Office of Health, Safety and Security
Operating Experience Level 3

OE-3: 2012-02 March 2012

Radiologically Contaminated Respirators

Purpose

This Operating Experience Level 3 (OE-3) document provides information on a safety concern related to radiological contamination of laundered/reconditioned respirators and parts that have been certified as clean.

Background

Inadequately cleaned and decontaminated respirators represent a potential health issue and increase the potential for worker contamination. Three events at different Department of Energy (DOE) sites underscore the importance of a vendor Quality Assurance (QA) program and site verification that vendors meet requirements to provide safe, uncontaminated respiratory protection equipment. The three events described below occurred at three different DOE sites from 2008 to 2012 and involved the same offsite vendor.

In February 2012, at Y-12, a radiological survey of laundered/reconditioned respirators and supplied air breathing tubes found both total and removable alpha contamination on several air breathing tubes, even though some of the tubes had not been used for work involving radioactive material since last being laundered.

A subsequent sitewide extent-of-condition evaluation of unused laundered/reconditioned respiratory protection equipment led to multiple (unused) pieces of respiratory protection equipment and air breathing tubes being found with radiological contamination, including two that exceeded the occurrence reporting threshold. Of approximately 6,000 items surveyed, 10% were removed from service.

In April 2011, at the Separations Process Research Unit (SPRU), a contamination survey spot-check (10% of respirators in an eight-drum batch) of full-face respirators received from an offsite laundry vendor (Unitech) identified contamination at a reportable level on one unused respirator. A follow-up survey of the respirators remaining in the drum identified no additional contaminated respirators, and corrective actions included a 100% survey of all site respirators.

In January 2008, at the Savannah River Site (SRS), a quality control survey performed on a bag of laundered respirators received from the offsite laundry vendor (Unitech) discovered a reading of contamination above acceptable limits on one respirator head harness.

Discussion

Immediate follow-up to a discovery of radiological contamination is key to protecting worker health and safety and preventing recurrence.

Y-12 suspended the use of laundered/reconditioned respiratory protection equipment, notified the Department requesting that the information be disseminated across the DOE Complex, sent an assessment team to evaluate the subcontracted laundry facility (Global Solutions/Unitech), and completed a 100% survey of laundered/reconditioned respiratory protection equipment. As a result of Y-12's

notification, the Office of Health, Safety and Security (HSS) was able to quickly notify the DOE Complex of this issue through various DOE-wide Radiological Protection working group contacts.

SPRU changed the source for respirator cleaning and maintenance, conducted a 100% survey of all respirators on site, put additional controls in place for incoming respirators, and completed a site evaluation of the subcontractor's process, procedures, and performance. SPRU's supplier conducted an internal review and performed corrective actions.

The SRS vendor performed a review and discovered that a new supervisor had instructed workers to use the (incorrect) Electra survey probe, contrary to previous corrective actions dictating that they use alpha-beta instruments with a smaller probe area. In addition, SRS evaluated the adequacy of SRS's pre-release surveying process to ensure that contamination levels were known prior to used respiratory protection equipment being sent for laundering.

RECOMMENDATIONS

Projects and sites that use respiratory protection equipment of any type or configuration should ensure that the requirements of DOE Order 414.1D, *Quality Assurance*, are being met. DOE O 414.1D requires DOE, its contractors, and subcontractors to purchase, accept, and use only those items or services that conform to established government- or industry-accepted specifications; to procure services from approved suppliers; to perform inspection and acceptance testing; and to establish requirements for subcontractors, vendors, and suppliers, among other criteria.

Title 10 Code of Federal Regulations, Part 835, *Occupational Radiation Protection* (10 CFR 835), specifies requirements for control of material and equipment with radiological contamination exceeding specified levels. In addition, 10 CFR 835 has provisions that radiation exposures be as low as reasonably achievable (ALARA). Improper surveying of respiratory protection equipment could result in contaminated items exceeding 10 CFR 835 criteria without proper controls and radiation exposures that are not ALARA.

All DOE elements must develop a Quality Assurance Program that addresses 10 quality criteria including Criterion 7 - *Procurement*, and Criterion 8 - *Inspection and Acceptance Testing*. Contractor Requirements Documents (CRDs) have corresponding requirements for Procurement and Inspection and Acceptance Testing.

DOE sites should ensure that respiratory protection equipment has been properly laundered/reconditioned to comply with contract specifications and protect worker health and safety. The following actions are recommended:

- Procure items and services that meet established requirements and perform as specified.
- Verify that vendors have an implemented QA Program that meets DOE requirements – that is, ensure vendors are aware of the requirements to provide equipment that poses no safety hazards to workers.
- Ensure that contracts with vendors require post-cleaning inspection and survey of respirators and verify this is being performed.
- Verify that vendors train their personnel.
- Perform quality audits of vendors to verify implementation of requirements.
- Document vendor inspections.
- Routinely perform inspections/radiological surveys on laundered/reconditioned respirators returned from the vendor.

- Notify other organizations and sites when noncompliances are found and perform extent-of-condition evaluations.
- If necessary, terminate the vendor contract and remove the vendor from the Qualified Suppliers List.

Regardless of who performs work at a site, the contractor is responsible for complying with the requirements of the CRD and for disseminating the requirements to all subcontractors (such as the laundry vendors) to ensure compliance with the requirements and the safe performance of work. Consensus standard(s) (i.e., ISO 9000, ASME-NQA-1) that provide an equivalent level of quality requirements may be used in lieu of those specified to implement the requirements in the CRD.

CONCLUSION

Occurrences of radiological contamination of laundered/reconditioned respiratory protection equipment underscore the importance of vendor quality control, routinely performing radiological surveys, and notifying DOE and other organizations when vendor contractual non-compliances are discovered. Immediate corrective action and notification to other sites are essential for protecting worker health and safety and preventing recurrences.

REFERENCES

Occurrence Reporting and Processing System (ORPS) reports:

- EM-SR--WSRC-MOGEN-2008-0001, *Fixed Contamination of Laundered Respirator*
- EM---WGI-G2H2-2011-0004, *Discovery of Contamination on Laundered Respirator*
- NA--YSO-BWXT-Y12SITE-2012-0009, *Contaminated Reconditioned Supplied Air Respirator Breathing Tubes*
- American Society of Mechanical Engineers (ASME)-National Quality Assurance (NQA)-1, *Quality Assurance Requirements for Nuclear Facility Applications (QA)*
- DOE Order 414.1D, *Quality Assurance*
- International Organization for Standardization (ISO) 9000
- Title 10 CFR Part 835, *Occupational Radiation Protection*

ADDITIONAL SOURCES OF INFORMATION

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This OE-3 document requires no follow-up report or written response.

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