Appendix C

QUALITY ASSURANCE PROJECT PLAN

FOR REMEDIATION OF SOIL & GROUNDWATER

Former McCandless Petroleum Site
2231 Delsea Drive
Franklinville, New Jersey

NJDEP SRP PI# 008192

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FOR TREATING THE FORMER SOURCE AREA
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FORMER McCANDLESS PETROLEUM SITE
2231 DELSEA DRIVE
FRANKLINVILLE, NEW JERSEY
NJDEP SPR PI# 008192

1.0 INTRODUCTION

This document represents the Quality Assurance Project Plan (QAPP), which is an Appendix to the Remedial Action Workplan for treating impacted soil and groundwater at the former McCandless Fuels facility located at 2231 Delsea Drive in Franklinville (Franklin Township), Gloucester County, New Jersey (hereinafter referred to as "the Site"). This QAPP describes the field and laboratory Quality Assurance and Quality Control measures to be implemented during the project.

1.1 Project Scope and Complexity

The scope of the project to be conducted under this QAPP is the remediation of residual polychlorinated biphenyls (PCBs~~), total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), and base/neutral/acid compounds (BNAs), collectively referred to as contaminants of concern (COCs) hereinafter,~~ in soils and groundwater at the Site. The approach to the remediation involves:

- Excavating and disposing of overburden unsaturated soil containing elevated concentrations of PCBs, as well as limited quantities of underlying saturated soils with elevated PCBs remaining (if any) following the *in-situ* treatment; and

- Pre- and post-excavation sampling will be performed to confirm compliance in the case of removal actions.

As part of the remedial action, some near surface soils (0-3' bgs) that exceeds NJDEP soil clean-up standards will be excavated and consolidated for disposal. In some cases, the deeper "hot-spot" soils will also be excavated, consolidated and treated/disposed.

1.2 Site Remediation Strategy

The remedial objectives for the Site are subject to location-specific conditions onsite, as determined by post treatment Performance Monitoring Samples collected by Resource Control Consultants in between 2010 and 2016. The remedial activities include strategic hot-spot excavation of PCB contaminated soils

with concentration equal to and greater than the approved Risk Based Disposal Application alternate cleanup goal, establishment of an engineering control (TSCA compliant cap) above a 3-4' buffer of clean soils, and establishment of institutional controls (deed notice, Remedial Action Permits (RAPs) for soil and groundwater and Classification Exception Area (CEA) for groundwater. The RAPs will ensure biennial inspection and certification that the engineering controls remain in place and effective and that groundwater quality is monitored.

2.0 DATA QUALITY OBJECTIVES

Data Quality Objectives (DQOs) are based on the concept that various uses of data collected during the remedial activities require varying degrees of data quality. Data quality is defined as the degree of certainty in a data set with respect to precision, accuracy, representativeness, completeness and comparability (PARCC). DQOs are qualitative and quantitative statements specifying the required quality of data necessary to support remedial activities. These activities include pre-design/pre-startup analysis; post-treatment performance monitoring; and post-remediation confirmatory sampling. A description of Precision, Accuracy, Representativeness, Completeness and Comparability (PARCC) parameters is described below.

Precision is a measure of agreement among individual measurements of the same property, usually under prescribed similar conditions. Precision is best expressed in terms of the standard deviation. Various measures of precision exist depending upon the "prescribed similar conditions".

Accuracy is the degree of agreement of a measurement (or an average of measurements) with an accepted reference or "true value". Accuracy is one estimate of the bias in a system.

Representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition.

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected to be obtained under correct normal conditions.

Comparability expresses the confidence with which one data set can be compared to another data set.

It is the responsibility of the field team to collect representative and complete samples. It is the responsibility of the analytical laboratory to analyze these samples using accepted protocols resulting in data that meet PARCC standards.

The categories of data quality to be utilized during the remediation and post closure monitoring of the subject site are consistent with those outlined in the USEPA Guidance document entitled *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA*, dated October 1988, and are described below.

- DQO Level 1 - Field Screening Utilizing Portable Instrumentation: Data used for site health & safety monitoring and field screening during site characterization activities. The data generally determines the presence or absence of certain constituents and is generally qualitative rather than quantitative. Field screening data provides the lowest data quality.

- DQO Level 2 - Field Laboratory Analysis: Data used for field screening during site characterization activities, evaluation of remedial alternatives, engineering design and monitoring during implementation of alternatives. The data generally determines levels of certain constituents relative to a calibration standard and is generally qualitative or quantitative.

- DQO Level 3 – Engineering Level Data: Data used for site characterization, risk assessment, evaluation of alternatives, engineering design and monitoring during implementation of alternatives. The data is quantitative and is generated using EPA analytical laboratory procedures, however, it does not include full Contract Laboratory Protocol (CLP) documentation.

- DQO Level 4 - Laboratory Analysis: Data used for risk assessment, evaluation of alternatives and engineering design. The data is quantitative and is generated using EPA analytical laboratory procedures. All analyses require full Analytical Services Protocol (ASP)/CLP analytical protocols including Data Usability Summary Reports (DUSR). Most the data generated during the Site Investigation will be DQO Level 4.

- DQO Level 5 – Non-Standard Special Analytical Services: Data for use when analysis by non-standard procedures is required to obtain specific or lower detection limits or analyses are not of a nature typically performed under the CLP Routine Analytical Service (RAS) Program.

DQOs have been developed for the tasks outlined in the Work Plan. During the remedial action process, it is anticipated that DQO Levels 1 and 4 will be utilized.

DQO Level 1 data (field screening) will be generated during the remedial implementation and monitoring activities including: screening of soil samples; health and safety monitoring; and collection of groundwater field parameters.

DQO Level 4 data (laboratory analysis) will be generated during activities relating soil and groundwater sampling and analysis.

3.0 SELECTED LABORATORIES

Laboratory	Address	NJDEP Laboratory ID#
Test America	777 New Durham Road Edison, NJ 08817	12028

4.0 PROJECT CONTACTS

QAPP Responsibility	Name	Affiliation	Phone
Overall Project Coordination	Timothy Fisher	Antea Group (formerly Delta Environmental Consultants, Inc.)	(914) 495-9935
Sampling Activities	Jared Levine	Antea Group	(609) 707-7166

5.0 ANALYTICAL METHODS/QUALITY ASSURANCE SUMMARY TABLE

Parameter	Matrix	Purpose	Number of Samples	Frequency	Field / Trip Blanks	Duplicates	Analytical Method	Container	Preservation	Maximum Holding Time
PCB	Soil	Post-Excavation Confirmatory Sampling	90	One-Time Sampling	N/A	5	8082	Glass; number and capacity to be determined by laboratory	Cool 4° C	14 days
TPH	Soil	Post-Excavation Confirmatory Sampling	90	One-Time Sampling	N/A	5	418.1 Mod	Glass; number and capacity to be determined by laboratory	Cool 4° C	14 days
BNA	Soil	Post-Excavation Confirmatory Sampling	23	One-Time Sampling	N/A	2	8270C + 15	Glass; number and capacity to be determined by laboratory	Cool 4° C	14 days
VOC	Soil	Post-Excavation Confirmatory Sampling	23	One-Time Sampling	N/A	2	8260B + 10	(1) to (3) EnCore™ Samplers or (3) 40-ml Glass, Teflon-lined septum per sample	Cool 4° C, Sodium Bisulfate and Methanol if 40-ml Glass used.	48-hour extraction if using EnCores™; 14 days

Footnotes:

(1) Dissolved oxygen, pH, temperature, redox potential, and specific conductance

6.0 SAMPLING METHODS

In accordance with N.J.A.C. 7:26E-2.1(a) 14, sampling methods, sample preservation requirements, sample handling times, decontamination procedure for field equipment, and frequency for field blanks, field duplicates and trip blanks will conform to applicable industry methods such as those specified in the NJDEP Field Sampling Procedures Manual dated August 2005.

6.1 Sample Collection

Based on the fact that invasive, subsurface work is necessary for implementation of the RAW (i.e. sampling, installation of monitoring wells and injection points, etc.), appropriate sampling technologies will be utilized that are consistent with the subsurface conditions at the site. The use of mechanized drilling equipment to advance boreholes is anticipated. Where sample collection is necessary, all sampling techniques employed will be in accordance with the Field Sampling Procedures Manual. The specific groundwater sampling techniques will be dictated by previous findings during the remedial investigations and treatment phases of the project. A multitude of NJDEP-approved techniques may be employed, including but not limited to the use of discrete samplers on drilling equipment or the use of centrifugal, submersible, or bladder pumps. Regardless of sampling technique, the following general procedures will be followed.

6.2 Containers

Soil samples collected for VOC analysis will be collected either by use of EnCore™ samplers and submitted to the laboratory for extraction within 48 hours of sampling, or by using a coring device to collect and transfer a weighed aliquot of soil into pre-weighed 40-milliliter (ml) glass vials with Teflon padded lids, that contain sodium bisulfate or methanol.

Soil samples collected for PCB analysis will be transferred from the sampling device (presumably a split spoon, Macrocore™ sampler or backhoe bucket) using a decontaminated stainless steel or dedicated plastic disposable trowel and placed in clean glass bottles of varying capacities, as provided by the laboratory.

Groundwater samples for VOC analysis will be collected in 40 ml-glass vials that have lids fitted with a Teflon pad for sealing the cap. The groundwater samples will be taken without air space or bubbles at the top of the vial that may cause volatilization.

Groundwater samples for BNA and PCB analysis will be collected in 1-Liter (L) clean amber glass bottles provided by the laboratory. The number of bottles required for each analysis will be determined by the laboratory.

Dependent on the required sampling methodologies, samples to monitor field parameters will be collected and analyzed in a clean plastic container with an opening large enough to accommodate the instrument probes, or in-line from a flow-though cell.

6.3 Labeling

Samples will be labeled in accordance with the naming convention developed based on Performance Monitoring Point network. After a sample container has been filled, the container will be sealed and labeled with an identification number and pertinent information.

The ID number is the minimal information that must be written on the sample containers. Other pertinent information typically includes the date and time of sample collection, the analytical method to be applied, the chain-of-custody recorder, and the initials of the person that collected the sample.

All containers will be properly labeled by using a permanent marker or a ballpoint pen. Samples for a certified fixed-based laboratory will be labeled for proper identification. Sample labels will accompany the physical samples to the laboratory. The sample label will be disposed of with samples.

6.4 Sample Storage In The Field

All samples collected under the investigation proposed in this section will be placed in a shuttle cooled to and maintained at 4^{o} Celsius, and shipped under chain-of-custody to a NJDEP-certified laboratory for analysis.

6.5 Sample Holding Times

The sample holding time starts as soon as the sample has been collected. Consequently, all samples will be shipped in a shuttle cooled to 4^{o} Celsius and delivered to a NJDEP-certified fixed-base laboratory as expeditiously as possible.

6.6 Sample Delivery

Samples for NJDEP-certified fixed-based laboratory analysis will be shipped to a fixed-based laboratory within 24 hours under chain-of-custody. For the fixed-based laboratory, either a commercial shipping company will deliver the samples or project personnel will deliver them.

7.0 FIELD INSTRUMENT CALIBRATION AND PREVENTATIVE MAINTENANCE

During the course of this investigation, soil samples and groundwater monitoring point headspaces may be screened with a photoionization detector (PID) in the field. A maintenance, calibration, and operation program will be implemented to ensure that routine calibration and maintenance is performed on all field instruments. Trained team members will perform scheduled calibration, field calibrations, checks, and

instrument maintenance prior to use each day. Additionally, calibration will be checked as necessary to ascertain that proper measurements are being taken.

Team members are familiar with the field calibration, operation, and maintenance of the equipment, and will perform the prescribed field operating procedures outlined in the operation and field manuals accompanying the respective instrument. Field personnel will keep records of all field instruments calibrations and field checks in the field logbooks. Calibration information recorded in field logbooks will include date, time, instrument model and serial number, a description of calibration or field check procedure, and any instrument deviations.

If on-site monitoring equipment should fail, the Site Manager will be contacted immediately. Replacement equipment will be provided or the malfunction will be repaired in a timely fashion.

8.0 CHAIN OF CUSTODY PROCEDURES

Once the samples have been collected, sealed, labeled, and placed in a shuttle cooled to 4^{o} Celsius, they are put in the custody of the person who collected the samples. The person having custody of the samples is responsible for ensuring that the samples are protected and are not tampered with or altered in any way. When the samples are transferred to the custody of another person, that person assumes responsibility for the samples. The samples must always be in the possession or control of the "responsible person" (*i.e.*, the person having custody of the samples).

Information typically included on a chain-of-custody record is sample identification, the date and time the sample was collected, the type and volume of the sample container, the type of matrix (soil, groundwater, or sediment), the number of samples, and the analyses to be performed on each sample. Each time responsibility for the samples is transferred from one person to another, the person relinquishing responsibility and the person accepting responsibility for the samples are required to sign the chain-of-custody and note the date and time that the transfer occurred. The chain-of-custody record always remains with the samples listed on the record until a fixed-based laboratory accepts the samples. Control of the samples is maintained by placing custody seals on the sample container. When shipping samples in a shuttle, the chain-of-custody is placed inside the chest along with the samples, the chest is taped closed with duct tape or boxing tape, and custody seals are placed across the opening and the tape.

Upon receipt by the fixed-base laboratory, the laboratory assumes responsibility for the samples. The laboratory logs in the samples and assigns unique laboratory identification to each sample submitted under the chain-of-custody. The original chain-of-custody remains with the samples until such time that the analytical data package for the samples compiled, at which time the original chain-of-custody is included in the laboratory deliverable.

9.0 LABORATORY SAMPLE STORAGE PROCEDURES

Upon receipt of coolers containing samples, an initial inspection of the sample shuttle and associated samples will be performed for signs of damage; the presence of custody seals, air bills or air bill stickers; and a chain-of-custody. Laboratory personnel will check sample containers for damage and appropriate volume, container type, and preservation for the proposed analysis, and will record broken or damaged containers, or samples that are not in the proper container on a sample receipt log. Laboratory personnel will then measure the temperature of the incoming samples, record the temperature on the chain-of-custody, and document any samples outside of the acceptable temperature range. Once an initial inspection of the coolers has been completed, samples will be logged into the laboratory's LIMS system. To mitigate sample cross contamination, laboratory personnel will tighten the lid on every sample bottle and remove any sample residue from the exterior surface. If the sample bottle has residue that is not removable, it will be placed in a sealable bag to eliminate any potential contact with other samples. Samples will be maintained in sample storage refrigerators, where the temperature is maintained at 4^{o} Celsius and is monitored and recorded daily.

10.0 LABORATORY DATA DELIVERABLE FORMATS

In accordance with NJDEP regulations pertaining to sites regulated under the NJDEP Site Remediation Program (SRP), samples analyzed for the Site COCs will be presented in Reduced Data Deliverable format, as well as electronically in NJDEP HAZSITE format.

Field Parameters will be entered on field data sheets by field personnel and presented in the associated project deliverable.