Date: Sat, 18 Apr 1998 09:30:52 -0400
From: eub@ornl.gov (Cynthia M. Eubanks)
Subject: Yellow Alert: Missed Inspections and Tests on Automatic Sprinkler Systems

The following Lockheed Martin Energy Systems, East Tennessee Technology Park Yellow Alert is issued to communicate concerns associated with automatic sprinkler systems. If you have any questions, please contact Joanne Schutt (s6u@ornl.gov ) at (423)574-1248.

Cynthia M. Eubanks

TITLE: **Missed Inspections and Tests on Automatic Sprinkler Systems**

IDENTIFIER: Y-1998-OR-LMESETTP-0304
DATE: March 27, 1998

**LESSONS LEARNED STATEMENT**: When computerized database systems are used to schedule work for a level of compliance beyond their original design requirements, a manual method is needed for confirming that work is adequately scheduled.

**DISCUSSION**: On January 5, 1998, during reviews of inspection and test records for fire protection systems in the K-33 and K-31 Buildings, in preparation for their transition to another company, it was discovered that no inspection records were in the database for building sections 902-1, 902-5, 902-6, 902-7, and 902-8 for several months. Upon further investigation, it was determined that the computerized fire inspections management information system (FIMIS) had not scheduled monthly fire department inspections for those five sections of Building K-33.

The requirement to conduct the missed inspections is to comply with national standards and Department of Energy (DOE) directives contained in the Oak Ridge Operations (ORO) Fire Protection Guide, 8th edition, not to expressly meet operational safety type requirements. Furthermore, the Basis of Interim Operation (BIO) document for the facility states that the effected sprinkler systems were required to be operable as part of the safety basis for operating in the building. Even though the monthly visual inspections and one cycle of semiannual tests were missed, the more comprehensive inspection and tests for system operability were successfully completed in April 1997 when full-flow trip tests were conducted.

The original design and implementation of FIMIS did not anticipate its use to satisfy the compliance rigor associated with tracking inspections and tests of safety significant systems. Therefore, the quality control checks necessary to assure such an enhanced level of rigor was not designed into the older computerized system. This lack of a manual check and balance resulted in the missed inspections.

As of January 9, 1998, all sprinkler system visual inspections were completed. All annual fire extinguisher inspections have been completed, and all semiannual alarm, main drain tests were completed on January 16, 1998. Additionally, the FIMIS programming error has been corrected and tested to assure that similar programming errors will not occur in the future.

**ANALYSIS**: An evaluation of the FIMIS by the computer programmer revealed that an error in the programming logic for the system had inadvertently eliminated these building sections from the scheduler at a time when five other buildings were placed in a "standby" status to remove them from the work schedule.

The direct cause of this incident was a design problem in the computer program that schedules inspections, tests, and maintenance work for fixed fire protection systems which erroneously eliminated the scheduled for building sections of K-33.

A contributing case was the way that inspection and testing work was organized. Prior to January 1998, inspection and testing work on fire protection systems in buildings was allocated in a manner that maximized the visits of all fire department personnel to each building on the site. This method would divide work in any given building amount more than one shift. Consequently, since no single shift had responsibility for an entire building, if any portions of a building are not scheduled, no shift would become aware of it since it could be assumed that the work was assigned to some other shift to complete.

The root cause for this incident was inadequate administrative control. The computerized scheduling and tracking system provided by FIMIS was less than adequate in its ability to assure that errors would not occur when changes are made to the database.

**RESOLUTION/RECOMMENDED ACTIONS:**

1. Conduct all surveillances and tests that were missed for fire sprinkler systems and fire extinguishers.

2. Correct the programming coding error and test changes made to prevent the FIMIS System from eliminating any active buildings from the scheduling of inspection, testing, and maintenance work.

3. Formally implement a change to the Fire Department's method of allocating monthly inspection and testing work to assure that a single shift is responsible for all inspection and testing work in an assigned building or facility so as to introduce a manual check to insure all work is scheduled and assigned.

ORIGINATOR: Lockheed Martin Energy Systems; William D. Harris, 423/576-8812 Protective Services Organization
VALIDATOR: C. P. Baxter, 423/574-0787 Quality Services Organization
CONTACT: Joanne E. Schutt, 423/574-1248
NAME OF AUTHORIZED DERIVATIVE CLASSIFIER: n/a
NAME OF REVIEWING OFFICIAL: A. S. Quist
PRIORITY DESCRIPTOR: Yellow/Caution
DOE FUNCTIONAL CATEGORY: Fire Protection, Information Technology
LMES FUNCTIONAL CATEGORY: FP - Fire Protection Engineering, IO - Information Flow and Operations
KEYWORDS: fire protection systems, inspection, sprinkler systems, fire extinguisher, alarm,

schedule, database
REFERENCES: ORO--LMES-K25GENLAN-1998-0003

**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 of any action taken as a result of this report or of any technical inaccuracies you find. Your feedback is important and appreciated.

Cynthia M. Eubanks, eub@ornl.gov
Performance/Quality Assurance Org.
Bechtel Jacobs Company, LLC
Phone: (423)576-7763; Pager = 873-6968
Fax: (423)574-5398