Rainier Commons
IPWP III Dust Sample Collection and Assessment Plan

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I. SAMPLING PLAN

1. Introduction

1.1 Objective/Scope

The objective of this sampling plan is to collect wipe samples to test and measure the potential presence and concentrations of PCBs and specified metals in settled dust on surfaces in tenant spaces that are adjacent to paint removal activities.

If ever PCBs are detected in settled dust at the identified trigger level of greater than 10 ug/100 cm^2, the additional analysis of the sample(s) collected for metal content is to be used to compare to the known metals profile of the blasting media to evaluate if PCBs were introduced by the paint removal process.

1.2 Project Description

Two types of samples, one for PCBs and one for metals, can be collected immediately adjacent to each other at any of the testing locations. Sample collection for PCBs will be done pre and post abatement. Sample collection for metals will be done post abatement and will be analyzed for metal content (copper, zinc, chromium and nickel) only if ever PCBs are detected at the identified trigger level of greater than 10 ug/100 cm^2. Sample collection for metals prior to abatement is not necessary given that use of the metal containing blasting media has not yet occurred.

Two different sample collection media will be used for the two types of samples.

1. For PCB analysis, a “hexane wipe” is used.

2. For metal content analysis, a “ghost wipe” is used.

Because the surface settled dust is removed once a sample is collected with use of either media, the exact same surface on any given day a sample is collected cannot and will not be used to

collect a sample with the other media. As a result, on any particular day when two or more samples are collected at a testing location, the surfaces sampled will be not be the same exact surface, rather testing will be done on a surface that is immediately adjacent to the initial location.

The specific locations from which samples will be collected are identified on the interior containment wipe sampling location diagrams.

Samples collected for PCB testing will be submitted to the laboratory for analysis. Samples collected for metal content analysis will be submitted to the laboratory and the Chain of Custody will indicate that these samples are to be held in custody for potential analysis. Further analysis will be ordered per the protocol below.

Once the laboratory analytical results are available for PCB content, NVL's CIH will determine if any PCB results are greater than 10 ug/100 cm^2, and if so, will send instructions to the laboratory which specific samples collected for metal content that are held in custody are to be analyzed.

Any samples submitted to the laboratory and requested to be held in custody for potential analysis are to be kept in custody by the laboratory for 14 days if not analyzed unless indicated otherwise by NVL's CIH. After this period, the samples are to be disposed of per the laboratory's standard protocol for disposing samples.

1.3 Basis of Plan

NVL Laboratories, Inc. (NVL) has prepared this sampling plan with reference to the "EPA's Requirements for House Dust Sample Collection and Assessment", for the Phase II work areas and to establish procedures ensuring the quality of the sample collection, analysis, interpretation and reporting.

Further references to this plan herein will be under the following underlined title: IPWP3 Dust Sample Collection and Assessment Plan (or "Sampling Plan").

2. References

The following lists the references used in connection with this Sampling Plan. References are referred to in this document using the underlined titles.

- Work Plan = "Work" or "Plan" = Rainier Commons Work Plan - Dated March 25, 2013 / Revised July 25, 2013
- IPWP1 = Individual Phased Work Plan #1 - Dated April 3, 2014
- IPWP2 = Individual Phased Work Plan #2 – Dated February 24, 2015
- Quality Assurance Project Plan for Rainier Commons House Dust Sample Collection and Assessment, USEPA November 2014
- EPA's Requirements for House Dust Sample Collection and Assessment

3. Description of Areas in IPWPIII to be Sampled

Interior tenant spaces that are adjacent to active paint removal activities are the areas that will be sampled.

Each interior space will be designated for their occupancy use as “RESIDENTIAL” OR “NON-RESIDENTIAL” based on Rainier Commons’ input. The determined occupancy designation will be indicated on each interior containment wipe sampling location diagram.

4. Overall Sampling Parameters

The following summarizes overall sampling parameters:

- Date and time for Sample Collection: Commencing prior to, and post any IPWPIIb paint removal work.

- Sample Locations: Sample locations are indicated on each of the interior containment wipe sampling location diagrams. Specifics regarding sample locations are detailed in Section 5.

- Samples to be collected: PCB wipe samples to be collect via hexane wipes; wipe samples for blasting media metals to be collected via ghost wipes.

- Sample Surface Size: PCB wipe samples will be collected over a 10 cm by 10 cm area. Metal content samples will be collected over a 1 foot by 1 foot area.

- Number of Samples Planned: Each interior containment wipe sampling location diagram indicates the number of sampling locations, which is equivalent to the number of samples planned with the addition of quality assurance and quality control sample(s), which is defined as 1 additional field blank for every 10 original samples in a laboratory submission set.

- Laboratory Method Reporting Levels:

  - For PCBs: The Method Reporting Limit will be .050 µg/wipe.
  - For Metals: The Method Reporting Limit will be 4.0 µg/wipe.

- Action Level: The PCB action level for reporting will be 10 µg/wipe. Any sample with a detection result above an Action Level will be shown in bold in the table in the report provided to the EPA.

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5. Locations for Testing

Interior tenant spaces that are adjacent to active paint removal activities are the areas that will be sampled.

The testing locations for each space are indicated on the interior containment wipe sampling location diagrams.

The protocol for determining the interior testing locations is as follows:

A: Each interior space will be designated for their occupancy use as “RESIDENTIAL” OR “NON-RESIDENTIAL” based on Rainier Common’s determination. The space occupancy designation will be indicated on each interior containment wipe sampling location diagram.

B: For spaces determined to be “Residential”:

Settled dust samples will be collected:

1. At points of ingress within the interior containment (number of locations depends on how many points of ingress there are).
2. Just outside secondary containment on the floor (1 location).
3. Mid-way between secondary containment and farthest wall at waist and ground level (2 locations, where waist level opportunity exists).
4. Near or at the farthest wall away from secondary containment at waist and ground level (2 locations, where waist level opportunity exists).

C: For spaces determined to be “Commercial”:

Settled dust samples will be collected:

1. At points of ingress within the interior containment (number of locations depends on how many points of ingress there are).
2. Just outside secondary containment on the floor (1 location).

The coding system to establish unique and distinguishable names for sample locations is described in the following table:

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Designated Sample Location #	Building & Location	Building Elevation View	Sample Type	Sample Type secondary indicator*
• Sequential # starting at 1 for the first in the sequence. • Number is predetermined, not repeated, and field annotated on each and every sampling location diagram. • If for some reason another "additional / new" location is sampled in the field, it will be given the next number in the current sequence.	**B =** Letter B followed by Building # **U** = Letter U followed by Unit #	Identified by the compass direction the wall undergoing abatement is facing. **N =** North **S =** South **E** = East **W** = West	**I** = Point of Ingress within the interior containment (number of locations depends on how many points of ingress there are) **O** = Just outside secondary containment on the floor (1 location) **M** = Mid-way between secondary containment and farthest wall at waste and ground level (2 locations where waist level surface to test opportunity exists) **F** = Near or at the farthest wall away from secondary containment at waist and ground level (2 locations where waist level surface to test opportunity exists) **Q** = QA/QC sample = 1 field blank for every 10 original samples	**W** = Waist Level **G** = Ground Level
**= W or G not used if not applicable for the location description* *A dash (-) will be placed between each code component on the Sample Locations*				

As an example using this coding system: For the 8th predetermined sample location for the residential space, assigned Unit #410 on the fourth floor of building 10, while abating the building elevation facing towards the south, that is selected because a sample is to be taken from the floor adjacent to the farthest wall away from the secondary containment would be identified as:

8-B10U410-S-FG

The coding system described above may change during the course of the project due to such things as practical experiences, and if so, the updated system will be written down, kept with the project records, and provided to EPA in the applicable weekly progress report.

6. Sampling Methodology

A Certified Industrial Hygienist (CIH) will oversee all sample collection, analysis, data interpretation and reporting involved with this IPWPIII Dust Sample Collection and Assessment Plan.

Wipe Samples for PCBs

- Surface samples for the presence of Polychlorinated Biphenyls (PCBs) will be collected using a wiping technique with 2 inch square cotton gauze pads wetted with n-hexane which will be previously prepared by NVL at their laboratory location in separate clean glass vials.
- Sample collection methodology will follow the steps described in QAPP set forth below.
- Surface areas sampled will be measured using a disposable 100 square centimeter (100 cm^2) paper template. One template will be used per sample collected and then disposed.
- Clean nitrile gloves will be used by the sampler at each location and will be appropriately collected for disposal and replaced at each new location.
- All sample locations will be identified, reviewed and confirmed with Rainier Commons personnel on site prior to sample collection.

Wipe Samples for Metals

- Surface samples for the presence of metals in the blasting media (Chromium, Copper, Nickel and Zinc) will be collected using a wiping technique using *Ghost Wipes*.
- Sample collection methodology will follow the steps described in QAPP set forth below.
- Surface areas sampled will be measured using a disposable one foot square paper template. One template will be used per each sample collected and then disposed.
- Clean nitrile gloves will be used by the sampler at each location and will be appropriately collected for disposal and replaced at each new location.
- All sample locations will be identified, reviewed and confirmed with Rainier Commons personnel on site prior to sample collection.

7. Chain of Custody

NVL's Standard Chain of Custody Procedures include:

- All samples must have an unique sample identifier.
- Personnel will maintain control and security of samples collected to prevent loss or possible tampering.
- A chain of custody form will be used to transfer custody of samples to the laboratory.
- The chain of custody form minimally includes fields for sample identifier, parameter for analyses, sample collection date and a custody transfer signature area.
- Samples collected will be properly stored and relinquished to the laboratory for analysis as soon as practical.

NVL will also standardize and use a logical system for uniquely identifying samples collected in the field. A field copy of each Sampling Location Diagram, annotated with individual Designated Sample Location numbers will be included with the Chain of Custody form and become a part of the project records.

8. Analysis

Wipe Samples for PCBs

- Samples will be submitted to a WA Dept. of Ecology accredited laboratory to be analyzed for PCB Aroclor content via EPA METHOD 8082A - POLYCHLORINATED BIPHENYLS (PCBs) BY GAS CHROMATOGRAPHY. The Method Reporting Limit will be established at 0.050 µg/wipe.

Wipe Samples for Metals

- Samples will be analyzed by NVL Labs. EPA Method 3051/6010C: Microwave Assisted Acid Digestion of Sediments, Sludges, Soils, and Oil. Samples are to be analyzed for metals previously determined to be present in abrasive blasting media; Chromium, Copper, Nickel, and Zinc.

Laboratory turnaround time will minimally be the standard of five business days.

9. Reporting

A written report will be provided by NVL to Rainier Commons to provide to the EPA upon completion of all laboratory analysis. The report will include a description of the sampling locations as well as site photos. The results of the laboratory analysis will be shown in a data table. Any sample with a detection result at or above an Action Level will be shown in bold in the table. Laboratory analysis reports and a site map showing sample collection locations will also be included as attachments to the report.

II. QUALITY ASSURANCE (QAPP)

In November 2014, EPA provided Rainier Commons a document titled "*QUALITY ASSURANCE PROJECT PLAN FOR RAINIER COMMONS HOUSE DUST SAMPLE COLLECTION AND ASSESSMENT"*, which addressed interior dust wipe sampling at Rainier Commons. This EPA approved document will be referred to in this plan as the EPA QAPP. In general, the QAPP set forth in this plan is modeled on the EPA QAPP, with minor exceptions noted below:

- EPA specific procedures and processes identified in the EPA QAPP document will be modified to be Rainier Commons and NVL specific.
- Samples will not be analyzed at EPA's Manchester Environmental Laboratory, but will be analyzed at private laboratories complying with identified QA/QC procedures.
- Sample collection procedures for the metals wipe samples will be performed in the same manner as the PCB wipe samples as set forth herein, with the exception of the sample media and sample area as noted in this document.

In addition to the above, the following is added for clarity:

- A "testing location" is the general location that is indicated where samples are collected. Examples include: point of ingress, just outside secondary containment, and mid-way between secondary containment and farthest wall at waist level.
- It is also important to note that because the surface settled dust is removed once a sample is collected when wiping with a media, the exact same surface on any day a sample is collected cannot be used to collect another sample. As a result, on any particular day when and where two or more samples are collected at a testing location, the surfaces sampled will be not be the same exact surface, rather testing will be done on surfaces that are immediately adjacent to each other.

1. Project Management Elements

1.1 Distribution

NVL staff involved with the project will receive instruction and be aware of the content of this plan. Rainier Commons' project manager will also receive a copy of this document and be responsible for any necessary further distribution.

1.2 Project Management/Task Organization

Munaf Khan	Project Manager, Laboratory Director / President
Dave Leonard	Certified Industrial Hygienist (CIH) / Technical Resource Expert
Marcus Gladden	Industrial Hygienist

Responsibilities of those listed above when collecting samples will include:

• receiving and inspecting the sample containers,
• completing and signing appropriate field records,

• collecting field samples as specified,
• assigning "unique and distinguishable" identifiers to each and every sample collected pursuant to the coding system set forth herein, or as amended,
• verifying the completeness and accuracy of chain-of-custody documentation,
• controlling and monitoring access to samples while in their custody, and
• initiating shipment of the samples to appropriate destinations.

NVL's schedule of tasks and activities include:

Activity	**Date / Timeframe**
Sample Collection	To be determined and coordinated with Rainier Commons prior to and following paint removal activities associated with IPWPIII.
Laboratory Analysis	Standard Laboratory Turn Around (Typically 5 business days)
Data Report	Within 30 business days of receipt of Laboratory Analysis Results

2. Quality Objectives and Criteria for Measurement Data

As stated in the EPA QAPP:

> Data quality objectives (DQOs) are qualitative and quantitative statements that clarify the intended use of the data, define the type of data needed to support the decision, identify the conditions under which the data should be collected, and specify tolerable limits on the probability of making a decision error due to uncertainty in the data. DQOs are developed by data users to specify the data quality needed to support specific decisions. DQOs for measurement data (referred to here as data quality indicators) are precision, accuracy, representativeness, completeness, comparability, and measurement range. The overall QA objective for analytical data is to ensure that data of known and acceptable quality are provided. To achieve this goal, data must be reviewed for 1) representativeness, 2) comparability, 3) precision, 4) accuracy (or bias), and 5) completeness. Precision, accuracy, completeness, sample representativeness and data comparability are necessary attributes to ensure that analytical data are reliable, scientifically sound, and legally defensible. Each analytical result or set of results generated should be fully defensible in any legal action, whether administrative, civil or criminal.
>
> <u>Precision:</u> Precision is a measure of internal method consistency. It is demonstrated by the degree of agreement between individual measurements (or values) of the same property of a sample, measured under similar conditions.
>
> The precision of the analyses is measured by monitoring the relative percent differences between duplicate measurements. Laboratory precision and accuracy can be measured by the laboratory measuring Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples and the analysis of laboratory duplicate samples. Laboratory MS/MSD analyses are usually performed on a 5% frequency (1 per 20 samples) while field duplicate samples analyses are performed at a 10% frequency (1 per 10 samples collected). However, lab and field duplicates, as well as MS/MSD

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analyses are not appropriate for wipe samples which represent a specific area measured and cannot be split or cut at the laboratory.

Accuracy (Bias): Accuracy is defined as the degree of agreement between an observed value and an accepted reference or true value. Accuracy is a combination of random error (precision) and systematic error (bias), introduced during sampling and analytical operations. Bias is the systematic distortion of a measurement process that causes errors in one direction, so that the expected sample measurement is always greater or lesser to the same degree than the sample's true value.

Accuracy will be evaluated by the using percent recovery (%R) of the target analyte in spiked samples (MS/MSD) and also the recoveries QC samples. Field blanks and method blanks are also used as indicators of accuracy and potential bias in the sample results. Percent recoveries are calculated as follows:

$$\% \text{ Recovery} = \frac{SQ - NQ}{S} \times 100$$

SQ = quantity of spike or surrogate found in sample
NQ = quantity found in native (un-spiked) sample
S = quantity of spike or surrogate added to native sample

Representativeness: 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. Representativeness of samples is ensured by adherence to standard field sampling protocols and standard laboratory protocols. The design of the sampling scheme and number of samples should provide a representativeness of each matrix or product of the chemical processes being sampled.

Comparability: Comparability is an expression of the confidence with which one data set can be compared with another. Comparability is dependent on the proper design of the sampling program and on adherence to accepted sampling techniques, standard operating procedures, and quality assurance guidelines. This is measured and achieved by using the same matrix, sample location, sampling techniques and analytical methodologies.

Completeness: Completeness is the percentage of valid results obtained compared to the total number of samples taken for a parameter. Since sampling are grabs and limited in number, the number of valid results obtained from the analyses are expected to be 100%. The % Completeness may be calculated using the following formula:

$$\% \text{ Completeness} = \frac{\text{\# of valid results}}{\text{\# of samples taken}} \times 100$$

The QA objectives outlined, above, will be evaluated in conjunction with the data validation process.

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3. Special Training Requirements/Certification

All persons collecting samples, under this plan, need to have proper training in the collection of dust samples using the wipe technique.

General safety precautions will be followed.

The analysts performing the analytical work for this project have extensive knowledge and skill in the execution of the analytical methods being requested at the certified laboratories selected.

4. Documentation and Records

NVL will document all field sample collection and handling activities necessary for proper processing in the laboratory and, ultimately, for the interpretation of results.

Required sample collection, locational data, monitoring data, shipment, chain of custody documentation, and final validated results will be kept on record.

Documentation in the field will be sufficient to enable participants to reconstruct events that occurred during the project accurately and objectively at a later time.

Documentation records need to be complete such that the analytical results can be traced to a dust sample obtained from a known location on a specific date. Any field notes deemed necessary to complete this documentation will be maintained with the site file.

Photographs of sample locations may also be used to clarify the types of surfaces where dust samples were obtained.

The following documents will be archived at the laboratory performing the analyses: (1) signed hard copies of sampling and chain-of-custody records (2) electronic and hard copy of analytical data including all supporting documentation - extraction and sample preparation bench sheets, raw data and reduced analytical data.

The laboratory will store all sample receipt, sample login, extraction/preparation, and laboratory instrument print-outs and other analytical documentation as per their established SOPs.

5. Sample Handling and Custody Requirements

The purpose of these procedures is to ensure that the quality of the samples is maintained during collection, transportation, storage, and analysis. All chain-of-custody requirements comply with NVL's Standard Chain of Custody Procedures, which include:

- All samples must have an unique field sample identifier that will include collection details that cannot be reused.
- Personnel will maintain control and security of samples collected to prevent loss or possible tampering.
- A chain of custody form will be used to transfer custody of samples to the laboratory.
- The chain of custody form minimally includes fields for sample number, parameter for analyses, sample collection date and time, sampler, and custody transfer signature area.

Samples collected will be properly stored.

Proper labeling of samples is an important aspect of quality assurance and will be adhered to.

A Chain-of-Custody Form acts as a record of sample shipment and a catalog of the contents of each shipment (coinciding with information on the field record).

Upon receipt of the samples, the analytical laboratory will record the arrival time on the chain of custody form. Any observations regarding the shipment (e.g., torn or damaged packaging, insufficient dry ice) also will be documented on the chain of custody form.

Samples will be hand delivered (or express shipped) to the analytical laboratory on the day of or day following sample collection.

The primary objective of chain-of-custody procedures is to provide an accurate written or computerized record that can be used to trace the possession and handling of a sample from collection to completion of all required analyses. A sample is in custody when it is:

- In someone's physical possession,
- In someone's view,
- Locked up, or
- Kept in a secured area that is restricted to authorized personnel.

6. Analytical Methods Requirements

The analytical methods that will be used by NVL for this project are as set forth above. For any instance in which laboratory results exceed QC acceptance criteria, re-extraction and/or reanalysis will occur as indicated in the applicable analytical method. The respective laboratory analysts will be responsible for ensuring that appropriate sample analysis procedures are followed and for taking appropriate actions to ensure deficiency correction, if any should occur

7. Quality Control Requirements

As stated in the EPA QAPP regarding routine quality control measures to be performed by the laboratory:

> QC checks for sample collection will be accomplished by a combination of chain-of-custody protocols and laboratory QA procedures as prescribed in the sampling or analytical methods. No QC samples (i.e., double blind performance evaluation samples) are planned for this activity outside of the normal laboratory QC criteria outlined in the analytical methods. These QC samples include blanks (field and laboratory method), field duplicates (where applicable) and method-specified lab QC. Lab duplicate and MS/MSD analyses are not appropriate for wipe samples which represent a specific area measured and cannot be split or cut at the laboratory or in the field when the sample is collected. A "true" field duplicate is also not appropriate for the dust samples in this project, as the vacuum wiping action with the testing media will remove all material from the area to collect the first sample leaving none to be collected by any testing methods. Results from these samples will be compared to the QC requirements indicated. All analyses that will be

performed for this project will produce definitive data. DQI targets for this project are specified in section 1.6 and precision and accuracy requirements are summarized in Table 5 of this QAPP.* Bias for estimated qualified data will be determined by the validation process in accordance with the objectives outlined in this document and the validation stages defined by the EPA (2009).

Table 5: Summary of Data Quality Objectives

Total Samples[1]	Matrix	Parameter	# QA Samples	Matrix	Container	Holding Time	Preservation	Method	Reporting Limit[2]	Precision	Accuracy
5	Dust	PCB Aroclors	1 filter blank	Dust	Glass Jar (shared)	14 days extraction / 40 days analysis	none	EPA 8082	0.1 mg/kg	50% RPD	50-150%
5	Dust	Metals: Cr, Cu, Ni, Pb, Zn	1 filter blank	Dust		180 days	none	EPA 3050B + 6010B/6020A	TBD	50% RPD	70 - 130%
6	Hexane Wipe	PCB Aroclors	1 wipe blank & 1 field duplicate	Surface residue	Wipe / Glass Jar	14 days extraction / 40 days analysis	none	EPA 8082	0.5 µg/wipe	50% RPD	50-150%
6	Ghost Wipe	Metals: Cr, Cu, Ni, Pb, Zn	1 wipe blank & 1 field duplicate	Surface residue	Wipe / Glass Jar	180 days	none	EPA 3050B + 6010B/6020A	TBD	50% RPD	50-150%

[1] Total number of samples includes field QC (field duplicate, blanks)

[2] The bases for the specified reporting limits are included in Appendix B.

*= text is from referenced EPA QAPP from 2014. As a result, section 1.6 referenced in the text is in that document. Table 5 is also in that document and is presented above.

For clarification and modification of the above text that will be specific for this projects:

Wipe Samples for PCBs

- Samples will be submitted to a WA Dept. of Ecology accredited laboratory to be analyzed for PCB Aroclor content via EPA METHOD 8082A - POLYCHLORINATED BIPHENYLS (PCBs) BY GAS CHROMATOGRAPHY. The Method Reporting Limit will be established at 0.050 µg/wipe.

Wipe Samples for Metals

- Samples will be analyzed by NVL Labs. EPA Method 3051/6010C: Microwave Assisted Acid Digestion of Sediments, Sludges, Soils, and Oil. Samples are to be analyzed for metals previously determined to be present in abrasive blasting media; Chromium, Copper, Nickel, and Zinc. The Method Reporting Limit will be 4.0 µg/wipe.

Laboratory turnaround time will minimally be the standard of five business days.

- For PCBs: The Method Reporting Limit will be .050 µg/wipe.
- For Metals: The Method Reporting Limit will be 4.0 µg/wipe.

A field duplicate sample will not be collected, as described in the EPA text above. Also, a field duplicate is also not appropriate for the dust samples collected in this project, as the vacuum wiping action with the testing media will remove all material from the area to collect the first sample leaving none to be collected by any testing methods."

8. Instrument/ Equipment Testing, Inspection, and Maintenance Requirements

All instrument/equipment testing, inspection and maintenance will follow the standard operating procedures for any preventative maintenance required on laboratory instruments specified in the laboratory's QA Manual.

9. Instrument Calibration and Frequency

All instruments and equipment used during fixed laboratory sample analyses will be operated, calibrated, and maintained according to the manufacturers' guidelines and recommendations, as well as criteria set forth in the applicable analytical methodology references and/or in accordance with the laboratory's QA manual and SOPs.

10. Inspection/ Acceptance Requirements for Supplies and Consumables

Hexane wipes will be provided by NVL's lab, along with containers in which to return them for direct digestion/extraction. Hexane wipes will have been pretested for PCBs; ghost wipes used are certified clean for the metals of interest.

11. Data Management

Standards contained in these documents will be used to ensure the validity of data generated by NVL for this project. Data validation will be performed as identified.

12. Assessment Oversight/Corrective Action

NVL's CIH will be responsible for reviewing documentation for accuracy and completeness within 48 hours of the sampling event. Sample results provided to the PM by the laboratory will be appended to the project reports. The PM will compare the sample information in the field log notebooks with the analytical results appended to the inspection report to ensure that no transcriptions errors have occurred.

If major deviations from the QA requirements of the project are observed in the data validation process, NVL's PM will contact the laboratory to correct the problem. If the laboratory is not responsive to the request, NVL's PM will inform Rainier Commons of the situation. A brief narrative will be written explaining the deviations, and recommendations will be given based on the quality of the submitted data. Any need for re-sampling and subsequent re-analysis will be decided by Rainier Commons if and when such a decision making situation arises.

Unavoidable deviations from the procedure set forth in this QAPP shall be documented by the NVL PM. Corrective action procedures that might be implemented from QA results or detection of unacceptable data will be developed if required and documented.

13. Data Validation and Usability

13.1 Data Review, Validation, and Verification Requirements

The data validation review of data packages will include an evaluation of the information provided on the analytical data sheets and required support documentation for all sample analyses; the

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supporting sample collection documentation, including chain-of-custody forms. The QA review also will examine adherence to the procedures as described in the cited SOPs and the specified analytical methods.

13.2 Validation and Verification Methods

All data generated shall be reviewed in accordance with the QA/QC requirements specified in the methods and the technical requirements in the QAPP.

The raw data for this project shall be maintained by the laboratory. Data review will be performed by the laboratory for all the analyses prior to the release of data. The laboratory will also archive the analytical data into their laboratory data management system.

Sample qualifications based on field blank results (when collected) will be applied in the same manner as qualifications based on laboratory method blank results.

13.3 Reconciliation with User Requirements

All data and related information obtained during the course of this project will be included in the data report package to be submitted to NVL's CIH. Results of the validated analytical data will be reviewed against the project's data quality objectives for accuracy (adequate reporting limits) and completeness.

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