

Hanford Site Evaluation of Electrical Equipment for Beryllium Procedure

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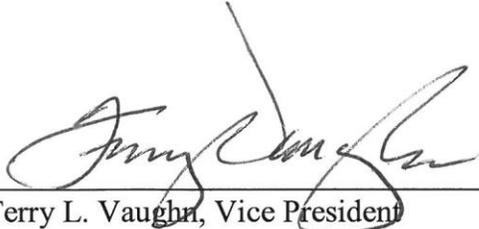


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ENERGY

Hanford Site Evaluation of Electrical Equipment for Beryllium Procedure

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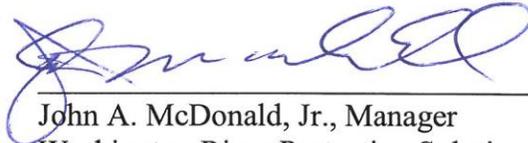
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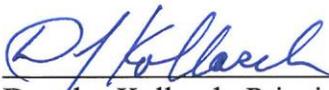
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Table of Contents

1.0	Purpose and Scope	1
2.0	Roles and Responsibilities	1
2.1	Electrical Worker	1
2.2	Project Industrial Hygienist	2
2.3	Project Line Management	2
3.0	Training Requirements.....	2
4.0	Procedure	2
4.1	Sampling of Relay Cabinets During Scheduled Preventative Maintenance	2
4.2	Sampling of Electric Equipment Other Than Relay Cabinets	
	During Scheduled Preventative Maintenance	4
4.3	Data Elements	5
4.4	Data Analysis	6
4.5	Data Consolidation.....	7
4.6	Response to Catastrophic Failure.....	7
5.0	Control and Review of Documents.....	8
6.0	Records	8
7.0	Sources	8
7.1	Requirements	8
7.2	References	8
	Appendix A: Definitions, Acronyms, and Abbreviations.....	9

1.0 Purpose and Scope

This Hanford Site Evaluation of Electrical Equipment for Beryllium Procedure, herein called the Procedure, defines the process for evaluating electrical equipment to determine whether it has the potential to have removable beryllium surface contamination due to beryllium containing components.

Examples of electrical equipment include (but are not limited to):

- Relay cabinets
- Switchgear
- Motor control centers
- Lighting panels
- Electrical disconnects

This Procedure is not applicable to:

- Light switches
- Electrical outlets
- Tools and equipment that are electrically powered
- Extra-low voltage systems (<50 V) such as programmable logic controllers (PLCs)
- Transformers
- Pole-mounted cut-outs

This procedure does not supersede any electrical safety, lockout/tagout (LOTO), or work management requirements. All work must undergo an appropriate hazard evaluation. Personal protective equipment, electrical safety, and LOTO requirements must be identified as part of the hazard analysis and properly documented in a work document that is appropriate for the work being conducted.

The scope of this procedure addresses potential beryllium contamination due to beryllium containing components. Electrical equipment that is located in an area of potential legacy beryllium contamination may require evaluation as items that are covered by other Characterization/Verification procedures.

2.0 Roles and Responsibilities

2.1 Electrical Worker

Electrical workers shall determine whether samples can safely be collected in and around electrical equipment and communicate that information to the Industrial Hygienist (IH) or Industrial Hygiene Technician (IHT).

2.2 Project Industrial Hygienist

Electrical equipment sampling plans and sampling reports shall be completed by a person with sufficient knowledge and experience to perform such activity, e.g., project IH, or assigned certified industrial hygienist (CIH).

2.3 Project Line Management

Project line management shall coordinate with project industrial hygiene personnel to facilitate the sampling of electrical equipment.

3.0 Training Requirements

Sampling of electrical equipment will normally be conducted by an IH or IHT. At a minimum, IH/IHT personnel conducting the sampling shall be Beryllium Worker qualified and have completed the Beryllium Posting, Assessment, Characterization and Verification Training. The craft workers supporting the collection of the samples, however, do not require Beryllium Worker training unless the electrical equipment is located in a Beryllium Controlled Area (BCA) or Beryllium Regulated Area (BRA).

All employees who work in or around electrical equipment during the collection of samples are required to comply with the requirements of DOE-0336, *Hanford Site Lockout/Tagout Procedure*.

NOTE: In certain instances, the IH/IHT will not be allowed to reach into an area around the electrical equipment. In those instances, the samples may be collected by an electrical worker under the direct oversight of a qualified IH/IHT.

4.0 Procedure

4.1 Sampling of Relay Cabinets during Scheduled Preventative Maintenance

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
Line Management	1.	Notify the project IH when scheduled preventative maintenance activities are being planned on relay cabinets.
		NOTE: Sampling of equipment is not required in the event of an emergent (non-scheduled) event that requires maintenance on electrical equipment to correct a safety issue or restore power to a facility.
Project IH	2.	Determine whether the equipment has been previously sampled. <ol style="list-style-type: none"> If it has not been sampled, coordinate with project line management during the work planning process to incorporate sampling into the work plan.

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
		<p>b. If the equipment has been sampled, no further action is required. Steps 3 – 8 are not required.</p> <p>c. If the specific equipment has not been sampled but other similar equipment (e.g. same manufacturer, make, and model) has, determine if there is any benefit to conducting additional sampling. If there is not, steps 3 – 8 are not required.</p>
Electrical Worker	3.	<p>Ensure that the electrical equipment is properly locked out prior to the start of any sampling.</p> <p>NOTE: All employees who work in or around electrical equipment during the collection of samples are required to comply with the requirements of DOE-0336, Hanford Site Lockout/Tagout Procedure.</p>
	4.	<p>Inform the IH/IHT of where samples can safely be collected.</p>
IH/IHT	5.	<p>Collect samples from the electrical equipment. If safe to do so, collect samples from the following locations:</p> <ul style="list-style-type: none"> • Interior of the electrical box/containment • Sides and bottoms of individual enclosures • Any components recommended by the electrical workers <p>Samples shall be collected in accordance with the methods contained in Appendices B, C, D, E, F, and G of DOE-0342-002, <i>Hanford Site Assessment & Characterization/Verification of Buildings Procedure</i>. If deviations must be made in the collection method, a note of the deviation as well as the rationale for the deviation shall be noted in the sampling record.</p>
	6.	<p>Consider collecting samples from the following locations:</p> <ul style="list-style-type: none"> • Exterior of the electrical box/containment • On and around vents • Floors and walls in the surrounding area <p>NOTE: The intent is that these locations will be sampled except in situations where conditions make collecting the sample inappropriate, or it has already been completed during characterization/verification sampling.</p>
	7.	<p>Ensure that the data required in Section 4.3 is collected. Unless prevented by safety or security concerns, pictures shall be taken of the equipment sampled.</p>

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
	8.	Collect a breathing zone sample on the electrical worker(s) if feasible. If electrical hazards (or other concerns) make breathing zone sampling infeasible, area sampling should be conducted instead.

4.2 Sampling of Electric Equipment Other Than Relay Cabinets during Scheduled Preventative Maintenance

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
Line Management	1.	Notify the project IH when scheduled preventative maintenance activities are being planned on electrical equipment other than relay cabinets.
		NOTE: Sampling of equipment is not required in the event of an emergent (non-scheduled) event that requires maintenance on electrical equipment to correct a safety issue or restore power to a facility.
Project IH	2.	Working with line management, determine whether sampling of the equipment is appropriate. Factors to consider in determining whether the equipment should be sampled include: Has the equipment been sampled previously? <ol style="list-style-type: none"> Has similar equipment (e.g. same manufacturer, make, and model) been sampled at other locations? Is there any information that beryllium components may be present? Does the equipment have contacts that open and close on a regular basis? Is the nature of the work being conducted conducive to collecting samples?
	3.	If sampling is determined to be appropriate, coordinate with project line management during the work planning process to incorporate sampling into the work plan. If sampling is determined not to be appropriate, no further action is required. Steps 4 – 9 are not necessary.
Electrical Worker	4.	Ensure that the electrical equipment is properly locked out prior to the start of any sampling.
	5.	Inform the IH/IHT of where samples can safely be collected. NOTE: All employees who work in or around electrical equipment during the collection of samples are required to comply with the requirements of DOE-0336, Hanford Site Lockout/Tagout Procedure.

<i>Actionee</i>	<i>Step</i>	<i>Action</i>
Project IH/IHT	6.	<p>Collect samples from the electrical equipment. If safe to do so, collect samples from the following locations:</p> <ul style="list-style-type: none"> • Interior of the electrical box/containment • Sides and bottoms of individual enclosures • Any components recommended by the electrical workers <p>Samples shall be collected in accordance with the methods contained in Appendices B, C, D, E, F, and G of DOE-0342-002, <i>Hanford Site Assessment & Characterization/Verification of Buildings Procedure</i>. If deviations must be made in the collection method, a note of the deviation as well as the rationale for the deviation shall be noted in the sampling record.</p>
	7.	<p>Consider collecting samples from the following locations:</p> <ul style="list-style-type: none"> • Exterior of the electrical box/containment • On and around vents • Floors and walls in the surrounding area <p>NOTE: The intent is that these locations will be sampled except in situations where conditions make collecting the sample infeasible, inappropriate, or it has already been completed during characterization/verification sampling.</p> <p>Samples shall be collected in accordance with the methods contained in Appendices B, C, D, E, F, and G of DOE-0342-002, <i>Hanford Site Assessment & Characterization/Verification of Buildings Procedure</i>. If deviations must be made in the collection method, a note of the deviation as well as the rationale for the deviation shall be noted in the sampling record.</p>
	8.	<p>Ensure that the data required in Section 4.3 is collected. Unless prevented by safety or security concerns, pictures shall be taken of the equipment sampled.</p>
	9.	<p>Collect a breathing zone sample on the electrical worker(s) if feasible. If electrical hazards (or other concerns) make breathing zone sampling infeasible, area sampling should be conducted instead.</p>

4.3 Data Elements

For samples that are collected on/in electrical equipment, the following information must be collected:

- Survey Number
- Sample Number
- Facility
- Location in Facility (room number, column number, etc.)
- Beryllium Status of Location (BCA, BRA, BCF, BSA, or Be Cleared)
- Equipment Name
- Make
- Voltage
- Sample location (e.g., inside panel door, outside cubicle, vents, arc chutes)

If available, the following additional information should be collected:

- Model
- Serial #
- Date of manufacture
- Date of installation (estimates are acceptable)
- Department of Energy (DOE) Asset Number
- Equipment Identification Number (EIN)
- Date of Last Preventive Maintenance
- Any other pertinent information (such as a Siemens breaker in a Westinghouse panel)

Sampling data collected from electrical equipment shall be handled in accordance with the contractor's procedure for the reporting and records management for industrial hygiene sampling data.

4.4 Data Analysis

Once the final sample results are available, determine which of the following three cases apply:

- a. Case 1 – All samples are below the trigger level:
 1. No further sampling required.
 2. Modify postings as necessary.
 3. Update the applicable Beryllium Facility Assessment Form as necessary.
 4. Provide the sample data to the Mission Support Contractor (MSC) Beryllium point of contact (POC).
- b. Case 2 – One or more samples are at or above the trigger level but none are at or above the control level:
 1. Post the area and/or equipment where the sample was collected in accordance with DOE-0342-003, *Hanford Site Postings and Labeling Requirements Procedure*.
 2. If possible, collect additional samples from adjacent areas on the equipment as well as the surrounding surfaces.
 - a. If none of the additional samples collected are at or above the trigger level, no further sampling is required.

- b. If any of the additional samples are at or above the trigger level (but are below the control 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.

NOTE: If any of the additional samples are found to be at or above the control level, they should be addressed in accordance with Case 3.

3. Modify posting as necessary.
 4. Update the applicable Beryllium Facility Assessment Form as necessary.
 5. Provide the sample data to the MSC Beryllium POC.
- c. Case 3 – One or more samples are at or 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 area, facility, and/or equipment where the sample was collected in accordance with DOE-0342-003, *Hanford Site Postings and Labeling Requirements Procedure*.
 3. Conduct additional characterization sampling of surrounding areas.
 4. Update the applicable Beryllium Facility Assessment Form.
 5. Provide the sample data to the MSC Beryllium POC.

4.5 Data Consolidation

A summary of sampling data shall be submitted to the MSC Beryllium POC at least quarterly. This summary is due by the last day of each fiscal quarter. The data summary shall contain the data elements listed in section 4.3. If no sampling was conducted in the quarter, an email shall be sent to the MSC Beryllium POC stating that fact.

MSC shall consolidate all of the sampling data into a spreadsheet or database. The MSC technical representative to the Hanford Site Chronic Beryllium Disease Prevention Program (CBDPP) Committee shall report any trends in the data to the CBDPP Committee on a quarterly basis.

4.6 Response to Catastrophic Failure

During the development of the plan to return the electrical equipment to normal operations, Industrial Hygiene shall be consulted to determine what beryllium sampling should be conducted and the proper controls that should be used during the recovery process.

NOTE: Contacting Industrial Hygiene is not a pre-requisite for taking steps to temporarily restore power prior to returning electrical equipment to normal operations.

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
Sampling Data	IH/IHT	Site-Wide Industrial Hygiene Database

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

DOE-0342, *Hanford Site Chronic Beryllium Disease Prevention Program*

DOE-0342-002, *Hanford Site Assessment & Characterization/Verification of Buildings Procedure*

DOE-0342-003, *Hanford Site Postings and Labeling Requirements Procedure*

DOE-0336, *Hanford Site Lockout/Tagout Procedure*, U.S. Department of Energy

Appendix A: Definitions, Acronyms, and Abbreviations

DEFINITIONS

Term	Definition
Catastrophic failure	A sudden and complete failure of one or more pieces of electrical equipment.
Electrical disconnect	Disconnect switches rapidly disconnect from power supplies in the event of an emergency or maintenance.
Lighting panel	A single panel distribution cabinet or wall cutout box that holds automatic overcurrent protection devices for lighting, heat, or power circuits.
Motor control center	A modular cabinet system for powering and controlling motors.
Preventive maintenance activities	The scheduled inspection, testing, and maintenance activities of electrical components to reduce the risk of catastrophic failure and/or unplanned outages.
Relay cabinet	A cabinet containing one or more relay switches for the control of electrical devices.
Switchgear	A combination of disconnect switches and breakers used to isolate electrical equipment in substations.

ACRONYMS & ABBREVIATIONS

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
cm	Centimeter
CWB&CTC	Central Washington Building & Construction Trades Council
DOE	U.S. Department of Energy
EIN	Equipment Identification Number
g	Gram
HAMTC	Hanford Atomic Metals Trade Council
IH	Industrial Hygienist
IHT	Industrial Hygiene Technician
LOTO	Lockout/Tagout
MSC	Mission Support Contractor
PLC	Programmable Logic Controllers
POC	Point of Contact
PPE	Personal Protective Equipment
sq	Square
µg	Microgram