments will be accompanied by the chain-of-custody record identifying the contents. A minimum of two copies of the chain-of-custody record will accompany the shipment to the laboratory, and copies will be retained by the sampler and placed in the project files. The laboratory will maintain one file copy, and the completed original will be returned to the environmental consultant's Project Manager. A copy of the completed original will be returned as part of the final analytical report.

- Samples will be properly packaged for shipment and dispatched to the appropriate laboratory for analysis, with a separate signed custody record enclosed in and secured to the inside top of each sample box or cooler. Shipping containers will be secured with strapping tape and custody seals for shipment to the laboratory. The custody seals will be attached to the front right and back left of the cooler and covered with clear plastic tape after being signed by field personnel. The cooler will be strapped shut with strapping tape in at least two locations.

- If the samples are sent by common carrier, the air bill will be used. Air bills will be retained as part of the permanent documentation. Commercial carriers are not required to sign off on the custody forms since the custody forms will be sealed inside the sample cooler and the custody seals will remain intact.

- Samples remain in the custody of the sampler until transfer of custody is completed. This consists of delivery of samples to the laboratory sample custodian, and signature of the laboratory sample custodian on chain-of-custody document as receiving the samples and signature of sampler as relinquishing samples.

5.10.6.2 Laboratory Custody Procedures

The environmental consultant's Project Manager or his/her designee will notify the laboratory of upcoming field sampling activities and subsequent sample transfer to the laboratory. This notification will include information concerning the number and type of samples to be shipped, as well as the anticipated sample arrival date. Samples will be received and logged in by a designated sample custodian or his/her designee. The sample custodian is responsible for maintaining sample custody and for maintaining all associated custodial documentation records. Upon sample receipt, the sample custodian will:

- Examine the shipping containers to verify that the custody tape is intact,
- Examine all sample containers for damage (i.e., breakages or leaks),
- Determine if the temperature required for the requested testing program has been maintained during shipment using the cooler temperature blanks and document the temperature on the chain-of-custody records,
- Compare samples received against those listed on the chain-of-custody,
- Verify that sample holding times have not been exceeded,
- Examine all shipping records for accuracy and completeness,
- Determine sample pH (if applicable) of aqueous samples and record on chain-of-custody forms,
- Sign and date the chain-of-custody immediately (if shipment is accepted), note the time that the samples were received and attach the air bill (if applicable),
- Note any problems associated with the coolers and/or samples on the cooler receipt form and notify the laboratory's Project Manager, who will be responsible for contacting the environmental consultant's Project Manager,
- Attach laboratory sample container labels with unique laboratory identification and test, and
- Place the samples in the proper laboratory storage.

Following receipt, samples will be logged in according to the following procedure:

- The samples will be entered into the laboratory tracking system. At a minimum, the following information will be entered: project name or identification, unique sample numbers (both client and internal laboratory), type of sample, required tests, date and time of laboratory receipt of samples, and field ID provided by field personnel.

- The laboratory's Project Manager will be notified of sample arrival.

The completed chain-of-custody, air bills, and any additional documentation will be placed in the final evidence file.

5.10.7 Field Equipment Decontamination Procedures

Reusable sampling equipment which is used to obtain samples for laboratory analysis will be thoroughly decontaminated prior to each use using the following procedures.

1. Wash and scrub with low phosphate detergent (e.g., Alconox) in tap water;
2. Rinse with tap water;
3. Distilled and deionized water rinse;
4. Air dry on clean polyethylene sheeting;
5. Wrap in aluminum foil, shiny side out, for transport (if not being used immediately).

Direct-push Macro-Core shoes which will contact soil will be decontaminated by soap and water wash (Alconox and tap water) and tap water rinse between uses. Drilling equipment which comes into contact with potentially grossly contaminated soil will be steam cleaned before use and between boreholes.

All moveable equipment, tools, and sampling equipment that has contacted PCB Remediation Wastes will be decontaminated prior to leaving the Site. Decontamination procedures will comply with either §761.79(b)(3)(i)(A), §761.79(b)(3)(ii)(A) or §761.79(c)(2).

5.10.8 Data Validation and Reporting

Data validation is the process of reviewing data and associated quality control criteria, and accepting, qualifying, or rejecting it on the basis of quality control criteria. Both field data evaluation and data validation are discussed below.

Appropriate QC measures will be used to ensure the generation of reliable data from sampling and analysis activities. Proper collection and organization of accurate information followed by clear and concise reporting of the data is a primary goal in this project.

5.10.8.1 Data Reporting

For all analyses, the laboratory will report results which are below the laboratory's RL; these results will be qualified as estimated (J) by the laboratory. Results for soil and sediment samples must be reported on a dry weight basis. The laboratory will provide all data in RCP data package format.

5.10.8.2 Field Data Evaluation

Measurements and sample collection information will be transcribed directly into the field logbook or onto standardized forms. If errors are made, results will be legibly crossed out, initialed and dated by the person recording the data, and corrected in a space adjacent to the original (erroneous) entry. Daily reviews of the field records by the environmental consultant's Field Team Leader will ensure that:

- Logbooks and standardized forms have been filled out completely and that the information recorded accurately reflects the activities that were performed.
- Records are legible and in accordance with good record keeping procedures (i.e., entries are signed and dated, data are not obliterated, changes are initialed, dated, and explained).
- Sample collection, handling, preservation, and storage procedures were conducted in accordance with the protocols described in this document, and that any deviations were documented and approved by the appropriate personnel.

5.10.8.3 Analytical Data Validation

Analytical data validation will include procedures within the laboratory and independent of the laboratory.

Data from laboratory analyses will be reviewed by the laboratory prior to release. Prior to being released as final, laboratory data will proceed through a tiered review process. Data verification starts with the analyst or technician who performs a 100 percent review of the data to ensure the work was done correctly the first time. It is the responsibility of the analyst or technician to ensure that the verification of data in his or her area is complete. The data reduction and initial verification process must ensure that:

- Sample preparation and analysis information is correct and complete;
- Results are correct and complete;
- The appropriate Standard Operating Procedures (SOPs) have been followed and are identified in the project records;
- Proper documentation procedures have been followed;
- All non-conformances have been documented; and
- Project-specific requirements have been met.

Following the completion of the initial verification by the analyst or technician, a systematic check of the data will be performed by an experienced peer, Laboratory Section Leader, or designee. This check will be performed to ensure that initial review has been completed correctly and thoroughly. Included in this review will be an assessment of the acceptability of the data with respect to:

- Adherence of the procedure used to laboratory SOPs and any project-specific methods and specific instructions;
- Correct interpretation of data (e.g., mass spectra, chromatographic interferences, etc.);
- Correctness of numerical input when computer programs are used (checked randomly) and numerical correctness of calculations and formulas (checked randomly);

- Acceptability of QC data;
- Documentation that instruments were operating according to method specifications (calibrations, performance checks, etc.);
- Documentation of dilution factors, standard concentrations, etc.;
- Sample holding time assessment; and
- Nonconforming events have been addressed by corrective action as defined on a nonconformance memo.

A third-level review will be performed by the Laboratory's Project Manager before results are submitted to the environmental consultant. This review serves to verify the completeness of the data report and to ensure that project requirements are met for the analyses performed. The items to be reviewed will include:

- Results are present for every sample in the analytical batch or reporting group;
- Every parameter or target compound requested is reported;
- The correct units and correct number of significant figures are utilized;
- All non-conformances, including holding time violations, and data evaluation statements that impact the data quality, are accompanied by clearly expressed comments from the laboratory; and
- The final report is legible, contains all the supporting documentation required by the project, and is in either the standard format or in the client-required format.

A narrative to accompany the final report will be finalized by the laboratory's Project Manager. This narrative will include relevant comments, including data anomalies and non-conformances.

The environmental consultant will be responsible for performing an independent validation of the analytical data. The data validation will be performed by a person with prior data validation experience in accordance with the CTDEEP's Laboratory Quality Assurance and Quality Control Data Quality Assessment and Data Usability Evaluation (DQA/DUE) Guidance Document dated May 2009 and revised in December 2010 (CTDEEP, 2010c).

Upon completion of the validation, a report will be prepared. This report will summarize the samples reviewed, elements reviewed, any non-conformances with the established criteria, and validation actions (including data qualifiers).

6.0 INVESTIGATION SUMMARY REPORT

Following the completion of the studies described herein, an Investigation Summary Report will be prepared. The report will include the following:

- A detailed description of the investigation performed;
- Identification of the type, quantity and location of non-hazardous and hazardous wastes or other hazardous materials on the Site;
- A definition of the extent and degree of contamination;
- An evaluation of remedial action alternatives that address the impacts relative to future industrial/commercial Site use, considering the following:
    - RSR I/C DEC and I/C VC for all contaminants (other than PCBs);
    - For PCBs, for direct exposure outside the buildings, compliance with 40 CFR Part 761 and with the inaccessible soil provisions of §22a-133k-2(b)(3) of the RSRs;
    - For PCBs, for direct exposure inside the buildings, compliance with the high occupancy standards in 40 CFR Part 761; and
    - For PCBS, for direct exposure under the buildings, compliance with the more stringent of the high occupancy standards in 40 CFR Part 761 and the inaccessible soil provisions of §22a-133k-2(b)(3) of the RSRs; and
    - The RSR PMC provisions, for both PCBs and for releases into fill (the Fill Variance exempts the PMC provisions with respect to the fill itself).
- A schedule for performing each alternative;
- A list of permits and approvals required for each alternative; and
- A preferred alternative from among those evaluated and justification for its selection.

Finally, the report will include a detailed program and schedule to perform the preferred remedial actions, including the preparation of required permit applications and obtaining the associated permits and approvals needed to implement the actions.

7.0 REFERENCES

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FIGURES

TABLES

APPENDIX A

PARTIAL CONSENT ORDER COWSPCB 15-001

APPENDIX B

TABLES AND FIGURES EXCERPTED FROM 1999 GEI ASBESTOS AND HAZARDOUS MATERIALS REPORT

APPENDIX C

2011 GEOQUEST INTERIOR SURVEY OF POTENTIAL PCB-CONTAINING EQUIPMENT SUMMARY TABLE