

Date: Wed, 28 May 1997 15:38:27 -0400  
From: eub@ornl.gov (Cynthia M. Eubanks)  
Subject: LMES Yellow Alert: Elevator Piping Failure

The attached Lockheed Martin Energy Systems Lesson Learned Yellow Alert pertains to inspection and configuration control of elevator equipment and piping systems. If you have any questions, please contact Carol Bell, 423/576-8011, e-mail at [belljc@ornl.gov](mailto:belljc@ornl.gov).

Thanks--  
Cynthia M. Eubanks

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TITLE: Elevator Piping Failure

IDENTIFIER: Y-1997-OR-LMESY12-0501  
DATE: May 8, 1997

**LESSONS LEARNED STATEMENT:** Elevator equipment and piping systems should be inspected to detect potential failures. Additionally, strict configuration control of elevator components is necessary to ensure safety.

**DISCUSSION:** A freight elevator that services areas outside the 9204-2E MAA was being refurbished by a subcontractor. The elevator car was at the third floor of the building with two subcontractor employees aboard. Electrical maintenance on the doors at the third floor level was being performed as part of the refurbishment. The elevator pumps were not running. A noise from below the elevator car was heard by the workers, and the elevator car started to descend slowly on its own. The elevator car finally stopped below the first floor level when it settled on the elevator shaft bottom springs.

Upon investigation, a cracked weld was discovered in a cylindrical plate steel sound dampening "muffler" that was located between the elevator pumps and the lifting jack. Approximately 300 gallons of oil sprayed through the crack, wetting down electrical and piping components in the elevator equipment room.

Additionally, because of the elevator equipment room's close proximity to MAA emergency egress doors, approximately 50 gallons of oil flowed underneath the doors into one vault-type room (VTR) and other work areas inside the MAA. Fissile material containers had to be relocated in the VTR to avoid the spreading oil. Initial cleanup took approximately 300 man-hours, much of this on overtime. Further cleanup efforts are necessary and damaged equipment and piping will have to be replaced before resuming work.

**ANALYSIS:** A management review determined that elevator refurbishment efforts in progress at the time of the failure did not cause the failure. Elevator subject matter experts determined that the muffler was not a standard approved design and had probably been fabricated in the plant and installed many years ago. The elevator and it's associated equipment was approximately 25 years

old. The failed weld in the muffler was cut out and sent to Development for failure analysis. This analysis indicated that the weld failed due to progressive fatigue cracking over many years of cyclic stress.

**RECOMMENDED ACTIONS:** Elevators should be inspected by qualified individuals to determine if non-standard equipment, particularly plate steel cylindrical mufflers are installed in the system in a similar configuration. Elevator equipment should also be inspected for tell-tale signs of leakage at mechanical joints that might indicate potential future failure. Where elevator equipment rooms are adjacent to critical work areas, consideration should be given to diking the rooms to limit spread of spilled or leaked oil, or checking the integrity of existing diking.

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**TECHNICAL POINT OF CONTACT:** Jack Shelton, (423) 574-0533, FMO Elevator Supervisor

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**NAME OF AUTHORIZED DERIVATIVE CLASSIFIER:** Rex Lynch

**PRIORITY DESCRIPTOR:** Blue/Information/Lessons Learned

**DOE FUNCTIONAL CATEGORY:** Maintenance

**LMES FUNCTIONAL CATEGORY:** MA - Maintenance

**KEYWORDS:** elevator, oil, maintenance

**REFERENCES:** None

**FOLLOW-UP ACTION:** Information in this report is accurate to the best of our knowledge. As a means of measuring the effectiveness of this report please notify J. Carol Bell at 423/576-8011, e-mail at [belljc@ornl.gov](mailto:belljc@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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