[DOE LETTERHEAD]

May 6, 1996

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, N.W.
Suite 700
Washington, D.C. 20004

Dear Mr. Conway:

Members of the Defense Nuclear Facilities Safety Board (DNFSB) staff conducted a review of the Los Alamos Critical Experiments Facility (LACEF) operations and safety analysis documentation on July 25-27, 1995. A report of this visit, dated August 11, 1995, was provided to the Department under your cover letter on November 3, 1995. This report has been reviewed by the Department and all of the issues raised by the DNFSB staff are addressed in the enclosed document.

I appreciate the review and assure you that the issues raised by your staff have been carefully considered. Moreover, an ongoing review and update of the LACEF Safety Analysis Report will include a review of the derivation of Technical Safety Requirements to determine if additional coverage is required to enhance safety.

Sincerely,

Victor Stello, Jr.
Principal Deputy Assistant Secretary for Safety and Quality
Defense Programs

Enclosure

cc:
Mark Whitaker, S-3. 1, w/encl.

**RESPONSE TO ISSUES RAISED IN
THE DEFENSE NUCLEAR FACILITIES SAFETY BOARD STAFF
MEMORANDUM ENTITLED
"LOS ALAMOS CRITICAL EXPERIMENT FACILITY SAFETY ANALYSIS REPORT REVIEW"
DATED AUGUST 11, 1995**

The Department of Energy and the Los Alamos National Laboratory (LANL) have carefully considered all issues raised by the Defense Nuclear Facilities Safety Board (DNFSB) staff during their review of the Los Alamos Critical Experiments Facility (LACEF) on July 25-27,

1995. A discussion of each issue and resultant action to be taken is provided below. Issues are referred to by the paragraph number in which they appear in the DNFSB staff memorandum, "Los Alamos Critical Experiment Facility Safety Analysis Report Review," dated August 11, 1995.

ISSUE 1: Paragraph 2. "Technical Specification Requirements (TSR) currently in use predate the issuance of Department of Energy (DOE) Order 5480.22; revised draft TSRs have been completed and should be implemented as soon as possible. "

RESPONSE: The new Technical Safety Requirements (TSRs), which comply with DOE Order 5480.22, "Technical Safety Requirements," (with Change 1, dated 9-15-92) were approved by the Albuquerque Operations Office on November 21, 1995, contingent upon inclusion of some recommended changes. An implementation plan was prepared by the LANL, and subsequent implementation of the TSRs is progressing on schedule. Full implementation of the new TSRs will be accomplished by May 1996.

ISSUE 2: Paragraph 4.a. "budget reductions and uncertainties have had a discernable impact on the LACEF. The staff is one-half the level that existed in 1989 and numbers about 45 people."

RESPONSE: Laboratory staffing has decreased since 1989. Currently, The LACEF staff consists of 14 full time equivalent employees (FTEs). An additional 45 FTEs work in other projects within the Nonproliferation & International Security (NIS-6) Group. Safety is assured by the staffing and qualifications commitments in TSR 5.5, "Operating Staff Requirements" and the LACEF Training Implementation Plan, developed to comply with DOE Order 5480.20, which assures a well-qualified crew for each experiment. However, the current LACEF staffing level does constrain the scope of the experimental program that can be undertaken

ISSUE 3: Paragraph 4.b. "There are 15 critical assemblies for steady state, burst, and subcritical experiments."

ISSUE 4: Paragraph 4.d. "The TSR currently approved for use is LA-6016-SOP, Rev. 2, dated September 1988, and lacks a comprehensive set of requirements as specified in DOE Order 5480.22. A new draft TSR has been completed and awaits DOE's approval."

RESPONSE: See Response to Issue 1, above.

ISSUE 5: Paragraph 4.d. "A preliminary review of this draft TSR indicated that additional requirements should be considered consistent with the present SAR assumptions:

· Surveillance of sealed floor drains in KIVA I and II to prevent critical mass accumulation."

RESPONSE: The floor drains are sealed in all three kivas. The integrity of the seals will be checked quarterly in accordance with the existing Kivas I, II, and III Maintenance Procedure NIS-6CEF-PMP-96.26, R01. This requirement will be added to the TSRs.

ISSUE 6: Paragraph 4.d. "A preliminary review of this draft TSR indicated that additional

requirements should be considered consistent with the present SAR assumptions:

· Specification of lubrication in BIG TEN assembly to avoid sparking in pyrophoric uranium."

RESPONSE: The BIG TEN rods and insertion holes are metal-clad. Thus, the primary contact surfaces are cladding and do not involve uranium. Sparking is caused by the mechanical rubbing of oxide dust in minor quantity which accumulates in the insertion holes. It is not credible for sufficient heat to be generated in this process to cause combustion of the bulk assembly materials.

ISSUE 7: Paragraph 4.d. "A preliminary review of this draft TSR indicated that additional requirements should be considered consistent with the present SAR assumptions:

· Inspection of GODIVA fuel for cracking that could impede motion of the control element or safety block."

RESPONSE: In keeping with ALARA, disassembly and inspection of GODIVA-IV is only performed when deemed essential to resolve unexplainable discrepancies in measured parameters. The GODIVA-IV Experiment Plan (N2CEF-EXP-219) specifies that operations will not proceed if there are any reactivity differences which cannot be attributed to temperature, machine configuration, or experimental coupling. With temperature, machine configuration, and experimental coupling held constant, typical GODIVA reproducibility is on the order of a few tenths of a cent. Experience indicates that even an extremely small crack in the fuel which is too small to impede motion of the control element or safety block will result in a significant difference in delayed critical reactivity measurements (as much as 46 cents). In the past, when an unexplainable change in delayed critical reactivity measurements of this magnitude occurred, the experiment was stopped and the machine was disassembled and inspected. Consequently, based on operational experience, an appropriate procedure for verifying reactivity reproducibility which encompasses the cracked plate scenario has been specified in TSR Section 5.2.

ISSUE 8: Paragraph 4.d. "A preliminary review of this draft TSR indicated that additional requirements should be considered consistent with the present SAR assumptions:

· A KIVA I inventory limit of 200 kg of highly enriched uranium (HEW) since the value is used as a limit in the analysis of natural phenomenon hazards."

RESPONSE: A thorough reassessment of the "Catastrophic failure of Kiva I and dispersal of uranium inventory" event will be conducted. A new safety analysis will be performed for HEU at risk to be stored in Kiva I. Based on the new safety analysis and projected program needs for HEU storage in Kiva I, TSR requirements for HEU at risk storage in Kiva I will be established. In the interim, administrative controls will be implemented to assure that the quantity of HEU at risk which is stored in Kiva I is below 200kg.

ISSUE 9: Paragraph 4.d. "A preliminary review of this draft TSR indicated that additional requirements should be considered consistent with the present SAR assumptions:

· A maximum SHEBA rod withdrawal speed."

RESPONSE: An Interlock prevents fuel from being added while the safety rod is inserted. Once inserted, unless the interlock fails and an operator makes a procedural error, additional fuel cannot be added. Therefore, withdrawal of the safety rod with fuel present results in addition of the same amount of reactivity that was taken away from the system when the rod was inserted, regardless of the withdrawal speed. Consequently, as the critical assembly is currently configured, the safety rod withdrawal speed has no impact on the safe operation of the assembly.

ISSUE 10: Paragraph 4.d. "A preliminary review of this draft TSR indicated that additional requirements should be considered consistent with the present SAR assumptions:

· Pu clad integrity inspection (smears)."

RESPONSE: Specific requirements for inspection (swipes) of plutonium cladding as stated in the SAR will be amplified in a TSR. The requirements in the SAR are currently being met as a part of the Radiation Protection and Monitoring Program which is required by TSR Section 5.4.

ISSUE 11: Paragraph 4.d. "A preliminary review of this draft TSR indicated that additional requirements should be considered consistent with the present SAR assumptions:

· Securing of SKUA experiments to prevent movement affecting criticality."

RESPONSE: Section 3/4.1.9 of the new TSRs requires securing of all experiments which could potentially move and add reactivity to a critical assembly. This requirement is implemented through test plan procedures for each of the critical assemblies.

ISSUE 12: Paragraph 4.d. "A preliminary review of this draft TSR indicated that additional requirements should be considered consistent with the present SAR assumptions:

· Hillside vault inventory limits for Pu (10kg) and U(100kg)."

RESPONSE: A thorough reassessment of the "Fire within the Hillside Vault (PL-26) and dispersal of the uranium and plutonium inventory" event will be conducted. A new safety analysis will be performed for HEU and plutonium at risk stored in the Hillside Vault. Based on the new safety analysis and projected program needs for HEU and plutonium storage in the hillside vault, TSR requirements for HEU and plutonium at risk stored in the Hillside Vault will be established. In the interim, administrative controls will be implemented to assure that the quantities of HEU and plutonium at risk which are stored in the Hillside Vault are below 100kg for HEU and 10kg for plutonium.

ISSUE 13: Paragraph 4.e. "In response to a staff question concerning the potential for hydrogen gas production due to radiolysis in fissile solutions, LACEF personnel indicated that inert gas pressure is monitored to ensure that flammability limits are not exceeded. This item is also appropriate for consideration as a TSR."

RESPONSE: In the SHEBA assembly, N2 cover gas is used to sweep out radiolytic and fission product gases to a catalytic recombiner in the system. The cover gas pressure, flow rate, and valve openings are described in the SHEBA Experiment Plan (N2CEF-EXP-225, R02). These system operating parameters are checked prior to each operation to assure they are within the operating envelope. If they are not, an interlock terminates the operation. This interlock was made a part of the safety system because no analysis regarding the safety significance of the cover gas system was available. In February 1996, the LACEF staff performed a rigorous analysis that demonstrates that the maximum concentration of radiolytic gasses generated during any conceivable SHEBA operation is well below the minimum concentration required to produce an explosive mixture in the SHEBA critical assembly vessel. Thus, accumulation of an explosive mixture in the SHEBA cover gas system is not credible and the LACEF staff is considering removal of this interlock from the safety system. The referenced analysis, which is based on empirical data, will be included in the next revision of the SAR.