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SUBJECT MATTER AREA: Chronic Beryllium Disease	PREPARER: L. Dombrowski	Page 1 of 39
PROCEDURE TYPE: Administrative <input checked="" type="checkbox"/> Emergency <input type="checkbox"/> Alarm Response <input type="checkbox"/>	CONCURRENCE/DATE: A. J. Reed 4/1/20 [Approval Signature on File]	
TITLE: CHRONIC BERYLLIUM DISEASE PREVENTION PROGRAM	APPROVED BY/DATE: Stephanie Miller 4/1/20 [Approval Signature on File]	
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Information Control Office

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REVISION LOG			
Revision	Effective Date	Description of Changes	Pages Affected
7	4/16/20	Intent change. Updated CBDPP to address beryllium work activities and scope which will affect requirements for exposure assessment, training, personal protective equipment and respiratory protection, waste disposal, hygiene facilities and practices, posting and labeling requirements, release criteria, and medical surveillance requirements. Revisions to Form-1227, Form-1232, Form-2235.	All
6	12/12/19	Intent change. Non-intent change. Removed “East Tennessee Technology Park (ETTP)” from the title of Form-1232.	4, 20, 21
5	6/15/17	Intent change. Incorporated changes to the Permissible Exposure Limit (PEL) from recently published OSHA changes to 29CFR1910.1024 and 1926.1124. Although the effective compliance date for the subject rule changes is still in the future, UCOR Management has directed that our adoption proceed as prudent and appropriate preparation for potential future beryllium scope. Changes have no impact upon ongoing scope. Revision deletes explicit reference to Industrial Hygiene Analytical System (IHAS).	3, 5, 6, 9, 16, 18, 20, 23, 26, 28, 29, 31, 32, 33, 34, 38, 40
4	11/14/16	Intent change. Updated section H to clarify lunchroom facilities. Updated Attachment B to reflect current inventory of active and inactive areas. Associated with CAMS IF-2016-0673.	8, 38-39, 45
3	2/25/15	Non-intent change. Updated Attachment B to reflect current inventory of active and inactive areas.	Attachment B
2	1/2/14	Intent change. Updated the scope section to specify that beryllium articles and laboratory operations that meet laboratory use of hazardous chemicals in 29 CFR 1910.1450 do not apply to this CBDPP. Added the definition of a beryllium article to Attachment A. Updated Attachment B to reflect current inventory of active and inactive areas in which suspect and/or known beryllium or beryllium-containing materials of beryllium concentration of 0.1% or 1,000 ppm or greater may be encountered. Corrected acronym uses within the document. Associated with CAMS IF-2014-0068.	All
1	8/21/13	Non intent change. Updated references that are outdated.	3-4, 26, 28-29
0	12/5/11	Intent Change. Revised document to reflect UCOR document number changes and nomenclature. Replaces BJC-EH-5150, Rev. 5, same title.	All

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PURPOSE

The purpose of the Chronic Beryllium Disease Prevention Program (CBDPP) is to describe the responsibilities and actions required for the protection of workers from exposure to beryllium.

SCOPE

The UCOR, an Amentum-led partnership with Jacobs, CBDPP applies to all UCOR self-performed work and all tiers of UCOR Subcontractors involved in the handling, processing, and storage of beryllium and beryllium-contaminated equipment at UCOR facilities where beryllium is present, and the handling of beryllium-contaminated wastes and structural materials during the decommissioning and demolition of structures that are contaminated with beryllium. The provisions of this CBDPP do not apply to work performed by other U.S. Department of Energy (DOE) Prime Contractors or their Subcontractors (e.g., National Strategic Protective Services, LLC) and by Community Reuse Organization of East Tennessee lessees, or other site tenants, that do not have a contractual relationship with UCOR. For additional exclusions, refer to the “Exclusions” Section of PPD-EH-1745, *Worker Safety and Health Program*. For activities outside the scope of this CBDPP that involve potential exposure to airborne beryllium, an update of this program must be approved by DOE prior to initiation of activities per Code of Federal Regulations (CFR) 10 CFR Part 850.10.

The requirements of this Program are based on 10 CFR Part 850, Chronic Beryllium Disease Prevention Program, Final Rule, and amended by 10 CFR Part 851, Worker Safety and Health Program. In 10 CFR Part 850, beryllium is defined as elemental beryllium and any insoluble beryllium compound or alloy containing 0.1 percent beryllium or greater that may be released as an airborne particulate. As specified in 10 CFR 850.2(b), this Program does not apply to beryllium articles or laboratory operations that meet the definition of laboratory use of hazardous chemicals in 29 CFR 1910.1450, Occupational Exposure to Hazardous Chemical in Laboratories.

At UCOR facilities, trace levels of beryllium are sometimes found as mixtures in waste streams including oils, solids, liquids, and other waste stream components. UCOR interprets the definition for beryllium to mean that beryllium is identified in mixtures using approved analytical methods in concentrations equal to or greater than 0.1% or 1,000 ppm to be defined as a beryllium-containing material. This interpretation is consistent with the criterion that 29 CFR 1910.1200, Hazard Communication, uses for a carcinogenic mixture, i.e., one that contains a carcinogenic component at a concentration of 0.1 percent (or 1,000 ppm) or greater, by weight or volume. Beryllium in mixtures not meeting the 1910.1200 criterion is excluded from the scope of this CBDPP.

It should be noted that beryllium fluoride, which is a soluble salt, is not included in the definition of “beryllium” in 10 CFR Part 850. However, DOE recognizes the potential for development of contact dermatitis, chronic ulcerations, and conjunctivitis associated with soluble forms of beryllium compounds that are not included in the definition of “beryllium” in the rule. Therefore, soluble beryllium compounds will be addressed by UCOR in hazard assessments and work control documentation, as applicable, to ensure worker protection.

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OTHER DOCUMENTS NEEDED

- 10 CFR Part 850, Chronic Beryllium Disease Prevention Program, Final Rule
- 10 CFR Part 851, Worker Safety and Health Program
- 29 CFR 1910.132, Personal Protective Equipment General Requirements
- 29 CFR 1910.134, Respiratory Protection
- 29 CFR 1910.141, Sanitation
- 29 CFR 1910.1200, Hazard Communication
- UCOR-5342, *Beryllium Counseling and Benefits Handbook*
- UCOR-5343, *UCOR Facilities Beryllium Baseline Inventory*
- PPD-EH-1400, *Integrated Safety Management System Program Description*
- PPD-EH-1745, *Worker Safety and Health Program*
- PPD-IH-5151, *Respiratory Protection Program*
- PPD-IH-5418, *Industrial Hygiene Program*
- PPD-WM-2400, *UCOR Waste Management Program Plan*
- PROC-EH-1013, *Accident Prevention Signs, Barricades, and Other Postings*
- PROC-EH-2005, *Personal Protective Equipment*
- PROC-FS-1001, *Integrated Work Control Program*
- PROC-IH-5206, *Generation and Use of Industrial Hygiene Work Permits*
- PROC-WM-2010, *Waste Container Management*
- PROC-WM-2013, *Certification of Waste for Disposal at Nevada National Security Site*
- Pro Forma Exhibit G, Environmental Compliance and Protection, Radiation Protection, and Worker Safety and Health
- Form 773, Industrial Hygiene Report
- Form-1227, Chronic Beryllium Disease Prevention Program Informed Consent Form
- Form-1232, Beryllium Health History Questionnaire
- Form-2235, Beryllium Registry Technical Review
- Form-3061, Industrial Hygiene Work Permit
- Form-3062, Industrial Hygiene Hazard Worksheet

REQUIREMENTS

A. Program Administration

1. Submission for Approval

UCOR will submit an updated CBDPP to the DOE Head of the Field Element for approval whenever a significant change or addition is made to this CBDPP.

2. Compliance

Compliance with 10 CFR Part 850 shall be achieved through the successful implementation of this CBDPP by UCOR and its Subcontractors. This CBDPP, addressing the 10 CFR Part 850 requirements, is a mandatory flow down document in Exhibit L-1, List of Mandatory Contractor Procedures. Subcontractor requirements are established and flowed, as applicable, to lower-tier Subcontractors through the completed Applicability and Responsibility Matrix of Exhibit G, Environmental Compliance and Protection, Radiation Protection, and Worker Safety and Health.

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3. Coordination Among Multi-Contractor Covered Workplaces

UCOR fully cooperates with other Contractors/Subcontractors and organizations to achieve a safe and healthy work environment. Interface agreements have been established to clearly define roles, responsibilities, and expectations of interfacing organizations (refer to “Coordination Among Multi-Contractor Covered Workplaces” Section in PPD-EH-1745).

4. Enforcement

Subcontractors shall report any beryllium issues of a regulatory compliance nature through their Subcontract Coordinator for screening within UCOR, consistent with the current requirements of their Subcontract (refer to “Enforcement Provisions” section of PPD-EH-1745).

NOTE: UCOR will distinguish between those workers who are currently qualified to work in posted beryllium work areas (Beryllium Controlled Areas[BCAs] and Beryllium Regulated Areas [BRAs]), and those who are not by the following definitions.

5. Beryllium Worker and Beryllium Associated Worker Definitions:

A **Beryllium Worker** is a worker who has:

- attended LEARN Module 32036, Beryllium Briefing;
- received a Beryllium-induced Lymphocyte Proliferation Test (BeLPT) with normal results;
- completed baseline and annual (as applicable) beryllium medical surveillance requirements; and
- attended LEARN Module 32028, Beryllium Worker Training.

Only a Beryllium Worker is qualified to perform work in BCAs or in BRAs.

Beryllium Associated Worker – A current worker who is or was exposed or was potentially exposed to airborne concentrations of beryllium at a DOE facility, including:

- 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.
- A Beryllium Worker is included in the DOE definition of Beryllium Associated Worker. However, at UCOR, although Beryllium Associated Workers includes Beryllium Workers, only current Beryllium Workers who are trained and qualified to work in beryllium work areas are authorized to enter and work in BCAs and BRAs; i.e., Beryllium Associated Workers are not authorized to enter BCAs and BRAs.

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6. Beryllium Awareness Training and Beryllium Worker Training:

Beryllium Associated Workers are required to participate in LEARN Module 21221, Parkworker. This training has a beryllium awareness section and will be provided before or at the time of initial assignment, and at least every 2 years thereafter. This training will be documented in LEARN and must:

- Be in accordance with 10 CFR 850,
- Include potential health risks to beryllium worker family members and others who may come in contact with beryllium from personal clothing or other items as a result of a beryllium control failure,
- Include an overview of the contents of the CBDPP.

Beryllium Associated Workers who are former Beryllium Workers are required to attend LEARN Module 32028, Beryllium Worker Training, at least every two years.

Beryllium Workers are required to participate in LEARN Module 32036, Beryllium Briefing, at least one week prior to having their initial blood draw for the BeLPT. This module does not require retraining. The Beryllium Briefing satisfies the requirement to provide one week notice to workers entering into the beryllium medical surveillance program for the first time.

Beryllium Workers are required to participate in LEARN Module 32028, Beryllium Worker Training, prior to performing beryllium work and at least every two years thereafter. This training will be documented and must:

- Be in accordance with 10 CFR 850;
- Include potential health risks to beryllium worker family members and others who may come in contact with beryllium from personal clothing or other items as a result of a beryllium control failure;
- Include an overview of the contents of the CBDPP; and
- Describe routes of exposure, health effects, work controls, and the medical surveillance program.

Beryllium Workers will be retrained when there is reason to believe that they lack the proficiency, knowledge, or understanding needed to work safely with beryllium or in areas with beryllium contamination. Should changes to 10CFR 850 or changes in field conditions/required controls drive an appreciable change to PPH-IH-5150, the Beryllium Worker population will be retrained to the revised LEARN Module 32028, Beryllium Worker Training. Final determination on whether a need exists for Beryllium Worker retraining due to changes to this procedure and/or LEARN Module 32028 rests with the CBDPP Program Manager, in consultation with the UCOR Industrial Hygiene Program Manager and the UCOR Training Manager. As Beryllium Associated Workers who are not Beryllium Workers are not permitted to conduct work with a potential for beryllium exposure, Beryllium Associated Workers will receive retraining on the updated LEARN Module 32028, Beryllium Worker Training, at their next scheduled bi-annual training.

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UCOR tracks completion of the Beryllium Worker Medical Surveillance Program through LEARN, signifying LEARN Module 32074, Beryllium Worker Medical Surveillance, as complete upon receiving confirmation from UCOR Health Services that a Beryllium Worker candidate has completed the Beryllium Worker Medical Surveillance Program process. The expiration date utilized for LEARN Module 32074 is 12 months from the date that the employee completes the Beryllium Worker Medical Surveillance Program. As long as the LEARN system shows a Beryllium Worker as current on both LEARN Module 32074, Beryllium Worker Medical Surveillance, and LEARN Module 32028, Beryllium Worker Training, that worker meets the Beryllium Worker requirements of PPD-IH-5150 and may be authorized access to posted BCAs/BRAAs and areas not yet characterized where process knowledge indicates beryllium contamination may be present.

B. Baseline Beryllium Inventory

1. A baseline inventory of the locations of beryllium operations and other locations of potential beryllium contamination has been developed. The inventory of UCOR facilities/areas at the East Tennessee Technology Park (ETTP), the Oak Ridge National Laboratory (ORNL), and the Y-12 National Security Complex (Y-12) in which beryllium is suspected to have previously been present or is known to be currently present is provided on the Beryllium page of the UCOR intranet.
2. The baseline inventory is maintained by the UCOR CBDPP Manager.

C. Hazard Review

1. **IF** it has been determined that beryllium may be present in a work area, **THEN** Form-3061, Industrial Hygiene Work Permit (IHWP), with a Form-3062, Industrial Hygiene Hazard Worksheet (IHHW), specific to beryllium will be generated for work activities during which workers may encounter beryllium. This process will follow that presented in PROC-IH-5206, *Generation and Use of Industrial Hygiene Work Permits*, with the IHWP integrated into a work package or procedure per PROC-FS-1001, *Integrated Work Control Program*.

D. Personnel Exposure Limits

1. Workers shall not be exposed to an airborne concentration of beryllium greater than the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) of 0.2 micrograms per cubic meter of air ($\mu\text{g}/\text{m}^3$) as an 8-hour time weighted average (TWA). This airborne limit is published in 29 CFR 1910.1024 and 29 CFR 1926.1124, and in 10 CFR 850, Chronic Beryllium Disease Prevention Program, and is measured in the worker's Breathing Zone (BZ) by personal air monitoring. DOE refers to the 0.2 $\mu\text{g}/\text{m}^3$ limit as the Action Level.
2. UCOR has established an Airborne Control Level (ACL) of 0.1 $\mu\text{g}/\text{m}^3$. This level is essentially an Action Level, but is referred to as an Airborne Control Level in this program to avoid confusion with DOE's Action Level (AL) of 0.2 $\mu\text{g}/\text{m}^3$.

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E. Exposure Monitoring

1. The Project Industrial Hygienist (PIH), with the assistance of supervision, shall evaluate the operations and areas in which operations will be performed, and then identify workers and areas to be monitored.
2. The PIH shall select a method of monitoring and analysis that has an accuracy of not less than plus or minus 25 percent, with a confidence level of 95 percent, for airborne concentrations of beryllium at the ACL.
3. The PIH shall oversee and/or review and approve exposure monitoring.
4. Personal BZ sampling shall be conducted for workers potentially exposed to airborne beryllium, or the PIH shall document the rationale for monitoring a limited subset of workers (e.g., maximum exposure potential). Results of sampling will be used to verify the adequacy of engineering, administrative, and personal protective equipment (PPE) controls, including respirators.
5. Air monitoring samples shall be analyzed in a laboratory accredited for metals by the American Industrial Hygiene Association (AIHA) or by a laboratory that demonstrates quality assurance for metals analysis that is equivalent to AIHA accreditation as determined by the CBDPP Program Manager.
6. Area sampling shall be conducted as determined by the PIH according to the accuracy and analytical requirements listed above for BZ sampling and analysis.
7. Area sampling will be conducted at access points of beryllium-contaminated areas, including Entry/Exit Points, and/or at downwind locations, or at the discretion of PIH, to ensure that airborne beryllium is not migrating into support areas.

NOTE: Surface contamination is only a cleanliness measure, and is not a predictor of health risk from beryllium contamination.

8. Surface wipe and/or bulk sampling shall be conducted as determined by the PIH to evaluate surface beryllium contamination, as part of the characterization of areas inside buildings where beryllium is a potential contaminant. An item or surface is considered “beryllium clean” if beryllium surface levels are less than 0.2 µg/100 cm².
9. Surface sampling will also be conducted periodically in support areas to verify that beryllium dust has not contaminated surfaces of lunchrooms, change rooms, and other support areas.
10. Required frequency of monitoring shall be determined by the PIH using a risk-based approach.

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F. Beryllium Controlled Areas

NOTE: Exclusion: These limits do not apply to surfaces of interiors of closed systems, such as enclosures, glove boxes, chambers, or ventilation systems.

1. A **Beryllium Controlled Area (BCA)** shall be established where surface concentrations of beryllium meet or exceed $0.2 \mu\text{g}/100 \text{ cm}^2$ but are less than $3.0 \mu\text{g}/100 \text{ cm}^2$; or where airborne beryllium levels meet or exceed $0.1 \mu\text{g}/\text{m}^3$ but are less than $0.2 \mu\text{g}/\text{m}^3$. BCAs will also be established and posted as a buffer area at the Entry/Exit points to a BRA.
2. BCAs must be demarcated from the rest of the workplace in a manner that adequately alerts workers to the boundaries of such areas.
3. Access must be limited to Beryllium Workers, including those workers at the BCA Entry/Exit Points.
4. Perform the following actions for work that takes place in BCAs:
 - Conduct exposure monitoring during beryllium work activities at a frequency specified by the PIH on the IHHW for beryllium;
 - Establish exposure reduction and minimization controls and practices; and
 - Provide change rooms and implement hygienic controls, such as washing hands and face after exiting the BCA and before eating, drinking, smoking, or applying cosmetics;
 - Respiratory protection and PPE will be worn in BCAs;
5. An example of a posting for BCAs is in Attachment C.

G. Beryllium Regulated Areas

1. A **Beryllium Regulated Area (BRA)** shall be established where airborne concentrations of beryllium are measured at or above DOE's AL of $0.2 \mu\text{g}/\text{m}^3$ or where surface levels of beryllium meet or exceed $3 \mu\text{g}/100 \text{ cm}^2$.
2. BRAs must be demarcated and posted from the rest of the workplace in a manner that adequately alerts workers to the boundaries of such areas using PROC-EH-1013, *Accident Prevention Signs, Barricades, and Other Postings*, compliant barricades and placards and/or posted containments if preferred.
3. Access must be limited to Beryllium Workers, including those working at the BRA Entry/Exit Points.
4. An entry log must be kept on individuals who enter BRAs. These records must include the name, date, time-in/time-out, and work activity.

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5. Perform the following actions for work that takes place in BRAs:
 - Conduct daily exposure monitoring during beryllium work activities;
 - Establish exposure reduction and minimization controls and practices;
 - Provide change rooms and showers;
 - Implement hygienic controls and practices, including showers at the end of the work day and washing hands and face after exiting the BRA and before eating, drinking, smoking, or applying cosmetics;
 - Provide and require use of respiratory protection for Beryllium Workers;
 - Provide respiratory protection for Beryllium Associated Workers if it is requested; and
 - Provide and require use of personal protective clothing and equipment.

6. An example of a posting for a BRA is in Attachment D.

H. Exposure Reduction and Minimization

1. Controls implemented in this program, coupled with the hierarchy of IH hazard controls outlined in PPD-IH-5418, *Industrial Hygiene Program*, shall be utilized to meet 10 CFR 850.25, Exposure reduction and minimization, requirements.

2. For each project or site where a potential exists for personnel exposure to airborne beryllium at levels equal to or greater than the UCOR ACL of 0.1 µg/m³ (BCA), beryllium exposure reduction and minimization techniques will be developed and incorporated into project and/or task work control documents. These will include the following:
 - Reduction of airborne levels of beryllium to as low as reasonably achievable (ALARA).
 - Minimization of the number of current workers exposed or potentially exposed to beryllium.
 - Minimization of the number of opportunities where workers may potentially be exposed.
 - Frequent cleaning of work and/or travel routes through beryllium-contaminated areas.
 - Minimize active handling and processing of beryllium-contaminated items and waste materials.
 - Use of clear plastic waste bags when possible so that the contents can be observed without opening the bag.
 - Minimizing the disability and lost work time of workers due to Chronic Beryllium Disease (CBD) and associated medical care.
 - Establishing exposure reduction and minimization goals to reduce airborne beryllium levels.

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3. In the event of an emergency/upset condition that occurs in a BCA or BRA, workers will stop work; warn nearby personnel; isolate the area as appropriate; and minimize exposures.
4. UCOR Health Services will be consulted for followup actions regarding need for further evaluation of personnel involved in or impacted by an emergency event/upset condition.
5. Not later than 6 months after commencing work under the CBDPP and when an adequate body of Beryllium exposure monitoring data has been collected, a team led by the CBDPP Program Manager and including PIHs, Beryllium Workers in that exposed population and their Supervision, UCOR Site Occupational Medical Directory (SOMD) (or his/her representative) and the DOE, will assess the results of that data along with the assessment/surveillance feedback and will set annual goals for Beryllium exposure reduction/minimization; define a rationale for those goals and a strategy to meet them; and will work with the IH Program Manager to develop a means of tracking progress toward reaching or exceeding those goals.
6. Similar team reviews will be conducted periodically to evaluate progress towards the defined goals; identify areas for increased focus; and determine if any populations of employees not presently identified as potentially exposed to beryllium are incurring beryllium exposures.
7. Reports generated as a result of these periodic assessments shall be provided to Project Management, line managers, planners, project PIH and IH Technician staff, active Beryllium Workers, UCOR Health Services SOMD and medical staff, and labor organizations representing Beryllium Associated Workers who request such information

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I. Hygiene Facilities and Practices

1. In areas where workers are exposed to beryllium at or above the UCOR ACL, the following practices must be followed:
 - Food, beverage, and tobacco products shall not be used while in the BCA or BRA.
 - Cosmetics cannot be applied while in the BCA or BRA.
 - Open wounds must be covered while in the BCA or BRA.
 - For entry into BCAs, disposable outer layer of protective clothing must be worn over company-provided clothing. The disposable outer layer will be removed at the BCA Exit Point.
 - For entry into BRAs, a second layer of disposable protective clothing shall be worn. The extent and type of the second layer will be determined by the PIH in the IHHW, with a graded approach applied in consideration of the likelihood of contact with contaminated surfaces, and/or the likelihood that the activity to be conducted in the BRA will result in increased airborne beryllium contamination or personnel contamination. The second layer shall be doffed at the BRA Exit Point. The last layer of disposable garments shall be doffed at the BCA Exit Point. The respirator will be doffed at the BCA Exit Point.
 - Removal of beryllium from protective clothing and equipment by blowing, shaking, or other means that may disperse beryllium into the air is prohibited.
2. Clean change rooms or areas must be provided for beryllium workers who work in BRAs. The change areas must be established prior to performing work in a BRA or BCA.
 - A facility free of beryllium must be provided for beryllium workers to change into and out of clean protective clothing and equipment to prevent cross-contamination, and to store personal clothing.
 - Change rooms or areas used to remove beryllium-contaminated clothing and PPE must be maintained under negative pressure or located to minimize dispersion of beryllium into clean areas.
 - Hand washing and shower facilities for beryllium must be provided for individuals who work in BRAs.
 - Beryllium workers who work in BRAs must shower prior to end of the work day. Beryllium Workers who work in BCAs may choose to shower at end of work shift, but are not required to do so.
3. A lunchroom facility must be readily accessible to beryllium workers, with tables for eating that are free of beryllium (less than 0.2 $\mu\text{g}/100\text{ cm}^2$) and in a facility that will not be exposed at any time to airborne beryllium at or above the UCOR ACL of 0.1 $\mu\text{g}/\text{m}^3$.

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4. Surface levels of beryllium in lunchrooms, change rooms or areas, and shower rooms, and other support areas must be maintained less than 0.2 µg/100 cm². These areas will be regularly cleaned to minimize beryllium contamination. These areas will also be wipe sampled periodically to ensure they are not contaminated with beryllium.
5. The change rooms or areas, shower and hand washing facilities, and lunchroom facilities must comply with 29 CFR 1910.141, Sanitation.

J. Respiratory Protection

1. UCOR has an established a respiratory protection program, PPD-IH-5151, *Respiratory Protection Program*, that complies with the requirements of 29 CFR 1910.134, Respiratory Protection.
2. Respirators must be supplied to and used by all workers who perform work in a BCA and/or in a BRA.
3. Consistent with the Respiratory Protection Program policy, a respirator shall be provided to any Beryllium Associated Worker who requests to use a respirator for protection against airborne beryllium, regardless of measured exposure levels.

K. Protective Clothing and Equipment

1. Protective clothing and equipment shall be provided to Beryllium Workers and properly used and maintained by the Beryllium Workers performing work in BCAs and in BRAs.

NOTE: Beryllium Associated Workers may request the use of protective clothing and equipment for protection against airborne beryllium, regardless of measured airborne exposure levels.

2. Follow requirements in PROC-EH-2005, *Personal Protective Equipment*, and PPD-IH-5151, *Respiratory Protection Program*, when workers use personal protective clothing and equipment. Other requirements include the following:
 - Procedures or instructions for decontamination, donning, doffing, handling, and storing protective clothing and equipment must be in place. Don and doff instructions will be posted at the BCA/BRA Entry and Exit Points, respectively. Decontamination instructions are included in the doffing instructions.
 - Beryllium-contaminated protective clothing and equipment must not be moved from areas that contain beryllium, except by Beryllium Workers.
 - Beryllium-contaminated protective clothing and equipment, when removed for laundering, cleaning, maintenance, or disposal, must be placed in labeled containers that prevent the dispersion of beryllium dust in accordance with the requirements of 10 CFR 850.38, Warning signs and labels, and described in Section O, Item 3 of this CBDPP.

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- Non-disposable protective clothing and equipment must be cleaned, laundered, repaired, or replaced as needed to maintain effectiveness.
 - Surveys, decontamination, and/or other required controls will be performed on equipment prior to it being removed from a BCA or BRA to a clean support area.
 - Organizations/individuals that launder or clean DOE beryllium-contaminated protective clothing or equipment shall be informed 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.
3. Beryllium-contaminated disposable protective clothing and equipment must be bagged, labeled, and properly disposed as beryllium-contaminated waste.

L. Housekeeping

1. Beryllium-contaminated surfaces in facilities will be controlled whenever possible to prevent airborne beryllium levels in employee work areas from meeting or exceeding the ACL of 0.1 µg/m³. Actions will be taken to prevent the spread of beryllium contamination, and/or to prevent/minimize airborne beryllium from escaping the building during demolition.
2. When cleaning floors and surfaces in areas where beryllium is present, 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 minimize the production of airborne dust. Cleaning beryllium-contaminated equipment or surfaces with compressed air/gases or other dry methods is prohibited.
3. Portable or mobile vacuum units that are used to clean beryllium-contaminated areas must be equipped with HEPA filters. The filters must be changed as often as needed to maintain their capture efficiency.

NOTE: Labels placed on equipment utilized in beryllium-contaminated areas may include warnings regarding other hazardous agents, such as lead, asbestos, and/or mercury.

4. Cleaning equipment that is used to clean beryllium-contaminated surfaces must be labeled: **Danger Contaminated with Beryllium** (or similar message), controlled, and not used for non-hazardous materials.

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M. Release Criteria

NOTE: In areas with known elevated beryllium levels in soils, it may be necessary to perform beryllium surface wipe/swipe sampling on equipment prior to commencing work for comparison with levels on equipment following work activities.

1. Before releasing beryllium-contaminated equipment for unrestricted use, ensure that:
 - The removable surface contamination level of equipment or items is less than 0.2 $\mu\text{g}/100\text{ cm}^2$ or is less than the beryllium surface levels measured on the equipment prior to commencing beryllium work activities.
2. Before releasing beryllium-contaminated equipment or other items to another facility performing work with beryllium, ensure that:
 - The removable contamination level of equipment or item surfaces is less than 3 $\mu\text{g}/100\text{ cm}^2$.
 - The equipment or item is properly labeled and described per Section O, Item 6 of this CBDPP.
 - 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.
 - Fixatives can be used if decontamination does not remove beryllium to a sufficient degree.

N. Waste Disposal

1. Beryllium-containing waste will be managed in accordance with PPD-WM-2400, *UCOR Waste Management Program Plan*. Waste materials will be classified prior to disposal. Plastic bags used to contain beryllium-contaminated waste will be a minimum of 6 mil thick. Containers used for beryllium-contaminated waste must meet the requirements defined in PROC-WM-2010, *Waste Container Management*.
 - a. **IF** beryllium waste is to be disposed at the Nevada National Security Site (formerly the Nevada Test Site), **THEN** the waste must be in compliance with the PROC-WM-2013, *Certification of Waste for Disposal at Nevada National Security Site*.
2. Beryllium-containing waste, and beryllium-contaminated equipment and other items that are disposed as waste, must be disposed in sealed, impermeable bags, containers, or enclosures to prevent the release of beryllium dust during handling and transportation. Whenever possible, these bags will be clear plastic so that the contents can be observed without opening the bag. The bags, containers, and enclosures that are used for disposal of beryllium waste must be properly labeled in accordance with the requirements of 10 CFR 850.38, Warning signs and labels, and described per Section O, Item 3 of this CBDPP.

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O. Posting of Signs and Labeling Requirements

1. Signs will be posted at each access point to a designated BCA with the following information:

**WARNING
BERYLLIUM CONTROLLED AREA
ACCESS RESTRICTED TO AUTHORIZED BERYLLIUM WORKERS ONLY
APPROVED IHHW FOR BERYLLIUM REQUIRED FOR ENTRY**

2. Signs will be posted at each access point to BRAs. The posting will include the following information:

**DANGER
BERYLLIUM REGULATED AREA
CANCER HAZARD
BERYLLIUM CAN CAUSE LUNG DAMAGE
AUTHORIZED PERSONNEL ONLY BEYOND THIS POINT**

3. Label containers of beryllium, beryllium compounds, or beryllium-contaminated clothing, equipment, waste, scrap, or debris that meet the scope of this CBDPP. Labels must contain the following information:

**DANGER
CONTAMINATED WITH BERYLLIUM
CANCER AND LUNG DISEASE HAZARD
DO NOT REMOVE DUST BY BLOWING OR SHAKING**

4. Signs and labels must be in accordance with 29 CFR 1910.1200, Hazard Communication; 10 CFR 850.38, Warning signs and labels; and PROC-EH-1013, *Accident Prevention Signs, Barricades and Other Postings*. Example signs and labels are presented as Attachments C, D, E, and F.

5. Consult with the CBDPP Manager if there is a situation that requires an additional or different type of posting or label.

6. **IF** equipment or an item has internal beryllium contamination, or potential internal beryllium contamination, **THEN** affix a label with the following information, or similar information, onto the equipment or item:

**DANGER
INTERNALLY CONTAMINATED WITH BERYLLIUM
CANCER AND LUNG DAMAGE HAZARD
WORK PACKAGE AND IHHW FOR BERYLLIUM REQUIRED TO
OPEN THIS ITEM**

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P. Medical Surveillance

1. A Medical Surveillance Program is established and implemented for identified Beryllium Associated Workers who voluntarily participate in the Beryllium Medical Surveillance Program and for Beryllium Workers who are required to participate in the Beryllium Medical Surveillance Program to be qualified as Beryllium Workers.
2. A list of Beryllium Associated Workers and Beryllium Workers based on records or other information shall be maintained by UCOR Health Services with input from Project Management and/or CBDPP Program Manager.
3. Identified Beryllium Associated Workers, who voluntarily participate in the Beryllium Medical Surveillance Program, and Beryllium Workers shall be provided medical evaluations at no cost and at a time and place that is reasonable and convenient to the worker.
4. A baseline medical evaluation is provided to identified Beryllium Associated Workers who voluntarily participate in the Beryllium Medical Surveillance Program and to Beryllium Workers who must participate in the medical surveillance program to be considered a Beryllium Worker. The baseline evaluation includes the following diagnostic protocols, at a minimum:
 - A detailed medical and work history with emphasis on past, present, and anticipated future exposure to beryllium, including questions relating to any respiratory symptoms experienced;
 - A physical examination with special emphasis on the respiratory system, skin, and eyes;
 - A chest radiograph (posterior-anterior, 14 × 17 inches) interpreted by a National Institute for Occupational Safety and Health (NIOSH) B-reader of pneumoconiosis or a board-certified radiologist (unless a baseline chest radiograph is already on file and was taken less than 5 years prior);
 - Spirometry consisting of forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV1);
 - A BeLPT; and
 - Any other tests deemed appropriate by the examining physician for evaluating beryllium-related health effects.
5. Medical evaluations are required for Beryllium Workers annually and every three years for Beryllium Associated Workers who choose to continue beryllium medical surveillance. The periodic medical evaluation includes the following diagnostic protocols:
 - A detailed medical and work history with emphasis on past, present, and anticipated future exposure to beryllium, including questions relating to any respiratory symptoms experienced;

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- A physical examination with emphasis on the respiratory system, skin, and eyes;
- Chest X-Ray every five years;
- A BeLPT; and
- Any other medical evaluations deemed appropriate by the examining physician for evaluating beryllium-related health effects.

6. A medical evaluation must be provided as soon as possible to any worker who may have been exposed to beryllium because of a beryllium emergency. A beryllium emergency could be equipment failure, container rupture, or other upset condition.

NOTE: The Beryllium Associated Worker or the Beryllium 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.

7. A multiple physician review and alternate physician review process has been established for Beryllium Associated Workers and Beryllium Workers that allows for the review of initial medical findings, determinations, or recommendations from medical evaluation(s) conducted. This process is described in detail in UCOR-5342, *Beryllium Counseling and Benefits Handbook*.

8. The SOMD must provide each Beryllium Associated Worker and Beryllium 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 CBD within 10 working days after the SOMD's receipt of the results of the medical tests or procedures. These evaluations are provided on the UCOR Health Services Duty Disposition Reports (DDR), and include a worker acknowledgement signature.

9. Within two weeks of receipt of results, the SOMD must provide to the employer a written, signed medical opinion for each medical evaluation performed on each Beryllium Associated Worker. The written opinion must take into account the findings, determinations, and recommendations of the other examining physicians who may have examined the Beryllium Associated Worker. This written medical opinion is provided on the DDR.

NOTE: Personnel participation in medical surveillance is voluntary. However, to be considered an active Beryllium Worker and to be qualified to perform work in BCAs and BRAs, the worker must participate in the beryllium medical surveillance program.

10. Airborne and surface sampling data shall be evaluated to determine the need for additional exposure controls.

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Q. Medical Removal

1. A Beryllium Worker must be offered medical removal from exposure to beryllium if the SOMD determines in a written medical opinion that it is medically appropriate to remove the worker from such exposure. The SOMD's determination must be based on two or more abnormal BeLPT results; chronic beryllium disease diagnosis; an examining physician's recommendation; or any other signs or symptoms that the SOMD deems medically sufficient to remove a worker.

2. **IF** a BeLPT test is uninterpretable, **THEN**
a repeat test will be performed.

IF a test is abnormal or borderline, **THEN**
two repeat BeLPT tests will be performed utilizing two blood serum samples.

NOTE 1: Temporary Medical Removal benefits are offered when the SOMD determines and provides a written medical opinion that a worker shall be temporarily removed from beryllium exposure pending a final medical determination. Temporary removal benefits may also be offered for the period pending receipt of medical testing results.

Temporary removal benefits are provided for up to one year (which may be extended if necessary) during the time that a final determination is being made. Permanent removal benefits are provided for up to two years.

NOTE 2: The fact that UCOR provides medical removal protection benefits per this CBDPP is not intended to expand upon, restrict, or change any rights to a specific job classification or position under the terms of an applicable collective bargaining agreement.

3. **IF** a Beryllium Worker has been temporarily or permanently removed from beryllium exposure, **THEN**
the Beryllium Worker must be provided the following:

- The opportunity to transfer to another position which is available, or later becomes available, for which the worker is qualified (or for which the worker can be trained in a short period) and where beryllium exposures are as low as possible, but in no event at or above the ACL of 0.1 µg/m³; and
- Job assignments that do not require entry into BCAs, BRAs, or into buildings and areas that have not been characterized for beryllium contamination, if there is a potential for beryllium contamination in that building or area.
- If the Beryllium Associated Worker cannot be transferred to a comparable job where beryllium exposures are below the ACL of 0.1 µg/m³, a maximum of two years of permanent medical removal protection benefits will be provided in addition to any temporary medical removal protection benefits that had been provided while the diagnosis was being confirmed with repeat and/or additional tests.

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R. Medical Consent

1. Each Beryllium Associated Worker and Beryllium Worker must be provided with a summary of the Beryllium Medical Surveillance Program at least one week before the first medical evaluation or procedure or at any time requested by the worker. This summary must include:
 - The type of data that will be collected in the Beryllium Medical Surveillance program;
 - 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.
2. Each Beryllium Associated Worker must be provided with information on the benefits and risks of the beryllium medical tests and examinations available to the worker via completion of LEARN Module 32036, Beryllium Briefing, which must be completed at least one week prior to any such examination or test, along with an opportunity to have the worker's questions answered.
3. The SOMD must obtain a Beryllium Associated Worker's or Beryllium Worker's signature on the completed Form-1227, Chronic Beryllium Disease Prevention Program Informed Consent Form, before performing medical evaluations or any tests.

S. Counseling

A counseling program has been developed to assist Beryllium Associated Workers who are diagnosed by the SOMD as being sensitized to beryllium or as having CBD. The counseling elements are detailed in the UCOR-5342, *Beryllium Counseling and Benefits Handbook*, which also includes a copy of 10 CFR 850 and its preamble. The CBDPP Program Manager, with cooperation from the worker's supervisor and UCOR Health Services, shall ensure that the worker attends the contractor counseling as soon as possible after a diagnosis has been made. UCOR is responsible to ensure that counseling is conducted for workers who work for its subcontractors.

1. This counseling program for a newly diagnosed beryllium sensitized worker or a worker diagnosed as having CBD includes the following elements to review with the worker:
 - Beryllium Medical Surveillance Program provisions and procedures;
 - Medical treatment options;
 - Medical, psychological, and career counseling;
 - Medical benefits;
 - Administrative procedures and workers rights under applicable Workers' Compensation laws and regulations;
 - Work practice procedures limiting Beryllium Associated Worker and Beryllium Worker exposures to beryllium;
 - Risk of continued beryllium exposure after sensitization.

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T. Performance Feedback

NOTE: See Section H, Steps H.5 and H.6 for additional requirements related to evaluation of program performance.

1. Periodic assessments and/or surveillances must be conducted of monitoring activities, hazards, medical surveillance, exposure reduction and minimization, and any occurrence reporting data related to beryllium program compliance and/or exposures.
2. Feedback from assessments must be provided to the supervisor, UCOR Health Services, the worker, the DOE, and others as appropriate.

WHAT TO DO

A. Roles and Responsibilities

UCOR Safety and Health (S&H) Manager

1. Oversee the preparation, modification, and maintenance of this CBDPP.
2. Assign a qualified individual to serve as the UCOR CBDPP Manager.

UCOR CBDPP Manager

3. Submit to DOE for approval an updated CBDPP whenever a significant change or addition is made [refer to 10 CFR Part 850.10(c), Development and approval of the CBDPP].
4. Perform periodic Assessments, Self Assessments, and/or Safety and Health (S&H) Surveillances to evaluate performance and compliance with this program.
5. Review and provide concurrence with any new project and/or subproject level plans, as required, that contain beryllium exposure control and minimization work practices if the potential exists for personnel exposures to exceed the ACL.
6. Verify in consultation with Subcontract Administrator and Subcontract Coordinator that project plans explicitly define the division of responsibilities where any portions of beryllium scope are subcontracted by UCOR.
7. Where exposure levels meet or exceed the ACL of 0.1 µg/m³, establish exposure reduction and minimization goals as required by 10 CFR Part 850.25, Exposure reduction and minimization, and Requirements Section H, Exposure Reduction and Minimization, of this CBDPP.
8. Update and maintain the inventory for locations where suspect and/or known beryllium or beryllium-containing materials may be encountered. The inventory is posted on the Beryllium page of the UCOR intranet.

PIH

9. Provide oversight of UCOR and Subcontractor CBDPP implementation.

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Subcontractors at all tiers **10.** For beryllium work activities within the scope of this CBDPP, comply with the established work control documentation in accordance with 10 CFR Part 850.11(a) and (b), General CBDPP requirements. Specify the current and planned operational tasks within the scope of this CBDPP; and comply with the requirements in Requirements, Section H, Exposure Reduction and Minimization.

B. Project Management and Support

PIH **1.** Generate Form-3062, Industrial Hygiene Hazard Worksheet (IHHW), and participate in the Job Hazard Analysis (JHA) of each work activity involving beryllium.

JHA Planning Team **2.** Conduct a hazard review of each work activity involving beryllium or beryllium-containing materials using the hazard assessment processes described in PROC-FS-1001, *Integrated Work Control Program*.

Beryllium Worker **3.** Assist in the identification of any potential beryllium hazards for assigned work activities.

C. Management of Beryllium Controlled Areas and Beryllium Regulated Work Areas

PIH **1.** Identify the presence or potential presence of beryllium and beryllium-containing materials in their facilities.

Job Supervisor **2.** Consult with the PIH for recommendations when activities will involve potential exposure of individuals to airborne or surface beryllium.

PIH **3.** Delineate BCAs by posting each access point and the BCA perimeter. See Attachment C for an example of a sign to be used for posting BCAs.

4. Delineate BRAs by posting each access point and the BRA perimeter with signs that meet the requirements of this CBDPP. See Attachment D for an example of a sign to be used for posting BRAs.

Job Supervisor **5.** Isolate BCAs and BRAs along the perimeter by using structural barriers such as walls, or using barricades and/or placards per PROC-EH-1013, *Accident Prevention Signs, Barricades, and Other Postings*.

6. Ensure that the individuals assigned to work in BCAs and BRAs are trained in the use of PPE, including decontamination; don/doff procedures; respiratory protection; LEARN Module 32028, Beryllium Worker Training; and any other training that may be required.

7. Allow only those individuals that are authorized and trained as Beryllium Workers to enter and work in BCAs and BRAs.

8. Minimize the number of workers at risk; the number of potential exposure opportunities; and the time personnel spend in BCAs and BRAs.

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- Job Supervisor **9.** Provide necessary PPE, including respiratory protection, per IHWP and IHHW requirements and/or PIH instructions. Respiratory protection and PPE shall meet the requirements of PPD-IH-5151, *Respiratory Protection Program*, and PROC-EH-2005, *Personal Protective Equipment*.
- Project Manager **10.** Provide change rooms for workers who enter BCAs and change rooms and shower facilities for workers who enter BRAs. Workers who enter BCAs and those who enter BRAs may utilize the same change rooms and showers. The change rooms and showers may also be used by personnel who are not Beryllium Workers.
- Job Supervisor **11.** Ensure waste containers that have beryllium-contaminated contents are labeled with the waste label as described in Section O, Requirements Item 3, of this CBDPP. See Attachment E for an example of appropriate labeling to be used.
- 12.** Ensure that surface wipe sampling is conducted by IH Technicians as determined by the PIH to evaluate beryllium background levels and the effectiveness of housekeeping. This sampling is not required to include the interior of installed closed systems such as enclosures, glove boxes, chambers, drums, or ventilation systems, unless the Sampling and Analysis Plan (SAP) or PIH specifies that those surfaces need to be sampled.
- 13.** Operate in accordance with established waste minimization practices.
- 14.** Ensure only Beryllium Workers are assigned to tasks in areas contaminated or potentially contaminated with beryllium.
- 15.** Reduce exposure potential by using ALARA principles.
- 16.** Where feasible, use nonporous and/or easily decontaminated work surfaces (e.g., bench tops, hood floors) on which beryllium-contaminated items are to be used or stored, unless they are of a disposable nature.
- 17.** Ensure that surfaces are decontaminated using appropriate methods (i.e., wet methods, vacuuming, or other cleaning methods, such as sticky tack cloths that avoid the production of airborne dust).
- 18.** Ensure that ventilation systems from primary containment equipment, such as glove boxes or hoods, are HEPA filtered and discharged to the outdoors.
- 19.** Prior to releasing or moving beryllium-contaminated equipment or items, ensure that the beryllium-contaminated equipment and items are cleaned to the lowest contamination level practicable, and do not exceed the criteria specified in 10 CFR 850. For release to another beryllium work area, this level should be as clean as reasonably achievable and shall be less than 3.0 µg/100 cm². For release of items to the general public or for use in a non-beryllium work area of a DOE facility, the items must be decontaminated to less than 0.2 µg/100 cm². If the equipment or item cannot be decontaminated to meet these standards, it can be wrapped or sprayed with fixative but only when it is being moved to a BCA or BRA.

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NOTE 1: If contamination meets or exceeds 0.2 µg/100 cm² and the equipment or item is being transported through a clean area, then it must be wrapped or otherwise contained/sprayed with fixative to prevent spread of beryllium contamination. The equipment or item, including potentially contaminated internal surfaces, MUST be decontaminated to less than 0.2 µg/100 cm² if the equipment or item will be moved to a non-beryllium work area or released to the general public.

NOTE 2: If the equipment or item has internal or potential internal beryllium contamination, label the equipment or item with the label as shown in Attachment F; a label with a similar message may be used instead with approval from the CBDPP Program Manager.

Worker

20. Use engineering and other control methods that are defined in work control documents. Engineering and work control methods commonly used to reduce the release of airborne dust include: use of a wet mop (instead of dry broom); vacuum cleaner equipped with a HEPA filter; wrapping or bagging items; minimizing items brought into BCAs and BRAs; minimizing handling and processing of beryllium-contaminated items and/or waste; using clear plastic bags for beryllium-contaminated waste so that the contents can be observed without opening the bag; and frequent cleaning of work areas and travel pathways.

21. Dry sweeping or dry mopping methods or other methods likely to result in airborne beryllium are prohibited.

D. Safety and Health Responsibilities

UCOR CBDPP
Manager

1. Conduct periodic Assessments and/or Surveillances to analyze monitoring activities, hazards, medical surveillance, exposure reduction and minimization, and occurrence reporting data as needed.

UCOR CBDPP
Manager and UCOR
S&H Manager

2. Perform a technical review of each Beryllium Registry data submittal (January and July) using Form-2235, Beryllium Registry Technical Review. These submittals are tracked using the Management Condition Reports in the Quality Assurance System.

PIH and S&H
Representative

3. Assist supervisor and work control planners in identifying operations and areas in which workers must be monitored for potential beryllium exposure.

4. Participate in the hazard review process with the JHA Planning Team.

PIH

5. Conduct exposure monitoring in accordance with Requirements, Section E, Exposure Monitoring.

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PIH

6. **IF** personal sampling results meet or exceed $0.2 \mu\text{g}/\text{m}^3$, **THEN** within 10 working days of receipt of those sample results, provide the elevated personal sampling result reports to the individual sampled and the sampled individual's supervisor.

OTHERWISE

(results less than $0.2 \mu\text{g}/\text{m}^3$), post the results within 10 working days of receipt of results in a location easily accessible to monitored workers.

7. Provide personal sampling reports to the UCOR SOMD and to the DOE within 10 days of receipt of results if the results meet or exceed $0.2 \mu\text{g}/\text{m}^3$.
8. Conduct follow-up investigations of potential occupational illnesses as a result of any reported workplace exposure to beryllium as requested by UCOR Health Services and document on Form 773, Industrial Hygiene Report.

E. Medical Surveillance

NOTE: A listing of identified Beryllium Workers and Beryllium Associated Workers in the Beryllium Medical Surveillance Program is maintained by UCOR Health Services in the medical data base. This listing is provided to the S&H Operations Manager and/or other managers/supervisors who require this listing.

UCOR CBDPP
Manager

1. Assist UCOR Health Services in the compilation of a list of Beryllium Associated Workers and Beryllium Workers that participate in the Beryllium Medical Surveillance Program.

Subcontractors at all
tiers

2. Identify Beryllium Workers and Beryllium Associated Workers participating in beryllium medical surveillance, as stipulated in 10 CFR Part 850, and ensure a listing is maintained and medical services are provided as required.

SOMD

3. Administer the Beryllium Medical Surveillance Program in accordance with the requirements in Requirements, Section P, Medical Surveillance.

CBDPP Program
Manager, SOMD and
Beryllium Associated
Worker or Beryllium
Worker

4. **IF** an employee seeks a second opinion, **THEN** make efforts to encourage and assist the two physicians to resolve any disagreement if the findings, determinations, or recommendations of the second physician differ from those of the initial physician.
5. Through respective physicians, designate a third physician (if despite the efforts of the CBDPP Program Manager and the Beryllium Associated Worker or Beryllium Worker, the two physicians are unable to resolve their disagreement) to:
- Review any findings, determinations, or recommendations of the other two physicians.
 - Conduct such examinations, consultations, laboratory tests, and consultations with the other two physicians, as the third physician deems necessary to resolve the disagreement among them.

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SOMD 6. Act consistently with the findings, determinations, and recommendations of the third physician, unless the SOMD and the Beryllium Associated Worker or Beryllium Worker reach an agreement that is consistent with the recommendations of at least one of the other two physicians.

NOTE 1: UCOR/Subcontractor and the Beryllium Associated Worker or Beryllium 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.

NOTE 2: 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.

Employer 7. Provide the Beryllium Associated Worker and Beryllium Worker, within 30 days following a written request, the information UCOR is required to provide the examining physician as described in 10 CFR 850.34(a)(6), Medical Surveillance.

F. Medical Removal

SOMD 1. Offer a Beryllium Worker removal from exposure to beryllium in accordance with Requirements, Section Q, Medical Removal, if determined in a written medical opinion that it is medically appropriate to remove the worker from such exposure. The determination must be based on two or more abnormal BeLPT results; CBD diagnosis; an examining physician’s recommendation; or any other signs or symptoms deemed medically sufficient to remove a worker.

UCOR and Subcontractor 2. **IF** a Beryllium Worker has been temporarily or permanently removed from beryllium exposure, **THEN** ensure the Beryllium Worker is provided:

- The opportunity to transfer to another position which is available, or later becomes available, for which the Beryllium Worker is qualified (or for which the worker can be trained in a short period) and where beryllium exposures are as low as possible, but in no event at or above the ACL; and
- Ensure that the Beryllium Associated Worker who is under either Temporary or Permanent Removed Status does not enter BCAs, BRAs, or buildings/areas that have not yet been characterized for beryllium (if there is a potential that beryllium contamination may be present in that building or area) and is not assigned to jobs in which entry to those areas is required.

3. **IF** medical removal protection benefits are provided, **THEN** ensure that the removed worker’s total normal earnings; continuity of service and/or seniority (when applicable); and other worker rights and benefits are maintained as though the worker had not been removed.

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NOTE 1: The employer's obligation to provide medical removal protection benefits to a removed 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.

NOTE 2: The employer may condition the provision of medical removal protection benefits upon the Beryllium Associated Worker's participation in medical surveillance provided in accordance with Section 850.34 of 10 CFR 850.

UCOR and
Subcontractor

4. **IF** a removed worker files a claim for workers' compensation payments for a beryllium-related disability, **THEN** ensure that medical removal protection benefits continue to be provided pending disposition of the claim.

G. Medical Consent

SOMD and UCOR

1. Provide each Beryllium Associated Worker and Beryllium Worker with a summary of the medical surveillance program and associated risks and benefits at least one week before the first medical evaluation or procedure or at any time requested by the worker.

NOTE: LEARN Module 32036, Beryllium Briefing, will be used to provide the above information to the worker.

SOMD

2. Obtain a Beryllium Associated Worker's and Beryllium Worker's signature on the completed Form-1227, Chronic Beryllium Disease Prevention Program Informed Consent Form, before performing medical evaluations or any tests.

H. Medical Counseling

UCOR and
Subcontractor

1. A counseling program has been developed to assist Beryllium Associated Workers and Beryllium Workers who are diagnosed by the SOMD as beryllium sensitized or to have CBD. This counseling program contains and will communicate the elements described in Requirements, Section S, Counseling, to the Beryllium Associated or Beryllium Worker that has just been diagnosed.

Supervisor or
Manager

2. The CBDPP Program Manager, with cooperation from the worker's supervisor and UCOR Health Services, will ensure that the beryllium sensitized worker attends the contractor beryllium counseling as soon as possible after a diagnosis has been made. UCOR is responsible to ensure counseling is conducted for workers who work for their subcontractors.

I. Exposure Reduction and Minimization

CBDPP Manager

1. Manage and control beryllium exposures in accordance with Requirements, Section H, Exposure Reduction and Minimization.

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J. Worker Training

- | | |
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| Training Resource | 1. Develop and provide training for Beryllium Associated Workers and Beryllium Workers as requested by project or subcontractor management. |
| CBDPP Manager | 2. Ensure that training meets the requirements of 29 CFR 1910.1200, Hazard Communication, and 10 CFR Part 850, and is presented by technically qualified individuals. |
| Job Supervisor and/or S&H Operations Manager | 3. Identify work force who require beryllium worker training, and ensure that Beryllium Associated Workers and Beryllium Workers attend training as required in Requirements, Section A, Program Administration, Item 6. |

K. Performance Feedback

- | | |
|------------------------|--|
| UCOR and Subcontractor | <p>1. Incorporate feedback using the principles detailed in PPD-EH-1400, <i>Integrated Safety Management System Program Description</i>, into performance measurements through project meetings, team meetings, lessons learned, corrective actions, debriefings, and other suitable means.</p> <p>2. In consultation with the PIH, assess results of beryllium monitoring activities. Examples of items to assess for beryllium may include the following:</p> <ul style="list-style-type: none"> • Number of workers potentially exposed; • Exposure level measures for groups and individuals such as percent exceeding the DOE's AL or UCOR's ACL; • Incidence of CBD and beryllium sensitization within the Beryllium Associated Worker and Beryllium Worker population; • Areas and/or waste containers outside BCAs and/or BRAs with removable surface contamination meeting or exceeding 0.2 µg/100 cm²; • Efforts to minimize the amount of Beryllium-contaminated waste that is generated where feasible (e.g., cubic feet). |
|------------------------|--|

RECORDS

- | | |
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| 1. | <p>Accurate records of all beryllium inventory information, hazard assessments, exposure measurements, exposure controls, and medical surveillance must be established and maintained for a minimum of 75 years and includes the following forms:</p> <ul style="list-style-type: none"> • Form-1227, Chronic Beryllium Disease Prevention Program Informed Consent Form • Form-1232, Beryllium Health History Questionnaire • Form-2235, Beryllium Registry Technical Review • Work packages and Type 3 Work Determinations utilized for conduct of work in BCAs/BRAs, including the associated IHWPs and IHHWs • Beryllium Regulated Area (BRA) Entry/Exit Logs (when completed) |
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- Industrial Hygiene Database (Cority) records of sampling of surface and airborne Be contamination
- Assessments and Surveillances generated as directed under 5150, along with any resultant CAMS Issues
- LEARN records associated with LEARN Module 21221, Parkworker, and CBDPP LEARN Module 32036, Beryllium Briefing, and LEARN Module 32028, Beryllium Worker training
- Beryllium Medical Surveillance Program records and LEARN records of completion of LEARN Module 32074, Beryllium Medical Surveillance
- UCOR-5342, *Beryllium Counseling and Benefits Handbook*
- UCOR-5343, *UCOR Facilities Beryllium Baseline Inventory*
- Duty Determination Reports associated with Beryllium Worker temporary or permanent medical removal from Beryllium Worker status and Beryllium Worker/Beryllium Associated Worker counseling conducted per PPD-IH-5150 Requirements - Section S and What To DO - Section H

NOTE 1: Within 10 business days of a written request, the Subcontractor shall provide UCOR with any data, including records and documentation associated with Subcontractor's compliance with the CBDPP.

NOTE 2: All records must be transferred to the DOE or its designee if the employer ceases to be involved in the CBDPP.

2. Beryllium records must be maintained in a current and readily accessible electronic system, which includes the ability to readily retrieve data in a format that maintains confidentiality.
3. Reports generated from the data must be in a format that protects the confidentiality of individuals. Records transmitted to other parties must not contain names, social security numbers, or any other variables that could be used to identify particular individuals.
4. Semi-annually, provide an electronic submittal for the Registry of Beryllium Associated Workers and Beryllium Workers that protects confidentiality. The registry submittal 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. The submittal must be transmitted to the DOE Office of Epidemiologic Studies within the Office of Environment, Safety and Health. Registry data will be reviewed by the UCOR CBDPP Manager and the UCOR S&H Manager (see Form-2235, Beryllium Registry Technical Review) prior to electronic submission of the data.

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SOURCE DOCUMENTS

- 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response
- 29 CFR 1910.1000, Air Contaminants
- Federal Register, Vol. 82, No.5, 1/9/2017, OSHA Beryllium rule changes, 29 CFR 1910.1024 and 29 CFR 1926.1124.
- DOE G 440.1-7A, *Implementation Guide for Use With 10 CFR Part 850, Chronic Beryllium Disease Prevention Program*
- Exhibit L-1, List of Mandatory Contractor Procedures

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Attachment A
DEFINITIONS/ACRONYMS
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ABIH – American Board of Industrial Hygiene

Abnormal BeLPT – A BeLPT test result in which two or more Beryllium concentrations are greater than the stimulation index, indicating beryllium sensitization.

Action Level (AL) – The level of airborne concentration of beryllium that, if met or exceeded, requires the implementation of worker protection measures. The DOE Action Level for airborne beryllium is a concentration of 0.2 µg/m³ 8-hour TWA as measured in the worker’s Breathing Zone by integrated personal sampling.

Airborne Control Level (ACL) – The Airborne Control Level is UCOR’s equivalent to an Action Level. This program uses the term Airborne Control Level in order to avoid confusion with DOE’s Action Level. UCOR’s Airborne Control Level is 0.1 µg/m³ as measured in the worker’s Breathing Zone by integrated personal sampling.

AIHA – American Industrial Hygiene Association

ALARA – As Low As Reasonably Achievable

Beryllium – Elemental beryllium and any insoluble beryllium compound or alloy containing 0.1 percent (1,000 ppm) beryllium or greater that may be released as an airborne particulate. It is important to note that this definition is consistent with the criterion that 29 CFR 1910.1200, Hazard Communication, uses for a carcinogenic mixture, i.e., one that contains a carcinogenic component at a concentration of 0.1 percent (or 1,000 ppm) or greater, by weight or volume.

Beryllium Activity – An activity taken for, or by, DOE at a DOE facility that can 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.

Beryllium Article – A manufactured item that is formed to a specific shape or design during manufacture, that has end-use functions that depend in whole or in part on its shape or design during end use, and that does not release beryllium or otherwise result in exposure to airborne concentrations of beryllium under normal conditions of use.

Beryllium Associated Worker – A current worker who is or was exposed or was potentially exposed to airborne concentrations of beryllium at a DOE facility, including:

- 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.
- A Beryllium Worker is included in the DOE definition of Beryllium Associated Worker. However, at UCOR, although Beryllium Associated Workers includes Beryllium Workers, only current Beryllium Workers who are trained and qualified to work in beryllium work areas are authorized to enter and work in Beryllium Controlled Areas (BCAs) and Beryllium Regulated Areas (BRAs); i.e., Beryllium Associated Workers are not authorized to enter BCAs and BRAs.

Beryllium Controlled Area (BCA) – An area in which surface levels of beryllium meet or exceed 0.2 µg/100 cm² or where airborne beryllium levels meet or exceed 0.1 µg/m³.

Beryllium Emergency – An upset condition such as, but not limited to, equipment failure, container rupture, or failure of control equipment or operations that results in an unexpected and/or significant release of beryllium or beryllium contamination at a DOE facility.

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Beryllium-induced Lymphocyte Proliferation Test (BeLPT) – An in vitro measure of the beryllium antigen-specific, cell-mediated immune response.

Beryllium Regulated Area (BRA) – An area in which the airborne concentration of beryllium exceeds, or can reasonably be expected to meet or exceed 0.2 µg/m³ and/or in which surface levels meet or exceed 3 µg/100 cm².

Beryllium Waste Material – A material containing beryllium if beryllium is present in the mixture in concentrations greater than 0.1 percent (1,000 parts per million).

Beryllium Worker – A **Beryllium Worker** is a worker who has:

- attended LEARN Module 32036, Beryllium Briefing;
- received a Beryllium-induced Lymphocyte Proliferation Test (BeLPT) with normal results;
- completed baseline and annual (as applicable) beryllium medical surveillance requirements; and
- attended LEARN Module 32028, Beryllium Worker Training.

Only a Beryllium Worker is qualified to perform work in Beryllium Controlled Areas or in Beryllium Areas.

Borderline BeLPT – One out of three blood serum samples has a beryllium concentration that is greater than the stimulation index (two or more blood serum samples greater than the stimulation index indicates beryllium sensitization).

BZ – Breathing Zone

CBDPP – Chronic Beryllium Disease Prevention Program

CFR – Code of Federal Regulations

Chronic Beryllium Disease (CBD) – A chronic lung disease caused by immunologic hypersensitivity to beryllium particles less than 10 microns in diameter.

cm² – square centimeter

DDR – Duty Disposition Reports

DOE – U.S. Department of Energy

Employer – The company (e.g., prime contractor, subcontractor) that is directly responsible for the health and safety of employees while performing a beryllium activity or other activity at a DOE facility. For subcontracted employees, the subcontractor is the employer.

Entry/Exit Point – An area that is designed to support personnel entering/exiting a contaminated work area and is the location of the final Personal Protective Equipment doffing step when exiting a contaminated work zone.

ETTP – East Tennessee Technology Park

Facility Manager – An individual who has specific responsibilities for the infrastructure of a facility or building. The definition of a Facility Manager is detailed in PROC-FO-515, *Facility Management*, Attachment A.

FEV1 – Forced expiratory volume at 1 second

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DEFINITIONS/ACRONYMS
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FVC – Forced vital capacity

HEPA – High-efficiency particulate air

IH – Industrial Hygienist

IHHW – Industrial Hygiene Hazard Worksheet

IHWP – Industrial Hygiene Work Permit

Job Hazard Analysis (JHA) Planning Team – A panel of technical and craft discipline personnel selected by the planner, with concurrence by the Facility Manager, to research the work, conduct the JHA, and prepare the work package or Technical Procedure.

Medical Removal Protection Benefits – The employment rights established by 10 CFR 850.35 for Beryllium Associated Workers who have accepted temporary or permanent medical removal from beryllium work activities following a recommendation by the Site Occupational Medicine Director.

NIOSH – National Institute for Occupational Safety and Health

ORNL – Oak Ridge National Laboratory

OSHA – Occupational Safety and Health Administration

Permissible Exposure Limit (PEL) – Airborne concentration of beryllium which is equal to or greater than the 8-hour Time-weighted average (TWA) of 0.2 µg/m³. This airborne limit is published in 29 CFR 1910.1024 and 29 CFR 1926.1124, and is measured in the worker’s breathing zone by personal monitoring.

PPE – Personal Protective Equipment

ppm – parts per million

Project Industrial Hygienist (PIH) – A professional qualified by education, training, and experience to anticipate, recognize, evaluate, and develop controls for occupational health hazards. This individual either is certified in the practice of industrial hygiene by the American Board of Industrial Hygiene (ABIH) or is current in all requirements of the UCOR Training Position Description entitled Project Industrial Hygienist.

Removable Contamination – Beryllium contamination that can be removed from surfaces by nondestructive means, such as casual contact, wiping, brushing, or washing.

Safety and Health (S&H) Representative – For UCOR, an individual with roles and responsibilities that are detailed in PPD-EH-1745, *Worker Safety and Health Program*. For Subcontractors, this individual is the Subcontractor ES&H representative or qualified individual (e.g., industrial hygienist).

Site Occupational Medical Director (SOMD) – The physician responsible for the overall direction and operation of the site occupational medicine program.

Subcontract Coordinator – For subcontracted work, ensures that roles assigned to the subcontractor are clearly defined. Coordinate between UCOR and subcontractor project team members. Primary point of communication between subcontractor and UCOR team members.

TWA – Time weighted average

Uninterpretable BeLPT – BeLPT results that cannot be interpreted due to assay variations.

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µg/m³ – Micrograms per cubic meter

Worker – A person who performs work for or on behalf of DOE, including a DOE employee, an independent contractor, a DOE contractor or subcontractor employee, or any other person who performs work at a DOE facility.

Worker Exposure – Means the exposure of a worker to airborne beryllium that would occur if the worker were not using respiratory protective equipment.

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Attachment B
UCOR FACILITIES BERYLLIUM BASELINE INVENTORY
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The UCOR Facilities Beryllium Baseline Inventory, UCOR-5343, provides a summary of UCOR facilities/areas at the East Tennessee Technology Park (ETTP) (formerly K-25 Site), Oak Ridge National Laboratory (ORNL), and Y-12 National Security Complex (Y-12) in which suspect and/or known beryllium or beryllium-containing materials may be encountered. The inventory is intended to comply with 10 CFR 850.20, and information has been extracted from several sources, including: K/ER-47/R1, *Site Descriptions of Environmental Restoration Units at the Oak Ridge K-25 Site, Oak Ridge, Tennessee*; archived files; documents; interviews; and anecdotal information obtained from site personnel and former employees; and air, surface, and bulk sampling as maintained in the accumulated UCOR Industrial Hygiene survey records. The Beryllium Inventory can be found on the Beryllium page of the UCOR Intranet.

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Attachment C
EXAMPLE OF SIGN FOR BERYLLIUM CONTROLLED AREA
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Attachment D
EXAMPLE OF SIGN FOR BERYLLIUM REGULATED AREA
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Attachment E
EXAMPLE OF BERYLLIUM-CONTAMINATED WASTE CONTAINER LABEL
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Attachment F
EXAMPLE OF INTERNAL BERYLLIUM CONTAMINATION LABEL
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