

ISMS Training Document
Track 1, Activity 5 – September 2011
Chronic Beryllium Disease Prevention Program (CBDPP)

Activity

Describe the significant requirements of the Department of Energy (DOE) Chronic Beryllium Disease Prevention Program (CBDPP) and how the program is implemented at Oak Ridge Office (ORO).

At the completion of this activity, fill out the Self-Certification Form certifying that you have read this activity sheet.

Note: When regulations, DOE directives, or other industry standards are referenced in this ISMS activity, please use the most recent version.

Key Documents

- [10 CFR 850, Chronic Beryllium Disease Prevention Program](#)
- [29 CFR 1910.1200, Hazard Communication](#)

What's In It For Me

In December 1999, DOE published [10 CFR 850](#), Chronic Beryllium Disease Prevention Program, which applies to both DOE and contractor employees. This rule affects DOE facilities with past, current, or future beryllium operations. Twenty-one DOE facilities (Beryllium Sites) have Chronic Beryllium Disease Prevention Programs (CBDPP). This list includes three local sites: Y-12, ORNL, and ETTP. However, some ORO personnel visit other DOE sites that are included on the list in the performance of their duties. The rule requires DOE managers at the affected facilities to develop and implement a CBDPP that will minimize the level of, and potential for, exposure to beryllium; reduce the number of workers exposed to beryllium; and establish medical surveillance requirements which provide for the early detection of chronic beryllium disease.

Definitions

Definitions provided in [10 CFR 850.3\(a\)](#) include:

- **Beryllium activity** means 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 worker** means a current worker who is regularly employed in a DOE beryllium activity.
- **Beryllium-associated worker** means a current worker who is or was exposed or potentially exposed to airborne concentrations of beryllium at a DOE facility, including:
 1. A beryllium worker;
 2. A current worker whose work history shows that the worker may have been exposed to airborne concentrations of beryllium at a DOE facility;
 3. A current worker who exhibits signs or symptoms of beryllium exposure; and
 4. A current worker who is receiving medical removal protection benefits.

Are you a beryllium worker or a beryllium-associated worker? The staff of

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ORO does not include any beryllium workers, but some personnel may enter areas with beryllium operations or beryllium regulated areas due to beryllium storage or contamination. Any worker who has reason to believe that they have been exposed to airborne concentrations of beryllium in the past, or may potentially be exposed to airborne concentrations of beryllium in the performance of their current duties, would be classified as a beryllium-associated worker. Personnel exhibiting signs or symptoms of beryllium exposure or receiving medical removal protection benefits would be classified as beryllium-associated workers as well.

**Employee
Responsibilities**

Beryllium-Associated Workers: All beryllium-associated workers must receive training that is in accordance with 29 CFR 1910.1200, Hazard Communication, includes the contents of the CBDPP, and includes 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 at a DOE facility. This training can be accomplished by completing the DOE Headquarters training titled "Beryllium Awareness for HQ Be Associated Workers" or other comparable training provided by DOE sites (e.g., Y-12, ORNL, or ETTP). A certificate of the training or a self-certification documenting its completion should be forwarded to the ORO Training Center and a copy forwarded to the AMESH Beryllium POC.

All Others: All other individuals who work at a site where beryllium activities are conducted must receive training that provides general awareness about beryllium hazards and controls. **This training meets that requirement.**

**Beryllium Medical
Surveillance Program**

Beryllium Medical Surveillance Program: Participation in the beryllium medical surveillance program is voluntary. For those choosing to participate, beryllium workers are required to receive the beryllium periodic medical evaluations annually and other beryllium-associated workers only need it once every three years. The required elements are included in your annual physical. A blood test known as the Beryllium Lymphocyte Proliferation Test (Be-LPT) is used by physicians to assess early signs of sensitivity to beryllium, prior to any onset of visible signs or symptoms of Chronic Beryllium Disease (CBD).

**Beryllium General
Awareness
Information**

What is Beryllium? Beryllium is a naturally occurring metal used in nuclear weapons components. Though useful, it can cause serious health problems to those who are exposed to airborne particles. Beryllium, symbol Be, is a silver-gray metallic element that occurs in about 30 minerals. It is very light (lighter than aluminum), but it is stiffer than steel. It has a high melting point, conducts heat well, and is corrosion-resistant. Beryllium-containing minerals are found in rocks, coal, oil, soil and volcanic dust. Beryllium is a key element in gems such as blue-green aquamarine and green emerald. Because it is a naturally occurring element, trace amounts can be found in ordinary air.

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**Beryllium General
Awareness
Information, Cont'd**

Beryllium Use at DOE. Beryllium is predominately used in engineering, defense, and nuclear weapons technology. Machining, powder pressing, laser cutting, sputtering, welding, and mechanical testing are the major activities involving beryllium. Chemistry, material science, and laser areas can use beryllium or beryllium parts in their operations. Those persons most likely to be exposed to beryllium activities are scientists, engineers, technicians, crafts, maintenance, and custodial workers. Managers, inspectors, and support staff who work in areas where beryllium is used may also be exposed. To find out if beryllium is or was used in or near the area in which you plan to be or were in the past, contact the safety and health professional responsible for that area.

Beryllium Health Hazards. The major disadvantages of beryllium use are its toxic and carcinogenic qualities. Inhalation of airborne beryllium particles may lead to Acute Beryllium Disease, Beryllium Sensitivity or Chronic Beryllium Disease (CBD). Beryllium is considered a human carcinogen. Studies show it can cause lung cancer at exposure levels greater than allowed at DOE facilities and higher than that which causes CBD and beryllium sensitivity. At exposure levels much higher than those which cause CBD, acute beryllium disease, sometimes called chemical pneumonia, can occur in days or weeks. Because of dramatically improved controls, neither lung cancer or acute beryllium disease are a problem in the modern DOE workplace.

Beryllium Sensitivity. Exposure to beryllium dust may cause sensitization, an immune system response to beryllium. Individuals who are sensitized have white blood cells that react to beryllium, but have no symptoms of the disease. Medical studies have shown that even small amounts of beryllium particles breathed deeply into the lungs may trigger this sensitivity in 2 to 5 percent of people exposed. In studies of people in certain occupations where exposure to beryllium was greatest (for example, studies of machinists in beryllium operations where precision machining places them close to the source of the particles), this figure rises to as much as 10 to 14 percent. Currently, there is no test available to determine who is at risk for becoming sensitized to beryllium. Blood tests can only indicate those individuals who have already become sensitized to beryllium.

Chronic Beryllium Disease. CBD occurs in individuals who have become sensitized to beryllium. These individuals have white blood cells in the blood or lungs that reacted to beryllium. This reaction can cause inflammation and irreversible scarring of the lungs which can hinder the transfer of oxygen when breathing. CBD can take many years to develop. Health effects have appeared in some people a few months after exposure and as long as 30 years later in others. The average time from first beryllium exposure to the development of symptoms (latency period) of CBD ranges from 10 to 15 years. This means you can be exposed to beryllium today and not suffer any health effects for decades. Currently, there is no way to determine who is susceptible to chronic beryllium disease prior to exposure. Therefore, DOE assumes that all workers may be

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Beryllium General Awareness Information, Cont'd

susceptible and requires controls to protect all of its workers. CBD symptoms resemble those of other lung diseases, particularly the disease known as sarcoidosis. Studies have found that in some cases doctors have misdiagnosed CBD as sarcoidosis or other lung diseases. Symptoms of CBD may include one or more of the following: persistent coughing, shortness of breath with physical exertion, fever, night sweats, chest pain; fatigue, weight loss, pain in the joints, and loss of appetite.

Treatment of Chronic Beryllium Disease. Over 200 past and present DOE workers have been confirmed as having CBD, a disease that can be treated but not cured. If a loss of lung function is detected, treatment may involve taking corticosteroids (often called steroids), a medicine that reduces inflammation. If successful, treatment with steroids can slow the progression of CBD by reducing the buildup of scar tissue and delaying permanent lung damage. Early diagnosis can be very helpful because it allows treatment with small doses of steroids which reduce the unwanted side effects. Individuals with insufficient levels of oxygen in their blood because of CBD may need supplemental oxygen to increase supply to the body and to protect the heart and other organs from the resulting damage. Some individuals diagnosed with CBD may never become sick enough to require treatment.

Beryllium Sampling and Monitoring at DOE Sites. To evaluate the beryllium risk, tens of thousands of air samples have been taken since 1960. Typically, the results are well below the DOE action level (level that triggers worker protective measures). The DOE action level is 0.2 $\mu\text{g}/\text{m}^3$ (micrograms per cubic meter). Since DOE began medically monitoring beryllium workers decades ago, 423 sensitized individuals, including 163 cases of CBD, have been diagnosed.

Controlling Beryllium Exposure. The DOE requires that exposure to beryllium be minimized to the greatest extent possible. The following types of controls used at DOE sites ensure employee safety and health, and minimize exposure to beryllium: Engineering controls, administrative controls and Personal Protective Equipment (PPE). Engineering controls are the most effective protection, as they involve designing equipment and facilities to protect employees with the intent of minimizing the need of employees to use PPE. The following table summarizes the primary controls.

Examples of Exposure Controls		
Engineering Controls	Administrative Controls	PPE and Clothing
Enclosure of the Operation	Postings to Identify Regulated Areas	Respirators
Local Exhaust Ventilation	Controlled Access	Gloves
HEPA Filtration	Labels to Identify Contamination	Lab Coats
Wet Machining Techniques	Training	Coveralls

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***AMESH Beryllium
Point of Contact
Information***

Any questions or comments regarding the CBDPP should be submitted to the AMESH beryllium POC listed below:

AMESH Beryllium Point of Contact:

Danny Cunningham, CIH, CSP
Industrial Hygienist
Environmental Management Support team (SE-312)
Office: (865) 241-1520
Pager: (865) 231-1563
Fax: (865) 574-9275
cunninghamdm@oro.doe.gov

Alternate POC: Dan Bowman, Laboratory Support Team, Phone: (865) 576-2113.

NOTE: This information can also be viewed at any time by going to the ORO internal website's Safety First page and clicking on the link to Beryllium Awareness under Safety and Health Information.

To Learn More

Click on these documents for more information about how CBDPP is applied at ORO and DOE.

- [10 CFR 850, Chronic Beryllium Disease Prevention Program](#)
- [29 CFR 1910.1200, Hazard Communication](#)
- ORO Safety First Website, <http://www-internal.oro.doe.gov/esq/safetyfirst/index.aspx> (Internal)