Hanford Site Assessment & Characterization/Verification of Structures & Conex Boxes Procedure

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management
Hanford Site Assessment & Characterization/Verification of Structures and Conex Boxes Procedure

Published Date: 09-19-2013  Effective Date: 05-14-2014

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

8 May 2013
Date

Paul W. Kruger, Vice President
Mission Support Alliance, LLC

5/10/13
Date

Bruce C. Covert, Director
Washington Closure Hanford, LLC

4/25/13
Date

John A. McDonald, ESH&Q Director
Washington River Protection Solutions, LLC

4-10-13
Date

Douglas Kollasch, Principal Manager
HPMC Occupational Medical Services

4-22-13
Date

Signature Page 1 of 1
# Table of Contents

1.0 Purpose .................................................................................................................. 1  

2.0 Roles and Responsibilities ...................................................................................... 1  
   2.1 Assessor ............................................................................................................. 1  
   2.2 CBDPP Hanford Atomic Metal Trades Council (HAMTC) Representative .......... 1  
   2.3 CIH/Industrial Hygiene Team (Exempt) Lead .................................................... 2  
   2.4 Project Industrial Hygienist ............................................................................. 2  

3.0 Training Requirements ........................................................................................... 2  

4.0 Procedure ............................................................................................................... 2  
   4.1 Beryllium Facility Assessment of Structures & Conex Boxes ......................... 2  
      4.1.1 Completing Beryllium Facility Assessment Forms for Structures ............... 2  
      4.1.2 Completing Beryllium Facility Assessment Forms for Conex Boxes ....... 5  
      4.1.3 Posting of Conex Boxes Awaiting Initial Sampling ................................. 8  
      4.1.4 Revision to the Beryllium Facility Assessment Form for Structures ... 8  
      4.1.5 Revision to the Beryllium Facility Assessment Form for Conex Boxes ... 9  
      4.1.6 Communication of Assessment Results .................................................... 9  
   4.2 Characterization/Verification Sampling of Structures and Conex Boxes .......... 10  
      4.2.1 Development of Beryllium Characterization/Verification Sampling Plan for Structures and Conex Boxes ................................................................. 10  
      4.2.2 Collection and Analysis of Samples ......................................................... 13  
      4.2.3 Changes to Sampling Plans .................................................................... 14  
      4.2.4 Partial Completion of Sampling ................................................................ 16  
      4.2.5 Analysis of Data ..................................................................................... 16  
      4.2.6 Completion of Sampling Reports ......................................................... 18  
      4.2.7 Communication of Sampling Results ..................................................... 19  
      4.2.8 Developing a Technical Basis for Exceeding Control Levels ................. 19  
      4.2.9 Verification Sampling of Conex Boxes .................................................... 20  
      4.2.10 Sampling Requirements for Structure Demolition Preparation and Conex Box Shipment Off-Site ................................................................. 21  

5.0 Control and Review of Documents ........................................................................ 21  

6.0 Records ................................................................................................................. 22  

7.0 Sources ................................................................................................................. 22  
   7.1 Requirements ................................................................................................. 22  
   7.2 References ...................................................................................................... 22  

Figure 1 ...................................................................................................................... 23  
Figure 2 ...................................................................................................................... 24  
Appendix A: Definitions & Acronyms ....................................................................... 25
1.0 Purpose

This Hanford Site Assessment and Characterization/Verification of Structures & Conex Boxes Procedure, herein called the Procedure, defines the process for preparing beryllium facility assessments, sampling plans, and characterization/verification sampling reports for structures and Conex boxes used for the storage of materials. This Procedure applies to Hanford Site contractors performing such activities.

Examples of structures include (but are not limited to):
- Compressed gas cylinder bunkers
- Smoke stacks
- Tanks and pits
- Containment basins
- Vaults that are not associated with a building
- Loading docks that are listed as separate structures in CareTaker
- Semi-permanent tent structures that are listed in CareTaker
- Steam tunnels that are listed in CareTaker

This Procedure is not applicable to:
- Buildings designed for human occupancy
- Conex boxes that have been modified for regular use as an office, respirator issuance station, or other similar activity
- Temporary structures made from materials such as fabric and tubular framing
- Waste sites and other outdoor areas

2.0 Roles and Responsibilities

2.1 Assessor

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

2.2 CBDPP Hanford Atomic Metal Trades Council (HAMTC) Representative

HAMTC and Beryllium Awareness Group (BAG) representatives for assessment 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, Industrial Hygiene 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 activity (e.g., project IH, or assigned CIH).

3.0 Training Requirements

All facility assessments of structures and Conex boxes and/or characterization/verification sampling will be conducted by an IH or IHT. At a minimum, IH/IHT personnel 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 Industrial Hygiene Team (Exempt) Lead/Manager reviewing the assessments shall have completed the Beryllium Facility Assessment and Characterization/Verification Training that corresponds with this procedure.

4.0 Procedure

4.1 Beryllium Facility Assessment of Structures & Conex Boxes

Contractors shall utilize a graded approach in determining the order and scheduling of facility assessments of structures and Conex boxes. Assessors will consider the frequency of use and potential for beryllium contamination to determine the prioritization for completing assessments.

4.1.1 Completing Beryllium Facility Assessment Forms for Structures

<table>
<thead>
<tr>
<th><strong>Actionee</strong></th>
<th><strong>Step</strong></th>
<th><strong>Action</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessor</td>
<td>1.</td>
<td>Collect facility information such as the structure description, year built (if available), and any assessments for adjacent buildings.</td>
</tr>
<tr>
<td></td>
<td>2.</td>
<td>Identify documentation, such as building histories and technical basis documents that might provide information on prior uses. Identify any applicable beryllium sampling data.</td>
</tr>
</tbody>
</table>
3. Conduct an initial interview with a person knowledgeable about the structure and its history (e.g., building administrator, building manager, or a senior Hanford employee) to determine the past usage of the structure.

4. Determine if any of the following statements are true (or may have been true in the past) about the structure, using the available documentation and the initial interview. The statements are:

   a. Attached to a beryllium controlled facility
   b. Adjacent to a beryllium controlled facility
   c. Potential beryllium contamination sources exist (this includes when sampling data collected since 2010 suggests that contamination may exist)
   d. Potential beryllium cross-contamination sources exist
   e. Potential internal beryllium contamination exists
   f. Beryllium items/equipment were transported over/through the structure

**NOTE:** The above statements are referred to as the “Six Criteria” in Figure 1.

5. Determine whether a walkdown is required. A walkdown is normally required if any of the above statements are true (or may have been true in the past).

If a walkdown is required, notify their Hanford Site CBDPP Committee HAMTC representative when a walkdown will be conducted. Give all current assessment data to the HAMTC 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 the walkdown.

If it is not feasible to conduct a site condition walkdown due to safety considerations, enter N/A in the Walkdown Date space on form A-6006-207, Beryllium Facility Assessment For Structures Form, and document the reasons for not conducting the walkdown in the Comments section of the form.

**NOTE:** The Central Washington Building & Construction Trades Council (CWB&CTC) CBDPP representative shall also be contacted for structures that are also routinely accessed by CWB&CTC employees.
CBDPP HAMTC Representative  6. Determine what level of HAMTC/BAG participation is appropriate for the walkdown.

Inform the assessor 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 HAMTC/BAG representative(s) are not available and/or request that additional individuals participate.

Assessor  7. Notify the administrator/manager of the structure that the walkdown is scheduled. The administrator/manager may participate in the walkdown if they so choose.

Walkdown Team  8. Determine the following during the walkdown(s)

a. Is it feasible and appropriate to conduct sampling of the structure? Issues to consider when determining if it is feasible and appropriate:
   1. How likely is there to be residual beryllium contamination?
   2. Do sources of naturally-occurring beryllium make sampling inappropriate?
   3. Does the presence of other hazards substantially outweigh the benefit of conducting beryllium sampling?
   4. Does the nature of the structure make sampling inappropriate?

b. If it is feasible and appropriate to conduct sampling, how many samples should be collected and where should the samples be collected from?

c. If it is determined that sampling should be conducted, when should sampling be conducted? Sampling options are:
   1. Schedule sampling to be conducted as soon as practicable.
   2. Schedule sampling prior to recommencing work in the area where the structure is located.
   3. Schedule sampling prior to demolition.

NOTE: The walkdown team should attempt to immediately address any issues raised during the walkdown by working with the structure 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.

9. Complete the assessment form A-6006-207 by following the Beryllium Facility Assessment Form For Structures Completion Instructions.

10. Review the completed form A-6006-207, Beryllium Facility Assessment Form for Structures signed by the assessor.

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 of the assessment form shall be different from the person who conducted the assessment. Contractors may conduct additional quality assurance reviews at their discretion.

NOTE: With the exception of signature blocks, the form must be completed electronically. Hand-written copies of the form are not acceptable as the record copy.

11. Provide a non-record copy to the applicable Department of Energy (DOE) field office after the assessment form has been completed and reviewed. In addition, submit a non-record copy to the Mission Support Contractor (MSC) Beryllium Point of Contact for use in creating the monthly summary of newly assessed facilities and for electronically posting in a central location. Submittals to the MSC and the applicable DOE field office can either be hard copy or electronic.

NOTE: It is the responsibility of the contractor conducting the assessment to maintain the record copy of the assessment.

### 4.1.2 Completing Beryllium Facility Assessment Forms For Conex Boxes

<table>
<thead>
<tr>
<th>Actionee</th>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessor</td>
<td>1.</td>
<td>Collect facility information, such as the description of the Conex usage, year built (if available), year brought on site (if available), and any assessments for adjacent buildings and/or structures.</td>
</tr>
<tr>
<td>Actionee</td>
<td>Step</td>
<td>Action</td>
</tr>
<tr>
<td>------------------------</td>
<td>------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>2.</td>
<td>Identify documentation, such as building histories and technical basis documents that might provide information on prior usage of the Conex box. Identify any applicable beryllium sampling data.</td>
</tr>
<tr>
<td></td>
<td>3.</td>
<td>Notify their Hanford Site CBDPP Committee HAMTC representative when a walkdown will be conducted. Provide all current assessment data to the HAMTC representative prior to the walkdown, allowing sufficient time for them to review and become familiar with the data. Take the necessary steps to ensure the HAMTC representative (or designee) is released and available to participate in the walkdown.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>NOTE:</strong> Contact the CWB&amp;CTC CBDPP representative for information on the Conex boxes that are also routinely accessed by CWB&amp;CTC employees.</td>
</tr>
<tr>
<td>CBDPP HAMTC Representative</td>
<td>4.</td>
<td>Determine what level of HAMTC/BAG participation is appropriate.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inform the assessor of who 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 HAMTC/BAG representative(s) are not available, and/or request that additional individuals participate.</td>
</tr>
<tr>
<td>Assessor</td>
<td>5.</td>
<td>Arrange for access into the Conex box. A person knowledgeable with the Conex box contents shall be a participant in the walkdown. The knowledgeable person will normally be an employee who routinely enters the Conex box to add and/or remove items/equipment.</td>
</tr>
<tr>
<td>Walkdown Team</td>
<td>6.</td>
<td>Determine the following during the walkdown(s):</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a.  Is the Conex box currently adjacent to a beryllium controlled facility? Has the Conex box been adjacent to a beryllium controlled facility in the past?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b.  Is the Conex box known to be used to store beryllium items and/or waste? Has it been used to store beryllium items and/or waste in the past?</td>
</tr>
</tbody>
</table>
c. Does the Conex box have the potential to store items that were removed from a beryllium controlled facility? Does the Conex box have the potential to have been used to store items that were removed from a beryllium controlled facility in the past?

d. Does the Conex box have the potential to store items contaminated with tank waste? Has it been used to store items potentially contaminated with tank waste in the past?

e. How many samples of items need to be collected? Are there any specific items that need to be sampled?

NOTE: The walkdown team should attempt to immediately address any issues raised during the walkdown by working with the Conex box owner 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.

7. Complete the assessment form A-6006-208 by following the Beryllium Facility Assessment Form for Conex Boxes Completion Instructions.

8. Review the completed form A-6006-208, Beryllium Facility Assessment Form for Conex Boxes signed by the assessor.

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.

NOTE: With the exception of signature blocks, the form must be completed electronically. Hand-written copies of the form are not acceptable as the record copy.

9. Provide a non-record copy to the applicable Department of Energy (DOE) field office after the assessment form and
applicable supporting documentation have been completed and reviewed. In addition, submit a non-record copy to the MSC Beryllium Point of Contact for use in creating the monthly summary of newly assessed facilities and for electronically posting in a central location. Submittals to the MSC and the applicable DOE field office can either be hard copy or electronic.

NOTE: It is the responsibility of the contractor conducting the assessment to maintain the record copy of the assessment.

### 4.1.3 Posting of Conex Boxes Awaiting Initial Sampling

If a Conex box is not sampled within the specified time for sampling as listed on form A-6006-208, Beryllium Facility Assessment Form for Conex Boxes, Contractors shall post the Conex Box as a Beryllium Suspect Area (BSA).

NOTE: Contractors may conservatively post Conex boxes as BSAs or Beryllium Controlled Areas (BCA) based on the walkdown results of the assessment team.

### 4.1.4 Revision to the Beryllium Facility Assessment Form for Structures

Any of the following changes will require that form A-6006-207, Beryllium Facility Assessment Form for Structures be updated:

- Structure ownership changes from one contractor to another
- Controlling project changes
- Current status (active, inactive, demolished) of the facility changes
- Structure changes from radiologically to nonradiologically controlled or vice versa

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.

Any of the following changes will require that form A-6006-207, Beryllium Facility Assessment Form for Structures undergo a complete revision (including a new walkdown):
- Additional structure information becomes available that changes the sampling requirements
- Reduction in the number of recommended sample points
- Removal of one or more locations from the recommended sample locations
- Reduction in the number of recommended sample points for items
- Sampling data is generated that determines beryllium contamination in excess of control levels is present

4.1.5 Revision to the Beryllium Facility Assessment Form for Conex Boxes

Any of the following changes will require that form A-6006-208, Beryllium Facility Assessment Form for Conex Boxes be updated:

- Conex box ownership changes from one contractor to another
- Controlling project changes
- Current status (i.e., active, inactive, disposed of) of the Conex box changes
- Conex box changes from radiologically to nonradiologically controlled or vice versa
- The nature of the items stored significantly changes (e.g., changed from storing furniture to storing demolition equipment)
- Entry frequency/verification sampling frequency

Any of the following changes will require that form A-6006-208, Beryllium Facility Assessment Form for Conex Boxes undergo a complete revision (including a new walkdown):

- The location of the Conex box changes
- The Conex box information changes in a way that impacts the initial sampling priority other than entry frequency
- Reduction in the number of recommended sample points for items
- Sampling data is generated that determines beryllium contamination in excess of control levels is present

4.1.6 Communication of Assessment Results

Non-record copies of both form A-6006-207, Beryllium Facility Assessment Form for Structures and form A-6006-208, Beryllium Facility Assessment Form for Conex Boxes 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.
The first week of each month the MSC shall create a facility assessment summary for buildings, structures, and Conex boxes. The summary shall include:

- Facilities that have been newly listed as Beryllium Controlled Facilities (BCFs)
  - Reason why each facility was listed as a BCF
- Structures and/or Conex boxes that have been listed as BSAs or BCAs
- Facilities that have been down-posted based on characterization sampling
  - Technical basis for down-posting

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

4.2  Characterization/Verification Sampling of Structures and Conex Boxes

4.2.1  Development of Beryllium Characterization/Verification Sampling Plan for Structures and Conex Boxes

A Beryllium Characterization/Verification Sampling Plan for Structures/Conex Boxes, A-6006-206, herein called the Sampling Plan, is required to be completed and approved for all beryllium characterization sampling of structures and Conex boxes. 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).

4.2.1.1  Sampling Plan Information

<table>
<thead>
<tr>
<th>Actionee</th>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• Enter the Structure or Conex ID number</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enter the Structure/Conex Description. This description should match the description provided on the appropriate Facility Assessment Form.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enter the Location Description. Ensure that this description matches the description provided on the appropriate Facility Assessment Form. Update the Facility Assessment Form if the information does not match the information on the appropriate Facility Assessment Form.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enter the Purpose for the sampling.</td>
</tr>
<tr>
<td>Action</td>
<td>Step</td>
<td>Action</td>
</tr>
<tr>
<td>--------</td>
<td>------</td>
<td>--------</td>
</tr>
<tr>
<td><strong>2.</strong></td>
<td>Enter the Number of Sample Points based on whether it is a structure or a Conex box:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) If a structure, the number of sample points will normally be the same as what is listed in the “Recommended Location/Number of Sample Points” on A-6006-207, Beryllium Facility Assessment Form for Structures. If this data is not the same as the “Recommended Location/Number of Sample Points” on A-6006-207, Beryllium Facility Assessment Form for Structures, revise the assessment form as described in Section 4.1.4: “Revision to the Facility Assessment Form for Structures.”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) If a Conex box, the number of sample points is either 10 sample points for initial sampling or 6 sample points for verification sampling.</td>
<td></td>
</tr>
<tr>
<td><strong>3.</strong></td>
<td>Enter the Location of Sample Points based on whether it is a structure or a Conex box:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) If a structure, the location of sample points will normally be the same as what is listed in the “Recommended Location/Number of Sample Points” on A-6006-207, Beryllium Facility Assessment Form for Structures. If this data is not the same as the “Recommended Location/Number of Sample Points” on A-6006-207, Beryllium Facility Assessment Form for Structures, revise the assessment form as described in Section 4.1.4: “Revision to the Facility Assessment form for Structures.”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) If a Conex box is undergoing initial characterization sampling, the location of sample points will be:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Two from the inside of the doors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Two from the floor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Two from each of the long (side) walls</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• One from the back wall</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• One from the ceiling</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) If a Conex box undergoing verification sampling, the location of sample points will be:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• One from the inside of the doors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• One from the floor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• One from each of the long (side) walls</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• One from the back wall</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• One from the ceiling</td>
<td></td>
</tr>
</tbody>
</table>
4. Enter the Number of Sample Points for Items. If this data is not the same as the “Recommended Location/Number of Sample Points for Items” on the appropriate Facility Assessment Form, revise the assessment form as described in:
   - Section 4.1.4 if a structure
   - Section 4.1.5 if a Conex box

5. Enter the Location of Sample Points for Items. If this data is not the same as the “Recommended Location/Number of Sample Points for Items” on the appropriate Facility Assessment Form, revise the assessment form as described in:
   - Section 4.1.4: “Revision to the Beryllium Facility Assessment Form for Structures” if a structure
   - Section 4.1.5: “Revision to the Beryllium Facility Assessment Form for Conex Boxes” if a Conex box

4.2.1.2 Personal Protective Equipment (PPE)

As part of planning, identify any required personal protective equipment (PPE). If the sampling will be conducted under a Beryllium Work Permit (BWP), list the appropriate permit number in the “Personal Protective Equipment” section of the Sampling Plan. 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.

4.2.1.3 Work Practices

As part of planning, 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 in the “Work Practices” section of the Sampling Plan. 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.
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.

NOTE 2: General statements such as “Use proper lift techniques when moving objects” should not be included in the “Work Practices” section.

4.2.1.4 Sample Analysis

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.

4.2.1.5 Comments/Deviations

Note any comments in this section. Document any deviations made from the recommendations in the appropriate Facility Assessment Form as well as the rationale for the changes. If any deviations must be made from the sample collection methods contained in Appendices B, C, D, E, F and G of DOE-0342-002, Hanford Site Assessment & Characterization/Verification of Buildings Procedure as well as the rationale for these deviations.

4.2.1.6 Approval of Sampling Plan

After the Sampling Plan has been completed and signed, either a CIH or Industrial Hygiene 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.

4.2.2 Collection and Analysis of Samples

Collect samples using the methods in Appendices B, C, D, E, F and G of DOE-0342-002, Hanford Site Assessment & Characterization/Verification of Buildings Procedure. Document any deviation from the methods in the
appendices in “Comments/Deviation” section of the Sampling Plan. In addition, the deviation for the sampling method must be discussed in the “Comments/Deviation” section of the characterization/verification sampling report.

All samples shall be analyzed by a laboratory accredited for metals by the American Industrial Hygiene Association (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.

4.2.3 Changes to Sampling Plans

4.2.3.1 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 µg/g when discussing wipe samples)
- Changing the types of samples to be collected (bulk or wipes)
- Modifying the locations 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 at the location of the revised text. Reporting of the change to the IH overseeing the work may be made in person, via telephone, or by
4.2.3.2 Major Changes to Sampling Plans

Major changes require a change to the Sampling Plan, and must also be approved by either a CIH or Industrial Hygiene 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

Examples of Major Changes:

- Decreasing the number of samples to be collected
- 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, partial sampling 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, as well as the justification for the change, in the characterization/verification sampling report.
4.2.4 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. The results shall be summarized and posted.

NOTE: Contractors may not take credit for meeting required sampling frequencies using partially completed sampling.

4.2.5 Analysis of Data

When final sample results are received from the laboratory, review the sample results to determine which of the three cases below apply and follow the appropriate steps.

a. Case 1 – All samples are below the trigger level:

1. No further sampling required (If full characterization sampling was conducted, the structure/Conex box 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 appropriate Beryllium Facility Assessment Form as necessary.
6. Notify the MSC Beryllium Point of Contact of change in structure/Conex box posting status as necessary.

b. Case 2 – One or more samples are above the trigger level but none are above the control level:

1. Control the area/item as a Restricted Access Area, and modify the Sampling Plan to require the collection of additional samples.
2. Collect 6 or more samples from within 5 linear feet 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 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 exceeds 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 posting as necessary.

8. Update the appropriate Beryllium Facility Assessment Form as necessary.

9. Notify the MSC Beryllium Point of Contact of change in structure/Conex box posting status as necessary.

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

c. Case 3 – One or more samples above the control level:
1. Notify applicable DOE field office of the results within one working day of receiving the final lab report via phone call or email.
2. Appropriately post the structure/Conex box.
3. Conduct additional characterization sampling of surrounding areas to ensure that contamination has not spread outside of the posted area.
4. Consider conducting additional sampling to define the area of contamination.
5. Complete the characterization/verification sampling report.
6. Communicate results to employees.
7. Update the Beryllium Facility Assessment Form.
8. Notify MSC Beryllium Point of Contact of change in structure/Conex box posting status.

4.2.6 Completion of Sampling Reports

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), and shall be completed for all sampling within 30 calendar days of receipt of the last sample result.

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 structure/Conex box 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 does not 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 each deviation in this section, including the reason for each deviation.

- Results Summary
  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 structure/Conex box status, including recommendations.

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

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

Once the report has been completed and signed, it shall be reviewed by either a CIH or Industrial Hygiene 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.

4.2.7 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.

4.2.8 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 work force 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 and HAMTC 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 may be considered to not be a beryllium activity.

NOTE 1: The applicable DOE field office shall ensure that CWB&CTC is involved in the concurrence process for those buildings or areas that have CWB&CTC workers present.

NOTE 2: If any sample exceeded the appropriate control level, the area where the sample was collected shall be controlled for beryllium until the applicable DOE field office concurs with the technical basis.

### 4.2.9 Verification Sampling of Conex Boxes

Once the initial characterization sampling has been completed, contractors shall conduct verification sampling of Conex boxes that have the potential to inadvertently receive beryllium contaminated items. The frequency for verification sampling shall be based on the frequency of entry into the Conex box.

- Sampling shall be conducted annually for Conex boxes that are entered one or more times per month
- Sampling shall be conducted every three years for Conex boxes that are entered less than one time per month but are entered at least once per year
- Sampling shall be conducted every seven years for Conex boxes that are entered less than once per year
Verification sampling is not required in the following instances:

- Conex boxes that are used solely for the storage of new items/equipment
- Conex boxes that are controlled by projects that do not have the potential for any of the following:
  - Employees that work within any BCFs
  - To share used items/equipment with other projects that do work within any BCFs
  - To store items contaminated with tank waste

**NOTE:** Except for the two conditions noted above, the Assessor must assume that the potential to inadvertently receive beryllium contaminated items exists and that verification sampling is required.

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

### 4.2.10 Sampling Requirements for Structure Demolition Preparation and Conex Box Shipment Off-Site

Contractors shall ensure that prior to demolition that characterization sampling has been conducted for all structures where sampling has been identified as being feasible and appropriate. Characterization sampling shall be conducted prior to demolition or the structure status shall be changed to a BCF during demolition.

Conex boxes that are being prepared for shipment off-site shall be sampled. A minimum of 12 samples (two samples per surface) shall be collected prior to releasing the Conex box to be sent off-site. Results shall be analyzed in accordance with Section 4.2.5 of this procedure.

### 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

<table>
<thead>
<tr>
<th>Record Description</th>
<th>Submittal Responsibility</th>
<th>Retention Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beryllium Facility Assessment Form</td>
<td>Assessor</td>
<td>Electronic (IDMS or similar)</td>
</tr>
<tr>
<td>Characterization/Verification Report (including all attachments)</td>
<td>Project IH</td>
<td>Electronic (IDMS or similar)</td>
</tr>
<tr>
<td>Sampling Data</td>
<td>IH/IHT</td>
<td>Site-Wide Industrial Hygiene Database</td>
</tr>
</tbody>
</table>

7.0 Sources

7.1 Requirements


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

7.2 References

- Beryllium Facility Assessment Form for Structures, A-6006-207
- Beryllium Facility Assessment Form for Conex Boxes, A-6006-208
- DOE-0342-002, Hanford Site Assessment & Characterization/Verification of Buildings Procedure
Figure 1

Assessment & Characterization of Structures

Does the current or past structure use indicate potential Be? (Six criteria)

Yes (includes answers of “Potential”)

Has structure been sampled in accordance with the current characterization procedure?

Yes

Review sample results against the applicable criteria.

Are results above criteria contained in the current characterization procedure?

No

Document on Be Facility Assessment form.

No

Document on Be Facility Assessment form. Post structure as a BSA.

Is sampling feasible and appropriate?

No

Determine when sampling should be conducted. Document on Be Facility Assessment form. Post structure as a BSA.

Yes

Sample in accordance with the current characterization procedure.

Yes

Document on Be Facility Assessment form. Post and control as required.
Figure 2
Assessment & Characterization of Conex Boxes

Is characterization sampling required?

Yes

Has Conex box been sampled in accordance with the current characterization procedure?

No

Sample in accordance with the current characterization procedure.

Yes

Review sample results against the applicable criteria.

Are results above criteria contained in the current characterization procedure?

No

Document on Be Facility Assessment form.

Yes

Schedule for routine verification sampling.

Document on Be Facility Assessment form. Post and control as required.
## Appendix A: Definitions & Acronyms

### DEFINITIONS

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthropogenic Beryllium</td>
<td>Beryllium and beryllium alloys created through artificial activities. The most common forms are beryllium, beryllium oxide, and copper beryllium alloys.</td>
</tr>
<tr>
<td>Control Level</td>
<td>The sample concentration level that requires an area to be beryllium controlled.</td>
</tr>
<tr>
<td>Facility</td>
<td>Buildings, Conex boxes, and structures are all considered to be facilities.</td>
</tr>
<tr>
<td>Naturally Occurring Beryllium</td>
<td>Natural forms of beryllium such as those found in soil, rocks, coal, and oil.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> Fly ash is considered to contain naturally occurring beryllium since the process of burning coal does not change the form of the beryllium.</td>
</tr>
<tr>
<td>Tank Waste</td>
<td>Legacy liquid and semi-solid waste materials that are currently stored in the 177 underground storage tanks.</td>
</tr>
<tr>
<td>Trigger Level</td>
<td>The sample concentration level that triggers additional investigative requirements.</td>
</tr>
</tbody>
</table>
# ACRONYMS & ABBREVIATIONS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIHA</td>
<td>American Industrial Hygiene Association</td>
</tr>
<tr>
<td>BAG</td>
<td>Beryllium Awareness Group</td>
</tr>
<tr>
<td>BCA</td>
<td>Beryllium Controlled Area</td>
</tr>
<tr>
<td>BCF</td>
<td>Beryllium Controlled Facility</td>
</tr>
<tr>
<td>Be</td>
<td>Beryllium</td>
</tr>
<tr>
<td>BRA</td>
<td>Beryllium Regulated Area</td>
</tr>
<tr>
<td>BSA</td>
<td>Beryllium Suspect Area</td>
</tr>
<tr>
<td>BWP</td>
<td>Beryllium Work Permit</td>
</tr>
<tr>
<td>CBDPP</td>
<td>Chronic Beryllium Disease Prevention Program</td>
</tr>
<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
</tr>
<tr>
<td>CIH</td>
<td>Certified Industrial Hygienist</td>
</tr>
<tr>
<td>cm</td>
<td>Centimeter</td>
</tr>
<tr>
<td>CWB&amp;CTC</td>
<td>Central Washington Building &amp; Construction Trades Council</td>
</tr>
<tr>
<td>DOE</td>
<td>Department of Energy</td>
</tr>
<tr>
<td>g</td>
<td>Gram</td>
</tr>
<tr>
<td>HAMTC</td>
<td>Hanford Atomic Metals Trade Council</td>
</tr>
<tr>
<td>IDMS</td>
<td>Integrated Document Management System</td>
</tr>
<tr>
<td>IH</td>
<td>Industrial Hygienist</td>
</tr>
<tr>
<td>IHT</td>
<td>Industrial Hygiene Technician</td>
</tr>
<tr>
<td>PPE</td>
<td>Personal Protective Equipment</td>
</tr>
<tr>
<td>MSC</td>
<td>Mission Support Contractor</td>
</tr>
<tr>
<td>sq</td>
<td>Square</td>
</tr>
<tr>
<td>µg</td>
<td>Microgram</td>
</tr>
</tbody>
</table>