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Level 2 Program Description Document (PDD)

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1.0 PURPOSE

- 1.1 This document describes and implements applicable requirements for the Chronic Beryllium Disease Prevention Program (CBDPP).
- 1.2 This document implements applicable regulatory requirements. They are listed in Appendix A, *Regulatory Requirements Flow Down*.

2.0 SCOPE AND APPLICABILITY

- 2.1 This Level 2 program description document provides requirements and guidance for a systematic approach to the protection of individuals from exposure to industrially-generated beryllium.
- 2.2 The CBDPP applies to Fluor-BWXT Portsmouth LLC (FBP) self-performed work whether performed by FBP employees or by contract labor personnel involving work in proximity, oversight, and removal of beryllium contamination at FBP-controlled facilities at the Portsmouth Gaseous Diffusion Plant (PORTS).
- 2.3 For activities outside the scope of the existing CBDPP that involve potential exposure to airborne beryllium, an update of the program must be approved prior to initiation of work activities.
- 2.4 The requirements contained in this document are based on U.S. Department of Energy (DOE) Title 10 Code of Federal Regulations (CFR) Part 850, *Chronic Beryllium Disease Prevention Program*. Beryllium is defined as elemental beryllium and any insoluble beryllium compound or alloy containing 0.1 percent, which is 1000 parts per million (ppm) beryllium or greater, that may be released as an airborne particulate.

Exceptions:

This document excludes natural forms of beryllium found in vegetation, soil, sediment, rock, coal, coal slag, coal ash, cement, concrete, abrasive blasting agents, brick, mortar, cinder block, etc.

3.0 PROGRAM DOCUMENTS

3.1 Requirements and Guidance

- 3.1.1 American Conference of Governmental Industrial Hygienists (ACGIH), *Threshold Limit Values for Chemical Substances and Physical Agents*, current edition
- 3.1.2 DOE Guide (G) 440.1-7A, *Implementation Guide for use with 10 CFR Part 850, Chronic Beryllium Disease Prevention Program*
- 3.1.3 Draft DOE Technical Standard, *Management of Items and Areas Containing Low Levels of Beryllium Areas (SAFT-0103) DOE-STD-XXXX-2005*

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- 3.1.4 Pro2Serve, *Identification of Natural and Anthropogenic Sources of Beryllium at the Portsmouth Gaseous Diffusion Plant, Portsmouth, Ohio Final Report*, May 2007
- 3.1.5 Title 10 CFR 1910, *Occupational Safety and Health Standards, Subpart Z, Toxic and Hazardous Substances*
- 3.1.6 Title 10 CFR Part 850, *Chronic Beryllium Disease Prevention Program*
- 3.1.7 Title 10 CFR 851, *Worker Safety and Health Program*
- 3.1.8 Title 29 CFR 1910, Subpart I, *Personal Protective Equipment*
- 3.1.9 Title 29 CFR 1910.134, *Respiratory Protection*
- 3.1.10 Title 29 CFR 1910.141, *Sanitation*
- 3.1.11 Title 29 CFR 1910.1200, *Hazard Communication*

3.2 Implementing Procedures

- 3.2.1 FBP-BS-PRO-00062, *Records Management Process*
- 3.2.2 FBP-IH-PRO-00023, *Surface Wipe Sampling*
- 3.2.3 FBP-IH-PRO-00024, *Industrial Hygiene Sampling*

4.0 PROGRAM RESPONSIBILITIES

4.1 Occupational Safety and Health (OS&H) Manager

Maintains responsibility for the CBDPP, including supplying necessary personnel, equipment, and funding.

4.2 OS&H Beryllium Program Manager

- 4.2.1 Oversees day-to-day activities of the CBDPP.
- 4.2.2 Evaluates compliance to the established CBDPP and maintains responsibility for documenting beryllium-contaminated areas, identifying and monitoring workers at risk, implementing risk reduction efforts, and ensuring effective clean up.
- 4.2.3 Assists supervisors with job transfers for beryllium-associated workers.
- 4.2.4 Provides information concerning beryllium exposure to beryllium-associated workers.
- 4.2.5 Designates OS&H Professionals to perform data entry into the DOE Beryllium Associated Worker Registry (BAWR) and oversees the data created.

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4.3 OS&H Professional

- 4.3.1** Assists the OS&H Beryllium Program Manager with sampling tasks, Hazard Analysis generation, DOE BAWR input, and other program tasks.
- 4.3.2** Provides technical guidance to supervision and Facility Managers for the posting of Beryllium Regulated Areas and Beryllium Controlled Areas.
- 4.3.3** Documents sampling results of areas and persons sampled.
- 4.3.4** Provides job-specific input to supervisors concerning working with beryllium contamination and completes associated documentation.
- 4.3.5** Provides beryllium-related input to Site Occupational Medical Director (SOMD), as requested.
- 4.3.6** Participates in hazard assessment process when requested.

4.4 Worker

Provides job-specific input to supervisors concerning working with beryllium contamination when requested.

4.5 Facility Manager

Participates in hazard assessment process when requested.

4.6 Supervisor

- 4.6.1** Ensures workers who perform activities in beryllium regulated or controlled areas are properly qualified.
- 4.6.2** Verifies annual training and medical surveillance required by this document is kept up-to-date for the employees he/she supervises who enter beryllium regulated and controlled areas.

4.7 Site Occupational Medical Director (SOMD)

Conducts all beryllium-related medical surveillance and associated activities covered within this program and 10 CFR 850.

4.8 Training Professional

Maintains training materials associated with CBDPP and trains workers identified by OS&H Professionals and supervision.

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5.0 PROGRAM DESCRIPTION

5.1 Chronic Beryllium Disease Prevention Program (CBDPP) Management

OS&H Manager

- 5.1.1 Appoint a qualified individual to serve as the OS&H Beryllium Program Manager.
- 5.1.2 Ensure that requirements of the CBDPP are flowed into subcontractor documents.
- 5.1.3 Provide sufficient personnel, equipment, and funding to maintain an effective CBDPP.

OS&H Beryllium Program Manager

- 5.1.4 Provide oversight of CBDPP implementations and serve as the site subject matter expert (SME).
- 5.1.5 Review and approve work activity plans and procedures with controls and tasks governed by the CBDPP.
- 5.1.6 Perform periodic program assessments to evaluate performance and compliance with the CBDPP.
- 5.1.7 Maintain a baseline inventory of the locations of beryllium contamination including beryllium controlled areas, beryllium regulated areas, and beryllium activities.
- 5.1.8 Identify the operations and areas in which workers must be monitored.
- 5.1.9 Ensure the written compliance program describes in detail the methods of compliance to be used in controlling exposures to applicable exposure limits.
- 5.1.10 Manage and control exposures to beryllium by reducing airborne levels of beryllium to As Low As Reasonably Achievable (ALARA).
- 5.1.11 Minimize the number of current workers exposed and potentially exposed to beryllium.
- 5.1.12 Minimize the number of opportunities for workers to be exposed to beryllium.
- 5.1.13 Establish exposure reduction and minimization goals.
- 5.1.14 Establish the required frequency of all exposure monitoring.
- 5.1.15 Direct OS&H Professionals to complete reviews of beryllium regulated and controlled areas.

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- 5.1.16 Identify the workers exposed or potentially exposed to beryllium contamination at those locations, and keep a log of such individuals in the site BAWR.
- 5.1.17 Direct Facility Managers to post locations in facilities or areas with appropriate signage as detailed in this document (see Appendix E, *Beryllium/Container Signs*).
- 5.1.18 Notify all FBP Directors to require that only non-beryllium materials/items be procured when ordering products and contracting services.

5.2 Hazard Assessment

OS&H Professional

- 5.2.1 **IF** work activity is planned for an area that has been determined to have beryllium contamination present, **OR** work activity will be in beryllium regulated or controlled areas, **THEN** a beryllium hazard assessment must be conducted prior to the beginning of each work activity using the principles of Integrated Safety Management System (ISMS). Ensure the hazard assessment includes, where available, the analysis of existing conditions, exposure data, the exposure potential of planned activities, and controls.
- 5.2.2 Ensure use of the following mechanisms when conducting a hazard assessment:
 - [1] A team must be used consisting of representatives from all parties performing the work, including supervision, workers, and OS&H Professionals to perform the hazard assessment according to FBP-IH-PRO-00022, *Job Hazard Analysis*.
 - [2] The hazard assessment process must include work permits and other contract requirements documents.
 - [3] A qualified individual must participate in and/or review the hazard assessment.

5.3 Permissible Exposure Limit

OS&H Professional

- 5.3.1 Ensure workers are never exposed to an airborne concentration of beryllium greater than Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL) as established in 29 CFR 1910.1000, *Air Contaminants*, or the latest revision of the ACGIH Threshold Limit Values (TLV), whichever is more restrictive.
- 5.3.2 **IF** the airborne concentration of beryllium is at or above the 10 CFR 850 Action Level of 0.2 micrograms per cubic meters ($\mu\text{g}/\text{m}^3$) as an 8-hour Time Weighted Average (TWA), **THEN** implement the following, where feasible:
 - Periodic exposure monitoring

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- Exposure reduction and minimization
- Regulated areas
- Occupationally hygienic facilities and practices
- Respiratory protection
- Protective clothing and equipment
- Warning signs (see Appendix E)

5.4 Exposure Monitoring

OS&H Beryllium Program Manager

- 5.4.1** Provide guidance to the OS&H Professional to plan and/or oversee beryllium exposure assessments and the type and frequency of monitoring to be performed.
- 5.4.2** Ensure initial and periodic monitoring is conducted in areas that may have airborne beryllium as shown by the baseline inventory and/or hazard assessment. The purpose of the monitoring is to document and maintain confidence that an individual's exposure to beryllium in any 8-hour work shift of a 40-hour workweek has not exceeded the applicable exposure limit and/or Action Level.
- 5.4.3** **IF** an airborne concentration of beryllium is at or above the Action Level, calculated as an 8-hour TWA exposure, **THEN** implement periodic monitoring, exposure reduction and minimization, regulated areas, hygiene facilities and practices, respiratory protection, protective clothing and equipment, and warning signs.

OS&H Professional

- 5.4.4** Ensure use of a method of air monitoring and analysis that has an accuracy of not less than 25 percent with a confidence level of 95 percent for airborne concentrations of beryllium at the DOE Action Level.
- 5.4.5** Ensure oversight and/or review and approval of exposure monitoring by a qualified individual.
- 5.4.6** Conduct personal breathing zone sampling for all workers exposed and potentially exposed to airborne beryllium, or provide the rationale for monitoring a limited subset of workers.
- 5.4.7** Use results of sampling to verify the adequacy of engineering, administrative, and personal protective equipment (PPE) controls, including respirators.
- 5.4.8** Ensure all air monitoring samples are analyzed in a laboratory accredited for metals by the American Industrial Hygiene Association (AIHA).

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- 5.4.9 Provide technical guidance to supervision and Facility Managers on the posting of Beryllium Regulated Areas and Beryllium Controlled Areas (see Appendix E).
- 5.4.10 Develop sampling strategies that include consideration of homogeneous exposure group, homogeneous sampling areas, and statistical objectives.
- 5.4.11 Perform and document survey results for surface wipe, surface bulk, surface mini-bulk, destructive analysis, personal breathing zone, and area air sampling for beryllium.
- 5.4.12 Notify affected workers of any beryllium monitoring results in writing within 10 working days after receipt of the results.
- 5.4.13 Conduct surface sampling, as needed, to determine ambient conditions and identify contamination that has the potential to become airborne.
- 5.4.14 Ensure beryllium-contaminated equipment and other items are cleaned to the lowest contamination level practicable, but not to exceed the release criteria specified in 10 CFR 850.31, *Release Criteria*, for items to the general public or for use in a non-beryllium area of a DOE facility.

5.5 Exposure Reduction and Minimization

Supervisor

- 5.5.1 Manage and control exposures to beryllium by reducing airborne levels of beryllium to ALARA, minimizing the number of workers exposed or potentially exposed to beryllium, and minimizing the number of opportunities to be exposed.
- 5.5.2 Reduce exposures using the conventional hierarchy of industrial hygiene controls (i.e., engineering, administrative, and PPE, in that order).

OS&H Beryllium Program Manager

- 5.5.3 **IF** exposure levels are at or above the DOE Action Levels, **THEN** establish a formal exposure reduction and minimization program to reduce exposure levels to below the DOE Action Level, if practicable.

Worker

- 5.5.4 Provide job-specific input to supervisors concerning working with beryllium contamination.

5.6 Identification of Beryllium Regulated and Controlled Areas

OS&H Professional

- 5.6.1 Identify and demarcate areas having low-level beryllium contamination (surface contamination above 0.2 µg/100 square centimeters [cm²] but below 3.0 µg/100 cm², **and** reasonably expected to have airborne concentrations above the applicable PEL/TLV) as Beryllium Controlled Areas.

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5.6.2 Identify and demarcate areas that have surface contamination levels at or above 3.0 µg/100 cm² as Beryllium Controlled Areas.

5.6.3 Identify and demarcate areas with airborne concentrations at or above the DOE Action Level of 0.2 µg/m³ as an 8-hour TWA as Beryllium Regulated Areas.

Facility Manager

5.6.4 Delineate Beryllium Regulated Areas and Beryllium Controlled Areas by posting the appropriate warning signs (see Appendix E and Appendix C, *Supplemental Guidance on Chronic Beryllium Disease Prevention Program [CBDPP] Compliance*).

5.6.5 Demarcate Regulated and Controlled Areas from the rest of the work place in a manner that adequately alerts workers to the boundaries of such areas.

Supervisor

5.6.6 Ensure access is limited to authorized persons.

5.6.7 Ensure access to Regulated Areas is limited to Beryllium Workers except during an emergency.

5.6.8 Ensure entry into Regulated Areas is controlled via a log of all entrants that shows each entrant's name, employee number, date, time in, time out, and work activity.

5.7 Beryllium-Contaminated Legacy Equipment/Systems or Structures

Supervisor

5.7.1 Contact an OS&H Professional for projects and tasks that will involve beryllium-contaminated legacy equipment/systems or structures in areas where dust levels may be disturbed, or to remove previously stored items within demarcated boundaries.

5.7.2 Ensure items found with surface contamination above 0.2 µg/100 cm² are decontaminated to lower levels, or disposed of, according to instructions presented in Subsection 5.12, *Release Criteria*, or Subsection 5.13, *Waste Disposal*.

5.8 Hygiene Facilities and Practices

Supervisor

5.8.1 Enforce the following requirements in areas where workers are exposed to beryllium at or above the DOE Action Level:

[1] Food or beverage and tobacco products must not be used.

[2] Cosmetics must not be applied.

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- [3] Beryllium workers must wear disposable protective outer clothing which must be removed or cleaned prior to exiting regulated areas.

5.8.2 Ensure clean change areas are provided for beryllium workers who work in regulated areas, including the following:

- [1] Provide separate facilities free of beryllium contamination for beryllium workers to change into and out of and store personal clothing, and to clean protective clothing and equipment to prevent cross-contamination.
- [2] Provide hand-washing and shower facilities for beryllium for individuals who work in regulated areas.
- [3] Ensure beryllium workers who work in regulated areas shower at the end of their work shift.

OS&H Professional

5.8.3 Ensure the change rooms, shower and hand-washing facilities, and lunchroom facilities comply with 29 CFR 1910.141, *Sanitation*.

5.9 Respiratory Protection

OS&H Professional

5.9.1 The PORTS respiratory protection program must comply with the respiratory protection program requirements of 29 CFR 1910.134, *Respiratory Protection*.

Supervisor

5.9.2 Respirators must be supplied to and properly used by all workers who are exposed or potentially exposed to an airborne concentration of beryllium above the applicable PEL/TLV or greater than or equal to the DOE Action Level.

5.9.3 The respiratory protection program must include any beryllium-associated worker who requests to use a respirator for protection against airborne beryllium regardless of measured exposure levels.

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5.10 Protective Clothing and Equipment

Supervisor

NOTE

Beryllium-associated workers may request the use of protective clothing and equipment for protection against airborne beryllium regardless of measured exposure at undetected or de minimus levels.

- 5.10.1 Ensure PPE according to hazard assessment requirements and/or safety and health instructions is provided to beryllium workers and properly used and maintained by workers where airborne beryllium is present at or above the DOE Action Level or where surface contamination is above 3 $\mu\text{g}/100\text{ cm}^2$ as required by 10 CFR 850.29, *Protective Clothing and Equipment*.
- 5.10.2 Ensure all applicable sections of 29 CFR 1910, *Occupational Safety and Health Standards*, Subpart I, *Personal Protective Equipment*, including 29 CFR 1910.132, *General Requirements*, are complied with when workers use personal protective clothing and equipment.
- 5.10.3 Ensure instructions for donning, doffing, handling, and storing protective clothing and equipment are in place.
- 5.10.4 Ensure no worker removes beryllium-contaminated protective clothing and equipment from areas that contain beryllium except for workers authorized to launder, clean, maintain, or dispose of the clothing and equipment.
- 5.10.5 Ensure the removal of beryllium from protective clothing and equipment by blowing, shaking, or other means that may disperse beryllium into the air is prohibited.
- 5.10.6 Ensure non-disposable protective clothing and equipment is cleaned, laundered, repaired, or replaced as needed to maintain effectiveness.
- 5.10.7 Ensure beryllium-contaminated protective clothing and equipment when removed for laundering, cleaning, maintenance, or disposal is placed in containers that prevent the dispersion of beryllium dust and containers are labeled.
- 5.10.8 Inform organizations/individuals that launder or clean DOE beryllium-contaminated protective clothing or equipment that exposure to beryllium is potentially harmful, and that clothing and equipment should be laundered or cleaned in a manner to prevent the release of airborne beryllium.
- 5.10.9 Ensure beryllium-contaminated disposable protective clothing and equipment is bagged, labeled, and properly disposed of as beryllium-containing waste.

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5.11 Housekeeping

Worker

- 5.11.1** WHEN cleaning floors and surfaces in areas where beryllium is present, THEN beryllium-contaminated floors and surfaces must be cleaned using a wet method, vacuum cleaner equipped with a High Efficiency Particulate Air (HEPA) filter, or other cleaning methods that avoid the production of airborne dust. Do not use compressed air or dry methods for such cleaning.
- 5.11.2** Portable or mobile vacuum units that are used to clean beryllium-contaminated areas shall be equipped with HEPA filters. Change the filters as often as needed to maintain their capture efficiency.
- 5.11.3** Ensure cleaning equipment that is used to clean beryllium-contaminated surfaces are labeled, controlled, and not used for non-hazardous materials.

OS&H Professional

- 5.11.4** Conduct surface sampling to determine background levels and effectiveness of housekeeping.

5.12 Release Criteria

OS&H Professional

NOTE

In areas with known elevated beryllium levels from natural sources, it may be necessary to perform beryllium surface smear and bulk sampling on equipment prior to commencing work for comparison with levels on equipment following work activities.

- 5.12.1** BEFORE releasing beryllium-contaminated equipment or other items to the general public or for use in a non-beryllium area of a DOE facility, ensure the following:
- The removable contamination levels of equipment or item surfaces do not exceed $0.2 \mu\text{g}/100 \text{ cm}^2$ or the concentration level of naturally occurring beryllium in soil (if equipment is contaminated with probable soil) at the point of release, whichever is greater.
 - The equipment or item is properly labeled.
 - The release is conditioned on the recipient's commitment to implement controls that will prevent foreseeable beryllium exposures.

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5.12.2 BEFORE releasing beryllium-contaminated equipment or other items to another site performing work with beryllium, ensure the following:

- The removable contamination level of equipment or item surfaces does not exceed 3 µg/100 cm².
- The equipment or item is properly labeled (see Appendix E).
- The equipment or item is enclosed or placed in sealed, impermeable bags or containers to prevent the release of beryllium dust during handling and transportation.

5.13 Waste Disposal

Supervisor

NOTE

Prior to disposal, contact a Waste Management Professional for further information about classifying beryllium-containing waste under Resource Conservation and Recovery Act (RCRA) requirements.

- 5.13.1** Ensure the generation of beryllium-containing waste is controlled and beryllium-contaminated equipment and other items are disposed of as solid or hazardous waste, determined on a case-by-case basis through the application of waste minimization principles.
- 5.13.2** Dispose of beryllium-containing waste, beryllium-contaminated equipment, and other items that are disposed of as waste in sealed, impermeable bags, containers, or enclosures to prevent the release of beryllium dust during handling and transportation.
- 5.13.3** Where feasible, ensure all bags, containers, and enclosures of beryllium-contaminated waste, scrap, and debris have a prominent warning label as shown in Appendix E.
- 5.13.4 IF** further guidance is needed, **THEN** consult with a Waste Management Professional.

5.14 Management of Identified Beryllium Regulated and Controlled Areas

OS&H Manager

- 5.14.1** Assist Supervisor in identifying operations, areas, and personnel to be monitored for potential exposure.
- 5.14.2** Upon request from Project Managers, Supervisors, or Workers and their representatives, participate in the hazard assessment process.

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- 5.14.3 Evaluate existing conditions, history, exposure data, and the exposure potential of planned activities to determine when air and/or surface samples are needed.
- 5.14.4 Conduct personal breathing zone sampling for workers exposed or potentially exposed to beryllium.
- 5.14.5 Provide personal sampling reports to the sampled individual's Supervisor and to the individual sampled. Inform Supervisors of personal breathing zone samples exceeding the DOE Action Level measured in the worker's breathing zone by personal monitoring and provide recommendations for controls.
- 5.14.6 Conduct surface sampling, where appropriate, to determine operational controls, background levels, and effectiveness of housekeeping. Perform and document survey results for surface wipe, surface bulk, surface mini-bulk, destructive analysis, personal breathing zones, and area air sampling for beryllium.
- 5.14.7 Consider homogeneous exposure groups, homogeneous sampling areas, and statistical objectives during development of sampling strategies.
- 5.14.8 Perform periodic monitoring of the appropriate type and frequency for each Beryllium Activity as determined by the OS&H Beryllium Program Manager.
- 5.14.9 Conduct additional monitoring when warranted as a result of changes in operations or procedures, or as necessary to support exposure reduction and minimization initiatives.
- 5.14.10 Provide the Supervisor with recommendations for working with beryllium contamination on a task-specific basis, and communicate beryllium related pre-job briefing information, as needed.
- 5.14.11 Assist supervision in the development of a Job Hazard Analysis (JHA).
- 5.14.12 Conduct follow-up investigations on potential occupational illnesses as a result of workplace exposure to beryllium contamination as determined by the SOMD.
- 5.14.13 Specify requirements for entry/exit, PPE, and other controls in regulated areas on the JHA, work permit, or other media.
- 5.14.14 Add personnel and site beryllium data to the site BAWR and transmit applicable data for inclusion into DOE's BAWR.

Supervisor

- 5.14.15 Coordinate with an OS&H Professional to plan intrusive work and monitoring in Beryllium Controlled Areas and Beryllium Regulated Areas.
- 5.14.16 Allow only individuals that are authorized, trained, and medically qualified to enter and work in beryllium regulated and controlled areas.

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- 5.14.17 Maintain a record of personnel performing intrusive work in the Beryllium Regulated Areas. **IF** desired, **THEN** use a written entry log at the location for this purpose (this log must include name, date, time in, time out, and work activity).
- 5.14.18 Minimize the number of workers at risk and minimize the number of opportunities and time spent in beryllium regulated and controlled areas.

Worker

- 5.14.19 Ensure clean change rooms and shower facilities are available.
- 5.14.20 Verify proper labeling of containers that serve as storage containers or have internal beryllium contamination.
- 5.14.21 Ensure beryllium waste is segregated from other materials/chemicals when feasible.
- 5.14.22 Notify the OS&H Beryllium Program Manager when there is a potential for worker exposure to beryllium contamination.
- 5.14.23 Ensure routine surface sampling is conducted to determine housekeeping conditions (this sampling is not required to include the interior of installed closed systems such as enclosures, glove boxes, chambers, drums, or ventilation systems).
- 5.14.24 Operate according to established waste minimization practices.
- 5.14.25 Reduce facility exposure potential by using ALARA principles.
- 5.14.26 Ensure surfaces are decontaminated using methods approved by an OS&H Professional.
- 5.14.27 Ensure ventilation systems from primary containment equipment, such as glove boxes or hoods, are HEPA filtered and discharged to the outdoors.

5.15 Medical Surveillance

OS&H Beryllium Program Manager

- 5.15.1 Provide the SOMD the referenced material specified in 10 CFR 850.34(a)(5) and 10 CFR 850.34(a)(6), with the exception of 10 CFR 850.34(a)(5)(i).

SOMD

- 5.15.2 Establish a medical surveillance program for beryllium-associated workers who voluntarily participate in the program.

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- 5.15.3** Establish and maintain a list of beryllium-associated workers who may be eligible for protective measures (the list must be based on the hazard assessment, exposure records, and other information regarding the identity of beryllium-associated workers; adjusted at regular intervals; and coordinated or be matching in data with the site BAWR).

NOTE

If FBP selects the initial physician to conduct any medical examination or consultation provided to a beryllium-associated worker, the worker may designate a second physician to:

- Review any findings, determinations, or recommendations of the initial physician.
- Conduct such examinations, consultations, and laboratory tests as the second physician deems necessary to facilitate this review.

FBP may condition its participation in, and payment for, multiple-physician review, upon the beryllium-associated worker performing the following within fifteen (15) days of receipt of the notice, or receipt of the initial physician's written opinion, whichever is later:

- Inform FBP in writing that he or she intends to seek a second medical opinion.
- Initiate steps to make an appointment with a second physician.

FBP and the beryllium-associated worker or the worker's designated representative may agree upon the use of any alternate form of physician determination in lieu of the multiple physician review process, so long as the alternative is expeditious and at least as protective of the worker.

The SOMD's written medical opinion must not reveal specific records, findings, and diagnoses that are not related to medical conditions that may be affected by beryllium exposure.

- 5.15.4** Administer the medical surveillance program for beryllium-associated workers.
- 5.15.5** Ensure the medical evaluations and procedures are performed by, or under the supervision of, a licensed physician who is familiar with the health effects of beryllium.
- 5.15.6** Provide to beryllium-associated workers who voluntarily participate in the medical surveillance program the medical evaluations and procedure at no cost and at a time and place that is reasonable and convenient for the worker.
- 5.15.7** Provide a baseline medical evaluation to beryllium-associated workers. Ensure the evaluation includes:
- Detailed medical and work history with emphasis on past, present, and anticipated future exposure to beryllium
 - Respiratory symptoms questionnaire

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- Physical examination with special emphasis on the respiratory system, skin, and eyes
- Chest radiograph (posterior-anterior, 14 x 17 inches) interpreted by a National Institute of Occupational Safety and Health (NIOSH) B-reader of pneumoconiosis or a board-certified radiologist (unless a baseline chest radiograph is already on file)
- Spirometry consisting of forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV1)
- Beryllium Lymphocyte Proliferation Test (Be-LPT)
- Any other tests deemed appropriate by the examining physician for evaluating beryllium-related health effects

5.15.8 Provide to beryllium workers a medical evaluation annually and to other beryllium-associated workers a medical evaluation every three years. Ensure the periodic medical evaluation includes:

- Detailed medical and work history with emphasis on past, present, and anticipated future exposure to beryllium
- Respiratory symptoms questionnaire
- Physical examination with emphasis on the respiratory system
- Be-LPT
- Any other medical evaluations deemed appropriate by the examining physician for evaluating beryllium-related health effects

5.15.9 Provide a chest radiograph to beryllium-associated workers at least once every five years.

5.15.10 Provide a medical evaluation as soon as possible to any worker who may have been exposed to beryllium because of a beryllium emergency. Ensure the medical evaluation includes the requirements of this document.

NOTE

The multiple physician review process is implemented when a worker disagrees with the findings of the initial medical evaluation.

5.15.11 Establish a multiple-physician review process when the need arises for beryllium-associated workers that allows for the review of initial medical findings, determinations, or recommendations from any medical evaluation conducted according to this section.

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- 5.15.12** Notify, in writing, a beryllium-associated worker of the right to seek a second medical opinion promptly after the initial physician provided by FBP conducts a medical examination or consultation.
- 5.15.13** **IF** the findings, determinations, **OR** recommendations of the second physician differ from those of the initial physician, **THEN** FBP and the beryllium-associated worker must make efforts to encourage and assist the two physicians to resolve any disagreement.
- 5.15.14** **IF**, despite the efforts of FBP and the beryllium-associated worker, the two physicians are unable to resolve their disagreement, **THEN** FBP and the worker, through their respective physicians, must designate a third physician to:
- Review any findings, determinations, or recommendations of the other two physicians.
 - Conduct examinations, consultations, laboratory tests, and consultations with the other two physicians as the third physician deems necessary to resolve the disagreement among them.
- 5.15.15** Ensure actions are consistent with the findings, determinations, and recommendations of the third physician, unless the SOMD and the beryllium-associated worker reach an agreement that is consistent with the recommendations of at least one of the other two physicians.
- 5.15.16** Within two weeks of receipt of results, provide to FBP a written and signed medical opinion for each medical evaluation performed on each beryllium-associated worker.
- 5.15.17** Ensure the written opinion takes into account the findings, determinations, and recommendations of the other examining physicians who may have examined the beryllium-associated worker. Ensure the SOMD's opinion contains the following:
- The diagnosis of the worker's condition relevant to occupational exposure to beryllium and any other medical condition that would place the worker at increased risk of material impairment to health from further exposure to beryllium
 - Any recommendation for removal of the worker from DOE beryllium activities or limitation on the worker's activities or duties, or use of PPE such as a respirator
 - A statement that the SOMD or examining physician has clearly explained to the worker the results of the medical evaluation, including all tests results and any medical condition related to beryllium exposure that requires further evaluation or treatment

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5.15.18 Provide each beryllium-associated worker with a written medical opinion containing the results of all medical tests or procedures, an explanation of any abnormal findings, and any recommendation that the worker be referred for additional testing for evidence of Chronic Beryllium Disease (CBD) within 10 working days of the SOMD's receipt of the results of the medical tests or procedures.

5.15.19 Provide, within 30 days after a request by a beryllium-associated worker, the same information FBP is required to provide to the examining physician under this section.

5.16 Beryllium Emergencies

OS&H Beryllium Program Manager

NOTE

FBP has an on-going emergency response program, and the existing emergency response system is prepared to respond to both environmental and medical emergencies.

Based on the current facilities managed and the activities performed by FBP, the hazard potential during a site airborne beryllium emergency release is extremely low.

5.16.1 **IF** a beryllium emergency related to decontamination or decommissioning (D&D) operations occurs, **THEN** coordinate with emergency response to ensure compliance with 29 CFR 1910.120(l), *Emergency Response by Employees at Uncontrolled Hazardous Waste Sites*.

5.16.2 **IF** a beryllium emergency related to any other operation occurs, **THEN** coordinate with emergency response to ensure compliance with 29 CFR 1910.120(q), *Emergency Response to Hazardous Substance Releases*.

5.16.3 Report on the applicable OSHA reporting form (e.g., OSHA 300 log, *Injury & Illness Recordkeeping Forms*) chronic beryllium disease cases caused or aggravated by occupational exposure to beryllium.

NOTE

FBP must use the results of the data analyses to identify additional workers to whom FBP must provide medical surveillance, and to determine the need for additional exposure controls.

5.16.4 Routinely and systematically analyze airborne beryllium exposure data with the aim of identifying individuals or groups of individuals potentially at risk for CBD and working conditions that are contributing to that risk.

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5.17 Medical Removal

SOMD

- 5.17.1** Offer a beryllium-associated worker removal from exposure to beryllium if it is determined in a written medical opinion that it is medically appropriate to remove the worker from such exposure. Ensure the determination is based on one or more positive Be-LPT results, CBD diagnosis, an examining physician's recommendation, or any other signs or symptoms that the SOMD deems medically sufficient to remove a worker.
- 5.17.2** Offer a beryllium-associated worker temporary medical removal from exposure to beryllium on each occasion that it is determined in a written medical opinion that the worker should be temporarily removed from such exposure pending a final medical determination of whether the worker should be removed permanently.
- [1]** IF a beryllium-associated worker is temporarily removed from beryllium exposure according to this section, THEN FBP must transfer the worker to a comparable job for which the worker is qualified (or for which the worker can be trained in a short period) and where beryllium exposures are ALARA, but in no event at or above the Action Level.
 - [2]** FBP must maintain the beryllium-associated worker's total normal earnings, seniority, and other worker rights and benefits as if the worker had not been removed.
 - [3]** IF there is no such job available, THEN FBP must provide to the beryllium-associated worker the medical removal protection benefits until a job becomes available or for one year (whichever comes first).
- 5.17.3** IF it is determined in a written medical opinion that the worker should be permanently removed from exposure to beryllium, THEN offer a beryllium-associated worker permanent medical removal from exposure to beryllium. IF a beryllium-associated worker is removed permanently from beryllium exposure based on the SOMD's recommendation according to this section, THEN FBP must provide the worker the medical removal protection benefits.
- 5.17.4** IF it is determined that a beryllium-associated worker should be temporarily or permanently removed from exposure to beryllium, THEN perform the following:
- [1]** Advise the beryllium-associated worker of the determination that medical removal is necessary to protect the worker's health.
 - [2]** Provide the beryllium-associated worker with a copy of 10 CFR 850 and any other information deemed necessary on the risks of continued exposure to beryllium and the benefits of removal.

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- [3] Provide the beryllium-associated worker the opportunity to have any questions concerning medical removal answered.
- [4] Obtain the beryllium-associated worker's signature acknowledging that the worker has been advised to accept medical removal from beryllium exposure and has been provided with the information on the benefits of removal and the risks of continued exposure to beryllium.

5.17.5 A beryllium-associated worker who has been permanently removed under this section may not be returned to the worker's former job status unless it is first determined in an SOMD-written medical opinion that continued medical removal is no longer necessary to protect the worker's health.

5.17.6 **IF**, in the SOMD's opinion, continued exposure to beryllium will not pose an increased risk to the beryllium-associated worker's health, and medical removal is an inappropriate remedy in the circumstances, **THEN** fully discuss these matters with the worker and, in a written determination, FBP may be authorized to return the worker to his or her former job status.

OS&H Beryllium Program Manager

NOTE

FBP's obligation to provide medical removal protection benefits to a removed beryllium-associated worker is reduced to the extent that the worker receives compensation for earnings lost during the period of removal either from a publicly or employer-funded compensation program or from employment with another employer made possible by virtue of the worker's removal.

FBP may condition the provision of medical removal protection benefits upon the beryllium-associated worker's participation in medical surveillance provided according to 10 CFR 850.34, *Medical Surveillance*.

5.17.7 **IF** a beryllium-associated worker has been permanently removed from beryllium exposure, **THEN** coordinate with his/her supervisors, Human Resources, and SOMD to ensure that one of the following are provided to the beryllium-associated worker:

- [1] The opportunity to transfer to another position which is available, or later becomes available, for which the beryllium-associated worker is qualified (or for which the worker can be trained in a short period), and where beryllium exposures are ALARA, but in no event at or above the Action Level; or
- [2] **IF** the beryllium-associated worker cannot be transferred to a comparable job where beryllium exposures are below the Action Level, **THEN** a maximum of two years of permanent medical removal protection benefits.

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- 5.17.8** IF medical removal protection benefits are required, **THEN** coordinate with Human Resources to ensure the removed worker's total normal earnings, seniority, and other worker rights and benefits are maintained as though the worker had not been removed.
- 5.17.9** IF a removed beryllium-associated worker files a claim for workers' compensation payments for a beryllium-related disability, **THEN** coordinate with Human Resources to ensure medical removal protection benefits continue to be provided pending disposition of the claim.

5.18 Medical Consent

SOMD

- 5.18.1** Provide each beryllium-associated worker with a summary of the medical surveillance program at least one week before the first medical evaluation or procedure or at any time requested by the worker. Ensure the summary includes:
- The type of data that will be collected in the medical surveillance program
 - A description of how the data will be collected and maintained
 - The purpose for which the data will be used
 - A description of how confidential data will be protected
- 5.18.2** Provide each beryllium-associated worker with information on the benefits and risks of the medical tests and examinations available to the worker at least one week prior to any such examination or test, and provide an opportunity to have the worker's questions answered.
- 5.18.3** Obtain a beryllium-associated worker's signature on FBP-FRM-00903, *Chronic Beryllium Disease Prevention Program Informed Consent Form*, before performing medical evaluations or any tests.

5.19 Counseling

SOMD

Provide counseling to assist beryllium-associated workers who are diagnosed by the SOMD to be sensitized to beryllium or to have CBD. Ensure the counseling program includes communicating with beryllium-associated workers the following:

- The medical surveillance program provisions and procedures
- Medical treatment options
- Medical, psychological, and career counseling
- Medical benefits

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- Administrative procedures and workers' rights under applicable Workers' Compensation laws and regulations
- Work practice procedures limiting beryllium-associated worker exposure to beryllium
- The risk of continued beryllium exposure after sensitization

5.20 Worker Training

Training Professional

- 5.20.1** Provide training for beryllium workers and awareness training for other potentially affected employees as requested by the OS&H Manager.
- 5.20.2** Provide beryllium awareness training to consist of general awareness about beryllium hazards and controls.
- 5.20.3** Provide beryllium worker training classes to include the following:
- Information according to 29 CFR 1910.1200, *Hazard Communication*, and 10 CFR 850
 - General awareness about beryllium hazards and controls
 - An overview of the contents of the CBDPP
 - Potential health risks to beryllium worker family members and others who may come in contact with beryllium on beryllium workers or beryllium workers' personal clothing or other personal items as the result of a beryllium control failure
- 5.20.4** Training must be provided before or at the time of initial assignment and at least every two years thereafter (refresher).
- 5.20.5** Retraining prior to refresher dates must be provided when there is reason to believe that a beryllium worker lacks the proficiency, knowledge, or understanding needed to work safely with beryllium.
- 5.20.6** Ensure training meets the requirements of 10 CFR 850.37, *Training and Counseling*, and 29 CFR 1910.1200 and is presented by technically qualified individuals.
- 5.20.7** Enter a notation of worker beryllium medical restrictions into the training database when directed by the SOMD and/or the OS&H Beryllium Program Manager.

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Supervisor

- 5.20.8** Ensure beryllium worker training is provided to employees required to enter Regulated and Controlled Areas before or at the time of initial assignment and at least every two years thereafter.
- 5.20.9** Ensure all other FBP employees and unescorted visitors present where Beryllium Activities are conducted are provided training that consists of general awareness about beryllium hazards and controls.
- 5.20.10** Ensure those individuals entering Regulated and Beryllium Controlled areas have up-to-date worker training and any specific instructions for the work activity.
- 5.20.11** Ensure beryllium retraining when there is reason to believe that a beryllium worker lacks the proficiency, knowledge, or understanding needed to work safely with beryllium, including at least in the following situations:
 - To address any new beryllium hazards resulting from a change to procedures or beryllium controls about which the beryllium worker was not previously trained
 - If a beryllium worker's performance involving beryllium work indicates that the worker has not retained the requisite proficiency

5.21 Recordkeeping and Use of Information

OS&H Beryllium Program Manager

- 5.21.1** Establish and maintain accurate records of all beryllium inventory information, hazard assessments, exposure measurements, exposure controls, and medical surveillance.
- 5.21.2** Convey to DOE or its designee all record series required by 10 CFR 850 if involvement in the CBDPP is ceased.
- 5.21.3** Link data on workplace conditions and health outcomes in order to establish a basis for understanding the beryllium health risk.
- 5.21.4** Ensure the confidentiality of all work-related records generated under this rule by ensuring the following:
 - [1]** All records that are transmitted to other parties do not contain names, social security numbers, or any other variables or combination of variables that could be used to identify particular individuals.

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[2] Ensure individual medical information generated by the CBDPP is either included as part of the worker's site medical records and maintained by the SOMD, or other physician if designated; maintained separately from other records; and used or disclosed only in conformance with any applicable requirements imposed by the Americans with Disabilities Act, the Privacy Act of 1974, *The Freedom of Information Act*, and any other applicable law.

5.21.5 Ensure all records required by 10 CFR 850 are maintained in current and accessible electronic systems which include the ability to readily retrieve data in a format that maintains confidentiality.

5.21.6 Ensure all records generated are transmitted in a format that protects the confidentiality of individuals to the DOE Assistant Secretary for Environment, Safety, and Health upon request.

5.21.7 Semi-annually transmit to the DOE Office of Epidemiologic Studies within the Office of Environment, Safety, and Health an electronic registry of beryllium-associated workers that protects confidentiality; the registry must include, but is not limited to: a unique identifier, date of birth, gender, site, job history, medical screening test results, exposure measurements, and results of referrals for specialized medical evaluations.

5.22 Performance Feedback

OS&H Beryllium Program Manager

5.22.1 Assess results of beryllium activity compared to expected results. Examples of outcome measures for beryllium may include the following:

- Number of workers potentially exposed
- Exposure level measures for groups and individuals such as percent exceeding applicable exposure limits
- Incidence of CBD and beryllium sensitization
- Percent of surface wipe samples exceeding 0.2 $\mu\text{g}/100\text{ cm}^2$
- Areas and waste containers outside operational area with removable surface contamination exceeding 0.2 $\mu\text{g}/100\text{ cm}^2$
- Beryllium-contaminated waste (e.g., cubic feet)

5.22.2 Conduct periodic analyses and assessments of monitoring activities, hazards, medical surveillance, exposure reduction and minimization, and occurrence reporting data.

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- 5.22.3 Ensure feedback of sampling results of analyses and assessments is given to the Supervisors, OS&H Professionals, medical staff, Workers, labor organizations representing the workers, and others involved in beryllium-related work and activities.

Supervisor

- 5.22.4 Incorporate feedback using the principles of ISMS into performance measurements through project meetings, team meetings, lessons learned, corrective actions, debriefings, and other suitable means.

Worker

- 5.22.5 Discuss lessons learned from the job and lessons to be learned from others in pre-job briefings and other safety meetings.

6.0 DEFINITIONS/ACRONYMS

6.1 Definitions

- A. **Beryllium (and Beryllium Materials)** – Elemental beryllium and any insoluble beryllium compound or alloy containing 0.1 percent (1000 ppm) beryllium or greater that may be released as an airborne particulate. Under this procedure, beryllium and beryllium materials shall be limited to the following:
- Industrially-generated forms of beryllium having sufficient concentration and distribution to cause surface wipe (removable) contamination levels for areas and/or equipment in excess of the 0.2 µg/100 cm² DOE Release Criteria. Such forms of surface contamination exclude beryllium that is determined more-likely-than-not to be of natural origin such as found in vegetation, soil, sediment, rock, coal, coal ash, etc.
 - In the absence of evidence to the contrary, materials determined to contain beryllium contamination levels above the concentration level of beryllium in natural materials (background) shall be categorized as industrially-generated beryllium. Contrary evidence includes contamination due to vegetation, soil, sediment, rock, coal, coal slag, coal ash, cement, concrete, abrasive blasting agents, brick, mortar, cinder block, etc.
- B. **Beryllium Activity** – An activity taken for, or by, DOE at a DOE facility that may expose workers to airborne beryllium including, but not limited to, design, construction, operation, maintenance, or decommissioning; and which may involve one DOE facility or operation, or a combination of facilities and operations.
- C. **Beryllium-Associated Worker** – A current worker who is or was exposed or potentially exposed to airborne concentrations of beryllium at a DOE facility, including:
- A beryllium worker

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- A current worker whose work history shows that the worker may have been exposed to airborne concentrations of beryllium at a DOE facility
 - A current worker who exhibits signs or symptoms of beryllium exposure
 - A current worker who is receiving medical removal protection benefits
- D. Beryllium Associated Worker Registry (BAWR)** – A complex-wide internal program to help DOE conduct and improve its CBDPPs. The Registry contains data on DOE contractor and federal workers, the jobs they performed, their beryllium exposure monitoring results, results from screening tests for chronic beryllium disease, and the results from subsequent medical diagnostic procedures.
- E. Beryllium Controlled Area** – An area in which surface contamination is detected above $0.2 \mu\text{g}/100 \text{ cm}^2$ but below $3.0 \mu\text{g}/100 \text{ cm}^2$ **and** is reasonably expected to have airborne concentrations greater than the applicable PEL/TLV.
- F. Beryllium Emergency** – Any occurrence such as, but not limited to: equipment failure, fire, or failure of control equipment or operations that results in an unexpected and significant release of beryllium contamination at a DOE facility.
- G. Beryllium-Induced Lymphocyte Proliferation Test (Be-LPT)** – An in vitro measure of the beryllium antigen-specific, cell-mediated immune response.
- H. Beryllium Regulated Area** – An area demarcated by FBP in which the airborne concentration of beryllium exceeds, or can reasonably be expected to exceed, the DOE Action Level.
- I. Beryllium Waste Material** – A material containing beryllium if beryllium is present in the mixture in concentrations greater than 0.1 percent (1000 ppm).
- J. Beryllium Worker** – A current worker who is regularly employed in a DOE beryllium activity.
- K. Chronic Beryllium Disease (CBD)** – A chronic lung disease caused by immunologic hypersensitivity to beryllium particles less than 10 microns in diameter.
- L. Facility Managers** – Individuals who are responsible and accountable for the infrastructure of a facility or building. They have a responsibility to perform hazard assessments to ensure beryllium controls are defined and implemented.
- M. Homogeneous Exposure Group (HEG)** – A group of employees who experience beryllium exposures similar enough that monitoring the agent exposures of any worker in the group provides data useful for predicting exposures to the remaining workers. The categorization of workers into these groups often involves categorization by process, job description, and agents, although finer separation may be attained by further dividing on the basis of task analysis.

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- N. Homogeneous Sampling Area** – A group of facilities, areas, items, structures, or equipment having the same general exposure profile for the agent being studied. Parameters include similar location, function, frequency of tasks performed, materials used, processes involved, etc.
- O. Medical Removal Protection Benefits** – The employment rights established by 10 CFR 850.35, *Medical Removal*, for beryllium-associated workers who voluntarily accept temporary or permanent medical removal for beryllium areas following a recommendation by the SOMD.
- P. Qualified Individual** – A senior industrial hygienist who is either certified in the practice of industrial hygiene by the American Board of Industrial Hygiene (ABIH) or meets the ABIH requirements for certification with sufficient industrial hygiene knowledge and experience to perform beryllium assessment and monitoring activities properly.
- Q. Release Criteria** – Before releasing equipment or items to the public or releasing them to DOE from identified beryllium-contaminated facilities for use in a non-beryllium area, FBP must ensure that:
- Removable contamination does not exceed the higher of either 0.2 µg/100 cm² or the concentration of beryllium in soil at the point of release, whichever is greater.
 - The equipment or item is labeled according to this procedure.
 - Recipient’s commitment to implement controls that will prevent foreseeable beryllium exposure, considering the nature of the equipment or item, its future use, and the nature of the beryllium contamination is obtained.
- R. Removable Contamination** – Beryllium contamination that can be removed from surfaces by nondestructive means such as casual contact, wiping, brushing, or washing.
- S. Site Occupational Medical Director (SOMD)** – The physician contracted to be responsible for the direction and operation of medically-related items detailed in the CBDPP. This professional serves as the FBP SOMD.
- T. Worker Exposure** – The exposure of a worker to airborne beryllium that would occur if the worker was not using respiratory protective equipment.

6.2 Acronyms

- A. ABIH** – American Board of Industrial Hygiene
- B. ACGIH** – American Conference of Governmental Industrial Hygienists
- C. ALARA** – As Low As Reasonably Achievable
- D. BAWR** – Beryllium Associated Worker Registry

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- E. Be** – Beryllium
- F. Be-LPT** – Beryllium Lymphocyte Proliferation Test
- G. CBD** – Chronic Beryllium Disease
- H. CBDPP** – Chronic Beryllium Disease Prevention Program
- I. CFR** – Code of Federal Regulations
- J. cm²** – square centimeters
- K. DOE** – United States Department of Energy
- L. FBP** – Fluor-BWXT Portsmouth LLC
- M. HEPA** – High Efficiency Particulate Air
- N. ISMS** – Integrated Safety Management System
- O. JHA** – Job Hazard Analysis
- P. m³** – cubic meters
- Q. OS&H** – Occupational Safety and Health
- R. OSHA** – Occupational Safety and Health Association
- S. PEL** – Permissible Exposure Limit
- T. PPE** – Personal Protective Equipment
- U. ppm** – parts per million
- V. PORTS** – Portsmouth Gaseous Diffusion Plant
- W. SOMD** – Site Occupational Medical Director
- X. TWA** – Time-Weighted Average
- Y. TLV** – Threshold Limit Value
- Z. µg** – micrograms

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Appendix A
REGULATORY REQUIREMENTS FLOW DOWN

1. 10 CFR 850, *Chronic Beryllium Disease Prevention Program*
2. 10 CFR 851, *Worker Safety and Health Program*

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Appendix B
SUPPLEMENTAL GUIDANCE ON SURFACE CONTAMINATION LEVELS

SURFACE CONTAMINATION		
(A) Beryllium Controlled Area	$> 0.2 \mu\text{g Be}/100 \text{ cm}^2$ but $< 3.0 \mu\text{g Be}/100 \text{ cm}^2$ and reasonably expected to have airborne concentrations above the applicable PEL/TLV -OR- Any surface contamination $\geq 3.0 \mu\text{g Be}/100 \text{ cm}^2$ ^{a, c}	FBP surface control limits
(B) Free Release Criteria Maximum removable surface contamination for release to non-beryllium work areas	$0.2 \mu\text{g Be}/100 \text{ cm}^2$ ^{b, c}	10 CFR 850.31
<p>^a These are the FBP units, based on other DOE site recommended controls levels, and are typically expressed in analytical laboratory reports as $0.01 \mu\text{g Be}/\text{cm}^2$.</p> <p>^b These are the units prescribed in 10 CFR 850; when expressed in the units typically used in analytical laboratory reports, these values are $0.002 \mu\text{g Be}/\text{cm}^2$.</p> <p>^c When there are visible accumulations of dust on accessible surfaces (for example, if a piece of equipment has been stored outdoors for an extended period of time), the release criteria are based on a bulk sample of the dust, and the applicable standard is the concentration of beryllium in the soil at the point of release [i.e., micrograms of beryllium per gram of soil ($\mu\text{g Be}/\text{g}$)].</p>		

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Appendix C
SUPPLEMENTAL GUIDANCE ON CHRONIC BERYLLIUM DISEASE PREVENTION PROGRAM (CBDPP) COMPLIANCE

CLASSIFICATION	CRITERIA	POSTING	AUTHORIZATION/ QUALIFICATION	CONTROLS
Beryllium Regulated Area	Airborne, or the potential for airborne, beryllium contamination at or above 0.2 µg/m ³ as an 8-hour TWA.	Danger BERYLLIUM REGULATED AREA BERYLLIUM CAN CAUSE LUNG DAMAGE CANCER HAZARD AUTHORIZED PERSONNEL ONLY	Beryllium Workers	Work Control Document including hazard controls. Respiratory protection and PPE. Personal air monitor. Beryllium entry log.
Beryllium Controlled Area	Surface contamination above 0.2 µg Be/100 cm ² but less than 3.0 µg Be/100 cm ² and reasonably expected to have airborne concentrations above the applicable PEL/TLV as an 8-hour TWA. -OR- Any surface contamination at or above 3.0 µg Be/100 cm ² .	CAUTION BERYLLIUM CONTROLLED AREA CONTAMINATED WITH BERYLLIUM BERYLLIUM CAN CAUSE LUNG DAMAGE CANCER HAZARD AUTHORIZED PERSONNEL ONLY	Beryllium Workers	Work Control Document including task specific hazard controls. Respiratory protection and/or PPE may be required. Respirator protection required if airborne potential greater than or equal to the PEL/TLV.

TITLE:

Chronic Beryllium Disease Prevention Program

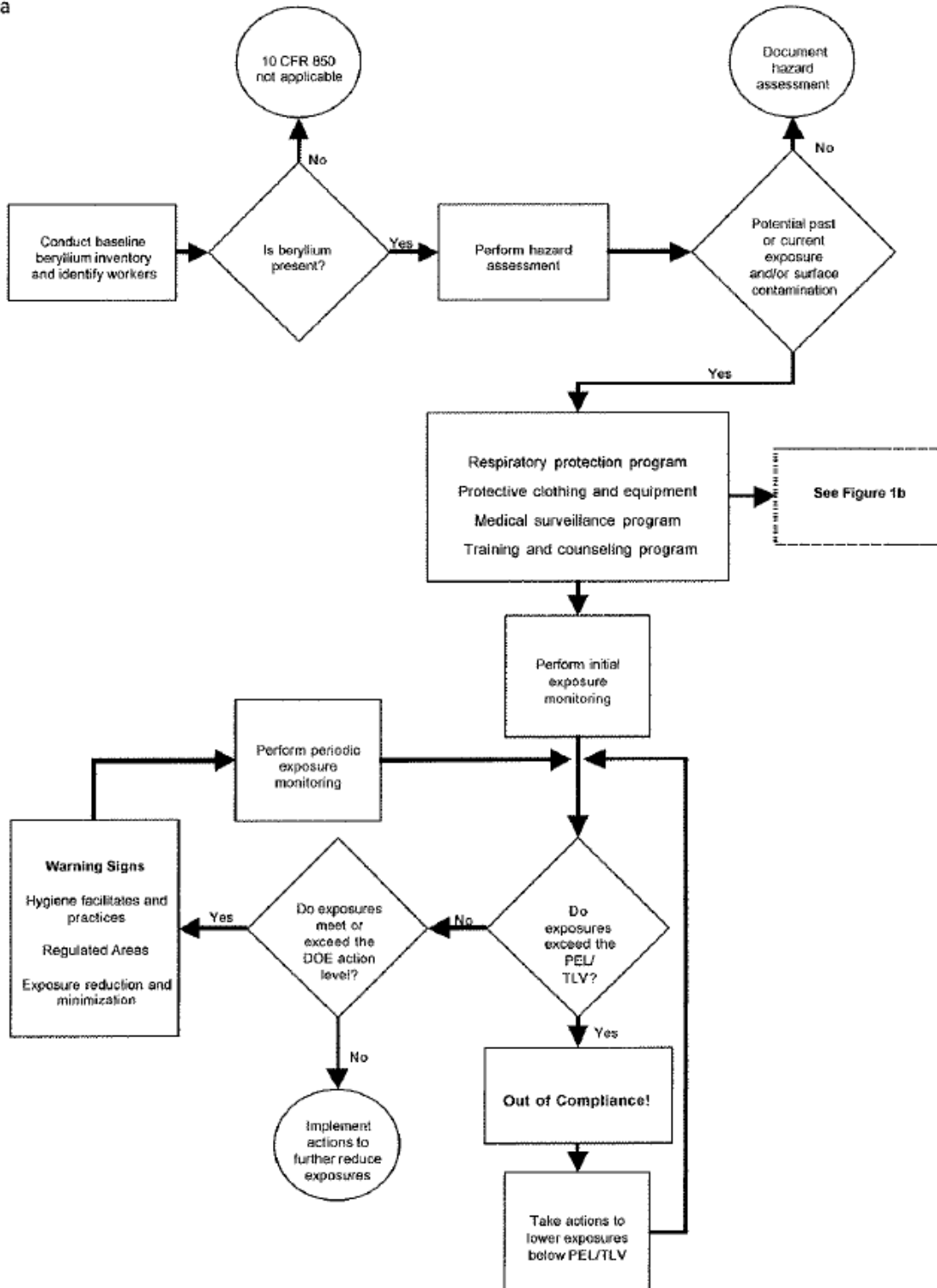
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Appendix D
CHRONIC BERYLLIUM DISEASE PREVENTION PROGRAM (CBDPP) DECISION PROCESS
FLOWCHART
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Figure 1a



TITLE:

Chronic Beryllium Disease Prevention Program

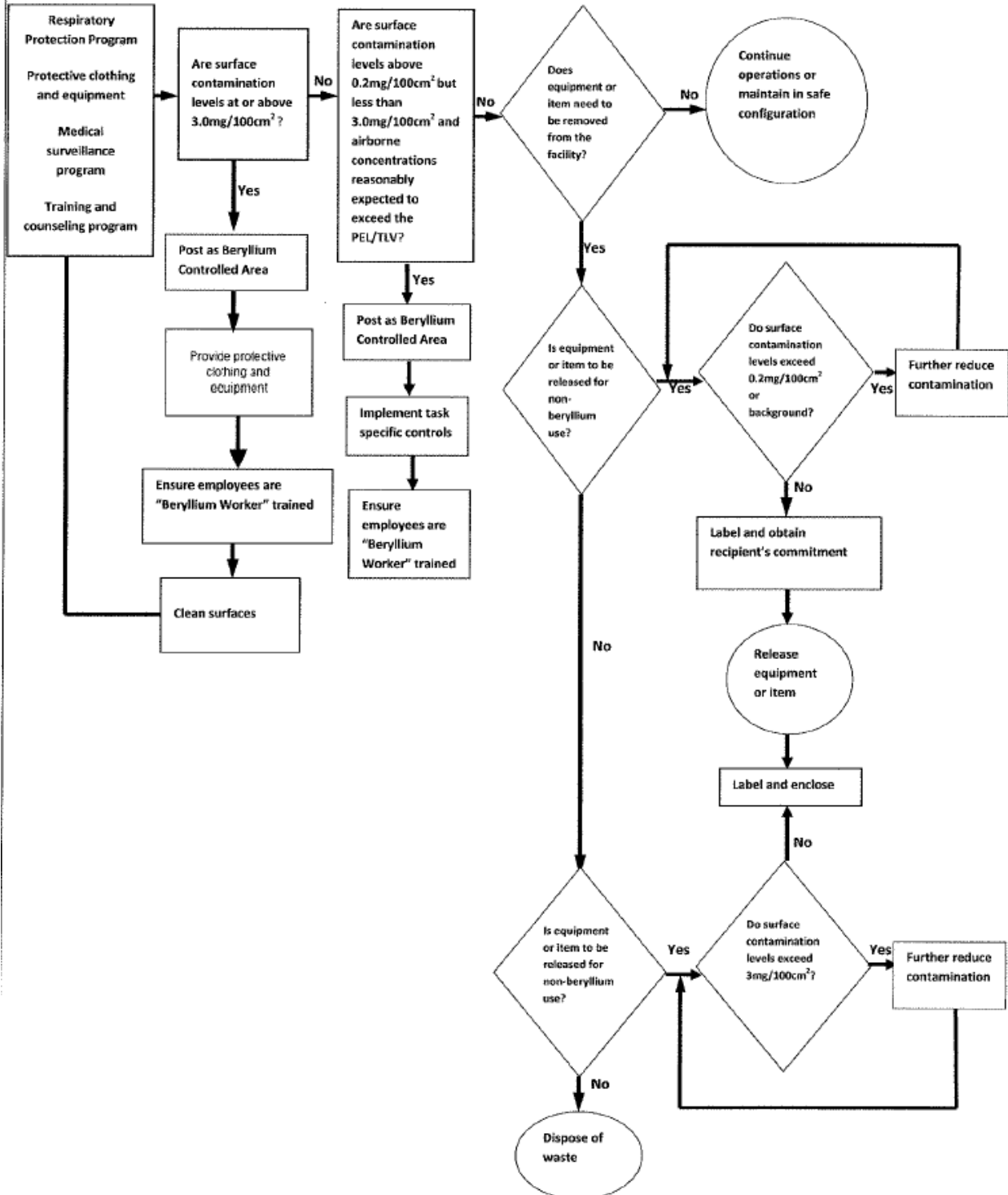
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Appendix D
CHRONIC BERYLLIUM DISEASE PREVENTION PROGRAM (CBDPP) DECISION PROCESS
FLOWCHART
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Figure 1b



TITLE:

Chronic Beryllium Disease Prevention Program

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Appendix E
BERYLLIUM/CONTAINER SIGNS
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DANGER

**BERYLLIUM REGULATED AREA
BERYLLIUM CAN CAUSE LUNG DAMAGE
CANCER HAZARD
AUTHORIZED PERSONNEL ONLY**

TITLE:

Chronic Beryllium Disease Prevention Program

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Appendix E
BERYLLIUM/CONTAINER SIGNS
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CAUTION

**BERYLLIUM
CONTROLLED AREA
AREA CONTAMINATED WITH
BERYLLIUM
BERYLLIUM CAN CAUSE LUNG
DAMAGE
CANCER HAZARD
AUTHORIZED PERSONNEL ONLY**

TITLE:

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**Appendix E
BERYLLIUM/CONTAINER SIGNS
Page 3 of 3**

DANGER

CONTAMINATED WITH BERYLLIUM

**DO NOT REMOVE DUST BY
BLOWING OR SHAKING**

CANCER AND LUNG DISEASE HAZARD