September 3, 1999

Dr. John Browne
[ ]
Los Alamos National Laboratory
P.O. Box 1663
Los Alamos, NM 87545

EA-1999-08

Subject: Preliminary Notice of Violation (NTS-ALO-LA-LANL-LANL-1999-0007)

Dear Dr. Browne:

This letter refers to the Department of Energy's (DOE) evaluation of the facts and circumstances concerning a series of deficiencies in work controls and in radiological monitoring which led to a worker's unplanned, uncontrolled radiological exposure and intake of radiological material, [ ], during November 1998 at the Chemistry and Metallurgy Research (CMR) Facility.

The Office of Enforcement and Investigation (EH-Enforcement) initiated an investigation of this event on November 23, 1998, and issued an Investigation Summary Report to you on June 2, 1999. On June 23, 1999, an Enforcement Conference was held with members of your staff to discuss the potential violations, their safety significance, and the status of corrective actions. A Conference Summary Report is enclosed.

Based on DOE's investigative results and the information provided by Los Alamos National Laboratory (LANL) during the Enforcement Conference, DOE has concluded that violations of 10 CFR 830.120 (Quality Assurance Rule) and of 10 CFR 835 (Occupational Radiation Protection Rule) likely occurred. The violations are described in the enclosed Preliminary Notice of Violation (PNOV).

The enclosed PNOV describes violations that involve multiple failures to (1) conduct approved work activities in accordance with LANL's established procedures and work controls; (2) adequately monitor for radioactive material; (3) post and control access to radiological areas; and (4) implement effective corrective actions. The identified deficiencies of failure to comply with LANL's work control procedures and failure to stop work when conditions became outside the work controls are similar to the CMR work control problems which led to the September 1997 stand-down of all normal operations within CMR. After the September 1997 stand-down, CMR's management's goal for restart of normal operations included ensuring that (1) CMR activities were properly authorized and implemented using an appropriate work control process and (2) the work force understood and adhered to the work control requirements. CMR recovery

and restart was achieved on April 17, 1998.
Further, CMR experienced another event on June 25, 1999, where a glovebox overpressurization lead to a glovebox glove rupture and extensive radioactive [ ] contamination throughout the affected room. Fortuitously, CMR workers were not in the room at the time of the glove rupture and therefore were not exposed to the radioactive material. LANL's analysis of this event as documented in NTS-ALO-LA-LANL-LANL-1999-0010 identified a breakdown in the "programmatic work process" including "a lack of formal documentation and failure to follow established and approved work processes at the CMR facility." DOE is particularly concerned that LANL has not implemented effective corrective actions for these recurring, similar problems.

In accordance with the "General Statement of Enforcement Policy," 10 CFR Part 820, Appendix A, the violations described in the enclosed PNOV involving (1) work process problems; (2) inadequate instrumentation and monitoring of work areas for radiation; (3) inadequate radiological postings and access control for radiological areas, and (4) inadequate processes to prevent recurrence of quality problems have been classified separately as Severity Level II problems. In determining the severity level of these violations, DOE grouped collectively the various examples of problems in each of these areas and considered the programmatic and recurring nature of these problems.

I am issuing the enclosed PNOV in response to these violations. Although LANL is exempt from civil penalty by statute, because of the safety significance of these violations, DOE would have issued a proposed Imposition of Civil Penalty in the amount of $220,000 ($55,000 for each Severity Level II violation). DOE has concluded that no mitigation is warranted for the violations described in the PNOV, regarding self-identification and reporting and implementation of effective corrective actions to prevent recurrence. Specifically, LANL failed to identify the recurring programmatic nature of these violations and report them into the EH-Enforcement Noncompliance Tracking System (NTS) in a timely manner. The November 1998 CMR work control event involved multiple recurring failures to effectively plan, authorize, implement and control work activities and was not reported into the NTS until months after EH-Enforcement had initiated an investigation. LANL originally placed this event in the local tracking system as a minor issue. Additionally, LANL's corrective actions to authorize and control work activities implemented as result of CMR's work stand-down have not been adequate to prevent recurrence of similar deficiencies which is further evidenced by the June 25, 1999, [radioactive material] contamination event.

You are required to respond to this letter and follow the instructions specified in the enclosed PNOV when preparing your response. Your response should document any additional specific actions taken to date. Corrective actions will be tracked in the NTS. You should enter into the NTS (1) any additional actions you plan to prevent recurrence and (2) the target completion dates of such actions. After reviewing your response to the PNOV, including your proposed corrective actions entered into the NTS in addition to the results of future assessments or inspections, DOE will determine

whether further enforcement action is necessary to ensure compliance with DOE nuclear safety requirements.

Sincerely,

David Michaels, PhD, MPH
Assistant Secretary
Environment, Safety and Health

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Enclosures:
Preliminary Notice of Violation
Enforcement Conference Summary
List of Attendees

cc: M. Zacchero, EH-1
K. Christopher, EH-10
S. Adamovitz, EH-10
D. Stadler, EH-2
O. Pearson, EH-3
J. Fitzgerald, EH-5
V. Reis, DP-1
D. Minnema, DP-311
D. Gurule, DOE-LAAO
J. Harris, DOE-LAAO
R. Glass, DOE-AL
B. Eichorst, DOE-AL
A. Elliott, LANL
J. Lieberman, NRC
D. Thompson, DNFSB
Docket Clerk, EH-10

Preliminary Notice of Violation

(NTS-ALO-LA-LANL-LANL-1999-0007)

University of California
Los Alamos National Laboratory

EA-1999-08

As a result of a Department of Energy's (DOE) evaluation of a series of activities which occurred in November 1998 in [ ] the Chemistry and Metallurgy Research (CMR) facility of Los Alamos National Laboratory (LANL), violations of DOE requirements were identified. In accordance with the "General Statement of Enforcement Policy," 10 CFR 820, Appendix A, the violations are described below.

I. 10 CFR 830.120(c)(2)(i) “Work Processes” requires that work be performed to established administrative controls using approved procedures.

10 CFR 835.1001(b) requires that for specific activities where use of physical design features are demonstrated to be impractical, administrative controls and procedural requirements shall be used to maintain exposures as low as reasonably achievable (ALARA).

Contrary to the above, work was not performed in accordance with established administrative controls using approved procedures, and adequate administrative controls and procedural requirements to maintain personnel radiation exposures ALARA at the CMR facility were not developed, maintained or not implemented in that-

A. CMR-QA-015, R01, "CMR Activity Approval Process", approved March 16, 1998, "outlines the process necessary to obtain authorization (from CMR line management) to begin new or changed activities in the CMR facility.." and stated that "line management approval is necessary to ensure that hazards have been identified, assessed, and analyzed and to ensure that appropriate controls are in place before work is authorized." The procedure further defined a "changed activity" as "changes that introduce new/different hazardous/radioactive materials and defined "new activity" as "those activities not covered by a current Work Authorization Package."

The "CMR Resumption Checklist Response" dated September 24, 1997, included an "Operation Summary" which stated that operations for Room [number] were for "access to [specified room] only, no operations performed in this room."

Attachment 3, "Facility Checklist for Confirmation of Operational Status" for Room

[number] dated September 22, 1997, of 22CMR-PLA-021, R00, "CMR Activity Resumption Process" stated that "no work with Rad (radioactive) materials will be done in this room for this activity. No radiation protection measures required."

However, in November 1998, work not covered by a current authorization package was performed in Room [number] in that a LANL radiological worker opened a can containing radioactive material, [ ], removed the lead shielding and the radioactive material contained in the can, and repackaged the radioactive material. These actions resulted in the creation of a radiation field of 150 milliRoentgen/hour (mR/hr) at 30 centimeters (cm) with a contact exposure rate of 2500 mR/hr. Authorization from line management to begin this new activity utilizing radioactive materials had not been obtained.

B. LIR402-720-01.1, "Work Planning," dated May 8, 1998, required that the "RWP shall inform workers of area radiological conditions and ALARA requirements" and that "RWPs shall be updated if radiological conditions change to the extent that protective requirements need modification."

RWP [ ] approved June 15, 1998, stated that the measured external dose rate in the work area, the Room [ ] hood, was 0.5 mrem/hr beta plus gamma radiation.

However, during the week of November 2, 1998, until November 10, 1998, a LANL radiological worker, working in the Room [ ] hood, opened a can containing radioactive material and removed the can's lead shielding which resulted in the creation of a High Radiation Area, with exposure rates up to 150 mR/hr at 30 cm. Even though radiological conditions had changed, the RWP was not updated to reflect the changed radiological conditions and the worker continued handling the radioactive material periodically over several days.

C. "Instructions for Completing the RWP Form" attached to RWP [ ] required that "For higher risk jobs such as work in respirators and work in High Radiation and/or High Contamination Areas, continuous coverage by an RCT is required."

However, during the week of November 2, 1998, a LANL radiological worker, working in the Room [ ] hood, opened a can containing radioactive material, removed the can's lead shielding which resulted in creation of a High Radiation Area, with exposure rates up to 150 mR/hr at 30 cm being generated. Working under RWP [ ] which specified only intermittent RCT coverage, the LANL worker continued to handle the radioactive material periodically over the next several days although an RCT was not present as required by the RWP Instructions to provide continuous coverage in the High Radiation Area.

D. LIR 401-10-01.0, "Stop Work and Restart" effective March 28, 1997, required that laboratory workers "stop work" if they "identify a hazardous condition in their work." Further, LIR 401-10-01.0 defines a "hazardous condition" as "one that exceeds the accepted safety practices for the operation."

RWP [ ] approved June 15, 1998, stated that the measured external dose rate in the work area, the Room [ ] hood, was 0.5 mrem/hr beta plus gamma radiation.

However, during the week of November 2, 1998, until November 10, 1998, a LANL radiological worker, working in the Room [ ] hood, opened a can containing radioactive material that was labeled as "[radioactive material] and "heavy - lead lined". Upon discovery that the can was not empty as originally thought, the radiological worker did not stop work as required, but continued to remove the can's lead shielding and examine the can's radioactive contents. As a result, the worker was exposed to a radiation field of 150 mR/hr at 30 cm with a contact exposure measurement of 2500 mR/hr and received an uptake of radiological material equivalent to 0.8 rem committed effective dose equivalent (CEDE) and a committed dose equivalent (CDE) to the bone surfaces of 12 rem.

E. LIR402-719-01.1, "Workplace Monitoring," dated May 8, 1998, required that the radiological worker "shall communicate to ESH-1 and his/her management changes in work, processes, procedures, configurations or controls that may affect radiological conditions of an operation or area."

RWP [ ] approved June 15, 1998, stated that the measured external dose rate in the work area, the Room [ ] hood, was 0.5 mrem/hr beta plus gamma radiation.

However, during the week of November 2, 1998, a LANL radiological worker, working in the Room [ ] hood, opened a can containing unanticipated radioactive material and removed the can's lead shielding which resulted in a High Radiation Area being generated. Neither the radiological worker nor the worker's immediate supervisor notified ESH-1 that previously unidentified radioactive materials had been discovered in the Room [ ] hood. As a result, the radiological worker continued to periodically handle the radioactive material with an exposure rate of 150 mR/hour over several days without appropriate work controls or monitoring. The worker eventually became radioactively contaminated which resulted in the worker receiving a radiation dose equivalent to 0.8 rem CEDE and a CDE to the bone surfaces of 12 rem.

F. CMR-POL-001, R04, "Radiation Protection Practices in the CMR Facility," approved October 31, 1996:

1. Section "General Requirements and Guidance" stated that "some lab coats and coveralls have openings at the hip. When performing hot jobs, tape these openings to avoid contamination of personnel clothing." However, on November 10, 1998, a LANL radiological worker was working with radioactive material, [ ], in the CMR Room [number] and did not tape the lab coat's openings. As a result, the radiological worker's personal clothing became contaminated with approximately 56,000 disintegrations per minute per 100 square centimeters(dpm/100cm^2) of [radioactive material].

2. Section "Minimum Requirements for Unescorted Entry into and Exit from Radiation Areas" required that "before starting any work, address special requirements in RWPs and/or SOPs for work in... contamination areas, high contamination areas, high radiation areas." However, during the week of November 2, 1998, work activities of a CMR worker in the Room [ ] hood ([radioactive material] repackaging) resulted in the creation of a High Radiation Area. The RWP [ ], dated June 15, 1998, continued to be used for the Room [ ] hood work even though the RWP failed to identify the needed special requirements for work in High Radiation Areas as required.

Collectively, these violations constitute a Severity Level II problem.
Civil Penalty - $55,000 (Waived)

II. 10 CFR 835.401(a)(2) requires that monitoring of areas shall be performed to document radiological conditions in the workplace.

10 CFR 835.401(a)(3) requires that monitoring of areas shall be formed to detect changes in radiological conditions.

10 CFR 835.401(b) requires that area monitoring in the workplace shall be routinely performed to identify and control potential sources of personnel exposure to radiation and/or radioactive material.

Contrary to the above, area monitoring was not performed to document radiological conditions in the workplace, to detect changes in radiological conditions, and identify and control potential sources of personnel exposure in that-

A. During the week of November 2, 1998, until November 10, 1998, dose rate (gamma) surveys were not performed for Room [number] although a LANL radiological worker had opened a stainless steel can labeled as containing "[radioactive material]," and continued working intermittently with the radioactive material over the next several days for repackaging purposes. Later radiation surveys conducted on November 12, 1998, identified contact radiation dose rates up to 2500 mR/hr emanating from one can which had been repeatedly handled by the LANL worker.

B. On November 10, 1998, during recovery operations after a LANL radiological worker and Room [number] became contaminated with [radioactive material], RCTs did not perform radiation dose rate surveys of the room prior to decontamination. As a result, radiation fields up to 150 mR/hour at 30 cm along with contact dose rate measurements of 2500 mR/hr were not identified until November 12, 1998.

III. 10 CFR 835.401(c)(2) requires that instruments used for monitoring shall be appropriate for the types of the radiation encountered.

Contrary to the above, instruments used for monitoring work activities in Room [number] during the week of November 2, 1998, until November 10, 1998, were not appropriate for the types of radiation encountered since the instruments were not capable of detecting gamma radiation. Later surveys identified contact gamma radiation fields ranging from 8 mR/hr to 2500 mR/hr for the cans containing radioactive material which were being handled by the LANL worker.

Collectively, these violations constitute a Severity Level II problem.
Civil Penalty - $55,000 (Waived)

IV. 10 CFR 835.501(b) requires that the degree of personnel entry control for radiological areas shall be commensurate with existing radiological hazards within the area.

10 CFR 835.501(c) requires that one or more of the following methods shall be used to ensure control: signs and barricades, control devices on entrances, conspicuous visual and/or audible alarms, locked entrance ways or administrative controls.

Contrary to the above, personnel entry control for CMR Room [number] was not commensurate with existing radiological hazards within the area and at least one of the methods required to ensure control of the area was not implemented in that-

A. During the week of November 2, 1998, until November 10, 1998, Room [number], which was routinely accessible by radiological workers and which contained an unsuspected radiation field of 150 millirem/hr, was incorrectly posted as a "Radiological Buffer Area" rather than as a High Radiation Area as required, nor were alternate permissible methods used to ensure appropriate control of personnel entry to the radiation field.

B. On November 10, 1998, recovery operations were performed by LANL RCTs in Room [number] after a radiological worker and the room became contaminated with [radioactive material]; however, gamma surveys to determine the dose rate status of the area were not performed until two days later on November 12, 1998 when the gamma surveys identified that the area was a High Radiation Area. Consequently, the area had not been posted to warn personnel of the high radiation hazard and appropriate personnel entry control(s) for the area had not established.

V. 10 CFR 835.603 requires that each access point to a radiological area shall be posted with conspicuous signs bearing the wording provided in this section.

10 CFR 835.603(b) requires that the words "Danger, High Radiation Area" be posted at any area accessible to individuals in which radiation levels could result in

an individual receiving a deep dose equivalent in excess of 100 millirem in 1 hour at 30 centimeters from the radiation source.

Contrary to the above, during the week of November 2, 1998 until November 12, 1998, an area within CMR Room [number] was not posted with the words "Danger, High Radiation Area" and was accessible to individuals even though dose rates of 150 mR/hr at 30 centimeters from the radiation sources were present.

Collectively, these violations constitute a Severity Level II problem.
Civil Penalty - $55,000 (Waived)

VI. 10 CFR 830.120(c)(iii). Quality Improvement, requires that processes to detect and prevent quality problems shall be established and implemented, that items, services and processes that do not meet established requirements be identified, controlled and corrected according to the importance of the problem and the work affected, and that correction shall included identifying the causes of problems and working to prevent recurrence.

Contrary to the above, processes to detect and prevent quality problems were not adequately implemented and corrective actions did not prevent recurrence in that on September 2, 1997, LANL management stood-down all normal operations within CMR due to a series of operational events which resulted from the performance of unauthorized work, failures to stop work when conditions became outside of the work controls and failures to follow written procedures. Corrective actions were implemented by LANL. However, the corrective actions to prevent similar safety related problems were ineffective in that during November 1998, a series of activities occurred which involved a radiological worker handling and repackaging radioactive materials without appropriate work controls and monitoring. These inadequate controls resulted from the failure to follow written work controls and the failure to stop work when conditions become outside the work controls. As a result, a LANL radiological worker became radiologically contaminated and received unplanned, uncontrolled internal and external radiation doses.

This is a Severity Level II violation.
Civil Penalty - $55,000 (Waived)

Pursuant to the provisions of 10 CFR 820.24, LANL is hereby required within 30 days of the date of this Preliminary Notice of Violation to submit a written statement or explanation to the Director, Office of Enforcement and Investigation, Attention: Office of the Docketing Clerk, P.O. Box 2225, Germantown, MD 20874-2225. Copies should also be sent to the Manager, DOE- Los Alamos Area Office, to the Manager, DOE-Albuquerque Operations Office, and to the cognizant DOE Secretarial Office for the facility that is the subject of this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Preliminary Notice of Violation" and should include the following for each violation: (1) admission or denial of the alleged violation; (2) the reasons for the violations if admitted or if denied, the reasons they are not correct; and

(3) the corrective actions that have been taken and the results achieved. The contractor will enter the following into the Noncompliance Tracking System: the corrective actions that have been or will be taken to avoid further violations and the target completion dates when full compliance will be achieved. In the event the violations set forth in this Preliminary Notice of Violation are admitted, this Notice will constitute a Final Notice of Violation in compliance with the requirements of 10 CFR 820.25.

David Michaels, PhD, MPH
Assistant Secretary
Environment, Safety and Health

Dated at Washington, DC,
This 3rd day of September 1999