

# Hanford Site Assessment & Characterization/Verification of Buildings Procedure

Prepared for the U.S. Department of Energy  
Assistant Secretary for Environmental Management



U.S. DEPARTMENT OF  
**ENERGY**

### CHANGE SUMMARY

Rev #	Date-Section Changed	Change Details
2	10/06/14 - 1.0	Add statement that DOE-0342-002 applies to assessment/characterization and not to sampling conducted in response to an upset condition.
2	10/06/14 - 1.0	Add note to state that forms created using a previous revision of the procedure don't need to be revised until a revision is otherwise required.
2	10/06/14 - 2.1	Added note that individuals who are not trained/qualified as assessors may assist in the collection of information and the coordination of walkdowns so long as a qualified assessor is responsible for determining completeness and accuracy.
2	10/06/14 - 2.4	Added note that individuals who are not trained/qualified as assessors may assist in the collection of information and the coordination of walkdowns so long as a qualified assessor is responsible for determining completeness and accuracy.
2	10/06/14 - 4.1.1, 5	Changed wording regarding the scheduling of walkdowns.
2	10/06/14 - 4.1.1, 6	Changed note regarding CWB&CTC to part of the step.
2	10/06/14 - 4.1.1, 9	Clarified that the walkdown team has the authority to determine who is appropriate to be contacted to provide building information.
2	10/06/14 - 4.1.1, 10	Added note that newer offices and single use buildings may be assessed through phone interviews and photographs if union participation isn't required.
2	10/06/14 - 4.1.1, 12	Added language to include the determination of sample numbers/locations.
2	10/06/14 - 4.1.1, 13	Assessment form will now be completed in the SWIHD Beryllium Module.

Rev #	Date-Section Changed	Change Details
2	10/06/14 - 4.1.1, 15	Added statement that it is not required to attach copies of sampling reports if a complete listing of the sample data is included in the “Summary of Sampling Data” section.
2	10/06/14 - 4.1.1, 16	Removed the requirement to provide non-record copies of the assessment to the MSC and RL/ORP (will be done automatically in SWIHD).
2	10/06/14 - 4.2	<ol style="list-style-type: none"> <li>1. Added a statement that uncharacterized EDE doesn’t need to be characterized for a building to be beryllium cleared.</li> <li>2. Changed the definition of fully characterized to all locations and items identified by the walkdown team.</li> <li>3. Removed statement regarding posting of partially characterized buildings.</li> </ol>
2	10/06/14 - 4.2.2	Removed steps for conducting a separate characterization walkdown.
2	10/06/14 - 4.2.3, 1	Added the step for creating the sampling plan.
2	10/06/14 - 4.3	Changed note on verification sampling to a requirement.
2	10/06/14 - 4.3.2, 3	Added a note that Table 1 does not apply to verification sampling.
2	10/06/14 - 4.3.2, 5	Change note regarding CWB&CTC to be part of the step.
2	10/06/14 - 4.3.2, 6	Changed actionee from HAMTC to Union representative.
2	10/06/14 - 4.3.2, 7	Changed actionee from Project IH to Walkdown Coordinator.
2	10/06/14 - 4.5.2	Changed from discuss with the union representative to notify.
2	10/06/14 - 4.7.1	Removed the requirement to notify the MSC of changes in posting status (will be done automatically in SWIHD).
2	10/06/14 - 4.7.1	In Case 2, clarified where the additional samples need to be collected from.

Rev #	Date-Section Changed	Change Details
2	10/06/14 - 4.7.2	<ol style="list-style-type: none"> <li>Added “(&lt;1,000sq. ft.)” to where it refers to small survey unit.</li> <li>Added note that Table 1 doesn’t apply to small survey units.</li> </ol>
2	10/06/14 - 4.8	Clarified expectation on how soon the Sampling Report needs to be completed.
2	10/06/14 - 4.10	<ol style="list-style-type: none"> <li>Added CWB&amp;CTC to the groups consulted.</li> <li>Added requirement to post the building until the field office concurs with the technical basis.</li> </ol>
2	10/06/14 - 4.12	Added requirements for mobile offices being shipped off site or transferred between contractors.
2	10/06/14 - Figure 1	Removed Figure 1.
2	10/06/14 - Definitions	Added definition for Small Survey Unit
2	10/06/14 - Acronyms	Added the acronym “SWIHD.”
2	10/06/14 - App B, 6	Changed from “If tears or curls are present” to “If tearing or curling of the corners of the wipe occurs.”
2	10/06/14 - App C, 2	Clarified how long to let the pump run prior to adjusting flow.
2	10/06/14 - App C, 6	Added “Turn off the pump.”
2	10/06/14 - App H	Added the instructions for completing the assessment form in SWIHD.
2	10/06/14 - Various	Standardized the term “Sampling Plan.”
1A	3/19/13 - Section 4.7.1(b)	Minor change to Section 4.7.1(b). Changed “decontaminated” to “remediated.”
1	10/29/12 - Section 2.3	Editorial correction at 2.3, changes to the Requirements and References Section, replaced Figure 1 with an updated flowchart, addition of acronym WIDS, added callout to Appendix B at 4.4. Signed, cleared for issue, not issued.
0	10/8/12	Initial issue, signed but not issued.



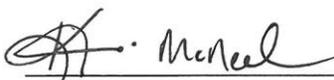
Terry L. Vaughn, Vice President  
CH2M HILL Plateau Remediation Company

10/28/2014  
Date



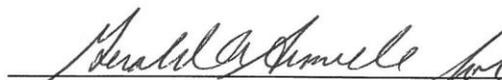
Michael B. Wilson, ESH&T Vice President  
Mission Support Alliance, LLC

30 Oct 14  
Date



Khiss McNeel, ESH&QA Director  
Washington Closure Hanford, LLC

11/4/2014  
Date



Robert E. Wilkinson, ESH&Q Manager  
Washington River Protection Solutions, LLC

11/4/14  
Date

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## 1.0 PURPOSE AND SCOPE

This Hanford Site Assessment and Characterization/Verification of Buildings Procedure, herein called the Procedure, is applicable to buildings designed for human occupancy. This includes any Conex box that has been modified for regular use as an office, respirator issuance station, or other similar activity.

This procedure applies to the assessment and characterization/verification of buildings. This procedure does not apply to sampling in response to upset conditions or to sampling in response to employee concerns.

All beryllium wipe and/or bulk samples in response to upset conditions and/or employee concerns shall be collected in accordance with the methods contained DOE-0342-002 Appendices B-G and results above the trigger level shall be adequately investigated. Downposting and/or de-posting of these sampled area(s) does not require that a formal report be written.

This Procedure is not applicable to:

- Structures such as smokestacks, tanks, and containment basins
- Conex boxes (other than those described above)
- Temporary structures made from materials such as fabric and tubular framing
- Waste sites and other outdoor areas

Previously completed assessment forms, sampling plans, and sampling reports created by following the requirements of previous revisions of this procedure **are not** required to be redone. Updates to assessment forms, sampling plans, and sampling reports shall be completed using the most current forms.

## 2.0 ROLES AND RESPONSIBILITIES

### 2.1 Assessor

The facility assessment of buildings shall be conducted by an assessor with sufficient knowledge and experience to perform such activity (e.g., project industrial hygienist [IH], industrial hygiene technician [IHT], or certified industrial hygienist [CIH]).

**NOTE:** Individuals who are not trained/qualified as assessors may assist in the collection of information and the coordination of walkdowns so long as a qualified assessor is responsible for determining completeness and accuracy.

### 2.2 CBDPP Hanford Atomic Metal Trades Council Representative

Hanford Atomic Metal Trades Council (HAMTC) and Beryllium Awareness Group (BAG) representatives for assessment and characterization/verification sampling plan development walkdowns shall be identified by the Chronic Beryllium Disease Prevention Program (CBDPP) HAMTC representative for the contractor that they represent

**2.3 CIH / Industrial Hygiene Team (Exempt) Lead**

Facility assessment forms, beryllium characterization/verification sampling plans, and characterization/verification sampling reports shall be reviewed by a person with sufficient knowledge and experience to perform such an activity (e.g., assigned CIH, or IH Team (Exempt) Lead).

**2.4 Project Industrial Hygienist**

Beryllium characterization/verification sampling plans and characterization/verification sampling reports shall be completed by a person with sufficient knowledge and experience to perform such an activity (e.g., project IH, or CIH).

**NOTE:** Individuals who are not trained/qualified as project IHS may assist in the collection of information and the coordination of walkdowns so long as a qualified project IH is responsible for determining completeness and accuracy.

**3.0 TRAINING REQUIREMENTS**

All facility assessments of buildings and/or characterization/verification sampling will be conducted by an IH or an IHT. At a minimum, an IH/IHT conducting facility assessments and/or characterization/verification sampling shall be Beryllium Worker qualified and have completed the Beryllium Facility Assessment and Characterization/Verification Training. In addition, the CIH or IH Team (Exempt) Lead/Manager reviewing the assessments shall have completed the Beryllium Facility Assessment and Characterization/Verification Training.

**4.0 PROCEDURE**

**4.1 Beryllium Facility Assessment of Buildings**

**4.1.1 Completing Beryllium Facility Assessment Forms**

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
Assessor	1.	Collect facility information such as building description, occupancy status, year built, and number of employees based in the facility.
	2.	Identify documentation, such as building histories and technical basis documents, which might provide information on prior uses. Identify any applicable beryllium sampling data from the building.
	3.	Conduct an initial interview with a person knowledgeable with the building and its history (e.g., building administrator, building manager, or a senior Hanford employee) to determine the type and complexity of the building.

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
		<p><b>NOTE:</b> Focus the interview, not only on the current use of the building, but also on any potential previous uses.</p>
	4.	<p>Determine the type of building that is being assessed, based on the categories listed below, using the available documentation and the initial interview. The categories are:</p> <ul style="list-style-type: none"> <li>a. Office or mobile office</li> <li>b. Single purpose building (e.g., pump house, guard house)</li> <li>c. Multi-purpose facility</li> </ul>
	5.	<p>Based on the information collected, determine if a walkdown is necessary. It should be considered that mobile offices may have had other uses or locations prior to being converted into office space. If a walkdown is not necessary, Steps 6 – 8 may be skipped.</p>
	6.	<p>Notify their Hanford Site CBDPP Committee HAMTC representative of the assessment information and whether a walkdown is planned. Provide all current assessment data to the HAMTC representative, allowing sufficient time for them to review and become familiar with the data.</p> <p>If the building is routinely used or occupied (or is known to have been previously occupied) by Central Washington Building &amp; Construction Trades Council (CWB&amp;CTC) employees, the CWB&amp;CTC CBDPP Representative shall also be notified of the assessment information and whether a walkdown is planned. Give all current assessment data to the CWB&amp;CTC representative with sufficient time for them to review and become familiar with the data.</p>
CBDPP Bargaining Unit Representative(s)	7.	<p>Determine what level of Bargaining Unit/BAG participation is appropriate and whether Bargaining Unit/BAG participation in a walkdown is necessary.</p> <p>Inform the assessor of who (if anyone) will be attending the walkdown. Designate alternate(s) as necessary from the company-level CBDPP subcommittee or from the specific project to attend the walkdown in the event that the original designated Bargaining Unit representative(s) are not available, and/or request that additional individuals participate.</p>
Assessor	8.	<p>Schedule the walkdown with the administrator/manager of the building. The administrator/manager may participate in the walkdown if they so choose.</p>

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
Assessor / Walkdown Team		Take the necessary steps to ensure the Bargaining Unit/BAG representative(s) are released and available to participate in the walkdown.
	9.	Determine who needs to be contacted to provide sufficient historical knowledge. Groups who may be appropriate to contact include: <ul style="list-style-type: none"> <li>a. Senior employees who are familiar with the building history</li> <li>b. Previous building administrators</li> <li>c. Bargaining Unit employees</li> <li>d. BAG members</li> <li>e. Workers who worked previously in the building (may be current Hanford workers, retirees, or workers who are no longer employed on the Hanford Site)</li> </ul>
	10.	During the interviews and walkdown(s), focus on whether the building currently has (or may have had in the past) any of the following areas and/or items of concern: <ul style="list-style-type: none"> <li>a. Machine Shops</li> <li>b. Metal Manufacturing Activities</li> <li>c. Materials Research and Development</li> <li>d. Fuel Assemblies Experiments</li> <li>e. Electrical Component Fabrication</li> <li>f. Laboratory Operations</li> <li>g. Tool Cribs</li> <li>h. Machinery/Equipment Storage of Potentially Beryllium-contaminated Items</li> <li>i. Tool Maintenance Activities</li> <li>j. Beryllium Controlled Areas (BCA)/Beryllium Regulated Areas (BRA)</li> <li>k. Electrical Distribution Equipment (EDE)</li> <li>l. Bridge Cranes</li> <li>m. Elevator Control Systems</li> <li>n. Other items that may have contained or be contaminated with beryllium or metals alloyed with beryllium including tool boxes, glove boxes and laboratory hoods.</li> </ul> <p><b>NOTE:</b> If it is determined that a walkdown isn't necessary, newer offices and single-use buildings may be assessed using photos and phone interviews with building administrators.</p>
	11.	Determine if additional walkdowns are required to determine characterization sampling requirements. If they are, Step 12 may

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
		be conducted at a later date prior to the completion of the assessment process.
	12.	<p>If areas/items of concern are identified, determine the following:</p> <ol style="list-style-type: none"> <li>Location and size of survey unit(s)</li> <li>Number of samples for each survey unit required for characterization</li> <li>Any specific locations requiring sampling</li> <li>Specific items that require sampling</li> <li>The relative priority for sampling</li> </ol> <p>When considering sampling locations , determine whether the following locations require sampling:</p> <ul style="list-style-type: none"> <li>Floors and ceilings (may include sampling under carpeting in areas of concern)</li> <li>Walls from floor to roof (includes areas above false ceilings)</li> <li>Horizontal surfaces (e.g. beams and catwalks) between the floor and roof (includes areas above false ceilings)</li> <li>Ventilation systems</li> <li>Concealed surfaces behind equipment and/or items</li> </ul> <p><b>NOTE 1:</b> Table 1 should be used as a guide to complete an initial determination of the number of samples required for each survey unit. Table 1 does not apply to small survey units (&lt;1,000 sq. ft.).</p> <p><b>NOTE 2:</b> The walkdown team should attempt to immediately address any issues raised during the walkdown by working with the building owner/administrator and/or the appropriate project management personnel. If one or more walkdown team members still have concerns regarding the results of the walkdown, the team shall take the issue to the company-level CBDPP subcommittee for assistance in resolving the issue. If the company-level CBDPP subcommittee cannot resolve the issue, it shall be raised to the Hanford Site CBDPP Committee.</p>
Assessor	13.	Complete the assessment using the beryllium specific feature of Site-Wide Industrial Hygiene Database (SWIHD) using the Beryllium Facility Assessment Form Completion Instructions (Appendix H).
Project IH	14.	Determine the posting requirements in DOE-0342-003, <i>Hanford Site Beryllium Posting and Labeling Requirements Procedure</i> , and post as required.

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
Assessor or Project IH	15.	<p>Assemble the supporting documentation. If available, attach the following documentation to the assessment form:</p> <ul style="list-style-type: none"> <li>• Characterization sampling data tables or notification forms (not required if complete listing of the sample data is included in the “Summary of Sampling Data” section)</li> <li>• Interview summaries</li> <li>• For documents that are ten pages long or less, attach the entire referenced document</li> <li>• For documents that are more than ten pages, attach the applicable sections of the referenced document</li> </ul> <p>For documents longer than ten pages, note in the “References” section of the assessment form where the referenced document is available (either the physical location or the URL for electronically stored documents).</p>
CIH or Industrial Hygiene Team (Exempt) Lead/Manager	16.	<p>Review the completed form that has been electronically signed by the assessor in SWIHD. The purpose of the review is to ensure that all data requirements have been met, that the forms have been completed properly, and that the conclusions are consistent with the data collected. The review does not require that the collected information be checked for accuracy. The person who conducts the review shall be different from the person who conducted the assessment. Contractors may conduct additional quality reviews at their discretion.</p> <p><b>NOTE 1:</b> The form must be completed electronically. Hand-written copies of the form are not acceptable as the record copy.</p> <p><b>NOTE 2:</b> The applicable U.S. Department of Energy (DOE) field office(s) and the Mission Support Contractor (MSC) will have “read only” access to the completed assessment and applicable supporting documentation through the SWIHD interface to the Integrated Document Management System (IDMS). The MSC will use this access and SWIHD reports to create the monthly summary of newly-assessed facilities and for electronically posting in a central location.</p> <p><b>NOTE 3:</b> It is the responsibility of the contractor conducting the assessment to maintain the record copy of the assessment.</p>

**4.1.2 Revision to the Beryllium Facility Assessment**

Any of the following changes will require that a facility assessment be revised:

- Facility ownership changes from one contractor to another

- Current status (active, inactive, demolished) of the facility changes
- Occupancy status (full time, part time, unoccupied) of the facility changes
- Sampling data is generated that changes the building status from beryllium controlled to beryllium cleared
- One or more answers on the form for past usage are changed from “Potential” to “Yes”

Revision of the form for the above reasons does not require that the entire assessment be conducted again. Only the sections of the assessment form that are impacted need to be revised.

In the event that other information (e.g., additional historical documents, information provided by a current or former worker) becomes available that affects the building’s status, the entire assessment process shall be repeated. If beryllium contamination above the control level is found in an area previously considered to be beryllium cleared, the entire assessment for that building shall be repeated.

#### **4.1.3 Communication of Assessment Results**

Non-record copies of all assessment forms shall be available to employees. These copies may be stored electronically, if all employees have access to electronic records. If hard copies are used, contractors shall set up centrally located information stations where hard copies of the assessment forms are stored and available.

The first week of each month, the MSC shall create a summary report of building assessment information. The summary shall include:

- Buildings that have been newly listed as Beryllium Controlled Facilities (BCFs)
  - Reason why each building was listed as a BCF
- Buildings that have been de-posted based on characterization sampling
  - Technical basis for de-posting the building

The distribution of the monthly summaries for use in safety tailgate meetings (or other safety meetings) is the responsibility of all affected contractors.

#### **4.2 Building Characterization Sampling**

Facilities may be either fully characterized or partially characterized. A facility with areas and/or items of concern (with the exception of electrical distribution equipment) must be fully characterized before it can be considered beryllium cleared. For a facility to be fully characterized all specific locations, items of concern, and any other items identified for sampling must be sampled.

Partial characterization may take the following forms:

- a. One or more survey units may be only partially characterized rather than moving/removing all equipment/items so that all concealed surfaces may be sampled. In other cases, a survey unit may not be characterized because access is difficult (e.g., high contamination areas or permit-required confined spaces).
- b. When entry into unoccupied buildings is required for surveillance, only the portion of the building being accessed must be characterized.

Facilities that have only been partially characterized must be posted as a BCF. All areas that are only partially characterized shall be posted in accordance with DOE-0342-003, *Hanford Site Beryllium Posting and Labeling Requirements*.

#### **4.2.1 Development of Characterization Sampling Plans**

A Beryllium Characterization/Verification Sampling Plan (Form A-6006-167), herein called the Sampling Plan, is required to be completed and approved for all beryllium characterization sampling. The Sampling Plan shall be completed by a person with sufficient knowledge and experience to perform such activity (e.g., project IH or assigned CIH). The following actions are required to complete the Sampling Plan:

#### **4.2.2 Review of Historical Sample Data**

Historical sample data may be used as a part of the characterization of a facility, if **all** of the following criteria are met:

- Samples were analyzed by an American Industrial Hygiene Association (AIHA) accredited laboratory (or a laboratory that demonstrates quality assurance for metals analysis that is equivalent to AIHA accreditation) and the laboratory reports are available.
- Clear identification detailing where the samples were collected is provided either by the sample collection notes or by the characterization report.
- Clear identification that the samples were not collected from a surface that had been decontaminated prior to sampling, provided by either sampling notes or interviews with the employees involved in the sampling.
- For wipe samples that were collected in a radiologically contaminated area, direct evidence that the radiological release protocol did not require that the surface being sampled be wiped or otherwise disturbed prior to collection of the beryllium wipe sample. While the direct evidence may be provided by a copy of the sample release procedure used, other sources of evidence, such as notes on the sample collection forms, interviews with the employees involved, or documentation in the Sampling Plan, may be considered acceptable.
- For samples that have results below the reporting limit, the sample reporting limit must be lower than the trigger level.
- Ensure the conditions that existed at the time of the sampling are

representative of the current building conditions.

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
Project IH	1.	Identify any previous sample data that meets the criteria for use in the characterization of a facility.
	2.	Adjust the required number of sample points for each survey unit as needed based on the data identified in Step 1.

**4.2.3 Completion of the Characterization Sampling Plan**

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
Project IH	1.	Complete the Job Information section of the Sampling Plan, A-6006-167. <ul style="list-style-type: none"> <li>• Enter the Building name.</li> <li>• Enter the Location Description.</li> <li>• Enter the Purpose for the sampling.</li> </ul>
	2.	Complete the “Survey Units” section of the form with the decisions made during the assessment.  List all identified survey units with the decisions made during the assessment in the “Identified Survey Units” section of the Sampling Plan as part of this step.
	3.	Summarize the applicable “Historical Sample Data” for each Survey Unit.
	4.	List any “Identified Sample Locations” that were identified during the assessment for each Survey Unit.
	5.	List the “Required Number of Sample Points” that were determined during the assessment for each Survey Unit.
	6.	Identify any required personal protective equipment (PPE). If the sampling will be conducted under a beryllium work permit (BWP), list the appropriate permit number. PPE identified in a BWP, operating procedure, or work package does not have to be listed again in the Sampling Plan; however, the Sampling Plan must reference those documents.
	7.	Identify any specific work practices that are required. This includes determining if the area needs to be temporarily up-posted to a BCA during intrusive sampling. If the sampling will be conducted under a BWP, list the appropriate permit number.

Actionee	Step	Action
		<p>Work practices identified in a BWP, operating procedure, or work package do not have to be listed again in the Sampling Plan. When required work practices are specified in other documents, the Sampling Plan must also reference those documents. If specific craft support is necessary to support the sampling, the craft requirements shall be listed in the “Work Practices” section of the Sampling Plan.</p> <p><b>NOTE 1:</b> Specific work practices include statements such as: <i>“An elevated lift shall be used while sampling the high bay area.” “All tools, respirators, and sample pumps shall be wet wiped prior to removal from the area.”</i></p> <p><b>NOTE 2:</b> General statements such as: <i>“Use proper lift techniques when moving objects”</i> should not be included in the “Work Practices” section.</p> <p>8. Identify whether beryllium is the only analyte, or if other metals also need to be assessed as part of the analysis. Identify any special instructions for the analysis of the samples in the “Sample Analysis” section of the Sampling Plan.</p> <p>9. List any “Comments/Deviations” that were identified during the walkdown or during the development of the Sampling Plan.</p>

**4.2.4 Approval of Characterization Sampling Plan**

After the Sampling Plan has been completed and signed, either a CIH or IH Team (Exempt) Lead/Manager must review and approve the Sampling Plan. The person who conducts the review shall be different from the person who wrote the Sampling Plan. Contractors may conduct additional quality assurance reviews at their discretion.

**4.3 Verification Sampling**

Contractors shall:

- Conduct verification sampling of buildings that have been deemed to be beryllium cleared based on the facility assessment or characterization results.
- Schedule cleared facilities for verification sampling.

Verification sampling shall be conducted at least every seven years for cleared facilities.

If contamination at or above the control level is found in a building considered to be beryllium clear, document the identified issue and process in accordance with the contractor’s issue management system.

#### 4.3.1 Development of Beryllium Verification Sampling Plan

A Beryllium Characterization/Verification Sampling Plan (Form A-6006-167), herein called the Sampling Plan, is required to be completed and approved for all beryllium verification sampling. The Sampling Plan shall be completed by a person with sufficient knowledge and experience to perform such activity (e.g., project IH or assigned CIH).

#### 4.3.2 Preparation and Completion of the Sampling Plan Development Walkdown

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
Project IH	1.	Review most current Beryllium Facility Assessment Form for the building and any Characterization/Verification Sampling Reports.
	2.	<p>Create an initial list of survey units using the following guidelines:</p> <ul style="list-style-type: none"> <li>a. Identify areas of common usage. Each area will normally be split into one or more survey units.</li> <li>b. Survey units normally will be no greater than 20,000 sq. ft. in floor area.</li> <li>c. Large areas that need to be divided into multiple survey units may be adjusted horizontally (e.g., the area below a false ceiling is one survey unit, the area above the false ceiling a second survey unit) or vertically (e.g., west half of high bay, one survey unit; the east half of high bay, a second survey unit).</li> </ul> <p>Identify any situations that may warrant deviation from the guidelines so that they may be discussed during the walkdown.</p>
	3.	<p>Compare the highest result from the most recent Characterization/Verification Sampling Reports and any other subsequent sample data with the Test Critical Values in Table 2 to identify a suggested number of samples for each survey unit.</p> <p>If the building was initially determined to be beryllium cleared and no characterization/verification sampling has been conducted, compare the analytical laboratory's Reporting Detection Limit (RDL) with the Test Critical Values in Table 2 to identify a suggested number of samples for each survey unit.</p> <p>For small survey units, use one sample for every 200 sq. ft. as a guide for the number of samples.</p> <p><b>NOTE:</b> It is not necessary to use Table 1 when preparing a Verification Sampling Plan.</p>

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
	4.	<p>Prepare an unapproved draft Sampling Plan with the information developed in Steps 2 and 3.</p> <p><b>NOTE:</b> PPE, Work Practices, and Sample Analysis information are not required to be on the draft Sampling Plan.</p>
CBDPP Bargaining Unit Representative(s)	5.	<p>Notify their Hanford Site CBDPP Committee HAMTC representative that verification sampling is needed and whether a walkdown is necessary. Give the facility assessment form, associated sampling data, and the draft Sampling Plan to the HAMTC representative prior to the planned walkdown with sufficient time for them to review and become familiar with the data. Take the necessary steps to ensure the representative (or designee) is released and available to participate in any required walkdowns.</p> <p>If the building is routinely used or occupied (or is known to have been previously occupied) by Central Washington Building &amp; Construction Trades Council (CWB&amp;CTC) employees, the CWB&amp;CTC CBDPP Representative shall also be notified of whether a walkdown will be conducted. Give all current assessment data to the CWB&amp;CTC representative prior to the walkdown with sufficient time for them to review and become familiar with the data. Take the necessary steps to ensure the representative (or designee) is released and available to participate in any required walkdowns.</p> <p>If a walkdown is not required, Steps 6 – 9 may be skipped. Document in the Sampling Plan the reason that a walkdown was not required in the “Comments/Deviations” section.</p>
Project IH	6.	<p>Determine what level of Bargaining Unit/BAG participation is appropriate for the walkdown.</p> <p>Inform the Project IH of who will be attending the walkdown. Designate alternates as necessary from the company-level CBDPP subcommittee, or from the specific project, to attend the walkdown in the event the original designated Bargaining Unit representative(s) are not available and/or request that additional individuals participate.</p>
	7.	<p>Notify the administrator/manager of the building that the walkdown is scheduled. The administrator/manager may participate in the walkdown if they so choose.</p>

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
Project IH / Walkdown Team	8.	Walk down the facility. If a walkdown is desired but it is not feasible to conduct a site condition walkdown due to safety considerations, meet as a team to discuss the Sampling Plan.
	9.	Interview employees of occupied buildings to identify particular areas/items of concern. Include specific locations of concern in the total number of sample points for the survey unit. Items identified by employees as needing sampling may either be made into their own survey unit or they may be included in the number of sample points for items within an existing survey unit.
	10.	Determine the following: <ol style="list-style-type: none"> <li>a. The appropriate number, size, and shape of survey units. Consider the following when determining appropriate number, size, and shape of the survey units:               <ul style="list-style-type: none"> <li>• Whether large areas (&gt; 20,000 sq. ft.) with a common usage should be a single survey unit</li> <li>• Whether large high bays should be divided horizontally or vertically</li> <li>• Whether multiple past usages suggests that rooms should be divided into multiple survey units</li> </ul> </li> <li>b. Consider the following when determining the appropriate number of samples:               <ul style="list-style-type: none"> <li>• The impact of the laboratory's RDL on the number of samples required</li> <li>• The height of the building (high bays may require more samples)</li> <li>• The number of items (areas with a large number of items may require more samples, areas with no items present may require fewer samples)</li> <li>• Complexity and past usage of the building</li> <li>• Whether the building is a small survey unit that requires fewer samples</li> </ul> </li> <li>c. Whether there are any locations that need to be identified on the Sampling Plan for biased sampling.</li> <li>d. The number of items that need to be sampled.</li> <li>e. Whether there are any specific items that need to be sampled.</li> <li>f. Whether wipe samples, bulk samples, or a combination of the two should be collected.</li> </ol>

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
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**NOTE:** The walkdown team should attempt to immediately address any issues raised during the walkdown by working with the building administrator/manager and/or the appropriate project management personnel. If one or more walkdown team members still have concerns regarding the results of the walkdown, the team shall take the issue to the company-level CBDPP subcommittee for assistance in resolving the issue. If the company-level CBDPP subcommittee cannot resolve the issue, it shall be raised to Hanford Site CBDPP Committee.

### 4.3.3 Completion of the Verification Sampling Plan Form

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
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- |            |    |   |
|------------|----|---|
| Project IH | 1. | Complete the “Survey Units” section of the form with the decisions made by the walkdown team.   |
|            | 2. | Summarize the applicable characterization reports and other samples collected in the area in the “Historical Sample Data” for each Survey Unit.   |
|            | 3. | List any “Identified Sample Locations” that were identified for each Survey Unit.   |
|            | 4. | List the “Required Number of Sample Points” that were identified by the team for each Survey Unit.  |
|            | 5. | Identify any required PPE. PPE identified in an operating procedure or work package does not have to be listed again in the Sampling Plan; however, the Sampling Plan must reference those documents.   |
|            | 6. | Identify any specific work practices that are required. This includes determining if the area needs to be temporarily up-posted to a BCA during intrusive sampling. Work practices identified in an operating procedure or work package do not have to be listed again in the Sampling Plan. When required work practices are specified in other documents, the Sampling Plan must also reference those documents. If specific craft support is necessary to support the sampling, the craft requirements shall be listed in the “Work Practices” section of the Sampling Plan. |

**NOTE 1:** Specific work practices include statements such as: “An elevated lift shall be used while sampling the high bay area.” “All tools, respirators, and sample pumps shall be wet wiped prior to removal from the area.”

Actionee	Step	Action
		<b>NOTE 2:</b> General statements such as: <i>“Use proper lift techniques when moving objects”</i> should not be included in the “Work Practices” section.
	7.	Identify whether beryllium is the only analyte, or if other metals also need to be assessed as part of the analysis. Identify any special instructions for the analysis of the samples in the “Sample Analysis” section of the Sampling Plan.
	8.	List any “Comments/Deviations” that were identified during the walkdown or during the development of the Sampling Plan.

#### 4.3.4 Approval of the Verification Sampling Plan

After the Sampling Plan has been completed and signed, either a CIH or IH Team (Exempt) Lead/Manager must review and approve the Sampling Plan. The person who conducts the review shall be different from the person who wrote the Sampling Plan. Contractors may conduct additional quality reviews at their discretion.

#### 4.4 Collection and Analysis of Samples

Collect samples using the methods in [Appendices B, C, D, E, F](#) and [G](#). Document any deviation from the methods in the appendices on the Sampling Plan in the “Comments/Deviations” section. In addition, the deviation from the sampling method must be discussed in the characterization/verification sampling report in the “Comments/Deviations” section.

All samples shall be analyzed by a laboratory accredited for metals by the AIHA or a laboratory that demonstrates quality assurance for metals analysis that is equivalent to AIHA accreditation.

Track and control all samples using the chain of custody process agreed upon by the contractor and the laboratory.

#### 4.5 Changes to Sampling Plans

##### 4.5.1 Minor Changes to Sampling Plans

Because conditions in the field can change, it is sometimes necessary to make field changes to the Sampling Plan. Minor changes may be made in the field with pen and ink by the IH/IHT conducting the work. While work may continue once the change is made, report all minor changes made in the field to the IH overseeing the sampling. Any change not included in the list below shall be considered to be a major change.

Minor Changes:

- Editorial changes to correct grammatical, typographical, or spelling errors
- Correction of units of measure (e.g., incorrectly referring to  $\mu\text{g/g}$  when discussing wipe samples)
- Changing the types of samples to be collected (bulk or wipes)
- Modifying the location where samples will be taken
- Increasing the number of samples to be collected

Document pen and ink changes by drawing a single line through the text being changed and inserting the new text in a legible manner. The IH/IHT conducting and/or overseeing the sampling shall then print their name, sign, and date the changed document. Reporting of the change to the IH overseeing the work may be made in person, via telephone, or by email. Document the change, as well as the justification for the change, in the characterization/verification sampling report.

#### **4.5.2 Major Changes to Sampling Plans**

Major changes require a change to the Sampling Plan, and must also be approved by either a CIH or IH Team (Exempt) Lead/Manager. Such approvals may be made by teleconference. If the approval is by teleconference, a written notation must be made on the changed document that the approval was received via teleconference. The notation shall include the following:

- Printed name of the person approving the change
- Printed name and signature of the person who received the verbal approval
- Date and time that the approval was received

In addition, the appropriate Bargaining Unit CBDPP Representative (or designee) must be contacted to ensure that they are aware of the changes being made.

Examples of Major Changes:

- Decreasing the number of samples to be collected
- Reducing the number of survey units
- Breaking a survey unit into multiple survey units
- Modifying the size of the survey units
- Not sampling an item or location that was specifically identified in the Sampling Plan as requiring sampling

When a major change is required, work may continue on all portions of the Sampling Plan that are not impacted by the major change. In cases where it is necessary to reduce the items/locations which are specifically identified for sampling within a survey unit, partial sampling of the survey unit may be conducted. In all cases, suspend sampling on the specific portion of the Sampling Plan that requires a major change.

Document pen and ink changes by drawing a single line through the text being changed and inserting the new text in a legible manner. The IH conducting and/or overseeing the sampling shall then print their name, sign and date the changed document. If the approval is by teleconference, make a notation on the changed document that the approval was received via teleconference, including the printed name of the person approving the change, the printed name and signature of the person who received the verbal approval and the date and time that approval was received.

Document the change, the justification for the change, when the appropriate CBDPP Bargaining Unit representative was contacted, and whether another walkdown was conducted in the characterization/verification sampling report.

#### 4.6 Partial Completion of Sampling

In the event that not all of the sampling specified on the Sampling Plan can be completed as planned, the contractor may either:

- Temporarily suspend sampling and complete the sampling at a later date
- Revise the Sampling Plan to reflect the changed scope of work

If sampling cannot be completed within 30 calendar days of the sampling being suspended, revise the Sampling Plan and complete an interim characterization/verification sampling report with the results summarized and posted.

#### 4.7 Analysis of Data

##### 4.7.1 Standard Survey Units

When final sample results are received from the laboratory, compare the results to [Table 2](#), the trigger levels, and the control levels. Compare the highest sample result with [Table 2](#) to determine if any additional samples need to be taken. If a sufficient number of samples have been taken, determine which of the following three cases apply:

- a. Case 1 – All samples are below the trigger level for the survey unit:
  1. No further sampling required (If full characterization/verification sampling was conducted, the area/item may be considered to be beryllium cleared)
  2. Complete the characterization/verification sampling report
  3. Communicate results to employees
  4. Modify postings, as necessary
  5. Update the Beryllium Facility Assessment Form, as necessary
- b. Case 2 – One or more samples are at or above the trigger level for the survey unit but none are above the control level:

**NOTE:** The additional samples required in Case 2 are separate from any additional samples taken to meet [Table 2](#) requirements.

1. Control the area/item as a Restricted Access Area, and modify the Sampling Plan to require the collection of additional samples
2. Collect six or more samples from adjacent areas. If possible, collect the samples from within five linear ft. radiating out in all directions from each sample location that exceeded the trigger level
  - a. If none of the additional samples collected exceed the trigger level, no further sampling is required
  - b. If any of the additional sample results indicate a level of beryllium that exceeds the trigger level in a particular direction, additional samples shall be taken as directed by the Project IH to determine the boundary of potential beryllium contamination in that direction
3. The additional samples shall be collected within two weeks of receipt of the final sample results or as agreed upon with the applicable DOE field office
4. Analyze the additional data
  - a. If none of the additional samples exceed the control level, the area/item may be considered to be beryllium cleared
  - b. If any of the additional samples exceed the trigger level, as part of good housekeeping, the area/item shall be remediated to the defined boundary by an accepted method prior to being deemed beryllium cleared
  - c. If any of the additional samples are found to be above the control level, post in accordance with DOE-0342-003, *Hanford Site Postings and Labeling Requirements Procedure*
5. Complete the characterization/verification sampling report
6. Communicate results to employees
7. Modify postings, as necessary
8. Update the Beryllium Facility Assessment Form, as necessary

**NOTE:** If the sample that exceeds the trigger level was collected on an item, the item may either be remediated by an accepted method or disposed of. The additional samples shall be collected from the area around the item.

- c. Case 3 – One or more samples are at or above the control level:
  1. Notify the applicable DOE field office of the results within one working day of receiving the final lab report via telephone call or email
  2. Appropriately post the area and facility where the sample was taken
  3. Conduct additional characterization sampling of surrounding areas to

- ensure that contamination has not spread outside of the posted area
- 4. Consider taking the posted area and breaking it down into multiple survey units and re-sampling to better define the area of contamination
- 5. Complete the characterization/verification sampling report
- 6. Communicate the results to employees
- 7. Update the Beryllium Facility Assessment Form

#### 4.7.2 Small Survey Units

When final sample results are received from the laboratory for a small survey unit (<1,000 sq. ft.), review the sample results to determine which of the above three cases apply and then follow the appropriate steps.

**NOTE:** Table 2 is not used as part of the data analysis for small survey units.

### 4.8 Completion of Sampling Reports

Complete characterization/verification sampling reports for all sampling within 30 calendar days of receipt of the last sample result (including any follow-up samples for results at or above the trigger level). Complete characterization/verification sampling reports for an entire building, or sections of a building, if not all of the sampling will be conducted at the same time.

The characterization/verification sampling report shall consist of the following:

Report Sections:

- Executive Summary

The executive summary is a brief (less than one page) summary of the report. A reader of the summary should be able to understand why the sampling was conducted, what the results were, and the main conclusions reached.
- Introduction

The introduction describes the building sampled and the reason that it was identified for sampling.
- Sample Strategy & Methodology

This section provides an overview of the sampling strategy and how the sampling was conducted. Because the Beryllium Characterization/Verification Sampling Plan is attached to the report, this section doesn't need to capture all of the Sampling Plan details.
- Deviations

In the event that a deviation is made that is authorized by this procedure, discuss the details of the deviation in this section. Include the reason for each deviation.
- Results Summary

This is a summary of the results that describes the number and type of samples collected and whether any samples were above the trigger and/or control levels.

Discuss any trends in the sampling data in this section.

- Conclusions/Recommendations

Any conclusions reached regarding the building status, including recommendations go in this section.

- References

A list of any documents mentioned in the report that are not provided as attachments are in this section.

Attachments:

- Sample Data Tables
- Characterization/Verification Sampling Plan (including all changes from the initial version)
- Photos and/or maps of sample locations
- Summary of Data (Postings)

The characterization/verification sampling report shall be completed by a person with sufficient knowledge and experience to perform such activity (e.g., project IH or assigned CIH). Once the report has been completed and signed, it shall be reviewed by either a CIH or IH Team (Exempt) Lead/Manager. The person who conducts the review shall be different from the person who wrote the report. The reviewer shall also sign the report. Contractors may conduct additional quality reviews at their discretion.

#### **4.9 Communication of Sampling Results**

Non-record copies of all characterization/verification sampling reports shall be available to employees. These copies may be stored electronically, if all employees have access to electronic records. If hard copies are used, contractors shall set up centrally located information stations where hard copies of the reports are stored.

#### **4.10 Developing a Technical Basis for Exceeding Control Levels**

Additional analysis may be conducted by the contractor when a naturally occurring source of beryllium is known to be present. In such cases, the contractor must present evidence that a naturally occurring beryllium source is expected to be the cause of any samples that exceed the control levels.

The technical basis shall include:

- The scope and/or area defined by the technical basis
- Description of the workforce affected
- Source of the natural occurring beryllium
- Expected concentrations of beryllium
- Evidence that no sources of anthropogenic beryllium were ever present
- Exposure controls that will be used

If the applicable DOE field office (with BAG, HAMTC, CWB&CTC involvement)

concurs with the contractor’s technical basis, the area defined by the technical basis can be considered beryllium cleared even if control levels are exceeded. In addition, ongoing work can be considered to not be a beryllium activity.

Any areas where one or more samples were at or above the applicable control level shall be controlled for beryllium until the applicable DOE field office concurs with the technical basis. This includes posting in accordance with DOE-0342-003, *Hanford Site Beryllium Posting and Labeling Requirements Procedure*.

**4.11 Sampling Requirements for Demolition Preparation**

Contractors shall ensure that all beryllium cleared facilities have characterization/verification sampling data prior to demolition. If a facility doesn’t have sampling data to support the decision to declare it beryllium cleared, either verification sampling shall be conducted prior to demolition or the building status shall be changed to a BCF.

**4.12 Transfer, Removal, and Demolition of Mobile Offices**

All trailers (e.g. mobile offices, rest room facilities, change trailers) being shipped off-site shall be assessed in accordance with this document, DOE-0342-002. Any areas/items of concern (with the exception of electrical distribution equipment) shall be sampled in accordance with DOE-0342-002 prior to the trailer being shipped off-site.

All trailers being transferred between contractors shall be assessed in accordance with DOE-0342-002. Prior to transfer, any areas/items of concern (with the exception of electrical distribution equipment) shall either be sampled in accordance with DOE-0342-002 or the trailer shall be appropriately posted.

Contractors shall ensure that all beryllium cleared mobile offices have characterization/verification sampling data prior to demolition. If a mobile office doesn’t have sampling data to support the decision to declare it beryllium cleared, either verification sampling shall be conducted or the building status shall be changed to a BCF prior to demolition.

**5.0 CONTROL AND REVIEW OF DOCUMENTS**

The Hanford Site CBDPP Committee will provide long-term stewardship and operation of this Procedure.

**6.0 RECORDS**

Record Description	Submittal Responsibility	Retention Responsibility
Beryllium Facility Assessment Form	Assessor	Site-Wide Industrial Hygiene Database (SWIHD)

<b>Record Description</b>	<b>Submittal Responsibility</b>	<b>Retention Responsibility</b>
Characterization/Verification Report (including all attachments)	Project IH	Electronic (IDMS or similar)
Sampling Data	IH/IHT	Site-Wide Industrial Hygiene Database (SWIHD)

## 7.0 SOURCES

### 7.1 Requirements:

10 CFR 850, "Chronic Beryllium Disease Prevention Program," Title 10, *Code of Federal Regulations*, Part 850, as amended.

10 CFR 851, "Worker Safety and Health Program," Title 10, *Code of Federal Regulations*, Part 851, as amended.

29 CFR 1910, "Occupational Safety and Health Standards," Title 29, *Code of Federal Regulations*, Part 1910, as amended.

DOE-0342, *Hanford Site Chronic Beryllium Disease Prevention Program (CBDPP)*, U.S. Department of Energy.

### 7.2 References:

Beryllium Characterization/Verification Sampling Plan, A-6006-167.

DOE-0342-003, *Hanford Site Beryllium Posting and Labeling Requirements Procedure*.

**TABLE 1: CHARACTERIZATION SAMPLING**

<u>Suggested minimum # of sample points</u>	
< 1000 sq. ft.	2 samples per every 200 sq. ft.
1,001 – 2,500 sq. ft.	10
2,501 – 5,000 sq. ft.	20
5,001 – 10,000 sq. ft.	30

TABLE 2: TEST CRITICAL VALUE TABLE

Number of Samples	Test Critical Values		Number of Samples	Test Critical Values	
	Wipe Samples (µg/100 cm <sup>2</sup> )	Bulk Samples (µg/g)		Wipe Samples (µg/100 cm <sup>2</sup> )	Bulk Samples (µg/g)
10	0.027	0.272	35	0.121	1.205
11	0.031	0.309	36	0.124	1.241
12	0.035	0.347	37	0.128	1.276
13	0.038	0.385	38	0.131	1.311
14	0.042	0.423	39	0.135	1.347
15	0.046	0.461	40	0.138	1.382
16	0.050	0.500	41	0.142	1.416
17	0.054	0.538	42	0.145	1.451
18	0.058	0.576	43	0.149	1.486
19	0.061	0.614	44	0.152	1.520
20	0.065	0.652	45	0.155	1.554
21	0.069	0.690	46	0.159	1.588
22	0.073	0.728	47	0.162	1.622
23	0.077	0.765	48	0.166	1.656
24	0.080	0.803	49	0.169	1.690
25	0.084	0.840	50	0.172	1.723
26	0.088	0.877	51	0.176	1.757
27	0.091	0.914	52	0.179	1.790
28	0.095	0.951	53	0.182	1.823
29	0.099	0.988	54	0.186	1.856
30	0.102	1.024	55	0.189	1.889
31	0.106	1.061	56	0.192	1.922
32	0.110	1.097	57	0.195	1.954
33	0.113	1.133	58	0.199	1.987
34	0.117	1.169	59 or more	0.200	2.000

The Test Critical Value (TCV) for 59 or more samples is the Control Level.

## APPENDIX A: DEFINITIONS &amp; ACRONYMS

## DEFINITIONS

Term	Definition
Anthropogenic Beryllium	Beryllium and beryllium alloys created through artificial activities. The most common forms are beryllium, beryllium oxide, and copper beryllium alloys.
Control Level	The sample concentration level that requires an area to be beryllium controlled.
Electrical Distribution Equipment	Electrical equipment such as Motor Control Centers, switchgear, relay cabinets, lighting panels, and electrical disconnects. It does not include light switches, electrical outlets, tools and other equipment that are electrically powered, extra-low voltage systems (<50 V) such as programmable logic controllers (PLCs), transformers and pole-mounted cut-outs.
Location of Concern	A specific location within a survey unit that is identified during employee interviews as potentially beryllium contaminated. All locations of concern shall be sampled.
Test Critical Value (TCV)	The highest sample value for a group of samples collected in a survey unit. The TCV determines the minimum number of samples required for a standard survey unit.
Naturally Occurring Beryllium	<p>Natural forms of beryllium such as those found in soil, rocks, coal, and oil.</p> <p><b>NOTE:</b> Fly ash is considered to contain naturally occurring beryllium since the process of burning coal doesn't change the form of the beryllium.</p>

Term	Definition
Small Survey Unit	A survey unit that is <1,000 sq. ft. in size.
Trigger Level	The sample concentration level that triggers additional investigative requirements.

## ACRONYMS

AIHA	American Industrial Hygiene Association
BAG	Beryllium Awareness Group
BCA	Beryllium Controlled Area
BCF	Beryllium Controlled Facility
Be	Beryllium
BRA	Beryllium Regulated Area
BSA	Beryllium Suspect Area
BWP	Beryllium Work Permit
CBDPP	Chronic Beryllium Disease Prevention Program
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CWB&CTC	Central Washington Building & Construction Trades Council
DOE	U.S. Department of Energy
EDE	Electrical Distribution Equipment
HAMTC	Hanford Atomic Metal Trades Council
IDMS	Integrated Document Management System
IH	Industrial Hygienist
IHT	Industrial Hygiene Technician
LPM	Liters Per Minute
MCEF	Mixed Cellulose Ester Filter
MSC	Mission Support Contractor
PPE	Personal Protective Equipment
RDL	Reporting Detection Limit
PLC	Programmable Logic Controllers
SWIHD	Site-Wide Industrial Hygiene Database
TCV	Test Critical Value
WIDS	Waste Information Data System

## APPENDIX B: WIPE SAMPLING

### Applicability

Wipe sampling is used for the characterization of hard, relatively smooth surfaces that are clean or have a light coat of dust or debris. As a rule of thumb, if a person can write their name in the accumulated material on a surface, wipe sampling alone is inappropriate and a bulk sample should be collected.

Wipe sampling is inappropriate for rough surfaces such as corrugated metal, wood, or other materials that may tear the wipe. Wipe sampling is also inappropriate for surfaces such as carpeting or fabric which can cause the particulate to not be collected by the wipe.

### Supplies

- Disposable sampling templates (10 cm by 10 cm)
- GhostWipe®<sup>1</sup> wipes
- Sample containers
- Measuring tool (tape or ruler)
- Disposable latex or nitrile gloves (powderless)
- Adhesive tape
- Cleaning wipes

### Procedure

1. Don a pair of clean gloves.
2. Determine whether it is appropriate to use a template or to define the sample area with tape.
  - a. Template – Carefully place a clean template on the surface to be sampled. Tape the outside edges of the template to prevent the template from moving during sample collection.
  - b. Tape – Measure out a 100 cm<sup>2</sup> area. Mark the area with tape, being careful not to disturb the settled dust. Clean off the measuring tool with a cleaning wipe. Once the area has been taped off, measure it a second time, recording the actual area. Clean off the measuring tool with a cleaning wipe.

**NOTE:** Tape can be used to define 100 cm<sup>2</sup> in shapes other than a 10 cm by 10 cm square.

3. If it is possible for the package containing the GhostWipe® wipes to be contaminated, clean the outside of the wipe package with a cleaning wipe prior to opening.
4. Remove the GhostWipe® wipe from its package. Confirm that it is clean and fully wetted. Discard the wipe if it is dry and/or shows evidence of contamination.

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<sup>1</sup> GhostWipe is a registered trademark of Environmental Express, Inc.

5. Using an open, flat hand with fingers held together, place the wipe on the surface to be sampled. Wipe the selected surface area, side to side, using an overlapping “S” or “Z” pattern while applying pressure to the fingertips. Wipe the surface so that the wipe passes over all of the identified surface area.
6. Inspect the wipe for tears or curling. If tears or curling of the corners of the wipe occurs, consider voiding the sample and collecting another sample from a different, adjacent area. Document the decision to keep or void the sample in the field notes and discuss the basis for the decision in the characterization sampling report. If so much material is present on the wipe that it is caking rather than adhering to the wipe, the sample shall be voided and a bulk sample shall be collected from an adjacent area.
7. Fold the exposed side of the wipe inward (i.e., fold in half). Using the once-folded wipe, wipe the same area, up and down, using an overlapping “S” or “Z” pattern while applying pressure to the fingertips. Wipe the surface so that the wipe passes over all of the identified surface area. Fold the exposed side of the wipe in a second time.
8. Using the twice-folded media, wipe the same area one more time, focusing on the edges and the corners of the selected surface area. Fold the exposed side of the wipe in.
9. Place the media in the sample container. Label the container with the sample identification. Record the location of the sample. Take any necessary photos. If the area sampled was marked with tape, ensure that actual area sampled is recorded.  
  
**NOTE:** Whenever possible, photographs and sample maps should be used to document where samples were collected.
10. *Optional* – Remove any tape and templates used.  
  
**NOTE:** Tape and/or templates may be left in place to identify the sample locations while the sample results are pending. In unoccupied buildings, locations and/or sample numbers may be marked directly on the building surfaces with building administrator permission.
11. Discard the gloves used.
12. Submit blank wipe samples as specified by the laboratory and/or company requirements.

## **APPENDIX C: BULK SAMPLING BY MICRO VACUUM**

### Applicability

When surfaces have heavy material loading, the collection of wipe samples is inappropriate. Bulk sampling by micro vacuum is the preferred method of collecting bulk samples. Micro vacuum sampling works best when the material is lightweight and does not adhere to the surface. If the micro vacuum is incapable of lifting the majority of the material off the surface being sampled, another bulk sampling method must be used.

### Supplies

- Air sampling pump
- Calibration device
- 37 mm Mixed Cellulose Ester Filter (MCEF) cassettes
- Tygon®<sup>2</sup> tubing or equivalent
- Scissors
- Radiological contamination protection filter (if needed)
- Sample containers
- Disposable latex or nitrile gloves (powderless)
- Adhesive tape
- Cleaning wipes

### Procedure

1. Attach a 37 mm MCEF cassette to the air sampling pump using Tygon® tubing. If necessary, place a radiological contamination protection filter in line between the cassette and the pump.
2. Activate the pump and let it run for several minutes (or according to manufacturer instructions). Adjust the flow to a level sufficient to collect material. While 2.5 lpm is normally sufficient to collect bulk material, higher flow rates may be used to collect denser material.

**NOTE:** Flow rates may be adjusted during sampling if necessary.

3. If it is necessary to reach into cracks or crevices, cut a 1in. – 2in. piece of Tygon® tubing to use as a collection nozzle. Cut one of the ends at a 45° angle. Attach the uncut end to the inlet side of the cassette.
4. Don a pair of clean gloves.
5. Using the sampling pump as a vacuum, collect the bulk sample. Slowly move the cassette (with or without the tubing nozzle) over the area, ensuring that the all visible material is

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<sup>2</sup> Tygon is a registered trademark of Saint-Gobain Performance Plastics Corporation California.

removed. If the sampling pump is incapable of picking up the material, void the sample and collect the bulk sample from an adjacent area using a different sample collection method.

While the mass required may vary by laboratory, normally at least 0.2 g is required and a minimum of 0.5 g is preferred. Reference cassettes may be used to estimate the mass of the material collected.

6. Turn off the sample pump. Remove the sample cassette and cap the openings. Discard the Tygon® collection nozzle if used. Ensure that the cassette is labeled with the sample identification. Record the location of the sample.

**NOTE:** Whenever possible, photographs and sample maps should be used to document where samples were collected.

7. If a layer of adhered material remains on the surface after collecting the micro vacuum sample, collect a bulk sample by scraping using the method in Appendix E, “Bulk Sampling by Scraping.” If sufficient material is collected by the scrape sampling, submit that material as a separate sample from the material collected by micro vacuum. If insufficient material is present for it to be a valid bulk sample, combine the material with the material collected by micro-vacuum.

8. *Optional* – Remove any tape and the template used.

**NOTE:** Tape and/or templates may be left in place to identify the sample locations while the sample results are pending.

9. Discard the gloves and template if used.
10. If the sampling pump assembly potentially touched the surface being sampled, wipe down the assembly using a cleaning wipe.
11. Generate blank micro vacuum samples (unused cassette) as requested by the lab and/or company procedure.

## APPENDIX D: BULK SAMPLING BY BRUSH

### Applicability

When surfaces have heavy material loading, the collection of wipe samples is inappropriate. Bulk sampling by brush works best for dense materials that do not adhere to the surface. Examples of materials best collected by brush are sandy, blown soil and debris mixed with metal fines.

### Supplies

- Disposable brushes
- Note cards or other stiff paper
- Sample containers
- Disposable latex or nitrile gloves (powderless)
- Adhesive tape
- Cleaning wipes

### Procedure

1. Don a pair of clean gloves.
2. Brush the material into the sample container. If necessary, use a note card to first collect the brushed material and then place into the sample container.

While the mass required may vary by laboratory, normally at least 0.2 g is required and a minimum of 0.5 g is preferred. Reference containers may be used to estimate the mass of the material collected.

3. Ensure that all visible material is removed. If necessary, use the scrape method in Appendix E: "Bulk Sampling by Scraping" to remove any adhered material. Any material collected using the scrape method shall be placed in the same container as the brushed up material. If use of both the brush and scrape methods are incapable of collecting all visible material, note this fact on the sample data sheet.
4. Place the material in the sample container. Label the container with the sample identification. Record the location of the sample.

**NOTE:** Whenever possible, photographs and sample maps should be used to document where samples were collected.

If a layer of adhered material remains on the surface after collecting the brush sample, collect a bulk sample by scraping using the method in Appendix E, "Bulk Sampling by Scraping." If sufficient material is collected by the scrape sampling, submit that material as a separate sample from the material collected by brush. If insufficient material is present for it to be a valid bulk sample, combine the material with the material collected by brush.

5. *Optional* –Remove any tape and template used.

**NOTE:** Tape and/or templates may be left in place to identify the sample locations while the

sample results are pending.

6. Discard the gloves, brush, and note card if used.

## **APPENDIX E: BULK SAMPLING BY SCRAPING**

### Applicability

When surfaces have heavy material loading, the collection of wipe samples is inappropriate. While micro vacuum sampling is the preferred method for collecting bulk samples, certain conditions require an alternative sampling method. If the material adheres to the surface, micro vacuum sampling may be incapable of removing the bulk material. In these cases, scrape sampling may be appropriate. Because this method uses mechanical removal, the potential for generating airborne particulates should be considered during the planning of the sampling.

Bulk sampling by scraping works best for materials that adhere to the surface. Scrape sampling is appropriate for oily dirt that cannot be vacuumed or brushed and on surfaces that have had a fixative applied.

### Supplies

- Non-metal spoon and/or knife (such as disposable cutlery)
- Note cards or other stiff paper
- Disposable brushes
- Sample containers
- Disposable latex or nitrile gloves (powderless)
- Cleaning wipes
- Spray bottle with distilled or deionized water

### Procedure

1. Inspect surface to be sampled. While surfaces requiring scrape sampling are normally unlikely to generate particulate during sampling, the surface to be sampled shall be wetted down using distilled or deionized water, if material capable of becoming airborne is present. An example would be a surface where loose particulate is sitting atop a crusted material.
2. Don a pair of clean gloves.
3. Using the non-metal knife or spoon, collect the bulk sample.
4. Scrape the material into the sample container. If necessary, use a note card to first collect the scraped material and then place into the sample container.

While the mass required may vary by laboratory, normally at least 0.2 g is required and a minimum of 0.5 g is preferred. Reference containers may be used to estimate the mass of the material collected.

5. Ensure that all visible material is removed. If necessary, use the brush method in Appendix D: "Bulk Sampling by Brush: to remove any remaining material. Any material collected using the brush method shall be placed in the same container as the scraped off material. If use of both the scrape and brush methods are incapable of collecting all visible material, note this fact on the sample data sheet.

6. Place the media in the sample container. Label the container with the sample identification. Record the location of the sample.

**NOTE:** Whenever possible, photographs and sample maps should be used to document where samples were collected.

7. Discard the gloves, disposable cutlery, brush, and note card if used.

## **APPENDIX F: BULK SAMPLING BY SCOOPING**

### Applicability

When surfaces have heavy material loading, the collection of wipe samples is inappropriate. While micro vacuum sampling is the preferred method for collecting bulk samples, certain conditions require an alternative sampling method. If too much material is present, micro vacuum sampling may allow only the top layer to be sampled before the sample cassette is fully loaded.

Bulk sampling by scooping is appropriate when an excess of material is present and only a small area needs to be sampled to collect a sufficient amount of sample material. Because a scoop sample would only be taken in a situation where dust loading prevents a 100 cm<sup>2</sup> area from having all visible material removed, a wipe sample isn't required to be collected.

### Supplies

- Non-metal spoon or other non-metal scooping tool (such as disposable cutlery)
- Sample containers
- Disposable latex or nitrile gloves (powderless)
- Cleaning wipes
- Spray bottle with distilled or deionized water

### Procedure

1. Inspect surface to be sampled. The surface to be sampled shall be wetted down using distilled or deionized water if material capable of becoming airborne is present.
2. Don a pair of clean gloves.
3. Using the non-metal scooping tool, collect the bulk sample. Ensure that all layers present are collected. Each sample shall be from a single location.
4. Label the container with the sample identification. Record the location of the sample.

**NOTE:** Whenever possible, photographs and sample maps should be used to document where samples were collected.

5. Discard the gloves and disposable cutlery.

**APPENDIX G: WIPE SAMPLING BY WHATMAN FILTER****(ANALYZED BY FLUOROMETRY)*****Applicability***

Wipe sampling with wetted Whatman®<sup>3</sup> filters is used for the characterization of surfaces that are hard, smooth, and clean. If the surface has any texture it is likely to tear the filter. Because Whatman® filters are smaller than GhostWipe® wipes, they are much more susceptible to overloading. Use of Whatman® filters is best used for sampling of recently cleaned surfaces that are hard and smooth.

The advantage of using wetted Whatman® filters is that they can be analyzed using the Berylliant®<sup>4</sup> fluorometers. Samples analyzed through fluorometry require less sample preparation time and results can be available more quickly.

***Supplies***

- Disposable sampling templates (10 cm by 10 cm)
- 47 mm Whatman® Grade 541 Ashless filter (or equivalent filter specified by the analytical lab)
- Sample containers
- Container of deionized water
- Measuring tool (tape or ruler)
- Disposable latex or nitrile gloves (powderless)
- Adhesive tape
- Cleaning wipes

***Preparation Steps Prior to Sampling***

To facilitate sampling in contaminated areas: prior to sampling, each filter that will be used shall be placed inside of a sample container. The sample container may be reused to receive the filter after sampling.

***Procedure***

1. Don a pair of clean gloves.
2. Determine whether it is appropriate to use a template or to define the sample area with tape.
  - a. Template – Carefully place a clean template on the surface to be sampled. Tape the outside edges of the template to prevent the template from moving during sample collection.
  - b. Tape – Measure out a 100 cm<sup>2</sup> area. Mark the area with tape, being careful not to disturb

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<sup>3</sup> Whatman is a registered trademark of Whatman International Limited Liability Company, United Kingdom.

<sup>4</sup> Berylliant is registered to Berylliant, Inc.

the settled dust. Clean off the measuring tool with a cleaning wipe. Once the area has been taped off, measure it a second time, recording the actual area. Clean off the measuring tool with a cleaning wipe.

**NOTE:** Tape can be used to define 100 cm<sup>2</sup> in shapes other than a 10 cm by 10 cm square.

3. Remove the filter from its container. If it possible for the container holding the filter to be contaminated, clean the outside of the container with a cleaning wipe prior to opening. Confirm that the filter is clean. Discard the filter if it shows evidence of contamination.
4. Moisten the filter with deionized water. The entire filter shall be moist, however, excess water shall be allowed to drip off the filter prior to collecting the wipe sample.
5. Using an open, flat hand with fingers held together, place the filter on the surface to be sampled. Wipe the selected surface area, side to side, using an overlapping “S” or “Z” pattern while applying pressure to the fingertips. Wipe the surface so that the filter passes over all of the identified surface area.
6. Inspect the filter for tears or curling. If tears or curls are present, consider voiding the sample and collecting another sample from a different, adjacent area. Document the decision to keep or void the sample in the field notes and discuss the basis for the decision in the characterization sampling report. If so much material is present on the filter that it is caking rather than adhering to the filter, the sample shall be voided and a bulk sample shall be collected from a nearby area.

**NOTE:** Extra filters may be brought to replace those filters that must be replaced due to tears, curling, and/or signs of contamination prior to sampling.

7. Fold the exposed side of the filter inward (i.e., fold in half). Using the once-folded filter, wipe the same area, up and down, using an overlapping “S” or “Z” pattern while applying pressure to the fingertips. Wipe the surface so that the filter passes over all of the identified surface area. Fold the exposed side of the filter in a second time and wipe the perimeter of the 100 cm<sup>2</sup> sample area.
8. Place the filter back into the sample container. Label the container with the sample identification. Record the location of the sample. Take any necessary photos. If the area sampled was marked with tape, ensure that actual area sampled is recorded.

**NOTE:** Whenever possible, photographs and sample maps should be used to document where samples were collected.

9. *Optional* – Remove any tape and templates used.

**NOTE:** Tape and/or templates may be left in place to identify the sample locations while the sample results are pending. In unoccupied buildings, locations and/or sample numbers may be marked directly on the building surfaces with building administrator permission.

10. Discard the gloves used.
11. Submit blank wipe samples as specified by the laboratory and/or company requirements.

**APPENDIX H - BERYLLIUM FACILITY ASSESSMENT FORM FOR BUILDING  
COMPLETION INSTRUCTIONS**

**Headings**

Revision #

Autogenerated by SWIHD.

Date

Date that assessment was initiated. For revised assessments, this will be the date that the revisions began and not when the first assessment was started.

Assessor

Name of the assessor completing the form in SWIHD.

Reviewed By:

The name of the Certified Industrial Hygienist or Industrial Hygiene Team (exempt) Lead/Manager who reviewed the assessment form and electronically approved the assessment form.

**Facility Information**

Building Location

The general Hanford Area where the building is located.

Location Detail (Building ID #)

Building number as listed in CareTaker or other reliable source.

Building Description

Obtained from CareTaker or other reliable source.

Contractor

Name of contractor company conducting the assessment.

Building Administrator

Names of the people responsible for the building. This could be building administrator, building manager or other. For some facilities, this may require a determination of who is responsible for the building. In the case of demolished buildings, this field would be listed as "N/A."

Project

Project/organization name that has responsibility for the facility.

Date Built

This can be obtained from Caretaker, the Facilities Management organization, or from building contacts. Estimates are acceptable.

Square Footage

Obtained from Caretaker or other reliable source.

Building Status

Obtained from Caretaker or other reliable source.

# Employees in Facility

This can be obtained from Caretaker, PopFon, or from building contacts. Estimates are acceptable.

Occupancy

Occupancy status can be obtained from PopFon or facility contacts

- Full time – One or more employees report to this building for their regular work
- Part time – No employees have their regular work area in the building but one or more employees enter the building on a regular basis
- Unoccupied – Entry into the building is only for demo prep and/or surveillance and maintenance activities

Rad Contamination Facility

Does the facility have any CAs, HCAs, RBAs, RMAs and /or Radiation Areas present? This information can be obtained from facility contacts.

Building Type

Single Purpose, Multi-Purpose or Office/Mobile Office

- Single Purpose buildings are facilities such as pump houses, monitoring stations, or guard shacks
- Multi-Purpose buildings have multiple activities housed in the same facility
- A mobile office that has been modified to house multiple activities shall be listed as a Multi-Purpose building

**NOTE:** Conex boxes that have been modified for use an office, respirator issuance station or other similar activity should be listed as Single Purpose building on the form

Facility Usage

Current usage of the facility: How is the building being used? For what purpose? Is there access by other than DOE/Contractor personnel? This information can be obtained from Caretaker or building contacts.

### Contacts

Walkdown Conducted

Was a walkdown conducted?

Walkdown Date:

Leave blank if a walkdown was not conducted.

### Individuals Contacted

List the names of all individuals who provided information used in this assessment. Include the date contacted and a summary of the information that they provided. Do not include previous assessors unless they are contacted.

### **Assessment Information**

#### Areas of Concern

For the following processes, evaluate both present usage as well as past usage:

- Machine Shops
- Metal Manufacturing Activities (e.g., foundries, metal extrusion, metal component assembly)
- Materials Research & Development
- Fuel Assemblies Experiments
- Electrical Component Fabrication
- Laboratory Operations
- Tool Cribs
- Machinery / Equipment Storage of Potentially Beryllium-Contaminated Items
- Tool maintenance activities (Including but not limited to Electrical, Pipefitter, Instrument, and Millwright shops)
- Beryllium Controlled Areas (BCAs) / Beryllium Regulated Areas (BRAs)

Areas where document reviews or interviews find some indication that a past usage may have included one of the above activities shall be marked as “Potential.” For buildings where minimal information is available, the walkdown team shall reach a consensus decision on whether “Potential” is the appropriate answer for usage. Provide location details unless obvious as well as any other applicable information. If the area of concern has been determined to be beryllium cleared through characterization sampling, check “Yes” in the appropriate “Cleared by Sampling” box.

#### Items of Concern

For the following processes, evaluate both present usage as well as past usage:

- Electrical Distribution Equipment
- Bridge Cranes
- Elevator Control Systems
- Other (e.g., beryllium alloy clips on conveyor belts)

Items where document reviews or interviews find some indication that items of concern may have been present in the past shall be marked as “Potential.” Provide location details, unless obvious, as well as any other applicable information. If the item of concern has been determined to be beryllium cleared through characterization sampling, check “Yes” in the appropriate “Cleared by Sampling” box.

### **Sampling Needs**

#### Additional Characterization Sampling Required?

Check “Yes” if any areas/items of concern are identified that haven’t been cleared through characterization sampling.

#### Recommended Survey Units

List any survey units identified by the walkdown team. Include both the name and a description of the survey unit.

#### Recommended Number/Location of Sample Points

List by survey unit the number of sample points and any specific sample locations for items identified by the walkdown team.

#### Recommended Number/Location of Sample Points for Items

List by survey unit the number of sample points and any specific sample locations identified by the walkdown team.

### **Characterization Information**

#### Building Status

With one exception, if any of the “Facility Usage” or “Items of Concern” questions are answered “Yes” or “Potential,” the building must be listed as a Beryllium Controlled Facility until it has been cleared through characterization sampling. If the only area/item of concern is electrical distribution equipment that hasn’t been characterized, list the building as “Uncharacterized EDE Only”

#### Summary of Sampling Data

List the name(s) (and identification number if available) of the characterization report(s) for the building being assessed. If sampling has been done and no characterization reports were written, list the survey number of any industrial hygiene surveys unless those surveys are included in a larger report that is referenced. If sampling doesn’t have a survey number, list the dates that the samples were collected and the storage location of the sample data. The assessor may attach the characterization report instead of summarizing the data.

### References

List any relevant documents. Examples may include:

- Building histories
- Employee interviews – provide a brief description of each employee’s expertise
- Transition reports
- CERCLA documents (e.g., RAWP, EE/CA)
- Environmental sampling documents
- Technical Basis Documents

For referenced documents, include the revision number and/or the creation date. In the event that no references are applicable (such as for new mobile offices supporting ARRA activities), mark as “N/A.”

### **Comments**

#### Comments

This should be a brief summary of the information obtained for this facility. If documents were obtained during the assessment, they should be summarized here and referenced in the “References” section.

#### Areas/Items of Concern

Autogenerated by SWIHD based on Assessment information.