



Hanford Occupational Health Services

Beryllium Information Booklet

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Disclaimer

The materials provided in this document are for informational purposes and are not intended for use as diagnosis or treatment of a health problem, or as a substitute for consulting with a licensed medical professional. Because each person's health needs are different, a physician should be consulted before acting on any information provided in these materials.

Every effort is made to ensure that this material is accurate and up-to-date; it is provided solely for the convenience of the user.

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Welcome to the CSC HOHS Beryllium Medical Surveillance Program

We have gathered information for you to read prior to your visit with CSC HOHS, which will help direct you to the appropriate resources and contacts.

CSC HOHS's Beryllium Medical Surveillance Program is designed to provide medical services in support of the health and safety for Hanford workers. CSC HOHS is committed to the education, health and preventive care for Hanford workers. Within this booklet, you will find information on the Beryllium Medical Surveillance Program, Frequently Asked Questions on Beryllium, and a copy of the 10 CFR 850 Final Beryllium Rule from the Federal Register.

In addition, a number of useful tools are available on the CSC HOHS website, such as a brochure on Beryllium Hazards, the Hanford Site Beryllium Questionnaire, and a list of Contractors' Points of Contact. This website also includes helpful information on other organizations that provide beryllium assistance: <http://www.hanford.gov/amh/page.cfm/beryllium>

CSC HOHS is responsible for administering the Beryllium Medical Surveillance Program in accordance with 10 CFR 850, attached. A copy of the Hanford site Chronic Beryllium Disease Prevention Program (CBDPP) may be obtained from your employer or available at <http://www.hanford.gov/files.cfm/DOE-0342.pdf>. We encourage you to know your rights and responsibilities as a beryllium-associated worker.

If you are in need of continued assistance, please contact the CSC HOHS Beryllium Case Management Specialist at (509) 376-6000.

Beryllium Medical Surveillance Program

The Federal Register 10 CFR 850 Final Beryllium Rule is the driver for the Hanford Site Chronic Beryllium Disease Prevention Program (CBDPP). 10 CFR 850 defines beryllium-associated workers as:

- *Beryllium-associated worker*: Current worker who is or was exposed or potentially exposed to airborne concentrations of beryllium at a DOE facility; a current worker who exhibits signs or symptoms of beryllium exposure; and a current worker who is receiving medical removal protection benefits. DOE has determined all Hanford workers are beryllium-associated workers. These workers may choose to enroll in the beryllium voluntary program.
- *Beryllium workers*: current workers who are regularly employed in a DOE beryllium activity. At Hanford, these workers are identified by the Employee Job Task Analysis (EJTA).

About the Beryllium Worker Program

- Workers are enrolled in the “Beryllium Worker Program” based on their EJTA. The evaluation and the Beryllium Lymphocyte Proliferation Test (BeLPT) are mandatory.
- Required physical exam and testing are conducted every year.
- A signed consent form is required prior to your exam and testing.
- You cannot perform work as a beryllium worker unless you have completed beryllium worker training and have a current medical clearance from CSC HOHS. Current is defined as less than 365 days from the date the provider signed the clearance. A withheld clearance means you are not cleared to perform beryllium work.

About the Beryllium Voluntary Program

- This program is for any current Hanford worker whose EJTA does NOT designate him/her as a beryllium worker.
- CSC HOHS recommends ongoing surveillance for individuals with a history of potential past exposure to beryllium at any DOE site.
- For workers enrolled in the “Beryllium Voluntary Program,” all aspects of the evaluation are voluntary including the BeLPT.
- Routine evaluations and testing are offered every three years. The CSC HOHS medical provider will determine if more frequent evaluations are recommended.
- Your employer will not be notified of your scheduled beryllium appointment and will not receive a medical opinion or results unless you receive a beryllium related diagnosis.
- If you are diagnosed as having beryllium sensitization or Chronic Beryllium Disease (CBD), CSC HOHS will issue a work restriction and notify your employer of your diagnosis through the job injury notification process.

Information for Beryllium Workers and the Beryllium Voluntary Program:

About The Exam

Recognizing the importance of worker safety and health, effective January 23, 2012, CSC HOHS will begin a new two-encounter examination process. There are several benefits of this new process:

1. Medical providers will be able to review and discuss all test results with patients during their examination.
2. Patients will leave CSC HOHS better informed about their health, safety, and ability to perform assigned work.
3. Patients will leave with all results and applicable paperwork in hand.

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How the Two-Encounter Examination Process Works

During the first encounter, each patient will complete all necessary testing. When testing is completed, the patient will be scheduled for a second encounter, usually 7-28 days later depending upon the type of examination and the availability of test results. During the second encounter, the medical provider will conduct all necessary physical examinations, discuss test results and review the *Medical Examination Report and Opinion Letter (Clearance)* with applicable work restrictions, if any. If a clearance is being withheld, it will be during this time that the medical provider consults with the patient and discusses the reasons for this decision. The patient will leave with all of his/her paperwork, including a copy of all test results.

- The exam includes:
 - Work history
 - Medical history
 - Physical examination with a physician (MD) or certified physician assistant (PA-C)
 - Pulmonary Function Test (PFT)
 - Chest x-ray
 - Beryllium Lymphocyte Proliferation Test (BeLPT)
- You will have an opportunity to ask questions and receive information about beryllium sensitization and beryllium disease.
- Beryllium testing will not be performed unless you sign the *Chronic Beryllium Disease Prevention Program Informed Consent Form*.
- You will be notified of the results of your examination and testing at your second encounter with the medical provider. It can take two to four weeks for CSC HOHS to receive the results of the BeLPT blood test.
- You will be notified within two Business days if you have a BeLPT result that is anything other than normal.

About Work Restrictions

- Workers are enrolled in the “Beryllium Worker Program” based on their EJTA. The evaluation and BeLPT are mandatory.
- Routine examinations and testing are scheduled annually.
- You cannot perform work as a beryllium worker unless you have completed beryllium worker training and have a current medical clearance from CSC HOHS with “C” indicated next to “Beryllium Worker”. Current is defined as less than 365 days from date the provider signed the clearance. “W” on the clearance means you are not cleared to perform beryllium work.
- A work restriction limiting exposure to beryllium will be given to workers in the beryllium voluntary program if they are diagnosed as beryllium sensitized or having CBD.

About Medical Opinions

- A medical clearance is the examining provider’s medical opinion as to whether or not you are medically cleared to perform the work indicated by your EJTA. Your EJTA is completed by your employer.
- You cannot perform work that requires a medical clearance until CSC HOHS has provided you the proper medical clearance form.
- Your current clearance(s) remains valid until the expiration date or it is replaced by a new clearance.
- “Withheld” means you are not medically cleared and you cannot perform that [specific] work unless a new clearance is issued.
- The clearance includes the expiration date for each medical program.
- You will receive a copy of your medical clearance in the mail if for any reason the provider was unable to issue your medical clearance due to additional results requiring review.
- Your employer (or prime contractor if you work for a sub-contractor) will also receive a copy of the medical clearance.
- Clearance information will be available electronically in the Hanford Site Worker Eligibility Tool (HSWET), Access Control/Entry System (ACES) and the CSC HOHS Patient Portal the day after entry. This information is

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available to your employer to ensure you are not assigned work unless you have the appropriate medical clearances.

- With the exception of a Beryllium Worker clearance, you may be “cleared” but have restrictions. Restrictions will be included on your medical clearance form. As an example, you may be cleared as a respirator user, but restricted from using negative pressure respirators.

About Follow-Up Evaluations

- The beryllium surveillance program provides referral to specialized facilities or providers for further evaluation for CBD. The CSC HOHS Beryllium Case Management team will be available to assist you with decision-making, and in understanding the various interpretations from the multiple opinions.
- If you are not offered a referral, but feel you need further beryllium evaluation you may request CSC HOHS facilitate a records review with National Jewish Health or another nationally recognized beryllium provider. CSC HOHS will provide the records and ask for an opinion as to whether or not referral is appropriate. CSC HOHS will abide by the recommendation of the external organization.
- Multiple Physician Review: Your employer provides you the opportunity under CSC HOHS’ medical surveillance program for you to seek second and third medical opinions (Multiple Physician Review) upon your request. Requests for Multiple Physician Review must be made to your employer in writing within 30 days following receipt of your results.
- Follow-up evaluations often include more invasive procedures. CSC HOHS Beryllium Case Management can team with you and your personal medical provider in determining what follow-up is appropriate for you. Other resources available for you include the Hanford Site Beryllium Worker Health Advocate.

About Your Company

- As defined by 10 CFR 850.34 (5) your employer must provide the SOMD with the information needed to operate and administer the medical surveillance program. This shall include your work history, monitoring data, hazard assessment, and use of personal protective equipment. Your employer will provide this information to you upon request.
- Your employer will be notified of any medical/work restrictions.
- Your employer will advise you of company policies and available assistance regarding follow up.
- Beryllium workers: your employer will provide you with beryllium training that includes information about medical screening.

About Your Records

- Your confidential medical records are maintained at CSC HOHS.
- Your records may be released only with your permission or as allowed by:
 - The Privacy Act of 1974
 - The Americans Disabilities Act
 - A court order, or other such legal actions
- Your records may be released for necessary official purposes of DOE, National Institute of Occupational Safety and Health, Occupational Safety and Health Administration, state health departments, or Congress.
- If you file a workers’ compensation or Department of Labor claim for beryllium sensitization or CBD, you will need to release your test results to the claim examiner before your claim can be processed. Under the privacy rule of the Health Insurance Portability and Accountability Act of 1996 (HIPAA), no one may access your test results unless you give them permission by signing a release of medical information.
- Other individuals who may use “de-identified” medical information (without personal identifiers such as name, social security number, address, or phone number) include:
 - Certain DOE officials responsible for the CBDPP.
 - Scientists and researchers working under DOE agreements
 - The Oak Ridge Institute for Science and Education (ORISE)

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About 10 CFR 850

The Federal Register 10 CFR 850 Final Beryllium Rule, fully implemented January 2002, gives direction for providing a safe workplace for beryllium-associated workers, establishment of a medical surveillance program, and direction for identifying those workers who may have had occupation exposure to beryllium at a DOE complex in the past. A copy of the rule is included in this booklet.

About the Beryllium Registry

As your Site Occupational Medicine Contractor, CSC HOHS acts as the data coordinator for the Beryllium-Associated Worker Registry; a compilation of CSC HOHS examinations, test results, and work history information provided by Hanford contractors for all beryllium-associated workers. The registry will be used to develop health studies to help us better understand CBD and those at risk of developing the disease. Registry data includes:

- Birth year and gender
- Work history
- Beryllium exposure
- Medical evaluations

The registry was established by regulation to monitor the effectiveness of DOE's CBDPP in preventing CBD. As directed by 10 CFR 850, this information is de-identified to protect confidentiality and is provided to the National Beryllium Registry.

Benefits and Risks of Testing Procedures

Pulmonary Function Test (PFT)

The pulmonary function test (PFT) measures how well your lungs work. You will be asked to breathe as deeply as possible into a mouthpiece that is connected to a machine called a spirometer. This measures and records the rate and amount of air inhaled and exhaled.

Please avoid smoking for at least one hour prior to the test. Eat lightly, but do not fast or drink a large amount of fluid. Wear loose, non-restrictive clothing. If you have asthma, use your inhaler per your routine and take all prescribed medication as you normally do. Dentures should be kept in; they will help keep a tight seal around the spirometer mouthpiece. Use the bathroom prior to the test.

During the test, you will be sitting upright in a chair. You will be asked to breathe a certain way through your mouth using the spirometry mouthpiece – for example, to inhale deeply and exhale completely. You will be asked to do this until you have three similar results. Tell the technician if you do not understand the instructions.

During the test, you may feel tired or short of breath. Tell the technician right away if you feel dizzy, begin wheezing, or have chest pain, a racing or pounding heart, nausea, or shortness of breath.

You may resume your normal activity after the test.

Chest X-ray

The chest x-ray is done to detect any abnormalities in the chest cavity including soft tissue and bony anatomy.

The chest x-ray is a valuable tool used for medical surveillance, general screening, and diagnosis. Chest x-rays pose very little risk to the patient when administered properly and the benefits far outweigh the risks. You should tell the Physician or PA if you have had recent chest or other x-rays elsewhere. You may not be required to repeat a chest x-ray if one has been done within the last six months.

Beryllium Lymphocyte Proliferation Test (BeLPT)

This blood test requires approximately four (4) tubes of blood drawn from a vein, usually a large vein near the crease of the elbow. Although complications from having blood drawn are rare, bruising or swelling from blood leaking into the surrounding tissue can occur. Some people are prone to feeling faint while having their blood drawn. Tell the technician right away if you experience lightheadedness or dizziness. Although false normal (negative) and false abnormal (positive) test results are possible, the BeLPT is the most reliable blood test for determining sensitization to beryllium. Some medications can interfere with test results. Inform CSC HOHS of all prescription and over the counter medications. The blood test results can take two to four weeks to be returned to CSC HOHS. The blood sample has to air ship within a certain amount of time for accuracy of test results. The results may come back without findings and the blood test will be repeated. Should the first test come back abnormal or borderline a second blood test will be performed. A split sample blood test, which requires twice as much blood to be drawn and equal samples are sent to two different lab facilities to have the same test performed. One abnormal BeLPT test result qualifies the employee for the Energy Employees Occupational Illness Compensation Program (EEOICP). When the results have been received by CSC HOHS, you will be notified of abnormal and borderline results by phone within two CSC HOHS business days. All results are mailed within 10 working days from receipt of results.

Beryllium Questions & Answers

Much of the information found in this section was obtained from the National Jewish Health Website at <http://www.nationaljewish.org/healthinfo/conditions/beryllium-disease>

Beryllium and the Hanford Site

Beryllium at Hanford

The use of beryllium at the Hanford site during fuel element production, and maintenance of selected industrial components and tools, has resulted in potential occupational beryllium exposure to current and former employees. As Hanford proceeds with extensive decommissioning and decontamination of older facilities, legacy beryllium containing dust and debris may still be encountered. Unfortunately, a small portion of exposed personnel has been diagnosed with beryllium-related medical conditions including CBD or beryllium sensitization. DOE and all Hanford contractors are committed to ensuring that current and former employees that may have received exposure to beryllium have an opportunity to receive appropriate medical testing, and if necessary, follow-up medical attention.

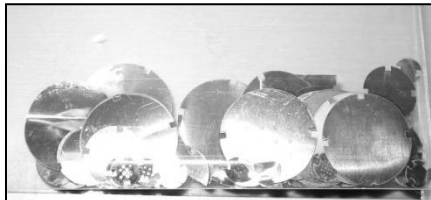
What is beryllium?

Beryllium is a naturally occurring element found in soil in the form of beryl and in rock in the form of bertrandite. Beryllium is a silver-grey metallic element and lighter than aluminum yet stiffer than steel. While beryllium occurs naturally in soils and in coal, natural occurring air concentrations are extremely low even in major urban areas.

Photos of beryllium



Beryllium ore



Small circular beryllium foils in a plastic bag, blue background.

Where is beryllium used?

Beryllium is extremely lightweight, hard, a good electrical and thermal conductor, and nonmagnetic. It is used by many industries, including:

- **Aeronautics and Aerospace** – components made from pure beryllium as well as copper-, aluminum-, nickel-, and magnesium-beryllium alloys
- **Ceramic manufacturing** – semi-conductor chips, ignition modules, crucibles, jet engine blades and rocket covers
- **Electronics** – transistors, heat sinks, x-ray windows, computer and telecommunication parts, and automotive parts
- **Atomic energy and defense industries** – heat shields, nuclear reactors, components for nuclear weapons
- **Laboratory work** – research and development, metallurgy, chemistry
- **Mineral extraction** – ore
- **Dental work** – alloys in crowns, bridges, and dental plates
- **Metal recycling** – computers, electronics, copper-alloy tubing, rod and wire
- **Sporting goods** – golf clubs, baseball bats, fishing rods
- **Fluorescent lamps** – prior to 1951, beryllium was used in the manufacturing of fluorescent lamps

Is beryllium hazardous?

Handling beryllium in its solid form, such as a finished computer part that contains beryllium, is not known to cause illness, unless the part still has dust on it from the production process. However, some people who inhale beryllium dust or fumes will develop beryllium sensitization or CBD. Although beryllium primarily affects the lungs, it can also cause a rash, poor wound healing, or wart-like skin bumps if it enters the body through an opening in the skin, such as a sliver or cut. Although low levels of beryllium are found naturally in soil and air, there is not enough beryllium in the air or soil to cause beryllium sensitization or CBD from these sources alone.

Does beryllium cause cancer?

Beryllium has been shown to cause cancer in humans and in many species of animals. Studies have confirmed the association between beryllium exposure and lung cancer in humans, especially in individuals with acute beryllium disease, caused by very high levels of beryllium exposure. The International Agency for Research on Cancer (IARC) has classified beryllium as a human carcinogen. Importantly, the far more common health concerns for beryllium-exposed individuals are beryllium sensitization and CBD, as levels of exposure are generally lower now than they were many decades ago when some of the cancer studies were conducted.

What is beryllium sensitization?

Beryllium sensitization is an “allergic” condition to beryllium that can develop after a person breathes beryllium dust or fumes. Some researchers think it might also occur if beryllium penetrates the skin through an open cut or from a beryllium splinter.

In individuals with beryllium sensitization, the immune system sees beryllium as a “foreign invader,” and builds an “army” of cells in the bloodstream that are prepared to react to beryllium wherever they see it in the body. These cells can be found using a blood test called the Beryllium Lymphocyte Proliferation Test (BeLPT)

What are the symptoms of beryllium sensitization?

Beryllium sensitization does not have any symptoms.

What is Chronic Beryllium Disease?

Chronic Beryllium Disease (CBD) is a lung condition that can develop after a person breathes beryllium dust or fumes. The immune system sees beryllium as a “foreign invader,” and builds an “army” of cells in the bloodstream that are prepared to react to beryllium wherever they see it in the body. When an individual is diagnosed with CBD, it generally

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means the battle between the immune system and the beryllium particles has resulted in scarring (called granulomas) in the lungs.

What are the symptoms of CBD?

Individuals with CBD may not have any symptoms at first, especially if the disease is diagnosed at an early stage. Patients may notice shortness of breath with walking, climbing stairs, or another activity, as well as a dry cough that will not go away. Some people may also experience fatigue, night sweats, chest and joint pain, and loss of appetite as the disease progresses.

How do you develop beryllium sensitization or CBD?

It is important to know that no one develops beryllium sensitization or CBD unless they are exposed to beryllium. Beryllium sensitization and CBD may develop after an individual breathes beryllium dust or fumes. Not every individual who is exposed to beryllium will experience health effects. Studies have shown that on average, 1-6% of exposed workers develop sensitization, although the rates can be as high as 16% among workers with the highest exposures, such as beryllium machinists. Factors such as particle size, type of beryllium used, amount and duration of exposure to beryllium, occupation, industry, and genetics may all play a role in determining why some people get sick and others do not. Once you are exposed to beryllium, you carry a lifelong risk of developing beryllium sensitization or CBD, even if the exposure amount was small or you are no longer exposed.

How do I know if I have beryllium sensitization or CBD?

Diagnosis of beryllium sensitization and CBD begins with a BeLPT blood test. The BeLPT helps determine if your immune system recognizes beryllium as a foreign invader and responds by building an “army” of cells in the bloodstream that are prepared to react to beryllium. In individuals who do not have beryllium sensitization or CBD, the immune system does not respond to beryllium in any manner. The BeLPT is an important first step in diagnosing the disease, but it cannot determine if you have CBD or simply beryllium sensitization. Additional testing is needed to determine whether or not you have the disease.

CBD Symptoms:
Cough
Shortness of breath
Fever
Fatigue
Night Sweats
Loss of appetite
Skin rash (sometimes)

Individuals with two or more abnormal BeLPT results are encouraged to undergo further evaluation to determine if they have CBD. This evaluation typically includes an appointment with a physician familiar with the health effects of beryllium. Based on the outcomes of these tests, your physician will likely be able to determine if you have CBD.

What is medical surveillance?

Medical surveillance programs for beryllium are designed to identify individuals with beryllium sensitization or CBD, as well as work practices that may cause beryllium sensitization and CBD. Surveillance programs typically have several components, including medical screening tests, exposure assessment, and work task analysis. Data collected during surveillance can help identify rates of sensitization and disease among individuals who perform similar types of work, leading to better exposure controls for all workers.

The Hanford Site has developed a site-wide CBDPP, which was completed May 2009. The Rule was “designed to minimize the exposure and the potential for occupational exposure to beryllium, reduce the number of workers exposed, and establish medical surveillance protocols to ensure early diagnosis of chronic beryllium disease.” (DOE memo, July 1997).

What can I do to prevent beryllium sensitization and CBD?

The Occupational Safety and Health Administration (OSHA) has set the permissible exposure limit (PEL) for beryllium at 2 micrograms per cubic meter in an 8-hour period. This is roughly equivalent to an amount of beryllium dust the size of a pencil tip spread across an area the length of a football field, 8 feet high. This standard has been shown to be inadequate to

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prevent beryllium sensitization and CBD, and many in the beryllium community and at OSHA are currently working to establish a lower limit in the workplace. Because we do not know of a definite “safe” level of exposure below which sensitization and disease do not occur, it is important to limit beryllium exposure to the lowest level possible. In the workplace, you should substitute another product for beryllium if at all possible, avoid dry sweeping of work areas, use proper exhaust ventilation and equipment, minimize the number of individuals who have access to areas where beryllium is used, ensure respirators fit properly and are used appropriately, change clothes before leaving the beryllium area and work facility, and ensure employees receive regular training on the proper handling of beryllium, as well as the hazards of beryllium exposure.

Is medical screening with the BeLPT (blood test) recommended?

The BeLPT is the best test currently available to detect beryllium related health effects. It is more sensitive than medical evaluation, spirometry, chest x-ray and CT scan. Studies have shown the BeLPT identifies 70% to 94% of beryllium sensitization and CBD cases. When used to test exposed individuals in a workforce over a period of time, it has been shown to detect new cases of beryllium sensitization and CBD. It is currently the most sensitive, least invasive, and most cost-effective screening tool for detecting beryllium sensitization among exposed individuals.

Because CBD is generally easiest to treat and control when detected in its early stages, regular medical screening with the BeLPT enables earlier detection, treatment, and outcomes for affected individuals. Individuals with abnormal blood tests have the opportunity to undergo additional clinical evaluation for CBD before symptoms of disease become apparent. Some individuals are diagnosed with beryllium sensitization and can be closely monitored for progression to CBD. Others may be diagnosed with “asymptomatic CBD,” which means that they do not yet have symptoms of the disease, such as respiratory symptoms or gas exchange abnormalities. Although treatment for asymptomatic CBD is not recommended by most physicians, it does permit a doctor to follow a patient more closely and begin treatment promptly should it become necessary.

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How do I get started in the Beryllium Voluntary Program?

If you are a current Hanford employee, just call the CSC HOHS Beryllium Case Management Specialist, at (509) 376-6000 or email [CSC HOHS_Beryllium@rl.gov](mailto:CSC_HOHS_Beryllium@rl.gov).

If you choose to participate in the Beryllium Previous Exposure Medical Program, CSC HOHS will request you to complete the [Hanford Site Beryllium Questionnaire](http://www.hanford.gov/amh/page.cfm/beryllium) for your medical file (<http://www.hanford.gov/amh/page.cfm/beryllium>). You may send it in or wait until your beryllium exam appointment. For further assistance, contact the CSC HOHS Beryllium Case Management Specialist, at (509) 376-6000.

Where can I find more information?

- **Beryllium-Associated Worker Registry Information**
 - <http://www.hanford.gov/amh/page.cfm/BerylliumRegistry>
- **CSC Hanford Occupational Health Services**
 - <http://www.hanford.gov/amh/page.cfm/beryllium>
- **DOE Chronic Beryllium Disease Prevention Program**
 - <http://www.hss.energy.gov/healthsafety/wshp/be/>
- **DOE Former Worker Medical Surveillance Program (includes Beryllium information)**
 - <http://www.hss.energy.gov/HealthSafety/FWSP/FormerWorkerMed/>
- **DOE Worker Health-Related Studies**
 - <http://science.energy.gov/>
- **Hanford Beryllium Evaluated Facilities List**
 - <http://www.hanford.gov/page.cfm/Beryllium>
- **Hanford Beryllium Webpage**
 - <http://www.hanford.gov/page.cfm/Beryllium>
- **Hanford Site Beryllium Health Advocates**
 - <http://www.hanford.gov/page.cfm/BerylliumHealthAdvocates>
- **National Jewish Health–Beryllium Program**
 - <http://www.nationaljewish.org/healthinfo/conditions/beryllium-disease/index.aspx>
- **Oak Ridge Institute for Science and Education, Beryllium Surveillance Program**
 - <http://orise.orau.gov/oews/>
- **U.S. Department of Labor**
 - <http://www.osha.gov/SLTC/beryllium/index.html>

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Other Resources:

<i>Organizations</i>	<i>Office Phone and/or Address</i>
National Supplemental Screening Program	866-812-6703
Energy Employee Compensation Resource Center	303 Bradley Blvd Ste 104 Richland, WA 99352 509-946-3333 888-654-0014
CSC HOHS Beryllium Case Management	1979 Snyder St Ste 150 Richland, WA 99354 509-376-6000
Building Trades National Medical Screening Program	HANFORD OUTREACH OFFICE 3021 W. Clearwater Ave Ste 204 Kennewick, WA 99336 509-783-6830 www.btmed.org
Hanford Beryllium Health Advocate	509-376-7909

CSC Hanford Occupational Health Services - Beryllium Information Booklet

References

1. “Chronic Beryllium Disease: Overview” *National Jewish and Medical Research Center*, <http://www.nationaljewish.org/healthinfo/conditions/beryllium-disease/index.aspx>
2. “Beryllium at Hanford” *DOE Hanford Site*, <http://www.hanford.gov/page.cfm/Beryllium>
3. Department of Energy “Federal Register” Volume 64, No. 235 Rules and Regulations Section 850, Chronic Beryllium Disease Prevention Program, Wednesday, December 8, 1999
4. “Beryllium Program” *CSC Hanford Occupational Health Services*, <http://www.hanford.gov/amh/page.cfm/beryllium>
5. Anderson D.M., Keith J., Novak P.D., Elloitt M.A. (1994). *Dorland’s Medical Dictionary Edition 28*. Philadelphia published in 1994

10 CFR 850, Rules and Regulations

Beryllium Register Vol. 64, No. 235

What Is the DOE Beryllium Registry?

Your health and the health of all workers is a major concern to DOE. There is a need to learn more about chronic beryllium disease and what causes some individuals to react more strongly than others do. A DOE beryllium registry has been established to collect and maintain information on workers who are exposed to beryllium. This registry is a tool that will be used in health studies to better understand the nature of the disease. With it we can measure the burden of health effects related to beryllium exposure. The registry will also be used to evaluate the effectiveness of exposure control programs.

In addition to information about your beryllium-related exposures, the results of beryllium sensitization testing and/or CBD status collected by your employer will be added to the registry. Your employer must treat this information as confidential medical information and can only use or disclose this information in conformance with the Privacy Act of 1974, the Americans with Disabilities Act, and other applicable laws. Your employer will establish a unique identifier for you that will be included in the registry instead of your personal identifying information (such as your name and social security number). The unique identifier will be used to inform your employer of any study results that you and your employer's Site Occupational Medical Director (SOMD) should know about. The SOMD will know to whom the unique identifier refers and will notify you of these results. At no time will your name or other personal identifying information be included in any report. The confidentiality of personal information in DOE records is protected under the Privacy Act of 1974.

List of Subjects in 10 CFR Part 850

Beryllium, Chronic beryllium disease, Hazardous substances, Lung diseases, Occupational safety and health, Reporting and recordkeeping requirements.

Issued in Washington, D.C., on

November 24, 1999.

Bill Richardson,

Secretary of Energy.

For the reason set forth in the preamble, Title 10, Chapter III of the Code of Federal Regulations is amended by adding a new part 850 as set forth below.

PART 850—CHRONIC BERYLLIUM DISEASE PREVENTION PROGRAM

Subpart A—General Provisions

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- 850.37 Training and counseling.
- 850.38 Warning signs and labels.
- 850.39 Recordkeeping and use of information.
- 850.40 Performance feedback.

Appendix A to Part 850—Chronic Beryllium Disease Prevention Program Informed Consent Form.

Authority: 42 U.S.C. 2201(i)(3), (p); 29 U.S.C. 668; E.O. 12196, 3 CFR 1981 comp., p. 145 as amended.

Subpart A—General Provisions

§ 850.1 Scope.

This part establishes a chronic beryllium disease prevention program (CBDPP) that supplements and is integrated into existing worker protection programs that are established for Department of Energy (DOE) employees and DOE contractor employees.

§ 850.2 Applicability.

(a) This part applies to:
(1) DOE offices responsible for operations or activities that involve present or past exposure, or the potential for exposure, to beryllium at DOE facilities;

(2) DOE contractors with operations or activities that involve present or past exposure, or the potential for exposure, to beryllium at DOE facilities; and

(3) Any current DOE employee, DOE contractor employee, or other worker at a DOE facility who is or was exposed or potentially exposed to beryllium at a DOE facility.

(b) This part does not apply to:

- (1) Beryllium articles; and
- (2) DOE laboratory operations that meet the definition of laboratory use of hazardous chemicals in 29 CFR 1910.1450, Occupational Exposure to Hazardous Chemical in Laboratories.

§ 850.3 Definitions.

(a) As used in this part:
Action level means the level of airborne concentration of beryllium established pursuant to section 850.23 of this part that, if met or exceeded, requires the implementation of worker protection provisions specified in that section.

Authorized person means any person required by work duties to be in a regulated area.

Beryllium means elemental beryllium and any insoluble beryllium compound or alloy containing 0.1 percent beryllium or greater that may be released as an airborne particulate.

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 article means 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 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.

Beryllium emergency means any occurrence such as, but not limited to, equipment failure, container rupture, or failure of control equipment or operations that results in an unexpected and significant release of beryllium at a DOE facility.

Beryllium-induced lymphocyte proliferation test (Be-LPT) is an in vitro measure of the beryllium antigen-specific, cell-mediated immune response.

Beryllium worker means a current worker who is regularly employed in a DOE beryllium activity.

Breathing zone is defined as a hemisphere forward of the shoulders, centered on the mouth and nose, with a radius of 6 to 9 inches.

DOE means the U.S. Department of Energy.

DOE contractor means any entity under contract with DOE (or its subcontractor) that has responsibility for performing beryllium activities at DOE facilities.

DOE facility means any facility operated by or for DOE.

Head of DOE Field Element means an individual who is the manager or head of the DOE operations office or field office, or any official to whom the Head of DOE Field Element delegates his or her functions under this part.

High-efficiency particulate air (HEPA) filter means a filter capable of trapping and retaining at least 99.97 percent of 0.3 micrometer monodispersed particles.

Immune response refers to the series of cellular events by which the immune system reacts to challenge by an antigen.

Medical removal protection benefits means the employment rights established by section 850.35 of this part for beryllium-associated workers who voluntarily accept temporary or permanent medical removal from beryllium areas following a recommendation by the Site Occupational Medicine Director.

Operational area means an area where workers are routinely in the presence of beryllium as part of their work activity.

Regulated area means an area demarcated by the responsible employer in which the airborne concentration of beryllium exceeds, or can reasonably be expected to exceed, the action level.

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

Responsible employer means:

(1) For DOE contractor employees, the DOE contractor office that is directly responsible for the safety and health of DOE contractor employees while performing a beryllium activity or other activity at a DOE facility; or

(2) For DOE employees, the DOE office that is directly responsible for the safety and health of DOE Federal employees while performing a beryllium activity or other activity at a DOE facility; and

(3) Any person acting directly or indirectly for such office with respect to terms and conditions of employment of beryllium-associated workers.

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

Unique identifier means the part of a paired

set of labels, used in records that contain confidential information that does not identify individuals except by using the matching label.

Worker means 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.

(b) Terms undefined in this part that are defined in the Atomic Energy Act of 1954 shall have the same meaning as under that Act.

§ 850.4 Enforcement.

DOE may take appropriate steps under its contracts with DOE contractors to ensure compliance with this part. These steps include, but are not limited to, contract termination or reduction in fee.

§ 850.5 Dispute resolution.

(a) Subject to paragraphs (b) and (c) of this section, any worker who is adversely affected by an action taken, or failure to act, under this part may petition the Office of Hearings and Appeals for relief in accordance with 10 CFR part 1003, Subpart G.

(b) The Office of Hearings and Appeals may not accept a petition from a worker unless the worker requested the responsible employer to correct the violation, and the responsible employer refused or failed to take corrective action within a reasonable time.

(c) If the dispute relates to a term or condition of employment that is covered by a grievance-arbitration provision in a collective bargaining agreement, the worker must exhaust all applicable grievance-arbitration procedures before filing a petition for relief with the Office of Hearings and Appeals. A worker is deemed to have exhausted all applicable grievance-arbitration procedures if 150 days have passed since the filing of a grievance and a final decision on it has not been issued.

Subpart

B—Administrative

Requirements

§ 850.10 Development and approval of the CBDPP.

(a) *Preparation and submission of initial CBDPP to DOE.* (1) The responsible employer at a DOE facility must ensure that a CBDPP is prepared for the facility and submitted to the appropriate Head of DOE Field Element before beginning beryllium activities, but no later than April 6, 2000 of this part.

(2) If the CBDPP has separate sections addressing the activities of multiple contractors at the facility, the Head of DOE Field Element will designate a single DOE contractor to review and approve the sections prepared by other contractors, so that a single consolidated CBDPP for the facility is submitted to the Head of DOE Field Element for review and approval.

(b) *DOE review and approval.* The appropriate Head of DOE Field Element must review and approve the CBDPP.

(1) The initial CBDPP and any updates are deemed approved 90 days after submission if they are not specifically approved or rejected by DOE earlier.

(2) The responsible employer must furnish a copy of the approved CBDPP, upon request, to the DOE Assistant Secretary for Environment, Safety and Health or designee, DOE program offices, and affected workers or their designated representatives.

(c) *Update.* The responsible employer must submit an update of the CBDPP to the appropriate Head of DOE Field Element for review and approval whenever a significant change or significant addition to the CBDPP is made or a change in contractors occurs. The Head of DOE Field Element must review the CBDPP at least annually and, if necessary, require the responsible employer to update the CBDPP.

(d) *Labor Organizations.* If a responsible employer employs or supervises beryllium-associated workers who are represented for collective bargaining by a labor organization, the responsible employer must:

(1) Give the labor organization timely notice of the development and implementation of the CBDPP and any

updates thereto; and

(2) Upon timely request, bargain concerning implementation of this part, consistent with the Federal labor laws.

§ 850.11 General CBDPP requirements.

(a) The CBDPP must specify the existing and planned operational tasks that are within the scope of the CBDPP. The CBDPP must augment and, to the extent feasible, be integrated into the existing worker protection programs that cover activities at the facility.

(b) The detail, scope, and content of the CBDPP must be commensurate with the hazard of the activities performed, but in all cases the CBDPP must:

(1) Include formal plans and measures for maintaining exposures to beryllium at or below the permissible exposure level prescribed in § 850.22;

(2) Satisfy each requirement in subpart C of this part;

(3) Contain provisions for:

(i) Minimizing the number of workers exposed and potentially exposed to beryllium;

(ii) Minimizing the number of opportunities for workers to be exposed to beryllium;

(iii) Minimizing the disability and lost work time of workers due to chronic beryllium disease, beryllium sensitization and associated medical care; and

(iv) Setting specific exposure reduction and minimization goals that are appropriate for the beryllium activities covered by the CBDPP to further reduce exposure below the permissible exposure limit prescribed in § 850.22.

§ 850.12 Implementation.

(a) The responsible employer must manage and control beryllium exposures in all DOE beryllium activities consistent with the approved CBDPP.

(b) No person employed by DOE or a DOE contractor may take or cause any action inconsistent with the requirements of:

(1) This part,

(2) An approved CBDPP, and

(3) Any other Federal statute or regulation concerning the exposure of workers to beryllium at DOE facilities.

(c) No task involving potential exposure to airborne beryllium that is outside the scope of the existing CBDPP may be initiated until an

update of the CBDPP is approved by the Head of DOE Field Element, except in an unexpected situation and, then, only upon approval of the Head of DOE Field Element.

(d) Nothing in this part precludes a responsible employer from taking any additional protective action that it determines to be necessary to protect the health and safety of workers.

(e) Nothing in this part affects the responsibilities of DOE officials under the Federal Employee Occupational Safety and Health Program (29 CFR part 1960) and related DOE directives.

§ 850.13 Compliance.

(a) The responsible employer must conduct activities in compliance with its CBDPP.

(b) The responsible employer must achieve compliance with all elements of its CBDPP no later than January 7, 2002.

(c) With respect to a particular beryllium activity, the contractor in charge of the activity is responsible for complying with this part. If no contractor is responsible for a beryllium activity, DOE must ensure implementation of, and compliance with, this part.

Subpart C—Specific Program Requirements

§ 850.20 Baseline beryllium inventory.

(a) The responsible employer must develop a baseline inventory of the locations of beryllium operations and other locations of potential beryllium contamination, and identify the workers exposed or potentially exposed to beryllium at those locations.

(b) In conducting the baseline inventory, the responsible employer must:

(1) Review current and historical records;

(2) Interview workers;

(3) Document the characteristics and locations of beryllium at the facility; and

(4) Conduct air, surface, and bulk sampling.

(c) The responsible employer must ensure that:

(1) The baseline beryllium inventory is managed by a qualified individual (e.g., a certified industrial hygienist); and

(2) The individuals assigned to this task have sufficient knowledge and experience to

perform such activities properly.

§ 850.21 Hazard assessment.

(a) If the baseline inventory establishes the presence of beryllium, the responsible employer must conduct a beryllium hazard assessment that includes an analysis of existing conditions, exposure data, medical surveillance trends, and the exposure potential of planned activities. The exposure determinants, characteristics and exposure potential of activities must be prioritized so that the activities with the greatest risks of exposure are evaluated first.

(b) The responsible employer must ensure that:

(1) The hazard assessment is managed by a qualified individual (e.g., a certified industrial hygienist); and

(2) The individuals assigned to this task have sufficient knowledge and experience to perform such activities properly.

§ 850.22 Permissible exposure limit.

The responsible employer must assure that no worker is exposed to an airborne concentration of beryllium greater than the permissible exposure limit established in 29 CFR 1910.1000, as measured in the worker's breathing zone by personal monitoring, or a more stringent TWA PEL that may be promulgated by the Occupational Safety and Health Administration as a health standard.

§ 850.23 Action level.

(a) The responsible employer must include in its CBDPP an action level that is no greater than $0.2 \mu\text{g}/\text{m}^3$, calculated as an 8-hour TWA exposure, as measured in the worker's breathing zone by personal monitoring.

(b) If an airborne concentration of beryllium is at or above the action level, the responsible employer must implement §§ 850.24(c) (periodic monitoring), 850.25 (exposure reduction and minimization), 850.26 (regulated areas), 850.27 (hygiene facilities and practices), 850.28 (respiratory protection), 850.29 (protective clothing and equipment), and 850.38 (warning signs) of this part.

§ 850.24 Exposure monitoring.

(a) *General.* The responsible employer

must ensure that:

(1) Exposure monitoring is managed by a qualified individual (e.g., a certified industrial hygienist); and

(2) The individuals assigned to this task have sufficient industrial hygiene knowledge and experience to perform such activities properly.

(b) *Initial monitoring.* The responsible employer must perform initial monitoring in areas that may have airborne beryllium, as shown by the baseline inventory and hazard assessment. The responsible employer must apply statistically-based monitoring strategies to obtain a sufficient number of sample results to adequately characterize exposures, before reducing or terminating monitoring.

(1) The responsible employer must determine workers' 8-hour TWA exposure levels by conducting personal breathing zone sampling.

(2) Exposure monitoring results obtained within the 12 months preceding the effective date of this part may be used to satisfy this requirement if the measurements were made as provided in paragraph (b)(1) of this section.

(c) *Periodic exposure monitoring.* The responsible employer must conduct periodic monitoring of workers who work in areas where airborne concentrations of beryllium are at or above the action level. The monitoring must be conducted in a manner and at a frequency necessary to represent workers' exposure, as specified in the CBDPP. This periodic exposure monitoring must be performed at least every 3 months (quarterly).

(d) *Additional exposure monitoring.* The responsible employer must perform additional monitoring if operations, maintenance or procedures change, or when the responsible employer has any reason to suspect such a change has occurred.

(e) *Accuracy of monitoring.* The responsible employer must use 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 action level.

(f) *Analysis.* The responsible employer must have all samples collected to satisfy the monitoring requirements of this part analyzed in a laboratory accredited for metals by the American Industrial Hygiene Association (AIHA) or a laboratory that demonstrates

quality assurance for metals analysis that is equivalent to AIHA accreditation.

(g) *Notification of monitoring results.* (1) The responsible employer must, within 10 working days after receipt of any monitoring results, notify the affected workers of monitoring results in writing. This notification of monitoring results must be:

(i) Made personally to the affected worker; or

(ii) Posted in location(s) that is readily accessible to the affected worker, but in a manner that does not identify the individual to other workers.

(2) If the monitoring results indicate that a worker's exposure is at or above the action level, the responsible employer must include in the notice:

(i) A statement that the action level has been met or exceeded; and

(ii) A description of the corrective action being taken by the responsible employer to reduce the worker's exposure to below the action level, if practicable.

(3) If the monitoring results indicate that worker exposure is at or above the action level, the responsible employer must also notify DOE and the SOMD of these results within 10 working days after receipt.

§850.25 Exposure reduction and minimization.

(a) The responsible employer must ensure that no worker is exposed above the exposure limit prescribed in § 850.22.

(b) The responsible employer must, in addition:

(1) Where exposure levels are at or above the action level, establish a formal exposure reduction and minimization program to reduce exposure levels to below the action level, if practicable. This program must be described in the responsible employer's CBDPP and must include:

(i) Annual goals for exposure reduction and minimization;

(ii) A rationale for and a strategy for meeting the goals;

(iii) Actions that will be taken to achieve the goals; and

(iv) A means of tracking progress towards meeting the goals or demonstrating that the goals have been met.

(2) Where exposure levels are below the

action level, implement actions for reducing and minimizing exposures, if practicable. The responsible employer must include in the CBDPP a description of the steps to be taken for exposure reduction and minimization and a rationale for those steps.

(c) The responsible employer must implement exposure reduction and minimization actions using the conventional hierarchy of industrial hygiene controls (*i.e.*, engineering controls, administrative controls, and personal protective equipment in that order).

§ 850.26 Regulated areas.

(a) If airborne concentrations of beryllium in areas in DOE facilities are measured at or above the action level, the responsible employer must establish regulated areas for those areas.

(b) The responsible employer must demarcate regulated areas from the rest of the workplace in a manner that adequately alerts workers to the boundaries of such areas.

(c) The responsible employer must limit access to regulated areas to authorized persons.

(d) The responsible employer must keep records of all individuals who enter regulated areas. These records must include the name, date, time in and time out, and work activity.

§ 850.27 Hygiene facilities and practices.

(a) *General.* The responsible employer must assure that in areas where workers are exposed to beryllium at or above the action level, without regard to the use of respirators:

(1) Food or beverage and tobacco products are not used;

(2) Cosmetics are not applied, except in change rooms or areas and shower facilities required under paragraphs (b) and (c) of this section; and

(3) Beryllium workers are prevented from exiting areas that contain beryllium with contamination on their bodies or their personal clothing.

(b) *Change rooms or areas.* The responsible employer must provide clean change rooms or areas for beryllium workers who work in regulated areas.

(1) Separate facilities free of beryllium must be provided for beryllium workers to change into, and store, personal clothing, and clean protective clothing and equipment to prevent cross-contamination;

(2) The change rooms or areas that are used to remove beryllium-contaminated clothing and protective equipment must be maintained under negative pressure or located so as to minimize dispersion of beryllium into clean areas; and

(c) *Showers and hand washing facilities.* (1) The responsible employer must provide hand washing and shower facilities for beryllium workers who work in regulated areas.

(2) The responsible employer must assure that beryllium workers who work in regulated areas shower at the end of the work shift.

(d) *Lunchroom facilities.* (1) The responsible employer must provide lunchroom facilities that are readily accessible to beryllium workers, and ensure that tables for eating are free of beryllium, and that no worker in a lunchroom facility is exposed at any time to beryllium at or above the action level.

(2) The responsible employer must assure that beryllium workers do not enter lunchroom facilities with protective work clothing or equipment unless the surface beryllium has been removed from clothing and equipment by HEPA vacuuming or other method that removes beryllium without dispersing it.

(e) The change rooms or areas, shower and hand washing facilities, and lunchroom facilities must comply with 29 CFR 1910.141, Sanitation.

§ 850.28 Respiratory protection.

(a) The responsible employer must establish a respiratory protection program that complies with the respiratory protection program requirements of 29 CFR 1910.134, Respiratory Protection.

(b) The responsible employer must provide respirators to, and ensure that they are used by, all workers who:

(1) Are exposed to an airborne concentration of beryllium at or above the action level, or

(2) Are performing tasks for which analyses indicate the potential for exposures at or above the action level.

(c) The responsible employer must include

in the respiratory protection program any beryllium-associated worker who requests to use a respirator for protection against airborne beryllium, regardless of measured exposure levels.

(d) The responsible employer must select for use by workers:

(1) Respirators approved by the National Institute for Occupational Safety and Health (NIOSH) if NIOSH-approved respirators exist for a specific DOE task; or

(2) Respirators that DOE has accepted under the DOE Respiratory Protection Acceptance Program if NIOSH-approved respirators do not exist for specific DOE tasks.

§ 850.29 Protective clothing and equipment.

(a) The responsible employer must provide protective clothing and equipment to beryllium workers and ensure its appropriate use and maintenance, where dispersible forms of beryllium may contact worker's skin, enter openings in workers' skin, or contact workers' eyes, including where:

(1) Exposure monitoring has established that airborne concentrations of beryllium are at or above the action level;

(2) Surface contamination levels measured or presumed prior to initiating work are above the level prescribed in § 850.30;

(3) Surface contamination levels results obtained to confirm housekeeping efforts are above the level prescribed in § 850.30; and

(4) Any beryllium-associated worker who requests the use of protective clothing and equipment for protection against airborne beryllium, regardless of measured exposure levels.

(b) The responsible employer must comply with 29 CFR 1910.132, Personal Protective Equipment General Requirements, when workers use personal protective clothing and equipment.

(c) The responsible employer must establish procedures for donning, doffing, handling, and storing protective clothing and equipment that:

(1) Prevent beryllium workers from exiting areas that contain beryllium with

contamination on their bodies or their personal clothing; and

(2) Include beryllium workers exchanging their personal clothing for full-body protective clothing and footwear before they begin work in regulated areas.

(d) The responsible employer must ensure that no worker removes beryllium-contaminated protective clothing and equipment from areas that contain beryllium, except for workers authorized to launder, clean, maintain, or dispose of the clothing and equipment.

(e) The responsible employer must prohibit the removal of beryllium from protective clothing and equipment by blowing, shaking, or other means that may disperse beryllium into the air.

(f) The responsible employer must ensure that protective clothing and equipment is cleaned, laundered, repaired, or replaced as needed to maintain effectiveness. The responsible employer must:

(1) Ensure that beryllium-contaminated protective clothing and equipment, when removed for laundering, cleaning, maintenance, or disposal, is placed in containers that prevent the dispersion of beryllium dust and that are labeled in accordance with § 850.38 of this part; and

(2) Inform organizations that launder or clean DOE beryllium-contaminated protective clothing or equipment that exposure to beryllium is potentially harmful, and that clothing and equipment should be laundered or cleaned in a manner prescribed by the responsible employer to prevent the release of airborne beryllium.

§ 850.30 Housekeeping.

(a) Where beryllium is present in operational areas of DOE facilities, the responsible employer must conduct routine surface sampling to determine housekeeping conditions. Surfaces contaminated with beryllium dusts and waste must not exceed a removable contamination level of 3 µg/100 cm² during non-operational periods. This sampling would not include the interior of installed closed systems such as enclosures, glove boxes, chambers, or ventilation systems.

(b) When cleaning floors and surfaces in areas where beryllium is present at DOE

facilities, the responsible employer must clean beryllium-contaminated floors and surfaces using a wet method, vacuuming or other cleaning methods, such as sticky tack cloths, that avoid the production of airborne dust. Compressed air or dry methods must not be used for such cleaning.

(c) The responsible employer must equip the portable or mobile vacuum units that are used to clean beryllium-contaminated areas with HEPA filters, and change the filters as often as needed to maintain their capture efficiency.

(d) The responsible employer must ensure that the cleaning equipment that is used to clean beryllium-contaminated surfaces is labeled, controlled, and not used for non-hazardous materials.

§ 850.31 Release criteria.

(a) The responsible employer must clean beryllium-contaminated equipment and other items to the lowest contamination level practicable, but not to exceed the levels established in paragraphs (b) and (c) of this section, and label the equipment or other items, before releasing them to the general public or a DOE facility for non-beryllium use, or to another facility for work involving beryllium.

(b) Before releasing beryllium-contaminated equipment or other items to the general public or for use in a non-beryllium area of a DOE facility, the responsible employer must ensure that:

(1) The removable contamination level of equipment or item surfaces does not exceed the higher of 0.2 µg/100 cm² or the concentration level of beryllium in soil at the point or release, whichever is greater;

(2) The equipment or item is labeled in accordance with § 850.38(b); and

(3) The release is conditioned on the recipient's commitment to implement controls that will prevent foreseeable beryllium exposure, considering the nature of the equipment or item and its future use and the nature of the beryllium contamination.

(c) Before releasing beryllium-contaminated equipment or other items to another facility performing work with beryllium, the responsible employer must ensure that:

(1) The removable contamination level of equipment or item surfaces does not exceed 3

µg/100 cm²;

(2) The equipment or item is labeled in accordance with § 850.38(b); and

(3) 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.

§ 850.32 Waste disposal.

(a) The responsible employer must control the generation of beryllium-containing waste, and beryllium-contaminated equipment and other items that are disposed of as waste, through the application of waste minimization principles.

(b) Beryllium-containing waste, and beryllium-contaminated equipment and other items that are disposed of as waste, must be disposed of in sealed, impermeable bags, containers, or enclosures to prevent the release of beryllium dust during handling and transportation. The bags, containers, and enclosures that are used for disposal of beryllium waste must be labeled according to § 850.38.

§ 850.33 Beryllium emergencies.

(a) The responsible employer must comply with 29 CFR 1910.120(l) for handling beryllium emergencies related to decontamination and decommissioning operations.

(b) The responsible employer must comply with 29 CFR 1910.120(q) for handling beryllium emergencies related to all other operations.

§ 850.34 Medical surveillance.

(a) *General.* (1) The responsible employer must establish and implement a medical surveillance program for beryllium-associated workers who voluntarily participate in the program.

(2) The responsible employer must designate a Site Occupational Medical Director (SOMD) who is responsible for administering the medical surveillance program.

(3) The responsible employer must ensure that the medical evaluations and procedures required by this section are performed by, or under the supervision of, a licensed

physician who is familiar with the health effects of beryllium.

(4) The responsible employer must establish, and maintain, a list of beryllium-associated workers who may be eligible for protective measures under this part. The list must be:

(i) Based on the hazard assessment, exposure records, and other information regarding the identity of beryllium-associated workers; and

(ii) Adjusted at regular intervals based on periodic evaluations of beryllium-associated workers performed under paragraph (b)(2) of this section;

(5) The responsible employer must provide the SOMD with the information needed to operate and administer the medical surveillance program, including the:

(i) List of beryllium-associated workers required by paragraph (a)(4) of this section;

(ii) Baseline inventory;

(iii) Hazard assessment and exposure monitoring data;

(iv) Identity and nature of activities or operations on the site that are covered under the CBDPP, related duties of beryllium-associated workers; and

(v) Type of personal protective equipment used.

(6) The responsible employer must provide the following information to the SOMD and the examining physician:

(i) A copy of this rule and its preamble;

(ii) A description of the worker's duties as they pertain to beryllium exposure;

(iii) Records of the worker's beryllium exposure; and

(iv) A description of the personal protective and respiratory protective equipment used by the worker in the past, present, or anticipated future use.

(b) *Medical evaluations and procedures.* The responsible employer must provide, to beryllium-associated workers who voluntarily participate in the medical surveillance program, the medical evaluations and procedures required by this section at no cost and at a time and place that is reasonable and convenient to the worker.

(1) *Baseline medical evaluation.* The responsible employer must provide a baseline medical evaluation to beryllium-

associated workers. This evaluation must include:

(i) A detailed medical and work history with emphasis on past, present, and anticipated future exposure to beryllium;

(ii) A respiratory symptoms questionnaire;

(iii) A physical examination with special emphasis on the respiratory system, skin and eyes;

(iv) A chest radiograph (posterior-anterior, 14 x 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);

(v) Spirometry consisting of forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV1);

(vi) A Be-LPT; and

(vii) Any other tests deemed appropriate by the examining physician for evaluating beryllium-related health effects.

(2) *Periodic evaluation.* (i) The responsible employer must provide to beryllium workers a medical evaluation annually, and to other beryllium-associated workers a medical evaluation every three years. The periodic medical evaluation must include:

(A) A detailed medical and work history with emphasis on past, present, and anticipated future exposure to beryllium;

(B) A respiratory symptoms questionnaire;

(C) A physical examination with emphasis on the respiratory system;

(D) A Be-LPT; and

(E) Any other medical evaluations deemed appropriate by the examining physician for evaluating beryllium-related health effects.

(ii) The responsible employer must provide to beryllium-associated workers a chest radiograph every five years.

(3) *Emergency evaluation.* The responsible employer must provide a medical evaluation as soon as possible to any worker who may have been exposed to beryllium because of a beryllium emergency. The medical evaluation must include the requirements of paragraph (b)(2) of this section.

(c) *Multiple physician review.* The responsible employer must establish a multiple physician review process for beryllium-associated workers that allows for the review of initial medical findings, determinations, or recommendations from any medical evaluation

conducted pursuant to paragraph (b) of this section.

(1) If the responsible employer selects the initial physician to conduct any medical examination or consultation provided to a beryllium-associated worker, the worker may designate a second physician to:

(i) Review any findings, determinations, or recommendations of the initial physician; and

(ii) Conduct such examinations, consultations and laboratory tests, as the second physician deems necessary to facilitate this review.

(2) The responsible employer must promptly notify a beryllium-associated worker in writing of the right to seek a second medical opinion after the initial physician provided by the responsible employer conducts a medical examination or consultation.

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

(i) Informing the responsible employer in writing that he or she intends to seek a second medical opinion; and

(ii) Initiating steps to make an appointment with a second physician.

(4) If the findings, determinations, or recommendations of the second physician differ from those of the initial physician, then the responsible employer and the beryllium-associated worker must make efforts to encourage and assist the two physicians to resolve any disagreement.

(5) If, despite the efforts of the responsible employer and the beryllium-associated worker, the two physicians are unable to resolve their disagreement, then the responsible employer and the worker, through their respective physicians, must designate a third physician to:

(i) Review any findings, determinations, or recommendations of the other two physicians; and

(ii) 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.

(6) The SOMD must act consistently with the findings, determinations, and recommendations of the third physician, unless the SOMD and the beryllium-associated worker reach an agreement that is consistent with the recommendations of at least one of the other two physicians.

(d) *Alternate physician determination.* The responsible employer and the beryllium-associated worker or the worker's designated representative may agree upon the use of any alternate form of physician determination in lieu of the multiple physician review process provided by paragraph (c) of this section, so long as the alternative is expeditious and at least as protective of the worker.

(e) *Written medical opinion and recommendation.* (1) Within two weeks of receipt of results, the SOMD must provide to the responsible 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. The SOMD's opinion must contain:

(i) The diagnosis of the worker's condition relevant to occupational exposure to beryllium, and any other medical condition that would place the worker at increased risk of material impairment to health from further exposure to beryllium;

(ii) Any recommendation for removal of the worker from DOE beryllium activities, or limitation on the worker's activities or duties or use of personal protective equipment, such as a respirator; and

(iii) A statement that the SOMD or examining physician has clearly explained to the worker the results of the medical evaluation, including all tests results and any medical condition related to beryllium exposure that requires further evaluation or treatment.

(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.

(f) *Information provided to the beryllium-associated worker.* (1) The SOMD must provide each beryllium-associated worker with a written medical opinion containing the results of all medical tests or procedures, an explanation of any abnormal findings, and any recommendation that the worker be referred for additional testing for evidence of CBD, within 10 working days after the SOMD's receipt of the results of the medical tests or procedures.

(2) The responsible employer must, within 30 days after a request by a beryllium-associated worker, provide the worker with the information the responsible employer is required to provide the examining physician under paragraph (a)(6) of this section.

(g) *Reporting.* The responsible employer must report on the applicable OSHA reporting form beryllium sensitization, CBD, or any other abnormal condition or disorder of workers caused or aggravated by occupational exposure to beryllium.

(h) *Data analysis.* (1) The responsible employer must routinely and systematically analyze medical, job, and exposure data with the aim of identifying individuals or groups of individuals potentially at risk for CBD and working conditions that are contributing to that risk.

(2) The responsible employer must use the results of these analyses to identify additional workers to whom the responsible employer must provide medical surveillance and to determine the need for additional exposure controls.

§ 850.35 Medical removal.

(a) *Medical removal protection.* The responsible employer must offer a beryllium-associated worker 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 one or more positive Be-LPT 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.

(1) *Temporary removal pending final medical determination.* The responsible employer must offer a beryllium-associated

worker temporary medical removal from exposure to beryllium on each occasion that the SOMD determines in a written medical opinion that the worker should be temporarily removed from such exposure pending a final medical determination of whether the worker should be removed permanently.

(i) In this section, "final medical determination" means the outcome of the multiple physician review process or the alternate medical determination process provided for in paragraphs (c) and (d) of § 850.34.

(ii) If a beryllium-associated worker is temporarily removed from beryllium exposure pursuant to this section, the responsible employer must transfer the worker to a comparable job for which the worker is qualified (or for which the worker can be trained in a short period) and where beryllium exposures are as low as possible, but in no event at or above the action level.

(iii) The responsible employer must maintain the beryllium-associated worker's total normal earnings, seniority, and other worker rights and benefits as if the worker had not been removed.

(iv) If there is no such job available, the responsible employer must provide to the beryllium-associated worker the medical removal protection benefits specified in paragraph (b)(2) of this section, until a job becomes available or for one year, whichever comes first.

(2) *Permanent medical removal.* (i) The responsible employer must offer a beryllium-associated worker permanent medical removal from exposure to beryllium if the SOMD determines in a written medical opinion that the worker should be permanently removed from exposure to beryllium.

(ii) If a beryllium-associated worker is removed permanently from beryllium exposure based on the SOMD's recommendation pursuant to this section, the responsible employer must provide the worker the medical removal protection benefits specified in paragraph (b) of this section.

(3) *Worker consultation before temporary or permanent medical removal.* If the SOMD determines that a beryllium-

associated worker should be temporarily or permanently removed from exposure to beryllium, the SOMD must:

(i) Advise the beryllium-associated worker of the determination that medical removal is necessary to protect the worker's health;

(ii) Provide the beryllium-associated worker with a copy of this rule and its preamble, and any other information the SOMD deems necessary on the risks of continued exposure to beryllium and the benefits of removal;

(iii) Provide the beryllium-associated worker the opportunity to have any questions concerning medical removal answered; and

(iv) Obtain the beryllium-associated worker's signature acknowledging that the worker has been advised to accept medical removal from beryllium exposure as provided in this section, and has been provided with the information specified in this paragraph, on the benefits of removal and the risks of continued exposure to beryllium.

(4) Return to work after medical removal.

(i) The responsible employer, subject to paragraph (a)(4)(ii) of this section, must not return a beryllium-associated worker who has been permanently removed under this section to the worker's former job status unless the SOMD first determines in a written medical opinion that continued medical removal is no longer necessary to protect the worker's health.

(ii) Notwithstanding paragraph (a)(4) (i) of this section, if, in the SOMD's opinion, continued exposure to beryllium will not pose an increased risk to the beryllium-associated worker's health, and medical removal is an inappropriate remedy in the circumstances, the SOMD must fully discuss these matters with the worker and then, in a written determination, may authorize the responsible employer to return the worker to his or her former job status. Thereafter, the returned beryllium-associated worker must continue to be provided with medical surveillance under § 850.34 of this part.

(b) Medical removal protection benefits.

(1) If a beryllium-associated worker has been permanently removed from beryllium exposure pursuant to paragraph (a)(2) of this

section, the responsible employer must provide the beryllium-associated worker:

(i) The opportunity to transfer to another position which is available, or later becomes available, for which the beryllium-associated worker is qualified (or for which the worker can be trained in a short period) and where beryllium exposures are as low as possible, but in no event at or above the action level; or

(ii) If the beryllium-associated worker cannot be transferred to a comparable job where beryllium exposures are below the action level, a maximum of 2 years of permanent medical removal protection benefits (specified in paragraph (b)(2) of this section).

(2) If required by this section to provide medical removal protection benefits, the responsible employer must maintain the removed worker's total normal earnings, seniority and other worker rights and benefits, as though the worker had not been removed.

(3) If a removed beryllium-associated worker files a claim for workers' compensation payments for a beryllium-related disability, then the responsible employer must continue to provide medical removal protection benefits pending disposition of the claim. The responsible employer must receive no credit for the workers' compensation payments received by the worker for treatment related expenses.

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

(5) For the purposes of this section, the requirement that a responsible employer provide medical removal protection benefits 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.

(6) The responsible employer may condition the provision of medical removal protection benefits upon the beryllium-associated worker's participation in medical surveillance provided in accordance with § 850.34 of this part.

§ 850.36 Medical consent.

(a) The responsible employer must provide each beryllium-associated worker with a summary of the medical surveillance program established in § 850.34 at least one week before the first medical evaluation or procedure or at any time requested by the worker. This summary must include:

(1) The type of data that will be collected in the medical surveillance program;

(2) How the data will be collected and maintained;

(3) The purpose for which the data will be used; and

(4) A description of how confidential data will be protected.

(b) Responsible employers must also provide each beryllium-associated worker with information on the benefits and risks of the medical tests and examinations available to the worker at least one week prior to any such examination or test, and an opportunity to have the worker's questions answered.

(c) The responsible employer must have the SOMD obtain a beryllium-associated worker's signature on the informed consent form found in Appendix A to this part, before performing medical evaluations or any tests.

§ 850.37 Training and counseling.

(a) The responsible employer must develop and implement a beryllium training program and ensure participation for:

(1) Beryllium-associated workers;

(2) All other individuals who work at a site where beryllium activities are conducted.

(b) The training provided for workers identified in paragraph (a)(1) of this section, must:

(1) Be in accordance with 29 CFR 1910.1200, Hazard Communication;

(2) Include the contents of the CBDPP; and

(3) Include 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.

(c) The training provided for workers identified in paragraph (a)(2) of this section

must consist of general awareness about beryllium hazards and controls.

(d) The responsible employer must provide the training required by this section before or at the time of initial assignment and at least every two years thereafter.

(e) The employer must provide retraining when the employer has reason to believe that a beryllium worker lacks the proficiency, knowledge, or understanding needed to work safely with beryllium, including at least the following situations:

(1) To address any new beryllium hazards resulting from a change to operations, procedures, or beryllium controls about which the beryllium worker was not previously trained; and

(2) If a beryllium worker's performance involving beryllium work indicates that the worker has not retained the requisite proficiency.

(f) The responsible employer must develop and implement a counseling program to assist beryllium-associated workers who are diagnosed by the SOMD to be sensitized to beryllium or to have CBD. This counseling program must include communicating with beryllium-associated workers concerning:

(1) The medical surveillance program provisions and procedures;

(2) Medical treatment options;

(3) Medical, psychological, and career counseling;

(4) Medical benefits;

(5) Administrative procedures and workers rights under applicable Workers' Compensation laws and regulations;

(6) Work practice procedures limiting beryllium-associated worker exposure to beryllium; and

(7) The risk of continued beryllium exposure after sensitization.

§ 850.38 Warning signs and labels.

(a) *Warning signs.* The responsible employer must post warning signs at each access point to a regulated area with the following information:

DANGER

BERYLLIUM CAN CAUSE LUNG
DAMAGE

CANCER HAZARD

AUTHORIZED PERSONNEL ONLY

(b) *Warning labels.* (1) The responsible employer must affix warning labels to all containers of beryllium, beryllium compounds, or beryllium-contaminated clothing, equipment, waste, scrap, or debris.

(2) Warning labels must contain the following information:

DANGER

CONTAMINATED WITH BERYLLIUM

DO NOT REMOVE DUST BY BLOWING

OR SHAKING

CANCER AND LUNG DISEASE HAZARD

(c) Warning signs and labels must be in accordance with 29 CFR 1910.1200, Hazard Communication.

§850.39 Recordkeeping and use of information.

(a) The responsible employer must establish and maintain accurate records of all beryllium inventory information, hazard assessments, exposure measurements, exposure controls, and medical surveillance.

(b) Heads of DOE Departmental Elements must:

(1) Designate all record series as required under this rule as agency records and, therefore, subject to all applicable agency records management and access laws; and

(2) Ensure that these record series are retained for a minimum of seventy-five years.

(c) The responsible employer must convey to DOE or its designee all record series required under this rule if the employer ceases to be involved in the CBDPP.

(d) The responsible employer must link data on workplace conditions and health outcomes in order to establish a basis for understanding the beryllium health risk.

(e) The responsible employer must ensure the confidentiality of all work-related records generated under this rule by ensuring that:

(1) All records that are transmitted to other parties do not contain names, social security numbers or any other variables, or combination of variables, that could be used to identify particular individuals; and

(2) Individual medical information generated by the CBDPP is:

(i) Either included as part of the worker's site medical records and maintained by the SOMD, or is maintained by another physician designated by the responsible employer;

(ii) Maintained separately from other records; and

(iii) Used or disclosed by the responsible employer only in conformance with any applicable requirements imposed by the Americans with Disabilities Act, the Privacy Act of 1974, the Freedom of Information Act, and any other applicable law.

(f) The responsible employer must maintain all records required by this part in current and accessible electronic systems, which include the ability readily to retrieve data in a format that maintains confidentiality.

(g) The responsible employer must transmit all records generated as required by this rule, in a format that protects the confidentiality of individuals, to the DOE Assistant Secretary for Environment, Safety and Health on request.

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

§ 850.40 Performance feedback.

(a) The responsible employer must conduct periodic analyses and assessments of monitoring activities, hazards, medical surveillance, exposure reduction and minimization, and occurrence reporting data.

(b) To ensure that information is available to maintain and improve all elements of the CBDPP continuously, the responsible employer must give results of periodic analyses and assessments to the line managers, planners, worker protection staff, workers, medical staff, and labor organizations representing beryllium-associated workers who request such information.

Appendix A to Part 850—Chronic Beryllium Disease Prevention Program Informed Consent Form

I, _____ have carefully read and understand the attached information about

the Be-LPT and other medical tests. I have had the opportunity to ask any questions that I may have had concerning these tests.

I understand that this program is voluntary and I am free to withdraw at any time from all or any part of the medical surveillance program. I understand that the tests are confidential, but not anonymous. I understand that if the results of any test suggest a health problem, the examining physician will discuss the matter with me, whether or not the result is related to my work with beryllium. I understand that my employer will be notified of my diagnosis only if I have a beryllium sensitization or chronic beryllium disease. My employer will not receive the results or diagnoses of any health conditions not related to beryllium exposure.

I understand that, if the results of one or more of these tests indicate that I have a health problem that is related to beryllium, additional examinations will be recommended. If additional tests indicate I do have a beryllium sensitization or CBD, the Site Occupational Medical Director may recommend that I be removed from working with beryllium. If I agree to be removed, I understand that I may be transferred to another job for which I am qualified (or can be trained for in a short period) and where my beryllium exposures will be as low as possible, but in no case above the action level. I will maintain my total normal earnings, seniority, and other benefits for up to two years if I agree to be permanently removed.

I understand that if I apply for another job or for insurance, I may be requested to release my medical records to a future employer or an insurance company.

I understand that my employer will maintain all medical information relative to the tests performed on me in segregated medical files separate from my personnel files, treated as confidential medical records, and used or disclosed only as provided by the Americans with Disability Act, the Privacy Act of 1974, or as required by a court order or under other law.

I understand that the results of my medical tests for beryllium will be included in the Beryllium Registry maintained by DOE, and that a unique identifier will be

used to maintain the confidentiality of my medical information. Personal identifiers will not be included in any reports generated from the DOE Beryllium Registry. I understand that the results of my tests and examinations may be published in reports or presented at meetings, but that I will not be identified.

I consent to having the following medical evaluations:

- / / Physical examination concentrating on my lungs and breathing
- / / Chest X-ray
- / / Spirometry (a breathing test)
- / / Blood test called the beryllium-induced lymphocyte proliferation test or Be-LPT
- / / Other test(s). Specify:

Signature of Participant:

Date:

I have explained and discussed any questions that the employee expressed concerning the Be-LPT, physical examination, and other medical testing as well as the implications of those tests. Name of Examining Physician:

Signature of Examining Physician:

Dated:

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Beryllium Information Booklet Revision Log

Date	Changes
March 2010	Eliminated duplication and inconsistencies. Changed phone number from Beryllium Hotline to Beryllium Nurse Case Manager. Removed forms and instructions that were no longer current. Changed references of Beryllium Assigned Worker to Beryllium Worker.
June 2010	Changed one reference to Beryllium Assigned Worker to Beryllium Worker. Added information regarding usage of medications that could affect the BeLPT.
June 2011	Changed all references to AMH to CSC HOHS and updated the general information that was no longer accurate. Included information regarding clearances, clarification on work restrictions and revised language relating to Multiple Physician Review
July 2011	Made revision under the beryllium voluntary program to clarify eligibility as “any current Hanford worker whose current EJTA does NOT designate him/her as a beryllium worker”
April 2012	Changed all references to Monitoring to Surveillance. Revised language to About Medical Opinions, About the Beryllium Worker Program, About Work Restrictions, and About the Beryllium Voluntary Program to reflect language used in the Beryllium Program Overview to have consistency between documents. Added section Beryllium at Hanford and added the Two-Encounter Examination Process to About the Exam. Web links were updated to ensure they led to the correct webpage. Language was revised throughout the entire document for clarification when needed and grammatical errors were corrected.