[DNFSB LETTERHEAD]

June 21, 1993

Dr. Everet H. Beckner
Acting Assistant Secretary
for Defense Programs
Department of Energy
Washington, D.C. 20585

Dear Dr. Beckner:

Defense Nuclear Facilities Safety Board (DNFSB) staff members (A.G. Jordan and R.W. Zavadoski) along with a DNFSB outside expert (D.S. Boyd) visited the Cassini operation in the TA-55 facility at Los Alamos National Laboratory (LANL) on June 3, 1993. DNFSB staff also visited TA-55 on March 2-4, 1993.

The enclosed DNFSB staff observations and comments identify concerns with the inspection and maintenance of glovebox gaskets and penetrations and are provided for your consideration in your on-going review of the readiness of TA-55 to begin processing plutonium oxide.

If you need any further information, please let me know.

Sincerely,

John T. Conway
Chairman

Enclosure

C: Bruce Twining, Manager, ALO
Mark Whitaker, Acting DOE/DR-1

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

June 16, 1993

MEMORANDUM FOR: G.W. Cunningham, Technical Director

COPIES: Board Members

FROM: Albert G. Jordan, Roger W. Zavadoski

SUBJECT: Los Amos National Laboratory (LANL): Observations from a Review of the Cassini Operation at the TA-55 Facility

1. Purpose: This trip report documents a review conducted by the Defense Nuclear Facilities Safety Board (DNFSB) technical staff on June 3, 1993 of glovebox integrity for the Cassini operation at the TA-55 plutonium facility at LANL.

2. Summary: If LANL were to systematically and thoroughly inspect glovebox gaskets, penetrations and any other potential leak paths of finely-divided powder in the Cassini line before proceeding with processing, the potential for a release of 238PuO2 into the processing rooms would be reduced.

3. Background: In support of the Cassini mission, DOE is manufacturing Radioisotopic Thermoelectric Generators (RTGs). LANL will perform two steps in the manufacture of the RTGs: Pelletization of 238PuO2, and encapsulation of the pellets in iridium capsules. This work will be performed inside gloveboxes by operators who wear no respiratory protection. Thus, the integrity of the gloveboxes is vital to the safety of the operators.

4. Discussion/Observations:

   a. LANL has recently discovered that at least three neoprene glovebox gaskets are deteriorated and need replacement. LANL reported that the discovery of the first of these was surprising to LANL since no previous failures of glovebox gaskets had been experienced. Glovebox gaskets at TA-55 are not regularly inspected as part of a formal inspection program. Most gaskets have been in service for 15 years. The typical shelf life of neoprene for use in seals, per Military Standardization Handbook Rubber Products: Recommended Shelf Life, MIL-HDBK-695C, is 5-8 years. In developing an inspection plan for glovebox gaskets, it is appropriate to consider the expected lifetime of neoprene as reflected in its shelf life.

   b. The DOE Health Physics Manual of Good Practices for Plutonium Facilities (May, 1988), while not addressing glovebox gaskets directly, states:

      "Generally, organic (plastic) materials are not recommended for use in plutonium

glove boxes. However, when dealing with process streams containing large quantities of fluorides or chloride ions, organic (plastic) pipe and equipment are sometimes required. When using organics in the glove box, care must be exercised in the selection of the material to minimize alpha deterioration.

c. The type of seal that failed was a "connecting-ring." LANL subsequently inspected all similar gaskets in the Cassini line and has decided to immediately replace a total of three. The three seals exhibiting pronounced deterioration were installed in gloveboxes which had been exposed to finely divided 238PuO2

d. LANL also inspected some, but not all, gaskets associated with glovebox windows. They showed less deterioration than connecting-ring gaskets, even in the same gloveboxes as the most deteriorated connecting-ring gaskets. It is not clear why window gaskets showed less deterioration. LANL postulated that they might be of somewhat different neoprene material. However, no information was presented on whether all window gaskets were made of the same material. If the difference in behavior between the connecting-ring and window gaskets is due to material variability, as postulated by LANL, inspection of all window gaskets would appear to be prudent to assure integrity of the gaskets.

e. Other types of pressure-boundary parts are installed on Cassini gloveboxes. Examples include "metal-to-metal" gaskets (which actually include a cruciform-shaped elastomer), gaskets at service panels, and electrical penetrations. LANL has not inspected all of these other types of seals.

f. Inspection of seals, penetrations and any other potential escape routes of 238PuO2 into the processing rooms is particularly important given the TA-55 passive safe shutdown mode (See Operational Safery Requirements for the Plutonium Facility (TA-55-4), September, 1988). The passive safe shutdown mode at TA-55 involves having no forced ventilation in the event of emergencies and off-nominal conditions. For example, in the event of a power failure, a reliable source of emergency power is not immediately supplied to the ventilation system. Thus, the negative pressure normally within a glovebox would, in time, equilibrate with ambient pressure and any small leak might eventually allow contamination into the room.

5. Future Staff Action:

a. DNFSB staff plans to review the LANL program for inspection of glovebox gaskets, penetrations and other potential leaks of finely-divided 238PuO2 from gloveboxes in the near future.

b. DNFSB staff also plans in the near future to review the ventilation and filtration systems, including the passive safe shutdown mode, and the roles they play in accident analyses and the TA-55 Operational Safety Requirements.