Field Wipe and Bulk Sampling Methods for Beryllium

Tank Farm Plant Operating Procedure

Table of Contents

1.0 PURPOSE AND SCOPE ............................................................................................................. 2
  1.1 Purpose .................................................................................................................................. 2
  1.2 Scope ...................................................................................................................................... 2

2.0 INFORMATION .......................................................................................................................... 3
  2.1 Terms and Definitions ............................................................................................................. 3

3.0 PRECAUTIONS AND LIMITATIONS .................................................................................... 4
  3.1 Personnel Safety ..................................................................................................................... 4
  3.2 Radiation and Contamination Control .................................................................................... 4

4.0 PREREQUISITES ....................................................................................................................... 6
  4.1 Special Tools, Equipment, and Supplies ................................................................................. 6
  4.2 Performance Documents ......................................................................................................... 7
  4.3 Field Preparation ................................................................................................................... 7

5.0 PROCEDURE ........................................................................................................................... 8
  5.1 Collecting Wipe Samples ...................................................................................................... 8
  5.2 Collecting Bulk Beryllium Samples ....................................................................................... 12
  5.3 Waste Handling for Beryllium Wipe and/or Bulk Sampling .............................................. 14
  5.4 Records .................................................................................................................................. 15
1.0 PURPOSE AND SCOPE

1.1 Purpose

This document provides instructions under the direction of Industrial Hygienists (IH) for conducting beryllium wipe and bulk sampling.

1.2 Scope

This document applies to the collection of beryllium wipe and bulk samples.

This procedure can be performed in multiple locations. A work area and/or location specific hazard analysis must be performed prior to starting the activity per TFC-ESHQ-S_SAF-C-02, “Job Hazard Analysis”.

Beryllium surface sampling shall be conducted in accordance with DOE-0342-002, “Hanford Site Assessment and Characterization/Verification of Buildings Procedure”, Appendices B-G. This includes the following sample methods:

- Appendix B, Wipe Sampling
- Appendix C, Bulk Sampling by Micro Vacuum
- Appendix D, Bulk Sampling by Brush
- Appendix E, Bulk Sampling by Scraping
- Appendix F, Bulk Sampling by Scooping
- Appendix G, Wipe Sampling by Whatman Filter (Analyzed by Fluorometry).
2.0 INFORMATION

2.1 Terms and Definitions

- Bulk sample - A sampling technique used to collect liquid or solid material of concern to determine the chemical identity and concentration of the material collected.
- Wipe sample - A sampling technique used for assessing removable surface contamination. Wipe samples are collected to screen for beryllium contamination.
- SWIHD - Site Wide Industrial Hygiene Database.
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

3.1.1 Consult with the job contact, as necessary, to plan for special entry requirements, safety hazards, and scheduling information. Determine if there are special precautions, protective clothing requirements, radiological controls, or other measures to ensure the safety of sampling personnel during beryllium wipe or bulk sampling.

3.2 Radiation and Contamination Control

3.2.1 Planned work in radiological areas must be approved by Radiological Control personnel per the Radiological Risk Screening procedure TFC-ESHQ-RP-RWP-C-01.

3.2.1.1 When performed without a formal work package or approved procedure (i.e., Level 3 or 4 work), this procedure is limited to radiological areas and work activities permitted by a low risk Radiological Work Permit (RWP).
3.2 Radiation and Contamination Control (Cont.)

3.2.2 Before conducting sampling or monitoring, contact the responsible Radiological Control personnel for the facility or area to determine any specific survey or monitoring requirements.
- Pre, during, and post contamination survey requirements
- Any applicable Release Survey Plan (RSP) for your specific equipment or task
- Alternative survey or monitoring needs to support the radiological release survey process.

3.2.3 Comply with the requirements set forth by the RWP, Health Physics Technician (HPT) coverage, RSP, and any other applicable procedures as determined above.

3.2.4 When exiting radiological areas where no HPT coverage was provided, inform the radiological control personnel of the use/history for the equipment being presented (e.g., only sampled air in the Contamination Area, no known history of contamination based on use, etc.) to aid them in properly evaluating the radiological release criteria needed.

3.2.5 Samples collected in a radiological area shall not be removed from the facility, transported by personnel, or submitted to an analytical laboratory until they have been evaluated by an HPT in accordance with approved procedures.
4.0 PREREQUISITES

4.1 Special Tools, Equipment, and Supplies

The following supplies are intended for wipe sampling:

- Disposable wipes meeting the following criteria:
  - Contains low background levels of the contaminant to be sampled (<5\(\mu\)g/wipe) or less than the required method reporting limit for the contaminant of concern
  - Is a single thickness
  - Is durable and does not tear easily
  - Does not contain aloe
  - Can be digested in the laboratory
  - Yields 80-120% recovery rates for samples spiked with metal dust (not metal in solution)
  - Remains moist during the wipe sampling process.

- Non-sterilized, powder-free, non-latex disposable gloves to prevent cross-sample contamination from hands

- Tweezers

- Non-sterilized, polyethylene sample vials (30 - 50 ml size), or equivalent hard-shell containers, that can be rinsed quantitatively in the laboratory

NOTE - Plastic baggies or paper envelopes are not to be used to transport or temporarily hold wipe samples. The laboratory cannot measure metal left on the interior surface of such containers.

- “Beryllium Sampling Field Log” form (A-6007-597)
- Disposable templates 100 cm\(^2\)
- Container labels or permanent marker
- Rack, bag, or box to carry sample containers
- Measuring tape
- Refer to DOE-0342-002, Appendices B-G for additional supplies when conducting beryllium wipe and bulk sampling.
4.2 **Performance Documents**

The following documents may be needed to perform this procedure:

- TO-100-052, “Perform Waste Generation, Segregation, Accumulation and Clean-up”
- TFC-ESHQ-RP_RWP-C-03, “ALARA Work Planning”
- TFC-ESHQ-IH-C-46, “Industrial Hygiene Reporting and Records Management”
- TFC-ESHQ-S-SAF-C-02, “Job Hazard Analysis”
- DOE-0342-002, “Hanford Site Assessment and Characterization/Verification of Buildings Procedure”
  - Appendix B, Wipe Sampling
  - Appendix C, Bulk Sampling by Micro Vacuum
  - Appendix D, Bulk Sampling by Brush
  - Appendix E, Bulk Sampling by Scraping
  - Appendix F, Bulk Sampling by Scooping
  - Appendix G, Wipe Sampling by Whatman Filter (Analyzed by Fluorometry.)
- Site Form A-6007-597 “Beryllium Sampling Field Log.”

4.3 **Field Preparation**

4.3.1 **PERFORM** a review of the applicable industrial hygiene sampling plan.

4.3.2 **PERFORM** a work area and/or a location specific hazards analysis per TFC ESHQ S SAF C 02, unless utilizing a work package with JHA/GHA hazards identified.
5.0 PROCEDURE

5.1 Collecting Wipe Samples

5.1.1 OBTAIN the following supplies:
- Disposable wipes
- Non-sterilized, powder-free, non-latex, disposable (nitrile) gloves to prevent cross-sample contamination from hands
- Tweezers
- Non-sterilized, polyethylene sample vials (30 - 50 ml size), or equivalent hard-shell containers, that can be rinsed quantitatively in the laboratory

NOTE - Plastic baggies or paper envelopes are not to be used to transport or temporarily hold wipe samples. The laboratory cannot measure metal left on the interior surface of such containers.
- “Beryllium Sampling Field Log” form (A-6007-597)
- Disposable templates 100 cm²
- Container labels or permanent marker
- Rack, bag, or box to carry sample containers
- Measuring tape.

5.1.2 OBTAIN a survey report number from the Site Wide Industrial Hygiene Database (SWIHD).

5.1.3 CHECK that a SWIHD sample identification number is attached to each sample container AND

ATTACH one if necessary.
5.1 Collecting Wipe Samples (Cont.)

NOTE - Beryllium wipe sampling is inappropriate for rough/porous surfaces such as corrugated metal, wood, concrete, asphalt or other materials that may tear the wipe.

- Areas in which workers are likely to have contact are important to sample.

5.1.4 DO NOT walk on or touch the surface to be wiped AND

IF the locations have not been predetermined, INSPECT the area to be sampled to determine the sampling locations.

NOTE - As a rule of thumb, a surface is considered to have gross contamination if a person performing a swipe in the accumulated material would leave a visible trail.

5.1.5 IF gross contamination appears on the surfaces, CONSULT with the Industrial Hygienist to determine if bulk sampling should be conducted.

5.1.6 PREPARE a sketch/picture of the area to indicate the locations where samples are collected.

5.1.7 PLAN a sequence of sampling sites beginning away from the most likely areas of contamination and proceeding to those areas likely to contain heavier levels of contamination.

5.1.8 WEAR Non-sterilized, powder-free, non-latex disposable (nitrile) gloves to prevent cross-sample contamination from hands.
5.1 Collecting Wipe Samples (Cont.)

NOTE - The number of blanks to be used will be dictated by the IH sample plan.

5.1.9 PREPARE field blanks as follows:

5.1.9.1 REMOVE a wipe from its container with forceps or the gloved hand.

5.1.9.2 DO NOT ALLOW the wipe to touch any other surfaces.

5.1.9.3 UNFOLD the wipe.

5.1.9.4 FOLD the wipe in half three times.

5.1.9.5 PLACE the wipe in the sample bottle or tube.

NOTE - The standard area sampled with wipe samples is 100 cm².

5.1.10 TAPE a disposable template on the first surface to be sampled

OR

IF the surface area is too small, irregular, or curved to allow a template to be used, MEASURE the area wiped using a measuring tape when use of the template is not feasible.

5.1.10.1 DOCUMENT the surface area/dimensions on the field log.

5.1.11 PICK up the sampling wipe with gloved hand.

5.1.12 PLACE the wipe flat on the surface to be wiped.

5.1.12.1 TAKE care not to tear the wipe AND PRESS down firmly and evenly.

5.1.13 ALLOW only one side of the wipe to contact the surface AND WIPE side to side over the sampling area, starting at the outside of the template and using “S”-like motions to completely cover the area.

5.1.14 FOLD the wipe in half with the contaminated surface facing inward using gloved hand.
5.1 Collecting Wipe Samples (Cont.)

5.1.15 **USE** a “S” or “Z”-like motion perpendicular to the original direction, completely **AND**

**WIPE** the area again.

5.1.16 **FOLD** the wipe in half again with the contaminated side in first.

5.1.17 **USING** the twice folded media, **WIPE** the same area one more time, focusing on the edges and the corners of the selected surface area.

5.1.17.1 **FOLD** in the exposed side of the wipe.

5.1.18 **PLACE** the wipe in the sample bottle or tube, using a separate bottle or tube for each wipe sample.

5.1.19 **REPEAT** Steps 5.1.10 through 5.1.18 for each successive wipe sample, using a new disposable gloves with each wipe **AND**

**GO TO** Step 5.1.20.

5.1.20 **DISPOSE** of sampling waste such as gloves, templates, masking tape, etc., in accordance with TO-100-052.

5.1.21 **DOCUMENT** results of the wipe sampling survey on the “Beryllium Sampling Field Log” form (A-6007-597) **AND**

**COMPLETE** documentation associated with beryllium wipe sampling in accordance with TFC-ESHQ-IH-STD-03.

5.1.22 **TRANSPORT** samples to Labs.

5.1.22.1 **IF** radioactive, **USE** appropriate ORSS (blue) card.

5.1.23 **IF** unable to transport samples, **CONSULT** with IH for appropriate storage area.

5.1.24 **PROVIDE** the completed survey forms and associated field records to the Project IH within two working days.

5.1.24.1 **ATTACH** sketches/pictures to the “Beryllium Sampling Field Log” (A-6007-597).
Field Wipe and Bulk Sampling Methods for Beryllium

5.2 Collecting Bulk Beryllium Samples

5.2.1 CONSULT with the job contact to plan for special entry requirements, safety hazards, and scheduling information.

NOTE - Methods used for bulk sampling metals include using a brush, non-metal spoon or knife, spatula, or micro-vacuuming.

5.2.2 OBTAIN bulk sampling supplies and sample containers.

5.2.3 OBTAIN a survey report number from the SWIHD.

5.2.4 APPLY a unique sample identification number on each sample container.

5.2.5 IF the locations have not been predetermined, INSPECT the area to be sampled to determine appropriate sampling locations.

5.2.6 PREPARE a sketch/picture of the area on the “Beryllium Sampling Field Log” form (A-6007-597) or an approved equivalent to indicate the locations where samples will be collected.

5.2.7 WEAR Non-sterilized, powder-free, non-latex disposable (nitrile) gloves to prevent cross-sample contamination from hands.

5.2.8 CHANGE gloves prior to collecting additional samples to prevent cross contamination of the samples.

5.2.9 COLLECT the bulk sample(s) in accordance with the recommended sampling method or plan or follow the direction of the Project IH.

5.2.10 PREPARE the samples for transportation to the analytical lab after samples are collected.
5.2 Collecting Bulk Beryllium Samples (Cont.)

5.2.11 **DISPOSE** of sampling waste such as gloves and collecting devices, in accordance with TO-100-052.

5.2.12 **DOCUMENT** results of the bulk sampling on the “Beryllium Sampling Field Log” form (A-6007-597), or an approved equivalent **AND** COMPLETE documentation associated with the sampling in accordance with TFC-ESHQ-IH-STD-03.

5.2.13 **TRANSPORT** samples to Labs.

5.2.13.1 **IF** radioactive, **USE** appropriate ORSS (blue) card.

5.2.14 **IF** unable to transport samples, **CONSULT** with IH for appropriate storage area.

5.2.15 **PROVIDE** the completed survey forms and associated field records to the Project IH within two working days.

5.2.15.1 **ATTACH** sketches/pictures to the “Beryllium Sampling Field Log” (A-6007-597).
5.3 Waste Handling for Beryllium Wipe and/or Bulk Sampling

5.3.1 FOR waste generated during field wipe sampling in Beryllium Controlled Areas or Beryllium Regulated Areas, PACKAGE AND DISPOSE of waste in accordance with TO-100-052.
5.4 Records

5.4.1 **PERFORM** the following for records identified within this procedure.

5.4.1.1 **RECORD** the number of times the record was generated in applicable column

**OR**

5.4.1.2 **SUBMIT** the package to IH.

<table>
<thead>
<tr>
<th>Records Submittal Checklist</th>
<th>Number of times completed</th>
<th>N/A (✓)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FORMS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial Hygiene surveys (including applicable forms and data.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEND the completed records with Records Submittal Checklist attached to the Industrial Hygiene Program for records retention.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

________________________ / __________________________ / _____________

Signature
IH

Print (First and Last) Date

The record custodian identified in the Company Level Records Inventory and Disposition Schedule (RIDS) is responsible for record retention in accordance with TFC-BSM-IRM_DC-C-02.