Lesson Learned Statement:

DOE established a Type A Accident Investigation Board to determine the causal factors and root causes of the welding/cutting fatality at the Oak Ridge East Tennessee Technology Park (formerly K-25 Site) on February 13, 1997.

See the Type A Investigation Report

DOE also disseminated preliminary accident investigation findings related to the flammability of anti-contamination clothing and the requirements for fire watches. DOE/EH-0550 Issue No. 971, March 1997 at http://tis.eh.doe.gov:80/docs/hha/hha_97_1.html

Discussion:

The accident at the Oak Ridge East Tennessee Technology Park involved a welder working outside a fixed shop area removing equipment from a facility in a high contamination area using an oxygen/acetylene cutting torch. Because the work was being performed in a high contamination radiological area, the welder was required to wear two layers of anti-contamination clothing, a full face respirator and a welder's mask.

Sparks and/or molten metal (slag) from the cutting operations ignited the welder's anti-contamination clothing. In this accident, fire consumed the clothing being worn by the welder in a very short period of time (approximately 3 minutes or less).

This accident illustrates the possibility that personal protective equipment can, by itself, create additional and often unrecognized worker hazards; in this case, the flammability hazard associated with the anti-contamination clothing. Thus, current jobs need to be reviewed for additional safety hazards that might be associated with the use of multiple controls or items of personal protective equipment.

- Slip, trip, or fall hazards associated with improper or loose fitting PPE;
- Rotating machinery entanglement hazards associated with the use of lab coats or other loose garments for protection against contamination or chemical spill hazard;
- Heat stress associated with multiple layers of clothing
- Vision impairments associated with loose fitting hoods, fogging goggles, etc.

Where such hazards are identified, the work controls should be modified either by using different personal protection equipment (e.g., non-skid anti-contamination shoe covers) to eliminate or reduce these unanticipated hazards or by introducing additional protection against the new hazards.

Analysis:
Contributing factors to the accident:

- flammability of the anti-contamination clothing
- worker's inability to see that his clothing was on fire
- lack of a designated/dedicated fire watch for the operations
- adequacy of the Job Hazards Analysis

**Recommended Actions:**

Actions taken by Lockheed Martin:

All Lockheed Martin Energy Systems managers must ensure that active permitted work and related hazards analysis and controls have been reviewed for additional hazards associated with the use of multiple controls or items of personal protective equipment. Safety and Health and Rad Con field support personnel are available to assist in this review.

A memorandum confirming that existing permitted work and hazards analyses have been reviewed for unidentified hazards must be submitted by April 30, 1997. This memo should identify the number of jobs reviewed and the number in which previously unidentified hazards were identified.

Potential lessons learned from these reviews which should be shared with other organizations should also be included as an attachment to this memo.

This documentation is to be submitted to the LMES Lessons Learned Program Managers.

**Originator:**

Lockheed Martin Energy Systems, Inc. W. D. Altman, Quality Director & LMES Accident Corrective Action Response Team Lead (423)574-9911 APPROVED BY: F. R. Mynatt, Vice President, Supporting Operations and

**Validator:**

N/A

**Contact:**

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**Name Of Authorized Derivative Classifier:**

N/A

**Name Of Reviewing Official:**

N/A

**Priority Descriptor:**
Red / Urgent

**Keywords:**

WELDING, BURNS, ANTI-CONTAMINATION CLOTHING

**References:**

Occurrence Report - ORO--LMES-K25GENLAN-1997-0001

**Type A Investigation Report**

Information in this report is accurate to the best of our knowledge. As means of measuring the effectiveness of this report please use the "Comment" link at the bottom of this page notify the Lessons Learned Web Site Administrator of any action taken as a result of this report or of any technical inaccuracies you find. Your feedback is important and appreciated.

**DOE Function / Work Categories:**

Conduct of Operations - General
Fire Protection
Welding, Burning Hotwork

**ISM Category:**

Develop / Implement Controls

**Hazard:**

Fire / Smoke / NFPA

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*End of Lesson!*