APPENDIX H
QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN (QAPP)

FOR THE

SITE MANAGEMENT PLAN

FOR
FORMER COLUMBIA SMELTING
A.K.A REDHOOK RECREATION AREA
BALL FIELDS 5 – 8 AND BALL FIELD 9

Red Hook Recreation Area Ball Fields 5 – 8 and Ball Field 9
Brooklyn, New York

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1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) presents the organization, objectives, planned activities, and specific quality assurance/quality control (QA/QC) procedures associated with the Site Management Plan (SMP) for the New York State Department of Environmental Conservation (NYSDEC) Site No. 224231 at the Red Hook Recreation Area Ball Fields 5 – 8 and Ball Field 9 (hereinafter referred to as the "Site"), Brooklyn, New York.

The Plan describes specific protocols for sample handling and storage, chain-of-custody, laboratory analysis, and data handling and management that will be implemented by the Owner's Representative conducting the field sampling and the laboratory responsible for the sample chemical analysis. Preparation of the Plan was based on EPA Quality Assurance Project Plan guidance documents, including:

- *EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5, March 2001), and*
- *Guidance for Quality Assurance Project Plans (EPA QA/G-5, December 2002).*

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

The NYSDEC Project Manager assigned to the Site and identified in the SMP will be responsible for reviewing submissions and overseeing project activities on behalf of the NYSDEC.

A qualified person that works for the Owner's Representative will serve as the Project Manager and will coordinate and manage the Site sampling, laboratory sample analysis program, data reduction, data validation, and reporting. The Project Manager will report directly to the Owner and the NYSDEC Project Manager.

A qualified person that works for the Owner's Representative will serve as the Project QA Officer to insure that the QAPP is implemented and oversee data validation. The Project QA Officer will conduct audits and provide QA/QC technical support for the sampling and analytical program. The Project QA Officer is independent from the collection of samples from the site and the laboratory data generation activities. In general, the QA Officer will be responsible for reviewing and advising on all QA/QC aspects of this program. The names and resumes for the Project Manager and Project QA Officer shall be provided to NYSDEC for review prior to the implementation of any sampling under the QAPP

A qualified person that works for the Owner's Representative will serve as the Field Team Leader will have overall responsibility for the completion of the field activities in accordance with the QAPP, and will serve as the communication link between the field team, subcontractors, and Project Manager. All other field staff will work with and report directly to the Field Team Leader and be responsible for understanding and implementing the QAPP requirements as they relate to their duties (e.g., sample collection, field instrument operation and calibration, field notes).

Laboratories used for the sample chemical analyses will be New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratories for the appropriate categories of sample analyses. The Laboratory Project Manager will communicate directly with the Project Manager regarding the project QA requirements, sample container order, and sample analytical results and reporting. The laboratory will be responsible for adhering to applicable requirements of this QAPP and providing all sample containers, sample couriers/shipment, field blank water, trip blanks, shipping sample coolers, and laboratory sample analysis documentation.

3.0 QUALITY ASSURANCE OBJECTIVES FOR DATA MEASUREMENT

The overall QA objective is to develop and implement procedures for sample collection and analyses which will provide data with an acceptable level of accuracy and precision.

The purpose of this Section is to define the QA goals required to meet the Data Quality Objectives (DQOs) of the project. QA goals for accuracy, precision, and sensitivity of analyses; and completeness, representativeness, and comparability of measurement data are established in the following sections.

The sampling and analysis program is summarized in Tables 1 through 2.

3.1 Accuracy, Precision, and Sensitivity of Analyses

The fundamental QA objective with respect to the accuracy, precision and sensitivity of analytical data is to meet the QC acceptance criteria of each analytical protocol. Laboratory analytical parameters and methods are listed in Tables 1 and 2.

The method accuracy (percent recovery) for Site samples will be determined by spiking selected samples (matrix spikes) with representative spiking compounds as specified in the analytical methods. Accuracy will be reported as the percent recovery of the spiking compound(s) and will be compared to the criteria specified in the appropriate methods.

The method(s)' precision (reproducibility between duplicate analyses) will be determined based on the analysis of field duplicate samples, the duplicate analysis of MS samples for organic parameters, and duplicate sample analyses for inorganic parameters. Precision will be reported as relative percent differences (RPDs) between duplicate analyses; acceptance criteria will be as specified in the appropriate analytical methods.

3.2 Completeness, Representativeness, and Comparability

A completeness requirement of 90 percent will be targeted for the sampling program (see below for a definition of completeness).

Analytical methods selected for this study are consistent with those used for previous studies (if applicable) to assure comparability of the data. All standards used by the laboratory will be traceable to reliable sources and will be checked with an independent standard.

The QA objectives are defined as follows:

- ***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, and through the collection of equipment blanks prior to the collection of samples for each type of equipment being used (e.g., split spoons, groundwater sampling pumps).

  The laboratory will assess the overall accuracy of the 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 blank results, the percent recovery (%R) of surrogate compounds in organic analyses, or %R of spiked compounds in matrix spikes (MSs), matrix spike duplicates (MSDs) and/or laboratory control samples (LCSs). This gives an indication of expected recovery for analytes tending to behave chemically like the spiked or surrogate compounds.

- ***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.

  Precision in the field 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 matrix per analytical parameter, with the exception of the TCLP parameters and parameters associated with wastewater samples. Precision will be measured through the calculation of relative percent differences (RPDs). The resulting information will be used to assess sampling and analytical variability. Field duplicate RPDs must be $\leq$ 30 for aqueous samples. These criteria apply only if the sample and/or duplicate results are >5x the quantitation limit; if both results are $\leq$ 5x the quantitation limit, the criterion will be doubled.

  Precision in the laboratory is assessed through the calculation of RPD for duplicate samples. For organic water analyses, laboratory precision will be assessed through the analysis of MS/MSD samples and field duplicates. For the inorganic analyses, laboratory precision will be assessed through the analysis of matrix duplicates and field duplicates.

- ***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.

- ***Representativeness*** is a qualitative parameter that 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. In addition, field duplicate samples will provide an additional measure of representativeness at a given location.

  Representativeness is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the Work Plans and QAPP are followed and that proper sampling, sample handling, and sample preservation techniques are used.

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

- ***Comparability*** expresses the confidence with which one data set can be compared to another. Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the Work Plans and QAPP are 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 is dependent on the use of recognized EPA or equivalent analytical methods and the reporting of data in standardized units. Laboratory procedures are consistent with those used for previous sampling efforts.

4.0 SAMPLING PROGRAM

All monitoring and sampling activities will be performed in accordance with the SMP. Environmental media sampling will include soil sampling for the purpose of soil characterization for borrow import.

Required sample containers, sample preservation methods, and maximum holding times are summarized for each sample type and analytical method in Table 2. The required sampling and analysis frequency for imported borrow soil is presented in Table 3.

4.1 Sample Preservation and Containerization

The analytical laboratory will supply the sample containers for the chemical samples. These containers will be cleaned by the manufacturer to meet or exceed all analyte specifications established in the latest U.S. EPA's *Specifications and Guidance for Contaminant-Free Sample Containers*. Certificates of analysis are provided with each bottle lot and maintained on file to document conformance to EPA specifications. The containers will be pre-preserved, where appropriate (see Table 2).

4.2 Equipment Cleaning

Reusable sampling equipment used for the collection of samples for laboratory analysis will be cleaned between each use in the following manner:

- Wash/scrub with a biodegradable degreaser ("Simple Green") if there is oily residue on equipment surface or the equipment contacted NAPL.
- Potable water rinse
- Wash and scrub with potable water and non-phosphate detergent (e.g., Alconox) mixture
- Potable water rinse
- 10 percent ultrapure nitric acid (HNO3) rinse for non-dedicated, stainless steel sampling equipment (excludes submersible pump and flow cell) and 1 percent HNO3 rinse for non-dedicated, non-stainless steel equipment for metals analysis only.
- Methanol rinse (only if sampling for organic analysis; pesticide-grade hexane rinse may also be required to remove heavy petroleum)
- Air dry on clean polyethylene sheeting
- Distilled/deionized water rinse
- Air dry on clean polyethylene sheeting

Cleaned equipment will be wrapped in new aluminum foil if not used immediately after air-drying.

4.3 Sample Collection Quality Control

To assess the quality of data resulting from the field sampling program, field duplicate samples, field equipment rinsate blank samples, samples for laboratory matrix spike/matrix spike duplicate (MS/MSD) analyses, and trip blanks will be collected (where appropriate) and submitted to the laboratory. Table 1 provides a summary of the planned field QC samples. Field QC samples will not be collected for samples associated with borrow soil import testing. The following summarizes the required frequency of collection of the field QC samples:

- Duplicate samples will be submitted at a frequency of one per 20 samples or in the event that a sampling round consists of less than 20 samples, one field duplicate will be collected.
- Field equipment rinsate blank samples will be collected at a frequency of one per 20 samples per matrix per type of equipment being used per parameter.
- One trip blank will accompany each cooler shipment containing aqueous samples for volatile organic compound (VOC) analyses.
- One MS/MSD sample pair will be collected and submitted at a minimum frequency of one per 20 field samples.

The following provides a detailed description of each of the planned field QC sample types:

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. Field duplicates will be collected by alternately filling sample bottles from the source being sampled. Field duplicates will be submitted at a frequency of one per 20 samples for all matrices and all parameters with the exception of parameters associated with waste samples collected for waste disposal characterization purposes.

Field equipment rinsate blanks will consist of laboratory-supplied distilled water and will be used to check for potential contamination of the sampling equipment that may cause sample contamination. Equipment blanks will be collected by passing the distilled water through the sampling equipment prior to sample collection. Equipment blanks will be submitted to the laboratory at a frequency of one per 20 samples per matrix per type of equipment being used per parameter. Equipment blanks will not be collected for parameters associated with waste samples collected for waste disposal characterization purposes.

Trip blanks will consist of distilled water (supplied by the laboratory) and will be used to assess the potential for VOC contamination of groundwater samples due to cross contamination during sample handling, shipment and storage. Trip blanks will be transported to the site unopened, stored with the investigative samples, and kept closed until analyzed by the laboratory. Trip blanks will be submitted to the laboratory at a frequency of one per cooler that contains groundwater samples for analysis for VOCs.

MSs and MSDs are two additional aliquots of the same sample submitted for the same parameters as the original sample. However, the additional aliquots are spiked with the compounds of concern. Matrix spikes provide information about the effect of the sample matrix on the measurement methodology and will be analyzed as a check on the analytical method's accuracy and precision. MS/MSDs will be submitted at a frequency of one per 20 investigative samples per matrix for organic parameters. MSs will be submitted at a frequency of one per 20 investigative samples per matrix for inorganic parameters.

5.0 DOCUMENTATION AND CHAIN-OF-CUSTODY

5.1 Field Books

Field team members will maintain a field book to document all field activities. Field books will provide the means of recording the chronology of data collection activities performed during the remediation. As such, entries will be described in as much detail as possible so that a particular situation could be reconstructed without reliance on memory. In certain cases, field books will be supplemented by the use of standardized sampling logs or forms developed for specific sampling activities.

The field book will be a bound notebook with water-resistant pages. Field book entries will be dated, legible, and contain accurate and inclusive documentation of the activity. The title page or inside cover of each book should contain the following:

- Project name
- Site address
- Site contact, if available
- Project number
- Sampling company name, address and contact name and phone number
- Start and end dates of field book entries

Entries into the field book will contain a variety of information. At the beginning of each daily entry, the date, start time, weather, and names of sampling team members present will be entered. The start and end of each day's entries in the field book will be signed or initialed and dated by the person(s) making the entry.

All entries into the field book or on standardized sampling logs or forms 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 that is signed and dated by the sampler. The correction will be written adjacent to the error.

5.2 Sample Labels

Immediately upon collection, each sample will be labeled with a pre-printed adhesive label, which includes a unique sample identifier/number, the date and time of collection, sampler's initials, analysis required, and sample preservative (if any). The following sample identifier scheme will be used:

Soil samples will be labeled as follows:

Example: S-1
Where: S – Designates sample type
(S-Soil)
1 –Unique Sample Number

5.3 Chain-of-Custody Records

Chain-of-custody records will be completed for all samples collected during the program to document the transfer of sample containers. Samples will be accompanied by a properly completed chain-of-custody form.

The chain-of-custody records will be initiated by the samplers in the field. The field portion of the completed chain-of-custody record will include, but not be limited to the following: (1) the project name; (2) name and signature of sampler; (3) the sample number; (4) the sample date and time of collection; (5) the sample containers and sample analyses requested; and (5) if applicable, any additional specific instructions to the laboratory (e.g., data deliverables, data turnaround times, samples having extra volume for MS/MSDs).

On a regular basis (daily or on such a basis that all holding times will be met), samples will be transferred to the custody of the respective laboratory directly by sampling personnel, via third-party commercial carriers (e.g., Fedex) overnight shipment, or via laboratory-provided same or next day courier service. All shipments will be accompanied by a completed chain-of-custody record identifying the contents. 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 laboratory, or to/from a secure storage location.

5.4 Sample Shipment

Upon collection, all samples will be refrigerated with ice at 4ºC (±2ºC). Samples will be properly packaged for shipment and dispatched to the appropriate laboratory for analysis, with a separate signed chain-of-custody record enclosed in each sample cooler. The original record will accompany the sample shipment to the laboratory, and a copy will be retained by the sampler and placed in the project file.

Sample coolers not delivered directly to the laboratory by sampling personnel or by laboratory-provided courier will be secured and closed with strapping tape and custody seals for commercial

carrier shipment to the laboratory. The custody seals will be covered with clear plastic tape after being signed by field personnel to protect them from incidental damage during handling/shipment.

If the samples are sent by commercial carrier, an air bill will be used and a copy retained by the sampler as part of the chain-of-custody documentation. Commercial carriers are not required to sign off on the completed custody records since the custody records will be sealed inside the sample cooler and the custody seals will remain intact.

5.5 Laboratory Sample Custody

Upon receipt of the sample coolers at the laboratory, each sample cooler will be inspected by the designated sample custodian. The condition of the cooler and any custody seals (if delivered by commercial carrier) will be noted on the chain-of-custody record or sample log-in records by the sample custodian.

The sample custodian will record the temperature of one sample (or temperature blank) and the temperature will be noted on the associated chain-of-custody records. The custodian will examine the records and compare samples received against those listed for accuracy and completeness. The sample custodian will document the date and time of receipt of the container, and sign the record (if shipment is accepted).

If damage or discrepancies are noticed (including sample temperature exceedances), they will be recorded in the remarks column of the chain-of-custody record, dated and signed. Any damage or discrepancies will be reported to the Lab Project Manager who will contact the Project Manager before samples are processed for direction or clarification, as appropriate.

6.0 CALIBRATION PROCEDURES

6.1 Field Instruments

Field instruments will be calibrated according to the manufacturer's specifications. At a minimum, instruments will be calibrated each day prior to initial use. Calibration instrument checks may also be performed throughout the day if suspect questionable instrument readings are observed by field sampling personnel. Calibration procedures performed will be documented in the field book and will include the date/time of calibration, name of person performing the calibration, reference standard used, the readings, and any setting adjustments made to the instruments.

6.2 Laboratory Instruments

Calibration procedures for a specific laboratory instrument will consist of initial calibrations, initial calibration verifications, and/or continuing calibration verification. Detailed descriptions of the calibration procedures for a specific laboratory instrument are included in the laboratory's standard operating procedures (SOPs), which describe the calibration procedures, their frequency, acceptance criteria, and the conditions that will require recalibration. These procedures are as required in the respective analytical methodologies (summarized in Table 2 of this Plan). The initial calibration associated with all analyses must contain a low-level calibration standard which is less than or equal to the quantitation limit.

7.0 SAMPLE ANALYTICAL PROCEDURES

A summary of the analytical parameters, methods, sample container and preservation requirements, and analytical holding times for the sampling program is presented in Table 2. For quantitation or reporting limits for parameters associated with soil samples, the laboratory will be required to attempt to meet or surpass the parameter-specific limits soil cleanup objective (SCOs) listed in 6 NYCRR Part 375-6.8 and NYSDEC CP-51 Soil Cleanup Policy Table 1 for the most stringent of Residential Use and Protection of Groundwater. In certain instances, if the soil SCOs are not achievable due to analytical limitations or sample matrix interferences, the laboratory will report the lowest possible quantitation limit.

When matrix interferences are noted during sample analysis, the laboratory will take appropriate actions to achieve the specified quantitation limits. The laboratory will re-extract and/or use any of the sample cleanup techniques presented in the analytical methods to eliminate matrix interferences. Samples should not be diluted by more than a factor of five to reduce matrix effects. Samples may be diluted to a greater extent if the concentrations of analytes of concern exceed the calibration range of the instrument. In such cases, the Laboratory QA/QC Officer will assure that the laboratory demonstrates good analytical practices and that such practices are documented.

8.0 DATA REDUCTION, VALIDATION, AND REPORTING

The analytical data for the soil samples will be reported by the laboratory in accordance with the New York State Analytical Services Protocol (ASP) Category B data deliverable format and NYSDEC EQuIS electronic data deliverable (EDD) format. Electronic MS Excel data deliverables that compare data to applicable criteria will also be provided by the laboratory.

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. Complete data packages suitable for the below specified data validation will be provided by the analytical laboratory.

For all analyses, the laboratory will report detected results that are below the laboratory's reporting limit; these results will be qualified as estimated (J) by the laboratory.

8.1 Data Evaluation/Validation

8.1.1 Field Data Evaluation

Measurements and sample collection information will be transcribed directly into a field book or onto standardized sampling logs or 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 Field Team Leader will ensure that:

- Field books and standardized logs or 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 SMP and this Plan, and that any deviations were documented and approved by the appropriate personnel.

9.0 INTERNAL QUALITY CONTROL

The subcontracting laboratory's Quality Assurance Project Plan will identify the supplemental internal analytical quality control procedures to be used. At a minimum, this will include:

- Matrix spike and/or matrix spike duplicate samples
- Matrix duplicate analyses
- Laboratory control samples
- Instrument calibrations
- Instrument tunes for SW-846 8260 and 8270 analyses
- Method and/or instrument blanks
- Surrogate spikes for organic analyses
- Internal standard spikes for SW-846 8260 and 8270 analyses
- Quantitation limit determination and confirmation by analysis of low-level calibration standard

10.0 PERFORMANCE AND SYSTEM AUDITS

Performance and systems audits of laboratory analysis, field sampling, and independent data validation activities will be conducted to verify the sampling and analyses are performed in accordance with procedures established and identified in the QAPP.

10.1 Laboratory Audits

For the purpose of external evaluation, performance evaluation check samples are analyzed periodically by the laboratory. Internally, the evaluation of data from these samples is done on a continuing basis over the duration of a given project.

The Project QA Officer may conduct performance and/or systems audits to insure that data of known and defensible quality are consistently produced during this program.

Systems audits are qualitative evaluations of all components of field and laboratory quality control measurement systems. They determine if the measurement systems are being used appropriately. The audits may be carried out before systems are operational, during the program, or after completion of the program. Such audits typically involve a comparison of the activities given in the laboratory's QA/QC plan described herein, with activities actually scheduled or performed.

The performance audit is a quantitative evaluation of the measurement systems used for a monitoring program. It requires testing the measurement systems with samples of known composition or behavior to quantitatively evaluate precision and accuracy. A performance audit may be carried out by or under the auspices of the Laboratory QA/QC Officer without the knowledge of the analyst during each sampling event for this program.

It should be noted, however, that any additional external QA audits by the Laboratory QA/QC Officer or Project QA Officer for this project will only be performed if deemed necessary.

10.2 Field Audits

Audits of field sampling activities may be conducted by the Project Manager or Project QA Officer. These audits include reviews of the sample collection field books, logs and chain-of-custody documents. Field inspections also include reviews of sample collection and handling methods (per the SMP and this plan), field instrument operation and calibration records, and sampling personnel familiarity with and availability of relevant project documents (e.g., QAPP, SMP, CAMP, etc.).

11.0 CORRECTIVE ACTION

The entire sampling program will be under the direction of the Project QA Officer. The emphasis in this program is on preventing problems by identifying potential errors, discrepancies, and gaps in the data collection/laboratory analysis/interpretation process. Any problems identified will be promptly resolved. Likewise, follow-up corrective action is always an option in the event that preventative corrective actions are not totally effective.

The acceptance limits for the sampling and analyses to be conducted in this program will be those stated in the method or defined by other means in this Plan. Corrective actions are likely to be immediate in nature and most often will be implemented by the contracted laboratory analyst or the Project Manager. The corrective action will usually involve recalculation, reanalysis, or resampling.

11.1 Field Corrective Action

Corrective action in the field may be needed when the sample network is changed (i.e., more/less samples, sampling locations other than those specified in the Plan), or when sampling procedures and/or field analytical procedures require modification, etc. due to unexpected conditions. The field team may identify the need for corrective action. The Field Team Leader will contact the Project Manager who will contact the Project QA Officer to discuss the proposed corrective action. After consultation with the Project QA Officer, the Project Manager will approve the corrective measure, as necessary. The Project Manager will notify the Field Team Leader of the approved corrective action and the Field Team Leader will ensure that the corrective measure is implemented by the field team.

Corrective actions will be implemented and documented in a field book by the field team. Documentation will include:

- A description of the circumstances that initiated the corrective action,
- The action taken in response,
- The final resolution, and
- Any necessary approvals

No staff member will initiate corrective action without prior communication of findings through the above-specified proper channels.

11.2 Laboratory Corrective Action

Corrective action in the laboratory may occur prior to, during, and after initial analyses. A number of conditions such as broken sample containers, omissions or discrepancies with chain-of-custody documentation, low/high pH readings, and potentially high concentration samples may be identified during sample log-in or just prior to analysis. Following consultation with laboratory analysts and Laboratory Section Leaders, it may be necessary for the Laboratory QA/QC Officer to approve the implementation of corrective action. The laboratory SOPs specify some conditions during or after analysis that may automatically trigger corrective action or optional procedures. These conditions may include dilution of samples, additional sample extract cleanup, automatic reinjection/reanalysis when certain QC criteria are not met, loss of sample through breakage or spillage, etc.

The analyst may identify the need for corrective action. The Laboratory Section Leader, in consultation with the staff, will approve the required corrective action to be implemented by the laboratory staff. The Laboratory QA/QC Officer will ensure implementation and documentation of the corrective action. If the nonconformance causes project objectives not to be achieved, the Project QA Officer will be notified. The Project QA Officer will notify the Project Manager, who in turn will contact all levels of project management for concurrence with the proposed corrective action.

These corrective actions are performed prior to release of the data from the laboratory. The corrective action will be documented in both the laboratory's corrective action files, and the narrative data report sent from the laboratory to the Project Manager. If the corrective action does not rectify the situation, the laboratory will contact the Project Manager, who will determine the action to be taken and inform the appropriate personnel.

TABLES

Table 1
Sampling and Analysis Summary

Sample Matrix	Analytical Parameter	EPA Analytical Method(1)	Number of Media Samples	Blind Field Duplicates	Trip Blanks
Imported Borrowed Soils	VOCs	EPA Method 8260	As needed	As needed	0
Imported Borrowed Soils	SVOCs	EPA Method 8270	As needed	As needed	0
Imported Borrowed Soils	Pesticides/PCBs	EPA Methods 8081/8082	As needed	As needed	0
Imported Borrowed Soils	Metals	EPA Methods 6010/7470/7471	As needed	As needed	0
Imported Borrowed Soils	PFAS	EPA Method 537.1	As needed	As needed	0

Notes:
(1) The most current ELAP TM version of the analytical methods shall be used by the laboratory.

Table 2
Analytical Parameters, Methods, Preservation, Holding Time and Container Requirements

Sample Matrix	Analytical Parameter[5]	EPA Analytical Method[(8)]	Sample Preservation	Holding Time[(1)]	Sample Container
Imported Borrowed Soil	VOCs	EPA Method 8260	MeOH[(2)]; 4^0 C	14 days to analysis	40-mL VOA vials
Imported Borrowed Soil	SVOCs	EPA Method 8270	None; 4^0 C	14 days to extraction	Amber glass jar
Imported Borrowed Soil	Pesticides/PCBs	EPA Methods 8081/8082	None; 4^0 C	365 days to extraction/14 days to extraction	Amber glass jar
Imported Borrowed Soil	Metals	EPA Methods 6010/7470/7471	None; 4ºC	180 days to analysis	Glass jar
Imported Borrowed Soil	PFAS	EPA Method 537.1	None; 4ºC	28 days to extraction	HDPE container

Notes:
(1) From date of sample collection.
(2) Methanol

Table 3
Recommended Number of Soil Samples for Soil Imported To or Exported From a Site [(1)]

Contaminant	**VOCs**	**SVOCs, Inorganics, & PCBs/Pesticides**	
Soil Quantity (cubic yards)	Discrete Samples	Composite	Discrete Samples/Composite
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
> 1000	Add an additional 2 VOC and 1 composite for each additional 1000 Cubic yards or consult with DER		

Notes:
(1) Source: NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation Table 5.4(e) dated May 3, 2010.