General

ENTERED

A.J. Eggenberger, Chairman
John E. Mansfield, Vice Chairman
Joseph F. Bader
Larry W. Brown
Peter S. Winokur

# DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700 Washington, D.C. 20004-2901
(202) 694-7000

December 8, 2008

The Honorable Thomas P. D'Agostino
Administrator
National Nuclear Security Administration
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0701

Dear Mr. D'Agostino:

In a letter to the National Nuclear Security Administration (NNSA) dated May 31, 2005, the Defense Nuclear Facilities Safety Board (Board) raised a number of issues regarding weaknesses in the fire protection program at Los Alamos National Laboratory (LANL). Paramount among these issues was the lack of a formal plan to address the baseline needs assessment for fire and emergency services conducted in 2004 and the lack of a long-term contract for these services with Los Alamos County. The Board acknowledges NNSA's recent completion of a cooperative agreement for fire and emergency services with Los Alamos County. The Board remains concerned regarding the outlook for aligning those services with the unique capabilities required to meet the fire protection needs of LANL. The enclosed report, prepared by the Board's staff, indicates that recommendations resulting from prior baseline needs assessments have not been addressed despite extensive analysis and plans.

The report further indicates that there are weaknesses in the current capability to respond to a fire or other emergency event in the unique hazard environments associated with defense nuclear facilities at LANL. This situation is a direct result of the failure to implement long-standing recommendations made in the 1995 and 2004 Baseline Needs Assessments, and is further evidenced by observations made and issues identified by Los Alamos National Security, LLC during recent emergency exercises. The enclosed report also finds that staffing shortages may be hindering needed improvements to the laboratory's fire protection program.

The Board understands that an updated baseline needs assessment is being prepared and is expected to be completed in December 2008. Timely completion of a comprehensive assessment and aggressive resolution of the associated recommendations should help improve the capabilities to respond to an emergency at LANL. The Board believes that NNSA must do a better job of implementing recommendations resulting from their baseline needs assessment than previously done in order to provide an adequate level of fire protection.

EXHIBIT
tabbies
215

33391

Therefore, pursuant to 42 U.S.C. § 2286b(d), the Board requests a report within 90 days after receipt of this letter that provides the following information:

- The prudent immediate measures to be taken to begin improving the identified weaknesses in fire and emergency response capabilities prior to fully implementing the updated baseline needs assessment;

- A summary of the results of the latest 2008 Baseline Needs Assessment (being prepared) focusing on the specific capabilities (in terms of equipment, personnel, training, and planning) necessary to provide comprehensive, effective fire and emergency response for the defense nuclear facilities at LANL and how the recently completed cooperative agreement for fire and emergency response will address these capabilities; and

- The strategy and schedule for achieving the necessary fire and emergency response capabilities.

Subsequently the Board also requests a report within 180 days of receipt of this letter that details plans, schedules, funding sources, and progress for fully implementing the updated Baseline Needs Assessment.

Sincerely,

A. J. Eggenberger
Chairman

Enclosure

c: Mr. Donald L. Winchell, Jr.
Mr. Mark B. Whitaker, Jr.

**DEFENSE NUCLEAR FACILITIES SAFETY BOARD**

# Staff Issue Report

September 5, 2008

**MEMORANDUM FOR:** T. J. Dwyer, Technical Director

**COPIES:** Board Members

**FROM:** J. Galaska, C. March

**SUBJECT:** Fire and Emergency Response Capabilities for Defense Nuclear Facilities at Los Alamos National Laboratory

This report documents a review of the capabilities to respond to a fire or other emergency at Los Alamos National Laboratory's (LANL) defense nuclear facilities. This review was conducted by members of the staff of the Defense Nuclear Facilities Safety Board (Board) J. Galaska and C. March, who visited the laboratory during July 21–23, 2008. The review also encompassed an examination of the laboratory's fire protection program, including an assessment of documentation covering recent emergency drills and exercises in which the Los Alamos County Fire Department (LACFD) participated.

Federal regulations and contractually invoked Department of Energy directives require the laboratory to provide suitable fire and emergency response for its defense nuclear facilities. The primary requirements for providing fire and emergency response are summarized in the attachment to this report and form the basis for the issues outlined in this report.

**Prior Recommendations to Achieve Necessary Response Capabilities Have Been Poorly Implemented.** An effective emergency response capability is measured by the establishment of and comparison with predefined emergency fire, medical, and hazardous materials response capabilities, including staffing, apparatus, facilities, equipment, training, pre-plans, offsite assistance, and procedures. These requirements are typically identified in the Baseline Needs Assessment and are supplemented with additional detail in responder training plans and facility-specific fire pre-plans.

A Baseline Needs Assessment was last completed at LANL in 2004. Seventeen recommendations were developed, which covered response to both the laboratory and the balance of Los Alamos County. Since that time, minimal progress has been achieved in closing these recommendations. Efforts essentially stopped in 2007 because of a perception of changing needs. Four recommendations that have not been closed pertain directly to the capability to respond to an emergency at a nuclear facility. These recommendations are long-standing and date back to similar recommendations in the 1995 Baseline Needs Analysis. The recommendations also correspond to the weaknesses in staffing, training, and planning observed

during the recent exercises, which are discussed further below. In particular, the recommendations include the need to:

- Increase minimum staffing from 28 to 45 per shift for a total of 159 personnel
- Develop a "hot patient" protocol for dealing with contaminated victims
- Ensure the accuracy of hazard information in fire pre-plans
- Conduct familiarization walk-throughs by the firefighters of each major facility at least biennially

**Exercise Performance Suggests the Need for Improvement.** The laboratory contractor's observations regarding recent site emergency drills and exercises in which LACFD participated suggest significant weaknesses in the ability of the fire department to provide an appropriate level of emergency response for LANL's defense nuclear facilities. These observations indicate a lack of comprehensive training and hazard awareness, insufficient staffing, and a lack of individual facility response planning. Key observations made by the contractor include the following:

- In an exercise on July 30, 2007, at the Waste Characterization, Reduction, and Repackaging Facility, LACFD personnel were ineffective in providing first aid to an injured and contaminated man because of an inability to understand and properly interpret the magnitude of hazard related to the dose rate and contamination level information that they were provided.
- In an exercise on November 6, 2007, the route of entry used by both the facility and LACFD personnel responding to a fire at the Plutonium Facility would have resulted in the spread of contamination. Furthermore, responding groups did not establish required clean and contaminated zone perimeters. As a result, the first LACFD vehicle to arrive parked near a potential contamination zone; it also blocked access for additional responding units.
- In an exercise on May 20, 2008, LACFD personnel were unprepared to respond into a tritium release area at the Weapons Engineering Tritium Facility. Participation in the exercise by an actual ambulance crew was also intentionally eliminated because of LACFD staffing shortages.

The Board's staff believes these observations require near-term actions to improve emergency responders' training, pre-planning, and familiarity with the defense nuclear facilities at LANL. Furthermore, despite the significant observations listed above, the exercise objectives were rated as having been successfully met in most cases. This indicates the need to refine the objectives related to responders, including LACFD, so as to assess the effectiveness of training and planning more rigorously. Supplemental exercises and drills focused on first responders should be considered.

**Updated Assessment to Improve the Understanding of Response Needs.** The laboratory has initiated an update to the 2004 Baseline Needs Assessment, with a projected completion date of December 2008. This update, which will focus solely on laboratory needs, will establish requirements for emergency response capabilities for the facilities at LANL. This updated information will delineate the expectations for performance in a nuclear facility environment, as well as revised training and fire pre-plans to comprehensively address issues such as the following:

- Firefighting within radiologically contaminated areas
- Appropriate usage of firefighting water in areas containing nuclear materials
- Appropriate usage of specialized firefighting agents, such as graphite and metal-x, on nuclear materials
- Firefighting techniques and issues for fires within gloveboxes
- Firefighting techniques and issues for fires within high-efficiency particulate air filter plenums
- Emergency medical response for radiologically contaminated individuals
- Containment of firefighting water runoff
- Hazard awareness and response to incidents involving unique materials such as tritium, plutonium, and enriched uranium
- Operation and use of active and passive nuclear facility fire protection features

**Inadequate Staffing May Be Impeding Progress toward Improving the Fire Protection Program.** Previous staffing evaluations identified a need for ten engineers in the Fire Protection Group. However, the budgeted staffing level for these functions is currently six engineers, with unfunded plans for an additional two limited-term positions. The limited staffing has impeded progress on previously identified fire protection issues, including inadequate program oversight; delayed completion of Fire Hazard Analyses; incomplete resolution of recommendations resulting from Fire Hazard Analyses; and lack of timely completion of required inspection, testing, and maintenance of fire protection equipment.

The laboratory is also served by a Fire Marshal Office, which is intended to provide independent review of fire protection design and analysis activities, concurrence with fire protection code equivalencies and exemptions, and participation in readiness verification activities. Staffing for this group is currently at one, with unfunded plans to add a second engineer. At least in part due to staffing shortages in the Fire Protection Group, the Fire Marshal has been providing expanded support to that group for high priority issues. The Board's staff believes this situation compromises the independence of the Fire Marshal function.

**Site-Wide Fire Water Distribution Network Requires Evaluation.** Aside from Technical Area 55, which has its own dedicated system, the defense nuclear facilities at LANL are supplied with fire water from a site-wide distribution system fed by Los Alamos County. In a number of nuclear facilities, this system supports fire suppression systems that have been identified as safety-class or safety-significant. As a result, NNSA and laboratory management have begun evaluating the adequacy of this water-supply system—which is not classified as a safety system—to reliably supply adequate water to these facility safety systems. The Board's staff understands

that these evaluations include a review of the distribution network; the potential for single-point failures; monitoring and alarm systems; facility notification protocols; and surveillance, calibration, and maintenance requirements. The intent of these efforts is to establish confidence that any degradation in the site-wide water supply that could impact credited fire suppression systems in nuclear facilities would be identified quickly, allowing the affected facilities to take appropriate response actions.

## Attachment

### Regulatory Drivers: Code of Federal Regulations and Department of Energy Orders

Department of Energy (DOE) Order 420.1B, *Facility Safety*, Section II, Part 3.b.(7), requires access to qualified and trained firefighting personnel in accordance with following:

> Access to qualified, trained fire protection staff that includes fire protection engineers, technicians, and fire fighting personnel to implement the requirements of this Order.

DOE Order 151.1C, *Comprehensive Emergency Management System*, Part 4.a.(1)(a), requires the development of a system that ensures the following:

> The Department can respond effectively and efficiently to Operational Emergencies and Energy Emergencies and can provide Emergency Assistance so that appropriate response measures are taken to protect workers, the public, the environment, and the national security....

DOE Order 151.1C, Sections 4.a.(2) and (3), further requires emergency planning and preparedness that includes identifying hazards, preparing emergency plans and procedures, and practicing response:

> (2) Emergency planning must include identification of hazards and threats, hazard mitigation, development and preparation of emergency plans and procedures, and identification of personnel and resources needed for an effective response.
> (3) Emergency preparedness must include acquisition and maintenance of resources, training, drills, and exercises.

Under 10 Code of Federal Regulations (CFR) 835.1302, individuals performing emergency actions are required to be trained on the identified hazards in accordance with the following:

> **§ 835.1302 Emergency exposure situations.**
> (a) The risk of injury to those individuals involved in rescue and recovery operations shall be minimized.
> (b) Operating management shall weigh actual and potential risks against the benefits to be gained.
> (c) No individual shall be required to perform a rescue action that might involve substantial personal risk.
> (d) Each individual authorized to perform emergency actions likely to result in occupational doses exceeding the values of the limits provided at § 835.202(a) shall be trained in accordance with § 835.901(b) and briefed beforehand on the known or anticipated hazards to which the individual will be subjected.

In 10 CFR 851, Appendix A, *Worker Safety and Health Functional Areas*, requirements are established for implementing the applicable functional areas mandated by § 851.24. The following portions apply to the emergency response organization:

> 2. Fire Protection
> (a) Contractors must implement a comprehensive fire safety and emergency response program to protect workers commensurate with the nature of the work that is performed. This includes appropriate facility and site-wide fire protection, fire alarm notification and egress features, and access to a fully staffed, trained, and equipped emergency response organization that is capable of responding in a timely and effective manner to site emergencies.
> (b) An acceptable fire protection program must include those fire protection criteria and procedures, analyses, hardware and systems, apparatus and equipment, and personnel that would comprehensively ensure that the objective in paragraph 2(a) of this section is met. This includes meeting applicable building codes and National Fire Protection Association codes and standards.