Chronic Beryllium Disease Prevention Program (CBDPP) Plan at the Berkeley Laboratory

Revised
March 30, 2007

I. Summary

- All currently identified Berkeley Lab beryllium operations involve use of beryllium articles or meet the definition of laboratory use of hazardous chemicals (29 CFR 1910.1450)
- The Chemical Hygiene and Safety Plan (CHSP) for the Berkeley Laboratory contains requirements that govern the safe use of beryllium
- Hazard assessments for all currently identified Berkeley Laboratory operations have been performed
- As per 10 CFR Part 850, the Berkeley Laboratory currently has no beryllium workers as defined by the rule, only beryllium-associated workers
- In accordance with best practice, the Berkeley Laboratory will adhere to the principles espoused in 10 CFR Part 850 (minimize worker exposure, number of individuals exposed, and future disability and lost time for workers resulting from exposure) as noted in the following approach to integrated beryllium health and safety management at the Berkeley Lab
- All beryllium activities at the Berkeley Lab will adhere to established waste minimization principles to reduce the amount of beryllium-containing waste.

II. Contractor Operations

All contractors engaged in beryllium activities at the Berkeley Laboratory will follow the provisions of the Integrated Worker Health and Safety Program for Beryllium Activities at the Berkeley Laboratory, except where otherwise specified in a job-specific work plan. This will cover all contractors, including those engaged in construction-type activities, such as removal of beryllium contaminated building systems and equipment. The Berkeley Lab will request from the contractor documentation that verifies adherence to the stipulations of the Integrated Worker Health and Safety Program for Beryllium Activities. This documentation will include:

- Beryllium awareness training records for contractor employees performing the work
- Completed Chronic Beryllium Disease Prevention Program Informed Consent Forms for all workers performing the work
- Written acknowledgement that all the employees of the contractor engaged in the work are familiar with and understand the Berkeley Lab's Integrated Worker Health and Safety Program for Beryllium Activities

III. Elements

A. Beryllium Inventory

The baseline beryllium inventory will be developed by reviewing pertinent information sources at the Berkeley Lab, including:

- Chemical Management System (CMS) records
- Purchase records
- Integrated Functional Appraisal (IFA) data
- Review of assembled archived records from 1940 from the Berkeley Laboratory Historical Beryllium Report
- Other field records or data, including employee interviews with IH or medical staff

Review of these information sources has yielded a baseline inventory of operations where beryllium is in active use or stored for potential use, and a legacy facility where beryllium was used at the Berkeley Lab. These operations are listed in the "Be Activities at Lawrence Berkeley National Laboratory" included in ***Attachment A***, which can be obtained from the Beryllium Program Manager at ext. 6571.

The inventory will be updated periodically, at least quarterly by reviewing, at a minimum, the information sources indicated above. New beryllium activities involving articles or that meet the definition of laboratory use will be incorporated in the inventory on a periodic basis. New beryllium activities that fall under the scope 10 CFR Part 850 will be communicated to DOE-OAK before being initiated. In the event that beryllium must be used, in an unexpected situation, that is outside the scope of the current program, informal approval from DOE-OAK will be obtained prior to starting work and updating the Integrated Worker Health and Safety Program for Beryllium Activities at the Berkeley Laboratory. An inventory of all beryllium operations will be entered and maintained in the Berkeley Laboratory's Comprehensive Tracking System (CTS).

B. Hazard Assessment

All operations at the Berkeley Laboratory that involve the active use or presence of beryllium will be evaluated by a certified industrial hygienist (CIH). Initially, a qualitative assessment will be performed to identify potential for exposure and adequacy of controls. If there is a potential for exposure to airborne beryllium or a potential for dermal uptake, a quantitative evaluation will be conducted to determine exposure levels. All assessments will be entered into CTS. Medical and industrial hygiene staff will review medical surveillance and exposure monitoring information on a periodic basis, as well as related information, for the purpose of uncovering any significant medical surveillance trends.

A qualitative hazard assessment has been conducted by a CIH for beryllium operations at the Berkeley Lab. In addition, for those operations where a potential for exposure to beryllium exists, a quantitative hazard assessment was performed. ***Attachment B,*** (which can be obtained from the Beryllium Program Manager at ext.

6571), contains hard copies of the qualitative and quantitative hazard assessments for the beryllium operations at the Berkeley Lab.

C. Permissible Exposure Limit

There is no instance where a worker has been exposed to an airborne concentration of beryllium greater than the permissible exposure limit established in 29 CFR 1910.1000 at the Berkeley Lab. Should such an exposure occur, the beryllium operation will be stopped immediately pending a review by the beryllium health and safety program manager and line management in an effort to reduce exposures.

D. Action Level

The Berkeley Lab will adhere to the action level of 0.2 micrograms per cubic meter calculated as a time-weighted average as measured in the worker's breathing zone. Any operation where the beryllium concentration is measured at or above the action level will result in implementation of the pertinent sections of 10 CFR Part 850, until such time as the exposures drop below the action level with a reasonable level of confidence.

E. Exposure Monitoring

All operations with the potential to generate airborne beryllium or a potential for dermal uptake will be monitored according to the following:

- Personal breathing zone sampling representative of exposure conditions will be conducted and updated periodically
- Sampling will be conducted by a CIH working under the direction of the beryllium program manager
- Appropriate statistical sampling considerations will be applied as per the AIHA guidance in "A Strategy for Assessing and Monitoring Occupational Exposures," 2nd edition
- A stated goal for the sampling program will be to have procedures with an accuracy of at least plus or minus 25% with a confidence level of 95 percent, for airborne concentrations of beryllium at the action level
- Samples will be analyzed at an AIHA-accredited laboratory
- Results will be communicated to the worker and line management within 10 days of CIH receiving results from analytical laboratory
- Any exposures at or above action level for beryllium will be communicated to DOE-OAK and the Occupational Physician within 10 working days of receiving results from the analytical laboratory
- All acquired data will be entered into CTS, including exposure information, worker duties, and personal protective equipment data, and made available to the SOMD and other medical staff. This information will be reviewed and updated, as necessary.
- All exposure sampling data will be transmitted to DOE-OAK upon request.
- Results from sampling conducted after January 7, 1999 will be used to fulfill initial monitoring requirements, except in cases where operation were discontinued prior to this date
- Affected employees will be notified in writing within 10 working days of receipt of the results. Employees will be informed within 10 days of the measured result, what the appropriate limit for beryllium is, whether the appropriate limit has been exceeded, and any corrective actions, based on exposure.
- Additional monitoring will be conducted for operations when a change has taken place and is expected to affect potential exposure to beryllium.

Exposure monitoring has been conducted for the operations at the Berkeley Lab where potential to exposure to airborne beryllium exists. This sampling was conducted by a CIH, and copies of the results are included in ***Attachment B.***

F. Exposure Reduction and Minimization

All beryllium operations will have specific practices and controls prescribed to reduce exposure. On a periodic basis these practices will be reviewed and re-evaluated to ensure exposure is being reduced to the greatest extent possible, regardless of exposure. Exposure reduction and minimization actions using the conventional hierarchy of industrial hygiene controls will be applied. Any modifications to the current work practices will be noted in the operation file in CTS. It is the intent of the Integrated Worker Health and Safety Program for Beryllium Activities to minimize, to the greatest extent possible, the number of workers

exposed to beryllium, as well as, the number of opportunities where workers could be exposed. This will be achieved through implementation of a review system of operations and exposures. The review will occur periodically and include industrial hygiene and occupational medical professionals who will review and analyze pertinent data for potentially redundant operations where beryllium is in use, as well as, emerging operations involving beryllium.

In addition, all beryllium-associated workers will be tracked a part of a beryllium similar exposure group. This group's membership will be tracked through both CTS and occupational medicine electronic tracking systems. This group will be reviewed, on a periodic basis, to limit membership.

G. Regulated Areas

Regulated areas in accordance with the provisions of 10 CFR Part 850 will be established for Berkeley Lab operations involving beryllium when the airborne concentrations of beryllium are measured at or above the action level. There is no requirement for establishment of regulated areas for beryllium operations currently identified at the Berkeley Lab.

H. Hygiene Facilities and Practices

Pertinent hygienic facilities will be provided and practices observed as defined in 10 CFR Part 850 in areas where workers are exposed to beryllium at or above the action level. At the present time, there is no requirement for hygiene facilities and special practices for beryllium operations at the Berkeley Lab.

I. Respiratory Protection

Respiratory protection will be provided to workers for protection against beryllium as described in the Respiratory Protection Program for Lawrence Berkeley National Laboratory (LBID-2136, 5/98, Rev. 1.1), and in accordance with the pertinent stipulations of 10 CFR Part 850. Though there are no currently identified operations that require the use of respiratory protection for protection from beryllium particulate, individuals involved in beryllium activities will be issued respiratory protection upon request, regardless of exposure.

J. Protective Clothing and Equipment

Protective clothing and equipment will be made available to individuals working with beryllium at the Berkeley Lab in accordance with the provisions of 10 CFR Part 850. Though, there are currently no identified instances where protective clothing and equipment, as prescribed in 10 CFR Part 850, would be required for protection from beryllium at the Berkeley Lab, individuals involved in beryllium activities will be issued protective clothing and equipment upon request.

K. Housekeeping

Housekeeping provisions consistent with those outlined in 10 CFR Part 850 will be applied to Berkeley Lab operations that have the potential to generate dispersible beryllium particulate. Such operations at the Berkeley Lab will be subject to routine

surface sampling to determine housekeeping conditions in operational areas. Operational areas outside of installed closed systems (e.g., vacuum chambers, and gloveboxes) will be subject to the removable contamination limit of 3 micrograms per 100 square centimeters during periods when the operation is inactive. Only wet methods or vacuuming (no air or dry cleaning methods will be used) will be used to remove contamination. All vacuum apparatus used in clean-up will be equipped with a HEPA filter that will be tested in accordance with the LBNL HEPA-filter testing program. In addition, all cleaning equipment used on beryllium-contaminated surfaces will be labeled and used exclusively for beryllium clean-up operations.

L. Release Criteria

The requirements contained in 10 CFR Part 850 for release of an item for another use or for distribution to the public will be adhered to for any item that has come into direct contact with beryllium as part of an operation at the Berkeley Lab. This would most appropriately pertain to pieces of equipment that have been used in legacy machining operations or recent small-scale activities such as Electrical Discharge Machining (EDM, Be Activity #10, on ***Attachment A***). In all cases, beryllium-contaminated equipment will be cleaned to the removable contamination level specified (not to exceed the higher of 0.2 micrograms per 100 square centimeters or the concentration of beryllium in the soil at the point of release, whichever is greater) at a minimum. Within the bounds of economic constraints, cleaning will be performed to the lowest contamination level practicable below removable contamination level specified (0.2 micrograms per 100 square centimeters). Transfer of any item ultimately designated for release is conditioned on the recipient's commitment to implement pertinent controls that minimize foreseeable beryllium exposure, taking into account the nature of the item received and the nature of contamination.

Contamination assessment activities and release determinations at the Berkeley Lab will be conducted by a CIH and records of the swipe sampling will be entered and maintained in CTS.

All items released to the public, to a DOE facility for non-beryllium use, or to another facility for work involving beryllium will be labeled as per 10 CFR 850, including the stipulations for required wording, and labels will be placed on the items in a conspicuous location.

Further, any items or beryllium-contaminated equipment released to another facility performing work with beryllium will be cleaned to the removable contamination level specified (not to exceed 3 micrograms per 100 square centimeters) at a minimum. The equipment or item in this case will be enclosed or placed in sealed, impermeable bags or containers to prevent the release of beryllium dust during handling and transportation.

M. Waste Disposal

Beryllium-containing waste generated at the Berkeley Lab will be processed in compliance with the Guidelines for Generators to Meet HWHF Acceptance requirements for Hazardous, Radioactive, and Mixed Wastes at the Berkeley Lab (LBNL PUB-3092, 9/99, Rev. 4), as well as, the provisions of 10 CFR Part 850.

N. Beryllium Emergencies

Incidents or emergencies involving beryllium at the Berkeley Lab will be handled in accordance with the provisions of 10 CFR Part 850. Specifically, the Berkeley Lab will ensure compliance with 29 CFR 1910.120(l) for handling beryllium emergencies related to decontamination and decommissioning operations, and 29 CFR 1910.120(q) for handling beryllium emergencies related to all other operations.

O. Medical Surveillance, Medical Removal, and Medical Consent

The Similar Exposure Group (SEG) for Beryllium-associated Workers program in the on-line occupational health manager system in the Health Services Group at the Berkeley Lab contains information on all pertinent beryllium medical surveillance, consent, and removal protocols.

The Berkeley Laboratory has identified no beryllium workers as defined by the standard, and less than 25 beryllium-associated workers overall. Most of the workers had beryllium lymphocyte proliferation testing under a DOE research protocol, not covered by this rule. In response to the final rule, a new examination was offered to these workers by 7/7/2000, the initial implementation date for the Rule. This examination was contingent on signature of the new DOE "Chronic Beryllium Disease Prevention Program Informed Consent Form". The results of new baseline examinations were used to assemble the LBNL Beryllium Worker Registry. Following this, periodic evaluations (including chest x-rays) are offered to this group of employees at 3 year intervals. In the event a worker is exposed to beryllium because of an emergency he or she will also be provided a medical evaluation, at least equivalent to a periodic evaluation, as soon as possible. All medical evaluations and procedures will be performed by, or under the supervision of, of the Site Occupational Medical Director at the Berkeley Lab who is familiar with the health effects of beryllium. Within 10 days of receipt of results of the findings of the examination, an interpretation of the findings relative to the Be exposure will be provided in writing to the employee. The communication will provide the worker with a written medical opinion containing the results of all tests and procedures, an explanation of any abnormal findings and any recommendations that the worker be referred for additional testing for evidence of CBD.

CBD, Be sensitivity and other abnormal conditions or disorder caused or aggravated by the occupational exposure to Be will be reported on the appropriate OSHA reporting form.

The Berkeley Lab will offer a beryllium-associated worker medical removal from exposure to beryllium if the Site Occupational Medical Director (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.

The Berkeley Lab will 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.

If a beryllium-associated worker is temporarily removed from beryllium exposure, the Berkeley Lab will 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. The Berkeley Lab will maintain the beryllium-associated worker's total normal earnings, seniority, and other worker rights and benefits as if the worker had not been removed. If there is no such job available, the Berkeley Lab will provide to the beryllium-associated worker the medical removal protection benefits specified below in this document, until a job becomes available or for one year, whichever comes first.

The Berkeley Lab will 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. If a beryllium-associated worker at the Berkeley Lab is removed permanently from beryllium exposure based on the SOMD's recommendation as specified in this document, the worker will receive the medical removal protection benefits as specified below.

If the SOMD at the Berkeley Lab determines that a beryllium-associated worker should be temporarily or permanently removed from exposure to beryllium, the SOMD will: (1) advise the beryllium-associated worker of the determination that medical removal is necessary to protect the worker's health; (2) provide the beryllium-associated worker with a copy of 10 CFR Part 850 and its preamble, and any other information the SOMD deems necessary on the risks of continued exposure to beryllium and the benefits of removal; (3) provide the beryllium-associated worker the opportunity to have any questions concerning medical removal answered by Berkeley Lab occupational medicine staff; and,(4) obtain the beryllium-associated worker's signature acknowledging that the worker has been advised to accept medical removal from beryllium exposure as specified in this document, and has been provided with the necessary information on the benefits of removal and the risks of continued exposure to beryllium.

The Berkeley Lab will not return a beryllium-associated worker who has been permanently removed to the worker's former job status unless the SOMD at the Berkeley Lab first determines in a written medical opinion that continued medical removal is no longer necessary to protect the worker's health.

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 will fully discuss these matters with the worker and then, in a written determination, may authorize the worker to return to his or her former job status. Thereafter, the returned beryllium-associated worker will continue to be provided with medical surveillance as per the Berkeley Lab beryllium medical surveillance program.

If a beryllium-associated worker has been permanently removed from beryllium exposure, the Berkeley Lab will provide the beryllium-associated worker: (1) The opportunity to transfer to another position which is available, or later becomes available, for which the beryllium-associated worker is qualified (or for which the worker can be trained in a short period) and where beryllium exposures are as low as possible, but in no event at or above the action level; or (2) If the beryllium-associated worker cannot be transferred to a comparable job where beryllium exposures are below the action level, a maximum of 2 years of permanent medical removal protection benefits.

If it becomes necessary to provide medical removal protection benefits to a beryllium-associated worker, the Berkeley Lab will maintain the removed worker's total normal earnings, seniority and other worker rights and benefits, as though the worker had not been removed.

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

The obligation of the Berkeley Lab 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.

The Berkeley Lab may condition the provision of medical removal protection benefits upon the beryllium-associated worker's participation in medical surveillance.Beryllium rule provisions for multiple physician review, Site Occupational Medical Director designation, alternate physician designation, written medical opinions and recommendations, communication with beryllium-associated workers, medical removal protection, and medical consent will be followed as outlined in the rule.

P. Training and Counseling

Any individual who has the potential to be exposed to beryllium will have specific written instructions on appropriate beryllium control measures and precautions in accordance with the stipulations of 10 CFR 850. This training will be reviewed with these individuals on an annual basis or more frequently, as needed by a CIH. Fundamental training for individuals with potential beryllium exposure consists of a Web-based Beryllium Hazard Communication course (EHS0342) which features a quiz; this course must be completed every two years. In addition, any individual who works with hazardous chemicals, such as beryllium, is required to take the Berkeley Lab Chemical Hygiene training course. All individuals on-site will, at a minimum, receive written safety information on beryllium and the Lab’s beryllium program (LBNL PUB-902, Beryllium Hazard Awareness at Berkeley Lab), and the general employee hazard communication course will discuss basic safety precautions. This training and information will be provided periodically as stipulated in the rule.

In addition, an employee counseling program to assist beryllium-associated workers who are diagnosed to have CBD or to be sensitized to beryllium will be conducted as prescribed in 10 CFR 850.

Q. Warning Signs and Labels

For all uses of beryllium that are associated with research laboratory operations, signs and labels will be utilized in accordance with the Berkeley Lab's Chemical Hygiene and Safety Plan. Any operation that falls within the definition of 10 CFR Part 850 will adhere to the provisions of the rule for warning signs and labels. This includes affixing warning labels, as required, to all containers of beryllium, beryllium compounds or beryllium-contaminated clothing, equipment, waste, scrap or debris. In addition, labels will reflect required wording as per 10 CFR 850, and will be of such a format (e.g., size of lettering, color scheme) and placed on containers in such a way as to provide adequate warning to individuals who may come into contact.

R. Recordkeeping and Use of Information

The Berkeley Lab will operate within the provisions of 10 CFR Part 850 for establishing and maintaining accurate records of all beryllium inventory information, hazard assessments, exposure measurements, exposure controls, and medical surveillance. Specifically, the Berkeley Lab will commit to the following:

- A hard copy file for each operation involving beryllium in the inventory at the Berkeley Laboratory will be established
- Qualitative and quantitative hazard assessment information will be included in these files, as well as, in the employee's medical file
- Beryllium-associated workers and line management will have copies of these assessments, including a discussion of appropriate controls and protective measures.
- The electronic versions of beryllium exposure data and hazard assessments will reside on CTS
- A report detailing workplace conditions contained in CTS is accessible to occupational medical staff and health outcomes contained in the occupational medicine electronic tracking system link the worker to the workplace (and vice a versa). This will establish a basis for understanding beryllium health risk.
- The electronic versions of medical surveillance records and other medical information pertaining to beryllium-associated workers will reside in official medical records and the occupational medicine electronic information system
- All records will be retained for at least 75 years, and will be turned over to DOE in the event of a change in the contractor-operator status at the Berkeley Lab.
- All records will be maintained in a confidential fashion consistent with established practices observed for other medical and industrial hygiene records, as well as, in accordance 10 CFR 850 stipulations. This includes placing medical information in a separate employee file maintained by the SOMD, and removing descriptive information from IH sampling reports and medical information prior to transmitting to other parties.

- Records required by 10 CFR 850 will be transmitted to the DOE Assistant Secretary for ES&H upon request, and the DOE Office of Epidemiological Studies will receive, on a semi-annual basis, an electronic registry of beryllium-associated workers that protects confidentiality of these individuals.

S. Performance Feedback

A periodic review of the Integrated Worker Health and Safety Program for Beryllium Activities at the Berkeley Laboratory to ensure effectiveness will be conducted in accordance with the provisions of 10 CFR Part 850, and will include analyses and assessments of monitoring activities, hazards, medical surveillance, exposure reduction and minimization, and occurrence reporting data. This review is to include the beryllium health and safety program manager, representatives for the Occupational Medicine program, and others, including line management, as necessary. Results of this periodic review will be made available to interested parties (e.g., line managers, labor organizations, workers) who request such information. Labor organizations representing employees covered by this program, will be notified on a timely basis regarding changes to the program, and any bargaining associated with the implementation of this program will be conducted in accordance with Federal labor laws. In addition, copies of the Integrated Worker Health and Safety Program for Beryllium at the Berkeley Laboratory will be available for the Department of Energy Berkeley Site Office (DOE-BSO) to review when changes are made.

T. Program Maintenance

A document, “Activities for Program Maintenance,” Appendix C describes the effort to ensure that the Chronic Beryllium Disease Prevention Program (CBDPP) Plan is implemented effectively at the Berkeley Lab. This appendix will be reviewed periodically and updated as necessary to reflect program changes and new initiatives.