From:	Keith Brower
To:	Czuhanich, Alex G (DEC)
Cc:	Wilkie, Henry (DEC); Brian Veith; robert.clarke@globalfoundries.com
Subject:	GLOBALFOUNDRIES Fab 10, Hopewell Junction, New York - SWMU Decontamination Program
Date:	Wednesday, November 02, 2016 3:24:35 PM
Attachments:	GLOBALFOUNDRES SWMU DECON QAPP.PDF GLOBALFOUNDRIES FHM Tank Decontamination and Sampling Procedures.pdf

Mr. Czuhanich,

I would like to start with a brief introduction. My name is Keith Brower. I work with Brian Veith at D&B Engineers and Architects, P.C. We have been retained by GLOBALFOUNDRIES U.S. 2 LLC to provide oversight and sampling associated with the decontamination of five Solid Waste Management Units (SWMUs) located at the Hudson Valley Research Park in Hopewell Junction, New York.

As you may be aware, GLOBALFOUNDRIES U.S. 2, LLC (a division of GLOBALFOUNDRIES) purchased the East Fishkill Facility/Hudson Valley Research Park (HVRP) from the International Business Machines Corporation (IBM) and assumed ownership of the facility in July of 2015. This facility is now generally referred to as "GLOBALFOUNDRIES Fab 10".

This project involves the decontamination and sampling of five Fluoride/Heavy Metal Wastewater Tanks and Lift Stations located at the facility. Please find attached, for your review and approval, a document entitled "GLOBALFOUNDRIES FHM Tank Decontamination and Sampling Procedures" which provides an overview of the tanks undergoing decontamination and the proposed sampling and analysis procedures for these tanks. Also attached for your review and approval is the Quality Assurance Project Plan (QAPP), which provides greater detail with regard to the proposed sampling, analysis and reporting procedures for this project.

In an effort to streamline the review process for this project, we would like to submit to you preliminary sampling results and technical conclusions as we complete the sampling an analysis for sets of one or more tanks. At that time we will ask for your informal concurrence with our conclusions that the decontamination criteria have been met. Once all of the sampling has been completed and the decontamination of all five units has been deemed complete, we will submit to you the final report for your formal review and approval. Please let us know if you are amenable to this process which has shown to be successful in the past when coordinating with NYSDEC to complete SWMU decontamination programs at this facility.

Brian Veith or I are available to discuss this project with you should you have any questions or comments and can be reached at (516) 364-9890, extensions 3009 and 3059, respectively.

D&B ENGINEERS
AND
ARCHITECTS, P.C.

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GLOBALFOUNDRIES U.S. 2 LLC – FAB 10
HUDSON VALLEY RESEARCH PARK – HOPEWELL JUNCTION, NEW YORK
PROCEDURES FOR DECONTAMINATION OF VARIOUS
SOLID WASTE MANAGEMENT UNITS (SWMUs)

Fluoride/Heavy Metal Wastewater Storage Tanks

This procedure is intended to be used to collect samples for analysis from the wastewater storage tanks listed below.

UNIT ID #	LOCATION	TANK CONTENTS	VOLUME (gal)	CONSTITUENTS OF CONCERN
18	B/385S	Fluoride/Heavy Metal Wastewater	71,000	Fluoride, chromium, lead and nickel
40	B/385S	Fluoride/Heavy Metal Wastewater	25,000	Fluoride, chromium, lead and nickel
165	B/310	Fluoride/Heavy Metal Wastewater	3,000	Fluoride, chromium, lead and nickel
3127	B330E Lift Station	Fluoride/Heavy Metal Wastewater	2,500	Fluoride, chromium, lead and nickel
3128	B330E Lift Station	Fluoride/Heavy Metal Wastewater	2,500	Fluoride, chromium, lead and nickel

1. *Any residual liquid remaining in the unit will be pumped as low as possible to the appropriate drain utilizing a transfer pump. Any remaining sludge/solids will be removed by hand, placed in a drum and properly labeled in accordance with USDOT regulations before being transferred to B/309 for classification and management in accordance with the requirements of 6 NYCRR Part 373 Regulations.*

2. *The SWMU interior will be decontaminated with a water and suitable surfactant solution in accordance with procedures approved by GLOBALFOUNDRIES. Decontamination water will be removed from the unit utilizing the same method as was used to remove residual liquid in Step 1 above.*

3. *Rinse water samples will be collected in accordance with the Rinsate Sample Collection Protocol provided in Section 1.7.3 on page 1-11 of the attached Quality Assurance Project Plan (QAPP)*

4. *Rinse water will be field tested to confirm that pH range is between 5 and 9. Rinse water samples from the Fluoride/Heavy Metal Wastewater tanks will be analyzed for pH, fluoride, chromium, lead and nickel by a NYSDOH ELAP certified laboratory.*

5. *Rinse water sample analytical results will be compared to the Class GA Groundwater Standards and Guidance Values listed in the NYSDEC Division of Water's Technical and Operational Guidance Series (TOGS) 1.1.1 - "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations." If the rinse water sample results exceed the Class GA Groundwater Standards, the decontamination process will be repeated until the results are below the Class GA Standards at which time the decontamination will be deemed complete.*

GLOBALFOUNDRIES U.S. 2 LLC – FAB 10
HUDSON VALLEY RESEARCH PARK
HOPEWELL JUNCTION, NEW YORK

QUALITY ASSURANCE PROJECT PLAN FOR DECONTAMINATION OF VARIOUS SOLID WASTE MANAGEMENT UNITS (SWMUs)

Prepared for:

GLOBALFOUNDRIES U.S. 2 LLC
HOPEWELL JUNCTION, NEW YORK

Prepared by:

D&B ENGINEERS AND ARCHITECTS, P.C.
WOODBURY, NEW YORK

OCTOBER 2016

GLOBALFOUNDRIES U.S. 2 LLC – FAB 10
HUDSON VALLEY RESEARCH PARK, HOPEWELL JUNCTION, NEW YORK
QUALITY ASSURANCE PROJECT PLAN FOR
DECONTAMINATION OF VARIOUS
SOLID WASTE MANAGEMENT UNITS

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1.0 QUALITY ASSURANCE PROJECT PLAN

1.1 Project Identification

Facility Name:	GLOBALFOUNDRIES U.S. 2 LLC – Fab 10 (GLOBALFOUNDRIES) Hudson Valley Research Park Hopewell Junction, New York
Project Name:	Decontamination of Various Solid Waste Management Units (SWMUs)
Project Managers:	Robert H. Clarke *(GLOBALFOUNDRIES)* Keith R. Brower *(D&B Engineers and Architects, P.C.)*
Quality Assurance Officer:	Robbin A. Petrella *(D&B Engineers and Architects, P.C.)*
Field Operations Manager:	Brian Werner *(D&B Engineers and Architects, P.C.)*

1.2 Objective and Scope

The objective of this program is to decontaminate three Solid Waste Management Units (SWMUs) located at Buildings 385 and 310 (B/385 and B/310) of the GLOBALFOUNDRIES Fab 10 located at the Hudson Valley Research Park in Hopewell Junction, New York. As part of the decontamination activities, rinse water and rinse water blank samples will be collected to verify the effectiveness of the decontamination procedures. The purpose of this Quality Assurance Project Plan (QAPP) is to develop and describe the detailed sample collection and analytical procedures that will ensure high quality data.

1.3 Data Usage

The data generated from the field sampling will be used to verify the effectiveness of the decontamination activities performed on the SWMUs and associated piping. Specifically, the

samples will be used to determine whether the decontamination activities were successful in removing any contamination present in the SWMUs and associated piping. If the samples indicate that contamination remains present, then additional decontamination may be required before the unit can be considered decontaminated.

1.4 Sampling Program Design and Rationale

The following presents a general discussion of the sampling to be conducted during the sampling portion of the program.

- Rinse Water Samples: Rinse water samples will be collected from certain SWMUs being decontaminated during this project. In addition, one blind duplicate will be collected each day a rinse water sample is collected.
- Rinse Water Blank Sample: One rinse water blank sample will be collected each day during this decontamination project. The rinse water sample will be collected directly from the water supply (i.e. hose or spigot) utilized to decontaminate the SWMUs.

1.5 Analytical Methods

Laboratory analysis of the rinse water and rinse water blank samples will consist of analyzing for pH, fluoride, chromium, lead and nickel, depending on sample location, in accordance with the 2005 NYSDEC Analytical Services Protocol (ASP).

Table 1-1 presents a summary of the parameters/sample fractions to be analyzed for each type of SWMU. The table also lists the sample location, type of sample, sample matrix, number of samples and frequency of sample collection, type of sample container, method of preservation, holding time and analytical method.

Table 1-1

GLOBALFOUNDRIES U.S. 2 LLC – FAB 10
DECONTAMINATION OF SWMUs
SUMMARY OF MONITORING PARAMETERS/SAMPLE FRACTIONS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	No. of Samples*	Frequency**	Container Type/Size/No.	Sample Preservation	Maximum Holding Time***	Analytical Method
Fluoride/Heavy Metals and certain Industrial Wastewater SWMUs	Grab	Water	Fluoride	3	5	Plastic/50 ml/1 ICHEM 300 series or equivalent	Cool to 4°C	26 days for analysis	7/05 NYSDEC ASP, Method 9214
			Metals****	3	5	Plastic/500 ml/1 ICHEM 300 series or equivalent	HNO_3 to pH <2 Cool to 4°C	6 months for analysis	7/05 NYSDEC ASP Method 6010D
			pH	3	5	Plastic/50 ml/1 ICHEM 300 series or equivalent	Cool to 4°C	analyze immediately	7/05 NYSDEC ASP, Method 9040C

*Number of samples includes a rinse water, rinse water blank and duplicate.

**Frequency equals number of SWMUs to be decontaminated.

***Holding times based upon Verified Time of Sample Receipt at the laboratory.

****Metals limited to chromium, lead and nickel.

1.6 Data Quality Requirements and Assessment

Data quality requirements and assessments are provided in the 2005 NYSDEC ASP, which includes the detection limit for each parameter and sample matrix (see Exhibit A). Note that quantification limits, estimated accuracy, accuracy protocol, estimated precision and precision protocol are determined by the laboratory and will be in conformance with the requirements of the 2005 NYSDEC ASP, where applicable. Table 1-2 presents a summary of the data quality requirements.

In addition to meeting the requirements provided in the 2005 NYSDEC ASP, the data must also be useful in evaluating the nature and extent of contamination. Data obtained during the field program will be compared to specific Standards, Criteria and Guidelines (SCGs). The SCGs to be utilized include:

Matrix	**SCG**
Rinse Water and Blank Samples	NYSDEC Class GA Groundwater Standards found at Division of Water Technical and Operational Guidance Series (1.1.1) dated June 1998.

1.6.1 Data Representativeness

Representative samples will be collected as follows:

- Rinse Water – Samples will be collected utilizing rinse water (preferably deionized). Rinse water will be poured into the SWMU, allowed to stand for approximately 10 minutes and then collected utilizing sterile plastic pipettes or similar equipment.
- Rinse Water Blank – Samples of the water utilized to decontaminate the area will be collected directly from the water source (i.e. hose, spigot, etc.) and passed through a sterile plastic pipette into the sample container.
- Equipment Decontamination – Non-sterile sampling equipment will be decontaminated prior to use at each location according to the NYSDEC-approved procedures described in Section 1.8 of this QAPP.

Table 1-2

GLOBALFOUNDRIES U.S. 2 LLC – FAB 10
DECONTAMINATION OF VAROUS SWMUs
DATA QUALITY REQUIREMENTS

Parameter	Sample Matrix	CRDL* (ug/l)	Estimated Accuracy	Accuracy Protocol	Estimated Precision	Precision Protocol
Metals	Liquid	0.2-200	--	Vol. IA, Chapter 3, Method 6010D, Table 4	--	Vol. IA, Chapter 3, Method 6010D, Table 4

*Contract Required Detection Limits.

Table 1-2 (continued)

GLOBALFOUNDRIES U.S. 2 LLC – FAB 10
DECONTAMINATION OF VAROUS SWMUs
DATA QUALITY REQUIREMENTS
OBJECTIVES FOR PRECISION, ACCURACY, AND COMPLETENESS

Matrix/Parameter	**Precision (%)**	**Accuracy (%)**
Rinse Water		
Metals(a)	± 25%	75-125

Notes:

(a) Accuracy will be determined as percent recovery of matrix spikes when appropriate or the percent recovery of a QC sample if spiking is inappropriate. Precision will be determined as relative percent difference of matrix spike duplicate samples, or duplicate samples if spiking is inappropriate.

Source: NYSDEC ASP

1.6.2 Data Comparability

All data will be presented in the units designated by the methods specified by a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratory, and the 2005 NYSDEC ASP. In addition, sample locations, collection procedures and analytical methods from earlier studies will be evaluated for comparability with current procedures/methods.

1.6.3 Data Completeness

The acceptability of 100% of the data is desired as a goal for this project. The acceptability of less than 100% complete data, meeting all laboratory Quality Assurance/Quality Control (QA/QC) protocols/standards, will be evaluated on a case-by-case basis.

The laboratory utilized to perform the analyses on the rinse water, rinse water blank and duplicate samples will provide NYSDEC ASP Category B data deliverables.

1.7 Detailed Sampling Procedures

Rinse water, rinse water blank and duplicate samples will be collected following the decontamination activities in order to verify the effectiveness of the decontamination activities. One rinse water sample, one rinse water blank sample and one duplicate sample will be collected from certain SWMUs which are decontaminated as part of this program. Sampling procedures and equipment to be utilized are described in this QAPP. Sample collection will be performed in conformance with the procedures outlined in this QAPP.

When collecting the samples, care will be taken to maintain sample integrity by preserving its physical form and chemical composition to as great an extent as possible. First, the equipment utilized to collect the samples must be new and sterile or properly decontaminated. An appropriate piece of sampling equipment (e.g., disposable pipette) will be utilized to collect the sample and transfer it to the laboratory-supplied sample container. The sample should reflect

and contain a good representation of the area from which it was collected. The sample will be transferred into the sample container as quickly as possible.

There are several steps performed after the transfer of the sample into the sample container that are necessary to properly complete the collection activities. Once the sample is transferred into the appropriate container, the container will be capped and, if necessary, the outside of the container will be wiped with a clean paper towel to remove any grime. A clean paper towel moistened with distilled/deionized water will be used for this purpose.

Prior to sample collection, the sample container will be properly labeled. Information such as the sample identification number, location, collection time and sample description will be recorded in the field log book. Associated paper work (e.g., Chain of Custody forms) will then be completed and will stay with the sample. The samples will be packaged in a manner that will allow the appropriate storage temperature to be maintained during transportation to the laboratory. Samples will be delivered to the laboratory within 48 hours of collection.

Proper personal protective equipment and monitoring equipment (if determined to be necessary) will be used at all times during sample collection to further maintain sample integrity and protection of worker health and safety.

1.7.1 Sample Identification

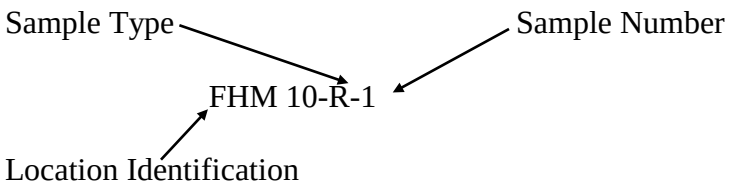
All samples collected during the field activities undertaken at GLOBALFOUNDRIES will be labeled with a sample identification code. The code will identify the sample location, sample type (sample matrix) and series numbers for the sample locations. Samples will be labeled according to the following system:

Location Identification: - The sample location will be assigned an identifier based on the SWMU from which the sample was collected. Samples collected from a Fluoride/Heavy Metal Tank will be denoted “FHM SWMU number” (e.g., samples associated with F/HM tank number “10” would be “FHM 10”).

Sample Type: - "R" for rinse water and duplicate samples and "RB" for rinse water blank sample.

Sample Number: - In the field, each sample location will be designated with a number. The number will correspond with the number of the sample collected. Therefore, the first blank collected from an SWMU will be denoted "1." If the SWMU requires further decontamination, the second rinse blank will be denoted "2" and so on.

Based on the above sample identification procedures, an example of a sample label collected from a F/HM tank number "10", would be:



1.7.2 Sample Handling, Packaging and Shipping

All analytical samples will be placed in the appropriate sample containers as specified in the NYSDEC July 2005 ASP. The holding time criteria identified in the ASP will be followed, as specified in Table 1-1.

Prior to packaging any samples for transportation to the laboratory, the sample containers will be checked for proper identification and compared to the field log book for accuracy. The samples will then be wrapped with a cushioning material (e.g., bubble wrap) and placed in a cooler (or laboratory shuttle) with a sufficient quantity of bagged ice or "blue ice" packs to maintain the samples at 4°C until arrival at the laboratory.

All necessary documentation required to accompany the samples during transportation will be placed in a sealed plastic bag and taped to the underside of the cooler lid. The cooler will then be sealed with fiber (duct) tape, and custody seals will be placed in such a manner that any opening of the cooler prior to arrival at the laboratory can be detected.

All samples will be shipped to ensure receipt at the laboratory within 48 hours of sample collection in accordance with ASP requirements.

1.7.3 Rinse Water/Blind Duplicate Samples

The following protocol will be adhered to for the collection of rinse water samples and the blind duplicate sample:

1. Be certain that the sample location is noted on a sample location sketch (see Section 1.10).

2. Be certain that the sampling equipment is either new or has been decontaminated utilizing the procedures outlined in Section 1.8.

3. Select a sample location within the area. One rinse water sample and one duplicate will be collected from each SWMU.

4. Remove a set of laboratory-supplied, precleaned sample containers from the sample cooler, label containers with an indelible marker and fill out a Chain of Custody form (refer to Section 1.10.2).

5. Don a new pair of disposable laboratory gloves (nitrile).

6. Slowly pour water into the SWMU from hose. The minimum amount of water necessary to properly fill all of the sample containers should be utilized. Note: Since it is not possible to extract all of the water poured into the SWMU, the volume of the sample containers plus additional water will have to be poured into the SWMU in order to properly fill all of the sample containers. Record the approximate volume of water utilized in the field log book.

   Note: If water will not pool within the SWMU, construct a berm to ensure pooling. Absorbent material or similar means should be used to construct berm.

7. Allow the water to remain within the SWMU for approximately 10 minutes.

8. Collect the rinse water duplicate samples from the SWMU utilizing a new or decontaminated pipette. If the liquid level is of sufficient depth, containers may be filled by dunking the unpreserved container into the pooled liquid, or utilizing a dedicated unpreserved container to then fill the preserved sample container.

9. Once each sample container has been filled, replace the sample container cap.

10. Return the sample containers to the cooler.

11. Measure the wetted area of SWMU in each sample location and record in the field log book.

12. Record notes in field log book as described in Section 1.10.3.

13. If reusable sampling equipment was utilized, decontaminate the sampling equipment according to the procedures described in Section 1.8.

14. Place all disposable personal protective equipment and disposable sampling equipment into a 55-gallon drum or other approved container for disposal.

1.7.4 Rinse Water Blank Sample

The following protocol will be adhered to for the collection of the rinse water blank sample:

1. Be certain that the sample location is noted on a sample location sketch (see Section 1.10).

2. Be certain that the sampling equipment is either new or has been decontaminated utilizing the procedures outlined in Section 1.8.

3. Remove a set of laboratory-supplied, precleaned sample containers from the sample cooler, label containers with an indelible marker and fill out a Chain of Custody form (refer to Section 1.10.2).

4. Don a new pair of disposable laboratory gloves (nitrile).

5. Collect the rinse water blank sample by filling each container directly from the hose or other source utilized to supply water to the area for the decontamination activities. The hose water should be passed from the hose through a sterile disposable syringe/pipette (the same type utilized for collecting the rinse water samples) into the sample container.

6. Once each sample container has been filled, replace the sample container cap.

7. Return the sample containers to the cooler.

8. Record notes in field log book as described in Section 1.10.3.

9. Place all disposable personal protective equipment and disposable sampling equipment into a 55-gallon drum or other approved container for disposal.

1.8 Decontamination Procedures

Whenever feasible, all field sampling equipment should be dedicated to a particular sampling location. In instances where this is not possible, a field cleaning (decontamination) procedure will be used in order to reduce the risk of cross-contamination between sample locations. A decontamination station will be established for all field activities if field decontamination is necessary. This will be an area located at some distance from the sampling locations so as not to adversely impact the decontamination procedure while still allowing the sampling team to keep equipment handling to a minimum.

1.8.1 Field Decontamination Procedures

All nondisposable equipment will be decontaminated at appropriate intervals (e.g., prior to initial use, prior to moving to a new sampling interval or location, and prior to leaving the site). Different decontamination procedures are used for the various types of equipment utilized to perform the field activities. When designing a field decontamination program, it is advisable to initiate environmental sampling in the area of the site with the lowest contaminant probability and proceed through to the areas of highest suspected contamination.

1.8.2 Decontamination Procedure for Sampling Equipment

All Teflon, polyvinyl chloride (PVC), high density polyethylene (HDPE) and stainless steel sampling equipment will be decontaminated utilizing the following procedure:

- Wash thoroughly with nonresidual detergent (e.g., alconox) and clean potable tap water using a brush to remove particulate matter or surface film.
- Rinse thoroughly utilizing distilled or deionized water.
- Wrap completely in clean aluminum foil with dull side against the equipment.

The first step, a soap and water wash, is designed to remove all visible particulate matter and residual oil and grease. The distilled/deionized water rinse ensures complete removal of

residual cleaning products and the aluminum wrap protects the equipment from contamination and keeps it clean for use at another sampling location.

1.9 Laboratory Sample Custody Procedures

A NYSDOH ELAP certified laboratory meeting the requirements for sample custody procedures, including cleaning and handling sample containers and analytical equipment, will be used. The Standard Operating Procedures of the laboratory selected to undertake the analysis of environmental samples for this program will be available upon request.

1.10 Field Management Documentation

Proper management and documentation of field activities is essential to ensure that all necessary work is conducted in accordance with this Quality Assurance Project Plan in an efficient and high quality manner. Field management procedures include following proper chain of custody procedures to track a sample from collection through analysis, noting when and how samples are split (if required), completing Chain of Custody forms and maintaining a daily field log book. Proper completion of the Chain of Custody and the field log book are necessary to support the future actions that may result from the sample analysis. This documentation will support that the samples were properly collected and handled.

1.10.1 Location Sketch

Each sampling point shall have its own location sketch with measurements and permanent references if possible. This sketch will be recorded in the field log book.

1.10.2 Chain of Custody

A Chain of Custody (COC) form is initiated at the laboratory with container preparation and transportation to the site. The COC must remain with the samples at all times and bear the name of the person assuming responsibility for the samples. This person is tasked with ensuring

secure and proper handling of the containers and samples. When the form is complete, it should indicate that there were no lapses in sample accountability.

A sample is considered to be in an individual's custody if any of the following conditions are met:

- It is in the individual's physical possession, or
- It is in the individual's view after being in his or her physical possession, or
- It is secured by the individual so that no one can tamper with it, or
- The individual puts it in a designated and identified secure area.

In general, Chain of Custody forms are provided by the laboratory contracted to perform the analytical services. At a minimum, the following information shall be provided on these forms:

- Project name and address
- Project number
- Sample identification number of each sample contained in the sample cooler
- Date of sample collection
- Time of sample collection
- Sample location
- Sample type/matrix
- Analyses requested
- Number of containers and volume collected
- Remarks (e.g., preservation, special handling, etc.)
- Sampler(s) name(s) and signature(s)
- Spaces for relinquished by/received by signature and date/time.

For this particular study, Chain of Custody forms provided by the laboratory will be utilized.

The Chain of Custody form is completed and signed by the person performing the sampling activities. The original form travels with the samples and is signed and dated each time the samples are relinquished to another party, until it reaches the laboratory or analysis is completed. The field sampler maintains a copy of the Chain of Custody form and a copy is retained for the project file. Each sample container must also be labeled with an indelible marker with a minimum of the following information:

- Sample identification number
- Project name/location
- Analysis to be performed
- Date and time of collection
- Sampler's initials

A copy of the completed Chain of Custody form is returned by the laboratory with the analytical results.

1.10.3 Field Log Book

Field log books must be bound and should have consecutively numbered, water resistant pages. All pertinent information regarding the site, project and sampling procedures must be documented. Notations should be made in log book fashion, noting the time and date of all entries. Information recorded in the log book should include, but is not necessarily be limited to, the following:

The first page of the log contains the following information:

- Project name and address
- Name, address and phone number of field contact
- Name, address and phone number of subcontractors and contact persons

Daily entries are made for the following information:

- Purpose of sampling
- Sampling location
- Number and volume(s) of sample(s) collected
- Description of sample location and sampling methodology
- Date and time of sample collection and personnel arrival and departure
- Geologic description of each sample interval, if applicable
- Collector's sample identification number(s)
- Sample distribution and method of storage and transportation
- References, such as sketches of the sample location or photographs of sample collection with dimensions
- Field observations such as weather conditions, visual signs of staining and/or stressed vegetation
- Signature of personnel responsible for completing log entries

1.11 Calibration Procedures and Preventive Maintenance

The following information regarding equipment will be maintained at the project site if monitoring is deemed necessary for health and safety purposes:

1. Equipment calibration and operating procedures which will include provisions for documentation of frequency, conditions, standards and records reflecting the

calibration procedures, methods of usage and repair history of the measurement system. Calibration of field equipment will be completed daily at the sampling site so that any background contamination can be taken into consideration and the instrument calibrated accordingly.

2. A schedule of preventive maintenance tasks, consistent with the instrument manufacturer's specific operation manuals, that will be carried out to minimize down time of the equipment.

3. Critical spare parts, necessary tools and manuals will be on hand to facilitate equipment maintenance and repair.

1.12 Performance of Field Audits

During field activities, if determined to be necessary, the QA/QC Officer will accompany sampling personnel into the field, verify that the site sampling program is being properly implemented and detect and define problems so that resolutions can be determined and implemented. All findings will be documented and provided to the Field Operations Manager.

1.13 Control and Disposal of Contaminated Material

Contaminated materials generated during this field program will primarily be limited to spent protective clothing, spent disposable sampling equipment and wastes generated as a result of equipment decontamination.

Any contaminated materials generated as a result of the field program will be contained in U.S. Department of Transportation (DOT) 55-gallon drums and staged in a designated area for subsequent waste characterization. Each drum will be identified by the type of material contained.

Decisions regarding the disposal of drummed material will be made, at least in part, based on the analytical results of the samples collected during this program. At the present time, there is no provision for separate analysis of contained material.

Decontamination water and sediment, if any, will be contained in 55-gallon drums. A decision regarding disposal of this material will be made following receipt of the sample results. Analysis of decontamination water/sediment may be required for proper management.

DOT-approved 55-gallon drums will be available for disposal of spent protective clothing and disposable sampling equipment, if any. These drums will be marked and labeled as containing personnel protective and sampling equipment. These drums will not be sampled. All drums will be sealed and staged on site to await proper off-site disposal.

1.14 Data Validation

Data validation will be performed in order to define and document analytical data quality in accordance with NYSDEC requirements that project data must be of known and acceptable quality. The analytical and validation processes will be conducted in conformance with the July 2005 NYSDEC ASP and USEPA CLP Statements of Work (SOW) dated September 2015. The validation will be performed by an individual meeting the qualification requirements for a data validator for the NYSDEC.

The USEPA Functional Guidelines for Evaluating Organics and Inorganics Analyses for the CLP will be used for the data validation process. The data validation process will ensure that all analytical requirements specific to this sampling program, including this Quality Assurance Project Plan, are followed. Procedures will address validation of routine analytical services (RAS) results based on the NYSDEC Target Compound List (TCL) for standard sample matrices.

The data validation process will provide an informed assessment of the laboratory's performance based upon contractual requirements and applicable analytical criteria. The report generated as a result of the data validation process will provide a base upon which the usefulness of the data can be evaluated by the end user of the analytical results. The overall level of effort and specific data validation procedure to be used will be equivalent to a "20% validation" of all analytical data in any given data package.

During the review process, it will be determined whether the contractually-required laboratory submittals for sample results are supported by sufficient back-up data and QA/QC results to enable the reviewer to conclusively determine the quality of data. Each data package will be checked for completeness and technical adequacy of the data. Upon completion of the review, the reviewer will develop a QA/QC data validation report for each analytical data package.

"Qualified" analytical results for any one field sample are established and presented based on the results of specific QC samples and procedures associated with its sample analysis group or batch. Precision and accuracy criteria (i.e., QC acceptance limits) are used in determining the need for qualifying data. Where test data have been reduced by the laboratory, the method of reduction will be described in the report. Reduction of laboratory measurements and laboratory reporting of analytical parameters shall be verified in accordance with the procedures specified in the NYSDEC program documents for each analytical method (i.e., recreate laboratory calculations and data reporting in accordance with the method specific procedure). The standard operating guideline manuals and any special analytical methodology required are expected to specify documentation needs and technical criteria and will be taken into consideration in the validation process. Copies of the complete ASP Category B deliverables will be submitted to the NYSDEC for review. Copies of the validation report, including the laboratory result data report sheets, with any qualifiers deemed appropriate by the data reviewer, and a supplementary field QC sample result summary statement, will be submitted to the NYSDEC, if requested.

Examples of standard validation reporting formats and completeness inventory lists which are proposed for use on this project are contained in Exhibit B. These report forms will be modified as necessary and made appropriate for any project specific or NYSDEC requirements.

The following is a description of the two-phased approach to data validation planned to be used on this project. The first phase is called "checklisting" and the second phase is the analytical quality review, with the former being a subset of the latter.

- Checklisting - The data package is checked for correct submission of the contract required deliverables, correct transcription from the raw data to the required deliverable summary forms and proper calculation of a number of parameters.

- Analytical Quality Review - The data package is closely examined to recreate the analytical process and verify that proper and acceptable analytical techniques have been performed. Additionally, overall data quality and laboratory performance is evaluated by applying the appropriate data quality criteria to the data to reflect conformance with the specified, accepted QA/QC standards and contractual requirements.

At the completion of the data validation, a Summary Data Validation/Usability Report will be prepared and submitted to the NYSDEC, if requested.

1.15 Performance and System Audits

A NYSDOH ELAP certified laboratory, which has satisfactorily completed performance audits and performance evaluation samples, shall be used on this project.

1.16 Corrective Action

A NYSDOH ELAP certified laboratory shall meet the requirements for corrective action protocols, including sample "cleanup" to attempt to eliminate/mitigate "matrix interference." Sample "cleanup" is not required for samples to be analyzed for metals.

1.17 Duplicate

The primary purpose of a duplicate sample is to determine the analytical precision of the laboratory contracted to perform the sample analyses. A duplicate sample is collected in the same manner as one of the environmental samples and analyzed for the same constituents. In this manner, the precision of the laboratory can be checked. One duplicate of a rinse water sample will be collected and analyzed during decontamination of each SWMU identified in this decontamination program.

EXHIBIT A

DETECTION LIMITS

Superfund Target Compound List (TCL)
and
Contract Required Quantitation Limits (CRQL)

Select Metals and Fluoride

		Quantitation Limits*	
Parameter	**CAS Number**	**Low Water (ug/l)**	**Low Soil/Sediment (ug/kg)**
1. Chromium	7440-47-3	10	2,000
2. Lead	7439-92-1	10	2,000
3. Nickel*	7440-02-0	40	8,000
4. Fluoride	16984-48-8	36	N/A

* Quantitation Limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis, as required by the protocol, will be higher.

All quantitation limits are referenced from the 2005 NYSDEC ASP.

EXHIBIT B

DATA VALIDATION FORMS

D&B ENGINEERS AND ARCHITECTS, P.C.

DATA VALIDATION CHECKLIST

Project Name:	
Project Number:	
Sample Date(s):	
Sample Team:	
Matrix/Number of Samples:	Water/ Soil/ Field Duplicates/ Trip Blanks / Field Blanks/
Analyzing Laboratory:	
Analyses:	Volatile organic compounds (VOCs), by USEPA method SW846 8260B Semi volatile organic compounds (SVOCs), by USEPA method SW846 8270C Polychlorinated biphenyls PCBs by USEPA SW846 Method 8082 RCRA Metals: by SW846 Method 6010 and mercury (Hg) by Method 7471
Laboratory Report No:	Date:

ANALYTICAL DATA PACKAGE DOCUMENTATION GENERAL INFORMATION

	Reported		Performance Acceptable		Not
	No	Yes	No	Yes	Required
1. Sample results					
2. Parameters analyzed					
3. Method of analysis					
4. Sample collection date					
5. Laboratory sample received date					
6. Sample analysis date					
7. Copy of chain-of-custody form signed by Lab sample custodian					
8. Narrative summary of QA or sample problems provided					

QA - quality assurance

Comments:

The data packages have been reviewed in accordance with the NYSDEC 6/05 ASP Quality Assurance/ Quality Control (QA/QC) requirements. A validation was conducted on the data package and any applicable qualification of the data was determined using the USEPA National Functional Guidelines of August 2014, or USEPA National Functional Guidelines of Inorganic Data Review, August 2014, method performance criteria, and D&B Engineers and Architects, P.C. professional judgment. The qualification of data discussed within this data validation checklist did not impact the usability of the sample results.

D&B ENGINEERS AND ARCHITECTS, P.C.

Laboratory Report:
SAMPLE AND ANALYSIS LIST

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent ID	Analysis			
					VOC	SVOC	PCB	Metals

ORGANIC ANALYSES
VOCS

	Reported		Performance Acceptable		Not
	No	Yes	No	Yes	Required
1. Holding times					
2. Blanks					
A. Method blanks					
B. Trip blanks					
C. Field blanks					
3. Matrix spike (MS) %R					
4. Matrix spike duplicate (MSD) %R					
5. MS/MSD precision (RPD)					
6. Laboratory Control Sample (LCS) %R					
7. Surrogate spike recoveries					
8. Instrument performance check					
9. Internal standard retention times and areas					
10. Initial calibration RRF's and %RSD's					
11. Continuing calibration RRF's and %D's					
12. Transcriptions – quant report vs. Form I					
13. Tentatively Identified Compounds (TICs)					
14. Field duplicates RPD					

VOCs - volatile organic compounds
%D - percent difference
RRF - relative response factor
%R - percent recovery
%RSD - percent relative standard deviation
RPD - relative percent difference

Comments:
Performance was acceptable.

ORGANIC ANALYSES
SVOCS

	Reported		Performance Acceptable		Not
	No	Yes	No	Yes	Required
1. Holding times					
2. Blanks					
A. Method blanks					
B. Field blank					
3. Matrix spike (MS) %R					
4. Matrix spike duplicate (MSD) %R					
5. MS/MSD precision (RPD)					
6. Laboratory Control Sample (LCS) %R					
7. Surrogate spike recoveries					
8. Instrument performance check					
9. Internal standard retention times and areas					
10. Initial calibration RRF's and %RSD's					
11. Continuing calibration RRF's and %D's					
12. Transcriptions – quant report vs. Form I					
13. Tentatively identified compounds (TICs)					
14. Field duplicates RPD					

SVOCs –Semi- volatile organic compounds
%D - percent difference
RRF - relative response factor
%R - percent recovery
%RSD - percent relative standard deviation
RPD - relative percent difference

Comments:
Performance was acceptable

ORGANIC ANALYSES
PCBs

	Reported		Performance Acceptable		Not
	No	Yes	No	Yes	Required
1. Holding times					
2. Blanks					
A. Method blanks					
B. Field blanks					
3. Matrix spike (MS) %R					
4. Matrix spike duplicate (MSD) %R					
5. MS/MSD precision (RPD)					
6. Laboratory Control Sample (LCS) %R					
7. Surrogate spike recoveries					
8. GC Surrogate retention time summary					
9. Initial calibration %RSD's					
10. Continuing calibration %D's					
11. Transcriptions – quant report vs. Form I					
12. Field duplicates RPD					

PCBs – Polychlorinated Biphenyls
%R - percent recovery
%D - percent difference
%RSD - percent relative standard deviation
RRF - relative response factor
RPD - relative percent difference

Comments:
Performance was acceptable.

INORGANIC ANALYSES
METALS

	Reported		Performance Acceptable		Not
	No	Yes	No	Yes	Required
1. Holding times					
2. Blanks					
A. Preparation and calibration blanks					
B. Field blanks					
3. Initial calibration verification %R					
4. Continuing calibration verification %R					
5. CRDL standard %R					
6. Interference check sample %R					
7. Laboratory control sample %R					
8. Spike sample %R					
9. Post digestive spike sample %R					
10. Duplicate RPD					
11. Serial dilution check %D					
12. Total verse dissolved results					
13. Field duplicates RPD					

%R - percent recovery %D - percent difference RPD - relative percent difference

Comments:
Performance was acceptable

DATA VALIDATION AND QUALIFICATION SUMMARY **Laboratory Report:**

Sample ID	Analyte(s)	Qualifier	Reason(s)
VOCS			
SVOCS			
PCBs			
METALS			

VALIDATION PERFORMED BY & DATE:	
VALIDATION PERFORMED BY SIGNATURE:	