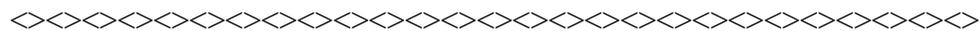


Date: Tue, 13 Oct 1998 10:31:25 -0400  
From: "Eubanks, Cynthia M. (EUB) " <eub@bechteljacobs.org>  
Subject: Yellow Alerts: Halogen Flashlights Melt Poly Bottles / Proper Use of In-Hand Procedures/Refresher Training

The following Bechtel Jacobs Company, LLC Lesson Learned Yellow Alerts were generated as a result of an incident that occurred at the East Tennessee Technology Park (ETTP). There are three lessons learned included in this message based on this incident. They are being disseminated for potential generic implications, as similar situations could occur at other facilities. If you have any questions, please contact Joanne Schutt at (423)574-1258, e-mail = s6u@ornl.gov.

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**TITLE: Halogen Flashlights Melt Polypropylene Bottles**

IDENTIFIER: Y-1998-OR-BJCETTP-0902      DATE: September 29, 1998

LESSONS LEARNED STATEMENT: Halogen flashlights can soften, degrade, and melt polypropylene when placed in close proximity. Care should be used when using halogen flashlights in close proximity to any material susceptible to heat.

DISCUSSION: On two separate occasions, holes were found in the 1-liter polypropylene bottles used for collection of fissile material. Both bottles had been attached to an approved vacuum cleaner and used to collect deposits loosened with a drill powered brush in the K-25 building. The incidents occurred on July 30, 1998, and on August 7, 1998. In both incidents, the fissile material was subsequently transferred to another bottle. The design of the system produced a negative pressure inside the bottle and precluded any release of material to the atmosphere. There was minimal (if any) potential for exposure to personnel in the vicinity of the vacuuming activities. Air samples collected for the day showed no elevated activity. The K-25 Building is classified as a hazard Category II Nuclear Facility

ANALYSIS: As part of the Deposit Removal Project, deposits of uranyl fluoride were being removed from piping in the K-25 Building. The work area was established as a high contamination airborne area, and personnel within the work area were wearing the appropriate personnel protective equipment. A criticality safe vacuum cleaner was used to collect the material in the safe volume/safe geometry bottle. Operators intermittently used flashlights near the translucent bottle to verify that material was being collected and to monitor the level within the bottle. At some point during the operation, the flashlight was laid down next to the bottle and left for the duration of the operation. When removal operations were complete, the bottle was

removed from the vacuum cleaner. While wiping the bottle for removal from the high contamination area, the operator noticed a small hole in the side of the bottle near the bottom. The hole was estimated to be 1/8" to 3/16" in diameter. An investigation into the first incident led to the conclusion that an unnoticed manufacturing defect was the cause. The project modified the work plan to examine the bottle carefully before and after use. The vacuum was used without incident on three subsequent occasions during which the flashlight was kept 3 to 4 inches away from the bottle. The second incident occurred on the fourth occasion after the first incident and on this occasion, the flashlight had been placed next to the bottle. Operations were suspended pending investigation of the cause. Visual inspections prior to use had verified the integrity of the bottle. Examination of the holes in both bottles revealed striking similarities. Both were at or near the same height from the bottom, both were approximately the same size, and both appeared to have ruptured to the inside of the bottle. Project personnel began to suspect heat as the cause of the problem. The work methods were simulated to examine possible sources of heat. The theory that small hot particles, generated by the drill and brush, was discarded when the brush was found to be cool to the touch after simulation. Another simulation placed three flashlights around the perimeter of the bottle attached to the vacuum cleaner. One location had been darkened in with a black marker, the second had a piece of metal tape on the inside of the bottle, and the third had neither tape nor dark spot. The flashlights were left in place for approximately 14 minutes before the vacuum was turned on. Personnel heard a distinct pop as soon as the vacuum was turned on. A hole similar to the holes from the incidents had been generated in the middle of the dark spot. A hole had started to form where the tape had been placed, and the third location showed no signs of deterioration. This test was repeated several days later with the same result. The project concluded that the flashlight in close proximity to the bottle was the direct cause of both incidents.

**RESOLUTION/RECOMMENDED ACTIONS:** Do not place halogen flashlights in close proximity to materials or processes which are subject to degradation or failure from localized heat without proper evaluation.

**ORIGINATOR:** T. W. Burwinkle; Project Management, 423-576-0423

**VALIDATOR:** M. B. Stiefel, 423-576-1334

**CONTACT:** Joanne E. Schutt, 423-574-1248

**NAME OF AUTHORIZED DERIVATIVE CLASSIFIER:** E. P. Larson

**NAME OF REVIEWING OFFICIAL:** D. D. Holt

**PRIORITY DESCRIPTOR:** Yellow/Caution

**KEYWORDS:** flashlights, polypropylene bottle, melt, halogen, heat

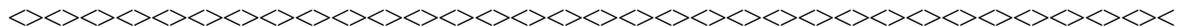
**REFERENCES:** ORO--BJC-K25GENLAN-1998-0006

**DOE FUNCTIONAL CATEGORIES:** Environmental Restoration and Waste Management

**BJC FUNCTIONAL CATEGORIES:** WM - Waste Management

**HAZARDS:** Radiological, Other

**WORK ACTIVITY:** Material Storage; Material Handling



**TITLE:** Proper Use of In-Hand Procedures

IDENTIFIER: Y-1998-OR-BJCETTP-0904 DATE: September 29, 1998

LESSONS LEARNED STATEMENT: Personnel may need to be retrained or reminded on the proper use of "in-hand" procedures.

DISCUSSION: On two separate occasions, holes were found in the 1-liter polypropylene bottles used for collection of fissile material. Both bottles had been attached to an approved vacuum cleaner and used to collect deposits in the K-25 building. The incidents occurred on July 30, 1998, and on August 7, 1998. In both incidents, the fissile material was subsequently transferred to another bottle. The design of the system produced a negative pressure inside the bottle and precluded any release of material to the atmosphere. There was minimal (if any) potential for exposure to personnel in the vicinity of the vacuuming activities. Air samples collected for the day showed no elevated activity.

ANALYSIS: The direct cause of both incidents was heat generated by halogen flashlights which had been placed next to the bottle during the vacuuming operation to verify that material was being collected and to monitor the level within the bottle. The investigation also revealed that procedures designated as "in-hand" were not in the field. Current requirements for "in-hand" procedures dictate that they be either in the hands of personnel doing or directing the work, or they are in the field for reference. Although it did not contribute to the incidents, project management concluded that personnel need to be retrained or reminded that procedures marked "in-hand" are to be in the field and referenced as necessary to assure proper implementation.

**RESOLUTION/RECOMMENDED ACTIONS:**

Project personnel may need to be reminded that "in-hand" procedures are required to be in the field during performance of the subject procedures and available for reference. In some cases, procedures must be read and followed step by step. The Bechtel Jacobs Company definition of "in-hand" procedures is in the process of being changed. The draft version requires that "in-hand" procedures be read and followed step by step. It also allows sections of the procedure to be designated as "in-hand" instead of the entire document. Current "in-hand" procedures may need to be revised to compensate for the new definition and project personnel need to be aware of current requirements.

ORIGINATOR: T. W. Burwinkle; Project Management, 423-576-0423

VALIDATOR: M. B. Stiefel, 423-576-1334

CONTACT: Joanne E. Schutt, 423-574-1248

NAME OF AUTHORIZED DERIVATIVE CLASSIFIER: E. P. Larson

NAME OF REVIEWING OFFICIAL: D. D. Holt

PRIORITY DESCRIPTOR: Yellow/Caution

KEYWORDS: in-hand procedure, procedures,

REFERENCES: ORO--BJC-K25GENLAN-1998-0006

DOE FUNCTIONAL CATEGORIES: Conduct of Operations, Environmental Restoration and Waste Management

BJC FUNCTIONAL CATEGORIES: OP - Conduct of Operations, WM - Waste Management

HAZARDS: Radiological, Hazardous Materials



Management

HAZARDS: Radiological, Hazardous Materials

WORK ACTIVITY: Material/Material Handling, Work Control

FOLLOW-UP ACTION: Information in this report is accurate to the best of our knowledge. As means of measuring the effectiveness of this report please notify Joanne E. Schutt at (423)574-1248, e-mail at [s6u@ornl.gov](mailto:s6u@ornl.gov) <mailto:s6u@ornl.gov> of any action taken as a result of this report or of any technical inaccuracies you find. Your feedback is important and appreciated.

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