U.S. Department of Energy
Office of Inspector General
Office of Audit Services

Audit Report

Beryllium Surface Contamination at the Y-12 National Security Complex

DOE/IG-0783 December 2007

Department of Energy

Washington, DC 20585

December 17, 2007

MEMORANDUM FOR THE SECRETARY

FROM: Gregory H. Friedman
Inspector General

SUBJECT: INFORMATION: Audit Report on "Beryllium Surface Contamination at the Y-12 National Security Complex"

INTRODUCTION AND OBJECTIVE

Since the 1950s, beryllium processing has been an important part of the mission of the Department of Energy's Y-12 National Security Complex in Oak Ridge, Tennessee. Y-12 has made widespread use of beryllium in its activities. As a consequence, the Department's worker safety programs have recognized the possibility that beryllium remains in buildings as well as on equipment and other surfaces. According to the Department, exposure to beryllium can cause beryllium sensitization or Chronic Beryllium Disease, defined as an often debilitating, and sometimes fatal, lung condition.

In accordance with Federal Regulations, the contractor operating Y-12, BWXT Y-12, implemented a Chronic Beryllium Disease Prevention Program. This Prevention Program required postings of beryllium surface contamination warnings in non-beryllium operations areas when contamination was found to be 0.2 micrograms and above. Further, it required that hazard assessments be performed when surface sampling established the presence of beryllium. BWXT's Prevention Program builds upon, and in certain cases, exceeds current regulatory requirements for beryllium contamination controls.

In November 2006, the Office of Inspector General received an allegation that workers at Y-12 had not been adequately protected from beryllium exposure. In response to the allegation, we initiated this audit to determine whether BWXT Y-12 had implemented surface contamination controls in accordance with its Prevention Program. Our audit included three facilities where beryllium operations were historically co-located with non-beryllium operations and focused on surface contamination outside of beryllium operational areas.

RESULTS OF AUDIT

Our review found that BWXT Y-12 had not consistently implemented key controls in non-beryllium operations areas as required by its Prevention Program. Specifically, when surface contamination was found outside beryllium operational areas, BWXT Y-12 had not always:

- Posted signs alerting workers to the potential for beryllium surface contamination; and,
- Performed or documented hazard assessments for beryllium contamination, although documented assessments were vital to identifying potential exposure risks.

For example, in 2002, BWXT Y-12 identified the presence of beryllium in one area at a level requiring further control actions. However, as of August 2006, BWXT Y-12 had not taken even the basic step of posting signs to alert workers to the potential risks. In April 2007, after our inquiries, BWXT Y-12 performed additional sampling that not only confirmed the presence of beryllium, but indicated contamination that, in some cases, exceeded 15 micrograms. This was 75 times higher than the level at which its Prevention Program required further controls. This area was posted in May 2007, almost five years after the initial characterization.

During the course of our review, BWXT Y-12 management pointed out that the requirement to post warnings of contamination outside beryllium operational areas exceeds the Department's regulations, which do not require postings for such surface contamination. We agree. In fact, this inconsistency was reflective of a gap that we found in the Department's current regulations. Department regulations do not address surface contamination found outside confirmed beryllium operational areas. In May 2005, to address this gap, the Department drafted a technical standard, which recommended warning signs when contamination occurs outside operational areas. As of August 2007, this standard had not been finalized.

The completion of hazard assessments was an important component of the Prevention Program. Yet, we found instances where surface sampling established the presence of beryllium in non-operational areas and BWXT Y-12 had not performed the required assessments. This was inconsistent with the Department's implementing guidelines for beryllium protection programs, which identify hazard assessments as the mechanism for determining and documenting potential worker exposure.

We found that BWXT Y-12's implementation of its Prevention Program was hampered, in part, because the contractor did not track recommendations made by its industrial hygienists to post contaminated areas. BWXT Y-12 also did not have a single repository of beryllium information that could be used by management and workers to identify contaminated locations.

As a result of these control weaknesses, the Department and BWXT Y-12 may not be doing all that is possible to minimize the risk of worker exposure to beryllium in non-beryllium operations areas. BWXT Y-12 management asserted that surface contamination can not be correlated to airborne beryllium exposures. However, the Department has recognized that surface contamination may constitute a pathway for worker exposure to beryllium.

During the course of this audit, we provided our findings to Department personnel who took actions to ensure that the areas with surface beryllium contamination were posted. BWXT Y-12 management informed us that it is developing a system that will centralize characterization data and improve the communication of information pertaining to beryllium.

MANAGEMENT COMMENTS

Management officials from the Office of Health, Safety and Security (HSS) and the National Nuclear Security Administration (NNSA) concurred with the audit report recommendations. HSS officials stated that the requirement to post areas when surface beryllium contamination occurs in non-operational areas will be addressed during the Fiscal Year 2008 amendment to Departmental regulations. NNSA stated that it had initiated a number of corrective actions. The actions taken and planned are generally responsive to the recommendations.

Although NNSA initiated corrective actions, officials expressed disagreement with certain statements contained in the report. In particular, NNSA stated that Chronic Beryllium Disease is caused by inhalation of airborne beryllium, which can not be correlated to surface contamination. This paralleled the assertions made by BWXT Y-12 during the audit. Additionally, NNSA officials pointed out that BWXT Y-12's Prevention Program requirement's for surface contamination in non-beryllium areas exceed regulatory requirements.

We recognize NNSA's position. During the audit, in consultation with Departmental experts, we could find no methodology to accurately predict the amount of beryllium that may become airborne from beryllium surface contamination. Nevertheless, the Department has taken the position that surface contamination is a potential hazard that may present an exposure route. In fact, airborne beryllium was detected while a BWXT Y-12 employee was testing for beryllium surface contamination in one of the buildings cited in the report. Although the amount did not exceed the Department's action level, it clearly demonstrated that surface contamination can pose a risk to workers.

Further, as acknowledged in the report, Department officials have recognized the risk associated with surface contamination and, in 2005, drafted a technical standard recommending warning signs for contamination occurring outside beryllium operational areas. At the time of audit, however, the standard had not been finalized. In view of the Department's concern for worker health and safety, we concluded that it is prudent that beryllium monitoring and control programs are fully implemented to minimize worker exposure.

Management's comments are included in their entirety in Appendix 3.

Attachment

cc: Deputy Secretary
Under Secretary of Energy
Administrator, National Nuclear Security Administration
Chief of Staff
Chief Health, Safety and Security Officer
Manager, Y-12 Site Office
Director, Policy and Internal Controls Management, NA-66

REPORT ON BERYLLIUM SURFACE CONTAMINATION AT THE Y-12 NATIONAL SECURITY COMPLEX

TABLE OF CONTENTS

Implementation of Beryllium Controls

Beryllium Contamination Management

BWXT Y-12, LLC's (BWXT Y-12) actions were not consistent with its Chronic Beryllium Disease Prevention Program (Prevention Program). In particular, BWXT Y-12 had not always posted locations of beryllium contamination that were outside of beryllium operational areas in the three facilities included in our review. These postings would have alerted workers to the potential risks of beryllium exposure. BWXT Y-12 also had not performed or documented the conduct of hazard assessments to communicate potential exposure risks.

Posting Beryllium Areas

In August 2002, BWXT Y-12 collected characterization samples in the East High Bay of Building 9201-5. Of the samples collected, half were above the site surface contamination limit with 5 samples showing contamination 15 times greater than the limit. We noted, however, that as of August 2006, this area had not been posted as being beryllium contaminated.

In April 2007, after our inquiries, BWXT Y-12 performed an additional characterization of the facility and found that 51 of the 60 samples collected in the East High Bay were above the site limit. Moreover, several samples revealed contamination exceeding 15 micrograms, which is 75 times greater than the level requiring further controls. According to the building operations manager, periodic operations had been ongoing in an adjacent area of the facility for years; however, the East High Bay was not posted as a beryllium area until May 2007, almost five years after the initial characterization.

In another case, during a 1998 characterization of Building 9808, a BWXT Y-12 industrial hygienist determined that ventilation ducts were contaminated with beryllium and recommended that employee access be restricted. However, we found that the area had not been posted with warning signs and that employees assigned to Building 9808 had access to the beryllium contaminated ductwork. In fact, we observed that employees in the facility had worked in the contaminated area around the ventilation ducts. According to BWXT Y-12, the ductwork outside of the building had been properly labeled, but no postings were made inside the building. During the audit,

BWXT Y-12 initiated additional sampling to determine the extent of contamination in the building. Several samples revealed contamination that was above 3 micrograms, which is 15 times greater than the level requiring posting. The highest reported sample was over 10 micrograms, which is 50 times greater than the limit. Subsequent to our inquiries, the area around the ductwork was posted as being beryllium contaminated.

Finally, we noted that characterization data from 2004 indicated the presence of beryllium exceeding the surface contamination limit in Building 9202. Specifically, 40 percent of the samples from the first floor foundry were above the site surface contamination limit. Although the industrial hygienist had recommended restricted employee access, BWXT Y-12 had not posted warning signs in the contaminated areas. The area was posted in June 2007 following discussion of our findings with Department of Energy (Department) personnel.

Beryllium Hazard Assessments

In addition, the Department's regulations state that a hazard assessment must be performed when characterization samples establish the presence of beryllium. The hazard assessment is an analysis of the existing condition, medical surveillance trends and exposure potential to workers. According to BWXT Y-12 management, prior to 2005, hazard assessments were conducted but not documented for beryllium contamination found outside beryllium operational areas. However, we found that since 2005, surface sampling had established the presence of beryllium in non-operational areas, but BWXT Y-12 had not always performed hazard assessments. For example, we noted that BWXT Y-12 had not performed documented hazard assessments for the previously discussed contamination found in areas of Building 9201-5. In addition, hazard assessments for Buildings 9808 and 9202 were not completed until July 2007. The lack of documentation for assessments prior to 2005, as well as, the absence of such assessments for more recently found contamination is significant since it is important in defining potential hazards.

Beryllium Contamination Controls

During the audit, BWXT Y-12 was unable to provide a definitive reason for not fully implementing its program requirements. In responding to a draft of this report, however, Department management stated that BWXT Y-12 had not implemented all procedures required by the Prevention Program for surface contamination, such as postings and conducting hazard assessments, because of higher priority concerns about active beryllium operations areas. We concluded that the contractor had not posted contaminated areas because it had not fully analyzed characterization sample results as required by its Prevention Program to determine the extent of contamination. For example, we determined that BWXT Y-12 had not statistically analyzed characterization data collected for Buildings 9201-5, 9808 and 9202. Such analysis would have disclosed the extent and levels of surface contamination in each of these locations.

BWXT Y-12 management also pointed out that its requirement to post areas of surface contamination outside operational areas exceeds the Department's regulations. We recognize that BWXT Y-12's Prevention Program exceeds regulatory requirements; in fact, they address a gap in the Department's existing regulations. Specifically, the regulations do not address posting surface contamination found outside beryllium operational areas; rather it focuses on surface contamination within beryllium operational areas. However, Department guidance recognizes that surface contamination, regardless of location, may present a route of exposure other than through airborne transmission. The guide includes the following example: a worker with beryllium contamination on their sleeve could brush the sleeve against their nose, resulting in an inhaled dose that could not be captured in a breathing zone sample. Further, we noted that in May 2005, the Department drafted a technical standard to address this regulation gap by recommending warning signs for contamination occurring outside beryllium operational areas. As of August 2007, this standard had not been finalized.

Although the requirement to post areas of surface contamination outside operational areas exceeds the Department's regulations, it should nevertheless have been implemented since it addresses a gap in the regulation and was part of BWXT Y-12's approved Prevention Program.

Implementing this requirement is significant since there is documented evidence of a potential hazard associated with surface contamination outside operational areas. In fact, during the audit, a BWXT Y-12 employee was found to have received a measurable exposure to beryllium while testing for beryllium surface contamination in one of the buildings cited in the report. While the amount did not exceed the Department's action level, it clearly demonstrates that surface contamination can pose a risk to workers.

Performance of Hazard Assessments

Regarding hazard assessments, BWXT Y-12 management stated that assessments had been conducted but that only those performed after 2005 were required by their procedures to be documented. We noted, however, that BWXT Y-12's lack of documentation was not consistent with the Department's 2001 implementing guidelines, which required that hazard assessments be conducted to determine and document potential worker exposure. BWXT Y-12 was unable to provide a reason for not conducting assessments of more recently identified surface contamination. However, the Department indicated that it is taking action to complete the required hazard assessments.

In responding to a draft of this report, Department officials stated that resources were deployed and hazard assessments conducted in the areas of highest risk, which are active beryllium operations. Legacy contamination areas were of secondary concern given the relatively low risk. During the audit we noted, however, that the areas containing active beryllium operations had been assessed and established as beryllium operational areas as early as the late 1990s. Thus, in our opinion, the legacy beryllium areas discussed in the report should have been a higher priority since employees in those areas were not aware of the potential risks of exposure, trained in the hazards of beryllium, or protected by controls to prevent beryllium exposure.

Enhancement of Controls

BWXT Y-12's implementation of its Prevention Program was also hampered because it did not track recommendations made by its industrial hygienists. As previously discussed, BWXT Y-12 had not implemented the hygienists' recommendations to post contaminated areas. BWXT Y-12 did not have a system to assign responsibility for addressing hygienists' recommendations or to track corrective actions.

Furthermore, we noted that BWXT Y-12 did not have a single repository of beryllium information that can be used by management and workers to identify contaminated locations. For example, characterization information was kept in numerous locations and on several separate databases. In fact, we provided compiled data to BWXT Y-12 and the National Nuclear Security Administration officials, which they had not assembled. During the audit, BWXT Y-12 informed us that they are developing a system that will centralize characterization data and improve the communication of information pertaining to beryllium.

Beryllium Contamination Effects

The Department and BWXT Y-12 may not be minimizing the risk of worker exposure to beryllium. Specifically, the Department's guidance recognizes that surface contamination may constitute a pathway for worker exposure to beryllium. However, neither the Department's regulations nor BWXT Y-12's implementation of its Prevention Program adequately addressed the potential hazards of such surface contamination. This is significant since research has shown that once exposed to beryllium, an individual carries a lifelong risk of developing beryllium sensitization or Chronic Beryllium Disease, even if the exposure amount was small or if the individual is no longer exposed.

RECOMMENDATIONS

We recommend that the Chief Health, Safety and Security Officer revise the Department's regulations to require controls including posting areas when surface beryllium contamination occurs in non-operational areas.

We further recommend that the Manager, Y-12 Site Office direct BWXT Y-12 to:

1. Fully implement the procedures within the Chronic Beryllium Disease Prevention Program including the statistical analyses of characterization data, posting warning signs in beryllium contaminated areas and performing and documenting hazard assessments for beryllium contamination;

2. Implement a system for tracking Industrial Hygiene recommendations to ensure they are addressed timely; and,

3. Ensure that the beryllium information database currently under development is completed and maintained.

MANAGEMENT COMMENTS

Both the Office of Health, Safety and Security (HSS) and the National Nuclear Security Administration (NNSA) concurred with the audit report recommendations. HSS officials stated that the requirement to post areas when surface beryllium contamination occurs in non-operational areas will be addressed during the Fiscal Year 2008 amendment to Department regulations. As acknowledged in the report, NNSA initiated a number of corrective actions during the audit, including posting warning signs in beryllium contaminated areas. A number of other actions have been planned to address the audit recommendations and are discussed in NNSA's comments which are included in Appendix 3.

However, NNSA believed the report contained certain inaccuracies. Specifically, NNSA stated that the report (1) inaccurately correlated surface contamination to airborne beryllium expose and health effects; (2) did not consider air sampling as part of Y-12's documented hazard assessment; and, (3) overstated the health effect of Chronic Beryllium Disease being fatal. NNSA also commented that, in the absence of regulatory guidance, the Y-12 contractor had a conservative internal limit for beryllium surface contamination outside of beryllium operational areas and that failure to implement an additional self-imposed limit does not equal failure to implement a key control.

AUDITOR COMMENTS

The actions taken and planned are responsive to the audit report recommendations. However, for the reasons provided below, we disagree with NNSA's assertions regarding the accuracy of certain statements contained in the report.

Correlation between Surface Contamination and Airborne Exposure

We recognize that there is no methodology to accurately predict the amount of surface beryllium that may become airborne. Nevertheless, the potential risk associated with surface contamination is a reality as evidenced by an occurrence at Y-12 in April 2007. In this case, a BWXT Y-12 employee had a measurable exposure to beryllium while testing for beryllium surface contamination in one of the buildings cited in the report. While the amount did not exceed the Department's action level, it clearly demonstrates that surface contamination can pose a risk to workers.

Further, as stated in the report, Department guidance recognizes that surface contamination, regardless of location, may present a route of exposure other than through airborne transmission. In fact, in order to minimize potential exposure, the Department requires beryllium workers to change out of work clothes and to shower before leaving the plant. These steps significantly reduce the movement of beryllium from the workplace and ensure that the duration of beryllium exposure does not extend beyond the work shift and, thus, protect workers and their families from off-site exposures.

Documented Hazard Assessments

As discussed in the report, documented hazard assessments were not provided for all of the areas included in the report. Management contends that air sampling was conducted in each of the areas of concern and thus constituted the conduct of a hazard assessment. However, area specific air sampling data was not provided to the audit team when hazard assessments were requested. In addition, while we agree that air sampling is a key element of a hazard assessment, according to Department guidance, other factors should be considered. For example, employers should ensure that hazard assessments take into account surface contamination and other routes of exposure.

Health Effects of Chronic Beryllium Disease

The definition cited in the report was obtained directly from the Federal Register. In it, the Department defines Chronic Beryllium Disease as, "a chronic, often debilitating, and sometimes fatal, lung condition."

We recognize, as stated in the report, that BWXT Y-12's written procedures regarding postings in non-operational areas exceed the requirements in the regulations. However, because the Department has acknowledged a potential risk associated with surface contamination in non-operational areas, any control designed to alert and protect workers is important and should be implemented. Further, Department regulations require that all activities must be conducted in compliance with an employer's Prevention Program. Since the requirement to post warnings in non-operational areas had been agreed to in the contractor's approved Prevention Program, it should have been implemented. Further, we noted surface contamination in several areas exceeded the regulatory limit of three micrograms where personal protective equipment would have been required, had the level of contamination been found in a beryllium operations area.

Appendix 1

OBJECTIVE

The objective of this audit was to determine whether BWXT Y-12, LLC (BWXT Y-12) had implemented surface contamination controls in accordance with its Chronic Beryllium Disease Prevention Program.

SCOPE

The audit was performed between December 2006 and November 2007. We conducted work at the Y-12 National Security Complex (Y-12) located in Oak Ridge, Tennessee and the National Nuclear Security Administration (NNSA) Headquarters in Washington, DC. Our efforts focused on beryllium contamination found outside of beryllium operational areas.

METHODOLOGY

To accomplish the audit objective, we:

- Reviewed laws, regulations, contractual requirements, and policies and procedures relevant to the management of beryllium contamination;
- Determined if baseline characterizations had been established and analyzed for Buildings 9201-5, 9808, and 9202;
- Analyzed Y-12 documentation relating to beryllium tooling, medical surveillance, and procurement;
- Toured numerous facilities at Y-12 to observe beryllium area postings; and,
- Held discussions with officials from the NNSA Headquarters, Y-12 Site Office, and BWXT Y-12 concerning the management of beryllium contamination.

We conducted this performance audit in accordance with generally accepted Government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective. The audit included tests of controls and compliance with laws and regulations related to beryllium operations. Because our review was limited, it would not necessarily have disclosed all internal control deficiencies that may have existed at the time of our audit. We did not rely on automated data

processing equipment to accomplish our audit objective. Finally, we assessed NNSA's compliance with the Government Performance and Results Act of 1993. Measures were in place regarding environment, safety and health issues that would apply to beryllium. We held an exit conference with Management on December 6, 2007.

RELATED AUDIT REPORTS

- The report on *Beryllium Controls at the Oak Ridge National Laboratory* (DOE/IG-0737, September 2006) found that the Oak Ridge National Laboratory did not properly manage activities related to beryllium contaminated equipment in Building 9201-2, which is located at the Y-12 National Security Complex. In particular, beryllium contaminated equipment was transferred to non-beryllium areas; employees working with contaminated equipment were not fully identified and notified; transferred equipment was not labeled appropriately; and, the building was not posted as a potential contamination area.

- The report on *Implementation of the Department of Energy's Beryllium-Associated Worker Registry* (DOE/IG-0726, April 2006), showed that the Department had not: maintained data completeness or accuracy in the worker registry; used the registry to evaluate health effects of beryllium exposure; nor used the registry as envisioned to examine the prevalence of beryllium disease. Thus, the audit results showed that program implementation did not meet expectations.

- The report on *Beryllium Oxide Operations at the Y-12 National Security Complex* (DOE/IG-0595, April 2003), disclosed a number of inefficiencies in Y-12's beryllium oxide operations. Specifically, operations were spread across the Y-12 site, and in some cases, were co-located with other Y-12 operations. In addition, manufacturing equipment and facilities were outdated, which increased manufacturing time and costs, and exacerbated health hazards associated with the use of beryllium.

Department of Energy
National Nuclear Security Administration
Washington, DC 20585

October 23, 2007

MEMORANDUM FOR: George W. Collard
Assistant Inspector General
for Performance Audits

FROM: Michael C. Kane
Associate Administrator
for Management and Administration

SUBJECT: Comments to Draft Report on Y-12 Beryllium Surface Contamination; A07YT040; IDRMS No 2006-31002

The National Nuclear Security Administration (NNSA) appreciates the opportunity to review the Inspector General's (IG) draft report, "Audit on Beryllium Surface Contamination at the Y-12 National Security Complex." We understand that the IG conducted this audit because of an allegation received in November 2006, that Y-12 workers were not adequately protected from beryllium exposure and that the IG wanted to determine if surface contamination controls were in accordance with Y-12's prevention program.

NNSA understands that allegations of mismanaging hazards must be resolved and when those allegations focus on beryllium and contamination the concerns for safety must be examined carefully. In the case of any allegation made about Y-12 and beryllium that resulted in this report, we believe that the complainant did not understand some basic issues related to beryllium and they may have been carried over to the draft report. Most specifically, the report gives the impression that exposure to surface contamination of beryllium can cause beryllium sensitization or Chronic Beryllium Disease. In fact, Chronic Beryllium Disease is caused by inhalation of airborne beryllium and should not be correlated to surface contamination.

We believe that there are some inaccuracies in the report and are providing comments in the following areas:

- It is inaccurate to correlate surface contamination to airborne beryllium exposure and health effects.
- The report does not consider air sampling that was conducted as part of Y-12's documented hazard assessment.
- The report is overstating the health effect of Chronic Beryllium Disease being fatal.

- The Y-12 contractor has a conservative internal limit for beryllium surface contamination, in the absence of regulatory limits, outside of beryllium operational areas. Failure to implement an additional *self-imposed* limit does not equal *failure to implement a key control.*

NNSA believes that the report is technically inaccurate in that it makes references and associations between beryllium surface contamination and the potential for personnel exposure to airborne beryllium and the associated health risks. Surface sampling is a qualitative indicator of housekeeping and can not be used to measure or predict airborne concentrations of beryllium or assess potential health risks. Any reference in the report, such as in the first paragraph, Introduction and Objective section, regarding "exposure to beryllium causing beryllium sensitization or Chronic Beryllium Disease" should be restated to indicate that "exposure to airborne beryllium may cause beryllium sensitization or Chronic Beryllium Disease." Chronic Beryllium Disease is caused by inhalation of airborne beryllium, which can not be correlated to surface contamination.

The statement regarding, "Chronic Beryllium Disease being often debilitating and sometime fatal" is an overstatement of health risks given the latest research on workers that participate in a medical screening program such as the BWXT Y-12 program. Due to early diagnosis and treatment provided by medical screening, it is not anticipated that Chronic Beryllium Disease will be fatal to any BWXT Y-12 personnel. Additionally, the latest research indicates that there is likely a dose response relationship with regard to beryllium exposure and health effects for individuals that do not have a genetic marker that predisposes them to beryllium sensitivity and potential Chronic Beryllium Disease.

The Beryllium Contamination Effects section of the report is not technically accurate in that it makes an association between beryllium surface contamination and airborne exposure/potential health effects. We recommend rewriting the Beryllium Contamination Effects section as follows: "The Department and BWXT Y-12 may not be maintaining effective housekeeping and contamination control practices in legacy beryllium areas. Legacy beryllium surface contamination should be maintained at a level as low as practical but in no instance should it reach a level that results in airborne beryllium as measured by personal and air area sampling."

Failure to post areas of legacy surface contamination above a self-imposed housekeeping limit does not rise to the level of "not consistently implementing key controls." There is no regulatory limit for legacy beryllium surface contamination outside of a beryllium operational area. BWXT Y-12 self-imposed a very conservative internal housekeeping limit. Not consistently implementing a self-imposed limit does not equate to "failure to implement a key control." We recommend removing the word "key" from the report.

Personal air sampling data, which is the only recognized method to assess personnel exposure, was not considered in the report. This data, along with area air sampling, are key elements of a hazard assessment. While the auditor was looking for a completed hazard assessment form, the report should note that air sampling was conducted in each of the areas of concern and that the formalized process for documenting these

assessments was instituted by BWXT Y-12 in 2005 as part of its Chronic Beryllium Disease Prevention Program. This sampling documents exposure to workers and does constitute the conduct of a hazard assessment.

With regard to the statement "BWXT Y-12 was unable to provide definitive reason for not fully implementing it's program requirements, BWXT Y-12 Management did discuss that and in accordance with 10 CFR 850, resources were deployed and hazard assessments conducted in the areas of highest risk which are active beryllium operations. Legacy contamination areas were of secondary concern given the relatively low risk.

In the cover memorandum, it should read, "BWXT Y-12 had not always posted signs alerting workers to the potential for beryllium surface contamination" vs. "posted signs alerting workers to the potential for exposure." Again, surface contamination can not be correlated to airborne beryllium exposure or health risks. Equally, the sentence, "BWXT Y-12 had not always performed or documented hazard assessments for beryllium contamination although documented assessment was vital to communication of exposure risks," is misleading. Air sampling, which is the primary component of a hazard assessment, was conducted in each area of concern noted in the report.

The following corrective actions are taking place in relation to the recommendations. In fact, Industrial Hygienists from the Office of Health, Safety and Security and NNSA Headquarters have reviewed the corrective actions and believe that the actions will fully address the recommendations from the Draft Report. These corrective actions have already been entered into the BWXT Y-12 Corrective Actions Planning System and will be tracked through to closure.

We support the actions that BWXT Y-12 has implemented in relation to the recommendations:

1. Fully implement the procedures within the Chronic Beryllium Disease Prevention Program including the statistical analysis of characterization data, posting warning signs in beryllium contaminated areas and performing and documenting hazard assessments for beryllium compounds.

Actions:

- Increase the frequency of beryllium Area Validations from annual to semi-annual and require line management concurrence that the validation is accurate. Status: Complete.
- Re-characterize the Building 9202 Foundry and disposition any samples 0.2ug/100cm2 in accordance with IH procedures. Status: Complete.
- Post Building 9808 in accordance with IH Procedures. Status: Complete.
- Issue a Standing Order to strengthen ES&H Requirements for all work activity in Building 9201-5. Status: Complete.
- Develop and complete refresher training for IH Staff on the surface beryllium characterization process and requirements to conduct and document hazard assessments in accordance with Y73-201 BWXT Y-12 CBDPP Manual. Status: Complete.

- Search databases and capture all surface contamination results 0.2 ug/100cm2 (1998-present). The purpose of this action is to address potential legacy surface contamination in accordance with the most recent version of the BWXT Y-12 CBDPP. Status: Complete.
- Establish a system to track the disposition of all surface contamination results >0.2 ug/100cm2 and document the decision making process via the hazard assessment required in Y73-201. Status: Due 11/15/07.
- Document the disposition of all surface contamination samples 0.2 ug/100cm2 from 1998 -present. Status: Due 7/31/08.

2. Implement a system for tracking IH recommendations to ensure they are addressed timely.

Action: Establish and implement a system to track IH recommendations to line management. Status: Due 12/15/07.

3. Ensure that the beryllium information database currently under development is completed and maintained.

Action: Implement the web-based Beryllium Communicator database. Status: Complete.

Again, NNSA appreciates the opportunity to review this draft report. Should you have any questions about this response, please contact Richard Speidel, Director, Policy and Internal Controls Management.

cc: Ted Sherry, Manager, Y-12 Site Office
Frank Russo, Senior Advisor, Environment, Safety and Health
David Boyd, Senior Procurement Executive
Karen Boardman, Director, Service Center

Department of Energy
Washington, DC 20585

October 5, 2007

MEMORANDUM FOR GREGORY H. FRIEDMAN
INSPECTOR GENERAL

FROM: GLENN S. PODONSKY
CHIEF HEALTH, SAFETY AND SECURITY OFFICER
OFFICE OF HEALTH, SAFETY AND SECURITY

SUBJECT: COMMENTS FOR IG DRAFT AUDIT REPORT: "Implementation of Beryllium Controls at the Y-12 National Security Complex." (AO7YT040)

The Office of Health, Safety and Security (HSS) has reviewed the subject draft audit report provided by the Inspector General's Office (IG) on September 20, 2007. Below is the response to the finding and recommendation addressed to HSS.

Recommendation 1:

We recommend that the Department of Energy, Chief Health, Safety and Security Officer revise the Department's regulations to require controls including posting areas when surface beryllium contamination occurs in non-operational areas.

Response:

Concur: Title 10 CFR 850 "Chronic Beryllium Disease Protection Program" (Rule) was published as a final rule in the Federal Register on December 1999. Since that time, HSS has been working with all of its stakeholders to characterize a number of issues posed by the Rule and has published a number of technical clarifications of the Rule. HSS has scheduled the development of an amendment to the Rule for FY 2008 to address those issues and formalize those technical clarifications. During the process of developing amendments to the Rule, HSS will address the IG's recommendation regarding the posting of areas when surface beryllium contamination occurs in non-operational areas.

If you have any questions, you may contact me at (301) 903-3777 or have a member of your staff contact Patricia Worthington at (301) 903-5926.

IG Report No. DOE/IG-0783

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