

**Resolution Form
DOE-0342 Chronic Beryllium Disease Prevention Program**

ID Number: 0342-34 **Title/Subject:** Incorporate Appendices E, F, and G from WBS 1.6.2 Work Control into DOE-0342

Initiated by: Colby Smith **Company:** WRPS **Date:** 10/25/12 **Phone #:** 373-2614

Affected Document Number / Revision:
DOE-0342, rev 1

Issue / Concern / Affected Step(s):
Incorporate Appendices E, F, and G, developed in support of the BeCAP Work Control product (WBS 1.6.2). These changes will be incorporated into DOE-0342, rev 2.

Discussion:
This Resolution Form integrates the documents developed by the Work Control Product Team into the CBDPP and is necessary to implement the requirements identified in the BeCAP Work Control product (WBS 1.6.2).

Resolution:
Inset the following Appendices into the applicable sections of the CBDPP.

- Appendix E: *Assessing, Documenting, and Reporting Beryllium Exposures Associated With Radioactivity*
- Appendix F: *Requirements for Conducting Beryllium Work.*
- Appendix G: *Typical Beryllium Personal Protective Equipment "Dress/Undress"*

Resolution Type:
Clarification: Document Change:

Resolution Completion Plan / Summary:
Incorporate Appendices into DOE-0342, Revision 2. The changes contained in this Resolution Form will take effect upon implementation of DOE-0342, Revision 2.

Web Site Posting Instructions:
Post as a pending change upon approval of the Resolution Form.

Removal from Web Site Instructions:
Move to the Archived Resolution folder upon incorporation into Revision 2.

Configuration Control:
Major: Minor: Initials: Committee Chair: SAS
Significant: Not Significant: Initials: DOE RL: PG DOE-ORP MEM

Signatures:

Accepted	Committee Chair	<u>Scott Baydel</u>	Date	<u>10/25/12</u>
Concurrence/ <u>Approved</u>	<u>PG</u> DOE-RL	<u>[Signature]</u>	Date	<u>10/26/12</u>
Concurrence/ <u>Approved</u>	<u>MEM</u> DOE-ORP	<u>[Signature]</u>	Date	<u>10/30/12</u>

**APPENDIX E:
Assessing, Documenting, and Reporting Beryllium
Exposures Associated with Radioactivity**

Throughout the Department of Energy (DOE) complex, operations involving activities where beryllium and radiological materials are used in concert with each other have been routine. This co-mingling of beryllium and radiological materials can provide the opportunity to gather and evaluate additional information about beryllium exposures or beryllium contamination levels.

In many cases, the number of variables is too great to effectively bound the beryllium contamination using radiological contamination data. When it is appropriate to associate beryllium with radiological contamination, the following steps shall be taken:

1. A Technical Evaluation (TE) shall be completed that documents the assumptions, limitations, and calculations used to determine the bounding values for the radiological contamination. The TE shall be compliant with the requirements for a Technical Evaluation (also called a Technical Basis Document) contained in the contractor's Radiation Protection Program. As part of the bounding values, the TE shall document the radiological contamination values that would be associated with $0.2 \mu\text{g Be}/100 \text{ cm}^2$ of surface contamination and $0.1 \mu\text{g Be}/\text{m}^3$ of airborne beryllium.
2. The Project for which the TE applies shall define limits for radiological contamination. These radiological limits shall correspond to no more than $0.02 \mu\text{g Be}/100 \text{ cm}^2$ of surface contamination and $0.01 \mu\text{g Be}/\text{m}^3$ of airborne beryllium. The project shall develop response plans that document the necessary steps to be taken in case the limits are exceeded. These response plans shall include beryllium surface and air sample requirements.
3. In the event of an airborne release of radiological contamination that triggers a Continuous Air Monitor (CAM) alarm, the Project shall calculate the theoretical concentration of beryllium that was present in the air. If the theoretical concentration exceeds $0.01 \mu\text{g Be}/\text{m}^3$, written notification of the theoretical beryllium exposure shall be provided to all employees who were present in the airspace at the time of the alarm. In addition, each employee shall also receive a summary of any beryllium monitoring (surface and/or air) that was conducted in response to the CAM alarm. Copies of the notifications shall also be sent to the Site Occupational Medical Provider for inclusion in each employee's medical records.

***NOTE:** Because CAM alarms may be caused by power spikes and equipment issues, the notifications are only required in the event that the CAM alarm is determined to have been caused by a radiological release and the theoretical concentration exceeds $0.01 \mu\text{g Be}/\text{m}^3$.*

**APPENDIX F:
Requirements for Conducting Beryllium Work**

1. Prime contractors shall have formal, documented agreements for inter-contractor work planning and work control that address beryllium work activities. These agreements shall identify roles and responsibilities for:
 - Work planning and/or work package development
 - Assignment of the field work supervisor
 - Delegation of work release authority and acceptance authority
 - Pre-job briefings
 - Identifying qualifications (Training & Medical)

While facility owners are responsible for evaluating the impacts of work scope and establishing location-specific requirements, they are not responsible for the technical oversight of work activities managed by other prime contractors.

2. The Contractor shall have a process that ensures all of the following, at a minimum:
 - Multiple work activities in a Beryllium Controlled Area (BCA) and/or Beryllium Restricted Area (BRA) are compatible with one another
 - Beryllium Work Permit (BWP) requirements are compatible with other work permit requirements used in a BCA/BRA (e.g., Radiological Work Permit, Asbestos Work Permit)
 - Beryllium worker training and medical clearances are verified prior to commencing work
 - Personal protective equipment (PPE) requirements for beryllium activities are compatible with requirements for other hazards (asbestos, radiological, lead, etc.)
 - Step off pad entry/egress protocols for beryllium work activities are documented
3. Each contractor shall maintain work control processes that utilize hazard analyses, which identify and evaluate beryllium hazards and establish applicable controls. Examples of process documentation include:
 - Job Hazard Analysis (JHA), Job Safety Analysis (JSA), Automated Job Hazard Analysis (AJHA), or equivalent
 - Beryllium Hazard Assessment (BHA)
 - Beryllium Work Permit (BWP)
 - Technical Evaluations
 - White Papers
 - Characterization Reports
4. The contractors hazard analysis process (JHA, JSA, AJHA or equivalent) shall identify beryllium as a hazard for the following:
 - All work in a BCA
 - All work in a BRA

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- Intrusive activities in an uncharacterized Beryllium Suspect Area (BSA)
 - Intrusive activities in equipment and/or systems labeled as Internal Beryllium Contamination
 - Intrusive activities in equipment and/or systems labeled as Potentially Internal Beryllium Contamination
 - Intrusive activities in areas, equipment and/or systems labeled for Fixed Beryllium Contamination
5. When the hazard analysis process identifies a beryllium hazard, the BHA and BWP will be used to identify the appropriate controls.
 6. The BHA and BWP shall be included with the work control documents.
 7. Instructions necessary to properly implement the controls identified on the BWP shall be incorporated into the work control documents.
 8. Prior to the start of a beryllium work activity, the following shall be performed in a pre-job briefing:
 - Review the BWP
 - Discuss the location and compatibility of beryllium work activities that may affect co-located, adjacent or other nearby work activities
 - Discuss potential beryllium upset conditions, how they may occur, and steps that shall be taken in response to such situations
 - Discuss lessons learned from past beryllium evolutions, as applicable
 9. If a beryllium-related issue is identified during an activity, work will be placed in a safe configuration, and a review shall be performed prior to work continuing. The review may be used to address a change in conditions or to ensure that the BHA/BWP or other work control documents are still valid. The review shall be documented on the work record, by a change to the BHA/BWP, or on other work control documents.
 10. Informal and formal post-job reviews are conducted to solicit feedback to improve work, discuss observed issues, provide opportunities for improvement, or to identify good practices observed during the work activity. These reviews may take place at the end of an entire job, or following a discrete part of a job. The level of risk and complexity associated with an activity determines the detail and formality required for the post-job review.
 - An informal post-job review is generally a discussion between the supervisor and the work team. At a minimum, an informal post-job review is required for all activities performed in a BRA. Documentation of the informal post-job review may be recorded in the work record but is not required to be captured on a formal post-job review record.
 - A formal post-job review includes team members and SME's discussing issues that arise during the job that are significant enough to warrant in-depth discussion. Formal post-job reviews may be conducted immediately following an issue or at the end of the job depending on the significance of the issue. These reviews shall be conducted and

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documented using existing contractor processes. The following are examples of situations requiring formal reviews:

- Beryllium work activities resulted in airborne beryllium above the action level
- A significant beryllium related issue was identified or repeated issues occurred
- Requested by an employee
- The activity was a first time performance of complex beryllium work

APPENDIX G:

Typical Beryllium Personal Protective Equipment “Dress/Undress”

Single Pair Personal Protective Equipment (PPE)

- One set of disposable coveralls
- Inner disposable booties/canvas boots and outer coverings such as disposable booties/rubber overshoes
- A minimum of two pair of surgeon/nitrile gloves
- A full face air purifying respirator (APR) with HEPA/P100 filters, entrants may upgrade to a powered air purifying respirator (PAPR) hood with HEPA/P100 filters, as required.

NOTE: All openings are normally taped

Undress of Single Pair Personal Protective Equipment

1. Place all items to be removed from beryllium area on designated equipment laydown area.
2. Remove outer disposable booties/rubber overshoes, as applicable.
3. Remove outer gloves.
4. Remove respiratory protection, as applicable.
5. Remove all exposed tape.
6. Remove coveralls.
7. Remove inner disposable booties/canvas boots, as applicable, and then step onto step-off pad.
8. Remove gloves and/or glove liners, as applicable.

Double Pair Personal Protective Equipment

Includes:

- Two sets of coveralls (outer pair shall be disposable)
- Inner canvas shoe cover and outer coverings such as disposable booties/rubber overshoes
- A minimum of two pair of surgeon/nitrile gloves
- A full face APR with HEPA/P100 filters, entrants may upgrade to a PAPR Hood with HEPA/P100 filters, as required.

NOTE: All openings are normally taped

Undress of Double Pair Personal Protective Equipment

1. Place all items to be removed from beryllium area on designated equipment laydown area.
2. Perform decon and undress, as applicable.
3. Remove outer disposable booties/rubber overshoes, as applicable.
4. Remove outer gloves.
5. Remove all exposed tape.
6. Remove outer coveralls.
7. Remove hood, as applicable.
8. Remove respiratory protection, as applicable.
9. Remove all exposed tape.
10. Remove inner coveralls.
11. Remove inner disposable booties/canvas shoe covers, as applicable, and then step onto step-off pad.
12. Remove gloves and/or glove liners, as applicable.