



OPERATING EXPERIENCE SUMMARY



U.S. Department of Energy
Office of Health, Safety and Security
OE Summary 2011-07
October 25, 2011

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Evaluation of One DOE Site's Multi-Contractor Chronic Beryllium Disease Prevention Program Yields Lessons Learned – Part 1: The Background

1

The following article is the first of three articles concerning an evaluation of a Department of Energy (DOE) site's development and implementation of a Chronic Beryllium Disease Prevention Program (CBDPP), as required in Title 10 Code of Federal Regulations, Part 850, Chronic Beryllium Disease Prevention Program, issued in 1999. This first article, Part 1, provides the background on the development of the CBDPP. Part 2 will discuss the program's good processes and practices, while Part 3 will discuss the weaknesses and potential improvements.

After reading the article, we encourage you to visit the Operating Experience Summary Blog at <http://oesummary.wordpress.com> and rate the article in terms of value to you and provide a comment on the article and/or identify topics that would be of interest to you for future articles.

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Department of Energy (DOE) contractors are required to develop and implement a Chronic Beryllium Disease Prevention Program (CBDPP) to implement the requirements of the beryllium rule, Title 10 Code of Federal Regulations, Part 850 (10 CFR 850), *Chronic Beryllium Disease Prevention Program*, initially issued in 1999. At one DOE site, stakeholders expressed concerns about the implementation of a recently revised site-wide CBDPP, as well as continuing instances of newly discovered beryllium-affected individuals. These concerns resulted in the DOE Office of Health, Safety and Security (HSS) conducting an inspection of the site-wide CBDPP. The inspection was

completed in June of 2010 and included both CBDPP processes and implementation. The inspection team determined that a single site-wide CBDPP was an effective way to foster consistent program understanding and implementation. The team also identified a number of areas where the program needed strengthening (including formalized contractor implementation plans, DOE oversight and direction, and enhanced communication) that would increase the understanding of risks associated with the inadvertent exposure of workers to beryllium (Be).

The beryllium rule, 10 CFR 850, *Chronic Beryllium Disease Prevention Program*, issued in December 1999, adopted OSHA's Permissible Exposure Limit (PEL) and established an action level at one-tenth of OSHA's PEL that triggers certain provisions of the rule. The rule also required DOE contractors to develop a DOE-approved CBDPP and achieve full implementation by January 2002.

Work with beryllium and beryllium-coated articles occurred across the DOE Complex from the 1950s through the 1980s, when the metal was used to fabricate parts for reactors, including fuel rods and other devices. A crystal of refined beryllium is shown in Figure 1-1. Although some DOE sites still periodically work with beryllium metal, the potential for worker exposure at the subject site is primarily associated with legacy contamination from past work or past use of beryllium alloys in equipment or tools. For a variety of reasons, information about the significant health risks and necessary safe work practices has not always been widely available or communicated to workers (e.g., after World War II and during the Cold War, some beryllium operations were classified at DOE sites). Further, because workers familiar with the old processes and potentially contaminated locations have now retired, information gaps can exist with regard to potentially hazardous beryllium contaminated areas. As a result, managers, workers, and environment, safety and health professionals must be vigilant about potential

hazards in all work areas, and worker safety depends on careful job hazard analyses, adequate surveys and postings, and rigorous compliance with hazard controls.



Figure 1-1. This pure broken crystal of refined beryllium ordinarily would be melted down and turned into strong, lightweight parts for missiles and spacecraft

At the evaluated site, most beryllium-containing items had been disposed of, but tools and equipment containing beryllium alloys were still on-site, and legacy beryllium contamination from past tool usage could remain in some facilities, particularly in areas such as fume hoods, welding stations, machine shops, exhaust ducts, and overhead surfaces that are not easily accessible for routine housekeeping. In areas where beryllium work was ongoing, engineering and administrative controls had been effectively applied; however, areas where legacy beryllium contamination might exist are more

difficult to locate and control. Without controls, beryllium particles can be inhaled, causing the body's immune system to react, resulting in an allergic-type response called sensitization. This sensitization may result in Chronic Beryllium Disease (CBD), which can affect lung function. Not everyone exposed to beryllium develops problems. National Jewish Health (NJH) estimates that 40 to 60 percent of workers with beryllium sensitization will develop CBD. However, symptoms may not be immediately apparent because the latency period can extend to more than 30 years.

Beryllium alloys can also be found in non-sparking tools and installed hardware, including older electrical switchgear and overhead crane components, which could pose potential health hazards to workers. These alloys could be released by activities such as cutting, welding, grinding, and friction and by arcing or wear of switchgear contacts. Beryllium contamination can be

DOE'S BERYLLIUM LEGACY

From the 1950s through the 1980s, beryllium was used to fabricate parts for reactors, including fuel rods, and other defense-related applications.

Today, residual beryllium contamination:

- Could be present in facilities' fume hoods, shop equipment, exhaust ducts, and previously inaccessible areas.
- Has been identified in non-sparking tools and installed hardware, including electrical switchgear and overhead crane components.
- Could be released by cutting, welding, grinding, or friction to expose today's workers.

spread to other facilities inadvertently when unmarked or inadequately controlled tools or equipment is moved from one area to another. A well-defined and implemented CBDPP can ensure that appropriate actions are taken to protect current workers. The beryllium rule requires a comprehensive program that includes establishing a baseline beryllium inventory, performing hazard assessments, conducting exposure monitoring, and establishing hazard controls for contaminated and potentially contaminated areas and for work involving potential exposure. The rule also requires medical surveillance and removal from working with beryllium for individuals with identified beryllium sensitivity or disease, training and counseling, recordkeeping, and performance feedback. DOE directives require oversight activities by contractors and DOE to ensure an effective CBDPP is established and implemented.

Not everyone who is exposed to beryllium will experience health effects. According to National Jewish Health (NJH), two to six percent of exposed workers develop sensitivity, although rates can be as high as 20 percent among workers with high exposures, such as beryllium machinists. However, once exposed to beryllium, a person carries a lifelong risk of developing beryllium sensitization, or Chronic Beryllium Disease (CBD). The latency period varies and can exceed 30 years.



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In 1999, the site's contractors developed a CBDPP document and conducted an initial site-wide baseline beryllium inventory to comply with the new beryllium rule. Prior to 2009, beryllium activities at the site were conducted under separate CBDPP documents developed and implemented by the various site operations contractors. The two DOE field elements and various stakeholders recognized that different approaches and protective measures (e.g., postings, training, and work practices) could be a problem at the site, where it is not unusual for employees of one contractor to perform work at facilities managed by another. As a result, a multi-contractor, union, and stakeholder committee was formed to develop a single CBDPP that would apply to all site Environmental Management contractors, with oversight from site DOE subject matter experts. The new site-wide CBDPP document was issued in May 2009. Both the single CBDPP and the formation of a CBDPP Committee were seen as positive steps to move the site toward an effective, standardized program providing appropriate protection of workers; however, the HSS inspection team determined that historical assessments and characterizations had been limited and documentation was incomplete.

The team also identified deficiencies in beryllium inventory and hazard assessments being conducted by site contractors under the new CBDPP. Deficiencies were also identified in training for some individuals and inadequate analysis of medical, job, and exposure data for employees diagnosed as beryllium sensitive or having CBD. In addition, contractors had not ensured that work planning and control processes and implementation were sufficiently protecting beryllium workers, co-located workers, and transient personnel from beryllium health hazards. Finally, DOE direction and oversight of the contractors' implementation of the CBDPP were insufficient and contributed to delays in full implementation. As a result, many opportunities for improvement were identified, and this multi-contractor site's experience in establishing and implementing a compliant and effective CBDPP provides a number of lessons that can benefit other organizations in DOE.

Parts 2 and 3 of this series will outline strengths, weaknesses, and performance issues identified during the Office of Independent Oversight inspection of one site's CBDPP. The complete inspection report can be accessed at http://www.hss.doe.gov/indepoversight/docs/reports/eshevals/2010/2010_Hanford_Beryllium_Reportv3_%28final%29_%28June%202010%29.pdf.

KEYWORDS: Beryllium, Be, Chronic Beryllium Disease, CBD, Chronic Beryllium Disease Prevention Program, CBDPP, 10 CFR 850, beryllium rule, HSS, inspection, National Jewish Health

ISM CORE FUNCTIONS: Define the Scope of Work, Analyze the Hazards, Develop and Implement Hazard Controls, Perform Work within Controls, Provide Feedback and Improvement



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Evaluation of One DOE Site's Multi-Contractor Chronic Beryllium Disease Prevention Program Yields Lessons Learned — Part 2: Good Processes and Practices

2

The following article is the second of three articles concerning an evaluation of a Department of Energy (DOE) site's development and implementation of a Chronic Beryllium Disease Prevention Program (CBDPP), as required in Title 10 Code of Federal Regulations, Part 850, Chronic Beryllium Disease Prevention Program, issued in 1999. The first article, Part 1, provided the background on the development of the CBDPP. This second article, Part 2, discusses the positive attributes identified during the review of the CBDPP and how the program was being implemented at one site. Part 3 will discuss the weaknesses in the CBDPP and implementation deficiencies that were identified, as well as the lessons learned that they can provide.

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In June 2010, stakeholder concerns about the adequacy of implementation of the Chronic Beryllium Disease Prevention Program (CBDPP) at one Department of Energy (DOE) site, as well as recent instances of newly discovered beryllium-affected individuals, resulted in the DOE Office of Health, Safety and Security (HSS) conducting an inspection of the newly developed site-wide CBDPP. Part 1 of this series provided background information about beryllium use, health effects, CBDPP requirements, and

the program. Part 2 discusses the positive attributes identified in this review of a CBDPP and how it was being implemented at one site. Sites developing, revising, or reviewing their CBDPPs should consider the applicability of these effective program elements and practices.

Good Work Practices

Collaborative Site-Wide Approach Facilitates Development and Effective Implementation. When new contracts for managing work activities at the site were made, key stakeholders in the CBDPP (i.e., DOE field elements, the local trade union, beryllium-affected workers, and multiple contractors) determined that a single, site-wide program would provide significant efficiencies and other advantages and initiated development of such a program. In 2007, there were multiple operations contractors on this site, along with two separate DOE site offices, a general services contractor and personnel (e.g., information technology, security, maintenance, and custodians), and subcontractors. Two other key stakeholders that could benefit from a single, integrated CBDPP were the local workers union and a large and active special interest organization called the Beryllium Awareness Group. This group comprised current and former site workers who were either beryllium-sensitized or had been diagnosed with Chronic Beryllium Disease (CBD), as well as their family members and friends. The group met regularly to share information, provide support, and promote more effective implementation of the beryllium rule (Title 10 of the Code of Federal Regulations, or 10 CFR 850) requirements by site organizations. In 2008, a committee was formed to develop the new site-wide CBDPP with representatives from multiple contractors, support from subject matter experts from the two DOE site offices, and input from the Beryllium Awareness Group and labor union representatives. This multi-contractor committee was effective in achieving consensus decisions on program development and maintenance and produced a generally sound



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program document that was compliant with the beryllium rule and was accepted by the contractors and the DOE field elements. This document was issued and became effective in May 2009.

Written Beryllium Work Permit Can Provide Effective Communication of Hazards and Controls. The new CBDPP included a formal permit for performing beryllium work that provided an effective, practical mechanism for work planners and supervisors to detail the specific controls and work practices required for any given set of circumstances for work in beryllium-controlled or -regulated areas. The beryllium work permit, developed during the job hazard analysis process, is reviewed and signed by supervision and Industrial Hygiene staff. The permit tells workers the beryllium hazards associated with the work; required posting and labeling; required personal protective equipment, training, and other entry requirements; specific sampling requirements; decontamination processes; level of Industrial Hygiene support required; and any other specific work practices or information needed to protect the workers and minimize the spread of contamination (e.g., ventilation, fixative, containment, and waste management). The requirements on this permit are developed in coordination with other safety and health requirements (e.g., asbestos or radiological controls and permits) to ensure proper worker protection and awareness for each hazard. Permit development must also consider and ensure coordinated controls for nearby work activities and ensure protection of co-located workers. The permit must keep up with changing requirements or conditions and must be discussed with workers at pre-job briefings and after any revisions to the permit.

Strong Training Program for Beryllium Workers. Contractors, the labor union, the Beryllium Awareness Group, and a local technical training organization worked together to develop and update a site-wide training course for beryllium workers. The course provided workers with basic knowledge of beryllium hazards and health effects, methods of controlling hazards, program requirements, and worker rights. The training included

practical exercises pertinent to beryllium workers, such as performing the work planning activities to develop a beryllium work permit for hypothetical beryllium tasks. This training course was found to be comprehensive and well presented by knowledgeable, experienced training staff, which resulted in a common understanding of CBDPP requirements and processes and appropriate implementation techniques for all beryllium workers onsite.

Multiple Sources for Beryllium Information and Support. Although communication between site line management and the workforce (including former workers) had been a longstanding challenge at this site and had contributed to trust issues, several organizations provided site management, workers, and beryllium-affected workers with information and support. Figure 2-1 shows a poster for an informational presentation that was designed to help workers protect their health in the workplace. The worker trade union safety representatives had gained the trust of both workers and management and were engaged in facilitating effective communication of concerns, responses, and resolution of problems. The Beryllium Awareness Group and the local union met and communicated routinely with workers and management and provided vehicles for monitoring implementation of the CBDPP and communicating concerns to DOE and the CBDPP committee. Affected workers also had access to information from the medical services contractor, nationally known beryllium experts from National Jewish Health (NJH), and websites maintained by contractors and HSS. Monitoring, nurturing, and promoting these types of information and support services by line management can ensure that workers, former workers, and the public can have access to accurate, up-to-date, reliable information about all aspects of exposure to beryllium in the workplace. These organizations and information sources serve as forums for identifying and resolving problems and concerns, fostering continuous improvement of a site CBDPP, and protecting workers and former workers.

Beryllium Disease:

Increasing Awareness/Protecting Worker Health



Exposure to beryllium dust from past processes and clean-up activities at the site can sensitize some individuals and cause a chronic, and sometimes progressively worsening, lung disease. This presentation explores how improvements in prevention, surveillance, work modification and communication can protect worker health.

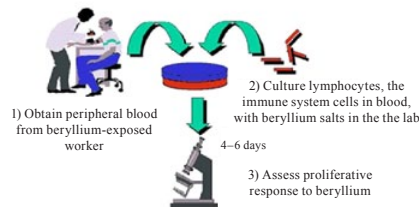


Figure 2-1. Poster for a presentation providing workers with information on Chronic Beryllium Disease

Part 3 of this series will discuss some of the process and performance weaknesses identified during the HSS inspection and associated lessons learned that may assist other DOE sites in developing, reviewing, or revising a CBDPP. The 2010 HSS inspection report can be accessed at http://www.hss.doe.gov/indepoversight/docs/reports/eshevals/2010/2010_Hanford_Beryllium_Reportv3_%28final%29_%28June%202010%29.pdf.

KEYWORDS: Beryllium, Be, Chronic Beryllium Disease, CBD, Chronic Beryllium Disease Prevention Program, CBDPP, 10 CFR 850, beryllium rule, HSS, inspection, National Jewish Health

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Evaluation of One DOE Site's Multi-Contractor Chronic Beryllium Disease Prevention Program Yields Lessons Learned – Part 3: Weaknesses and Potential Improvements

3

The following article is the third of three articles concerning an evaluation of a Department of Energy (DOE) site's development and implementation of a Chronic Beryllium Disease Prevention Program (CBDPP), as required in Title 10 Code of Federal Regulations, Part 850, Chronic Beryllium Disease Prevention Program, issued in 1999. The first article, Part 1, provided the background on the development of the CBDPP. The second article, Part 2, discussed the positive attributes identified during the review of the CBDPP and how the program was being implemented at one site. This article, Part 3, discusses the weaknesses in the CBDPP at one site and the implementation deficiencies that were identified, as well as the lessons learned that they can provide.

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In March and April 2010, the Department of Energy (DOE), Office of Health, Safety and Security (HSS), conducted an inspection of a multi-contractor DOE site contractor's Chronic Beryllium Disease Prevention Program (CBDPP). The results of this inspection included a number of positive attributes and process and performance issues that can provide lessons learned for other DOE sites to consider as they develop, revise, or review

a CBDPP. Parts 1 and 2 of this series provided background information on beryllium, its health effects, the requirements for a CBDPP, and possible lessons learned from the positive attributes of the program reviewed by HSS. Part 3 discusses some of the weaknesses in the CBDPP and implementation deficiencies that were identified during the inspection, as well as the lessons learned they can provide.

Lessons from CBDPP Weaknesses and Performance Deficiencies

Use an appropriate project management approach to ensure timely and effective CBDPP implementation. Contractors developing or making substantial revisions to a program as challenging as the CBDPP should take advantage of proven project management techniques. Mechanisms such as requiring formal gap analyses between existing conditions, practices, and procedures and new program requirements and developing and maintaining formal implementation plans with specific tasks and milestone dates can provide implementers with a better understanding of the scope of needed actions and a defined, management-monitored plan to achieve implementation. At the evaluated site, only one contractor had performed a formal gap analysis. Formal implementation plans had not been directed or promoted by DOE, and none of the contractors developed one. Further, the contractor CBDPP committee did not effectively exercise its responsibility to provide direction for implementation of the CBDPP, instead providing minimal guidance or expectations in support of effective implementation. As a result, many of the CBDPP elements were not fully or effectively implemented, including making needed revisions to the work control processes to incorporate new beryllium signage, postings (such as those shown in Figure 3-1), and use of a beryllium work control permit; assessing the application of the CBDPP to the site's two analytical and production laboratories; and implementing specific requirements of the CBDPP, such as each contractor's roles and responsibilities when counseling beryllium-affected workers.



Figure 3-1. Postings such as these from DOE sites warn workers of potential beryllium dangers

Ensure accurate, up-to-date baseline inventories and hazard assessments. An essential element to establishing an effective CBDPP is a comprehensive, accurate understanding of where beryllium hazards exist and the significance of those hazards. The CBDPP and implementing procedures must contain sufficiently specific requirements to identify potential sources of beryllium contamination, taking advantage of individuals (including past employees) with corporate knowledge of facilities and past work activities and thorough research of all available historical work and survey records. Formal processes must be established for long-term maintenance of these records of beryllium inventory and hazard analysis information for possible future use. At the evaluated site, available historical beryllium use records were not used for the re-baseline efforts, the initial baseline inventory records had been poorly maintained, and information from prior employees and individuals with diagnosed Chronic Beryllium Disease (CBD) was not consistently sought out. These were all factors that hindered efficient and effective inventory and characterization.

Further, contractors must develop thorough procedures, instructions, or plans on how to conduct and document facility beryllium assessments and characterization. Facility characterization forms need to clearly identify the specific information and level of detail to be recorded and include fields for names and signatures

of the personnel who prepare, complete, review, and approve the data sheets. These inventory and characterization records must provide sufficient detail to justify conclusions as to facility status and needed actions. Building walkdowns should be an integral part of the characterization process to supplement document reviews and personnel interviews. For sites where characterization has been completed, controls must be in place to ensure that, if conditions are subjected to changes that could affect the existing characterization (e.g., major relocation of equipment, remodeling, work in areas not previously fully accessible for characterization, and demolition), additional surveys and hazard analyses are performed to comply with beryllium rule requirements and protect workers.

Establish effective communication of worker rights, program requirements, and processes. The subjects of health hazards, treatment, protection, and beryllium-rule-specified worker rights and requirements are complicated. As a result, discussions about these topics can generate a variety of reactions from workers, including fear, anxiety, anger, and confusion. In addition to establishing a comprehensive, rigorous training program for designated beryllium workers, sufficient training must be provided to the many support personnel who may have an interface with elements of the CBDPP. Managers, supervisors, work planners, safety and health personnel, human resources staff, co-located workers, and other stakeholders who have any responsibilities for or could be affected by the CBDPP need to be identified and provided with training tailored to their specific situations. At the site reviewed by HSS, beryllium-affected workers; general workers; managers; environment, safety, and health professionals; and support staff often had different and sometimes conflicting views of beryllium regulations, beryllium issues, and individual beryllium-related concerns. Some employees indicated that they had never heard of beryllium, even after taking mandatory General Employee Training that included a discussion of potential beryllium hazards. Finally, although



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information concerning beryllium may be available in many forms, including the internet, handouts, policies, and training classes, workers and stakeholders may still not be getting the information they need. Management needs to be vigilant to identify indications (including incidents and events) that personnel do not understand beryllium hazards and controls, cannot find the information they need, or are not having their questions answered and take prompt actions to evaluate and strengthen training and communication mechanisms.

Ensure that work planning and control processes and their implementation effectively address beryllium hazards. The beryllium rule requires that work planning and control processes, and their implementation in beryllium-controlled facilities and areas, must be sufficient to fully ensure protection of workers, co-located employees, and transient personnel. At the evaluated site, each contractor had a unique work control process, which resulted in inconsistencies and gaps with respect to implementation of the site-wide CBDPP. In addition, work planning and control for some beryllium work was poorly implemented and thus presented risks to workers. Further, contractual interfaces were not sufficiently defined to address the responsibilities and processes for work planning and control for beryllium activities performed in facilities controlled by other contractors. In some cases, the CBDPP and hazard analysis procedures did not adequately address beryllium hazards or controls. For example, the CBDPP called for sampling *before* work activities that could generate dust (e.g., deep cleaning, installing or removing utilities, maintenance, and remodeling) to determine whether beryllium was present, but it did not require sampling afterwards. A common challenge at most DOE sites is maintaining work control documents and processes current, given frequent changes in facility characterization and CBDPP revisions. Contractor work control procedures must incorporate the most recent requirements in the CBDPP. Web-based beryllium information, such as beryllium building classifications, worker training requirements, and beryl-

lium information in job hazards analysis tools used by planners, must be maintained accurately and current. For example, although some facility assessments for the evaluated site classified buildings as *clean, but requiring additional sampling of some areas and equipment*, work packages for the maintenance activities on those specified areas and equipment did not contain additional sampling requirements.

Pre-job briefings should provide a mechanism for reviewing the controls identified in the work package or in beryllium work permits, if used. Also personal protective equipment usage in the field should be consistent with requirements specified in hazard analysis documents and work permits. Work packages and permits for beryllium work must be sufficiently detailed and task-specific to adequately identify job-specific requirements such as Industrial Hygiene sampling requirements, specific ventilation controls, or steps to follow if an off-normal event occurs. Beryllium postings in buildings must be current and consistent with the requirements of the CBDPP to adequately protect workers, co-located employees, and transient personnel. (Figure 3-2 shows a beryllium posting at a DOE site.) In addition, boxes containing beryllium-contaminated equipment and beryllium waste containers should be labeled in accordance with the most recent CBDPP requirements. DOE sites with legacy beryllium contamination are constantly challenged to develop mechanisms to control or prevent the potential spread of beryllium contamination. For example, the use of ropes to demarcate beryllium contamination areas in open areas is not as effective in minimizing the spread of beryllium contamination as the use of critical barriers such as plastic sheeting or walls.

DOE and contractor management provide rigorous, continuous, unambiguous leadership and oversight. Even when a sound CBDPP has been developed, there is a need for leadership and guidance from DOE and contractor management to ensure that program implementation remains on the right track to fully comply in a timely manner. DOE field elements need to be proactive and

formal in directing and guiding contractor efforts and in holding contractors accountable for comprehensive, timely, and prioritized implementing actions. DOE field elements must provide clear direction regarding expectations, provide focused oversight during rollout activities, and continuously monitor implementation. If contractor implementation issues are identified, the causes of problems or delays need to be promptly identified and addressed. DOE and contractor assessment, issues management, and application of lessons learned must be rigorous and effective to ensure that CBDPP processes, as implemented, provide protection for workers from beryllium hazards as required.

Ensure that medical providers responsible for administering the beryllium medical surveillance program have access to the information necessary to analyze and evaluate medical, job, and exposure data.

Medical providers must establish and implement a medical surveillance program for beryllium-affected workers who volun-

tarily participate in the program. The medical evaluations and procedures required by 10 CFR 850.34 (“Medical Surveillance”) must be performed under the supervision of a licensed physician who is familiar with the effects of beryllium. Medical providers must have access to hazard assessment and exposure data and all of the information necessary to routinely and systematically analyze and identify individuals or groups potentially at risk for CBD, as well as working conditions that may contribute to that risk. At the evaluated site, information from the individual contractors that was necessary for the medical provider to use in their analysis and evaluation of beryllium risk was at times inconsistent and not always provided. The organizational structure at the site did not provide for a mechanism that would formally establish interfaces and responsibilities among medical, Industrial Hygiene, and Human Resource personnel with critical roles in providing and analyzing medical, job, and exposure data that would identify sources of risk. Failing to perform the required analyses, specifically for newly discovered cases of beryllium sensitivity or disease, contributed to lost opportunities that could help determine whether these new cases were from recent or past exposures and whether additional protective actions were needed.

Summary of Lessons Learned

As the HSS inspection results demonstrate, having a program is not enough when the adversary is an invisible health risk such as beryllium. To ensure success, both DOE and contractor management must understand the basic issues, communicate with all parties, and monitor the program to ensure that all steps are completed.

Although site contractors had previous program implementation experience, the most recent contractor accepted the past practices of prior beryllium characterization efforts that proved to be inadequate. Contractors that inherit a long-term program such as this should consider re-evaluating its implementation and progress to ensure that nothing “falls through the cracks”



Figure 3-2. Beryllium posting at a DOE site

during or after contract turnover. Management and personnel responsible for implementation of a program must understand the dangers the program is meant to control, ensure creation of teams of safety-minded managers, communicate that worker safety is paramount, and garner and maintain worker trust.

Other Lessons Learned and Opportunities for Improvement

The inspection team identified many other issues and opportunities for improvement that could facilitate communications, correct underlying management weaknesses, and ensure worker protection as a CBDPP is implemented. The complete HSS inspection report can be accessed at [http://www.hss.doe.gov/indepoversight/docs/reports/eshevals/2010/2010_Hanford_Beryllium_Reportv3_\(final\)_\(June%202010\).pdf](http://www.hss.doe.gov/indepoversight/docs/reports/eshevals/2010/2010_Hanford_Beryllium_Reportv3_(final)_(June%202010).pdf).

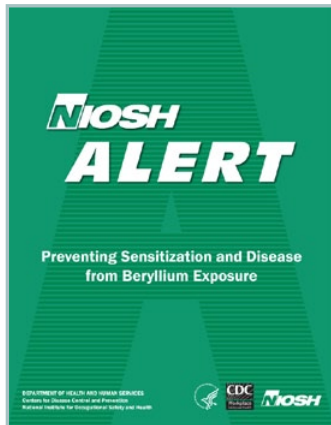


Figure 3-3. NIOSH Alert

A National Institute for Occupational Safety and Health (NIOSH) Alert, *Preventing Sensitization and Disease from Beryllium Exposure*, also explains what workers and employers should do to prevent sensitization and diseases related to beryllium exposure (see Figure 3-3). The NIOSH document warns that cases of beryllium sensitization and chronic beryllium disease have been reported from exposures *below* the current Occupational Safety and Health Administration (OSHA) Permissible Exposure

Limit of $2.0 \mu\text{g}/\text{m}^3$ of air and the NIOSH Recommended Exposure Limit of $0.5 \mu\text{g}/\text{m}^3$. The Alert can be accessed at <http://www.cdc.gov/niosh/docs/2011-107/pdfs/2011-107.pdf>.

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