September 21, 1998

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

EA 98-10

Subject: Preliminary Notice of Violation (NTS-ALO-LA-LANL-LANL-1997-0002 and NTS-ALO-LA-LANL-LANL-1998-0001)

Dear Dr. Browne:

This letter refers to the Department of Energy=s (DOE) evaluation of the facts and circumstances related to a series of events at the Chemistry and Metallurgy Research (CMR) Facility which led to a stand-down of all normal operations within CMR on September 2, 1997. The series of events in question occurred following July 7, 1997, when DOE issued an Enforcement Letter to Los Alamos National Laboratory (LANL), concerning potential violations leading to the November 1996 fire and explosion at the CMR Facility. The July 7, 1997, Enforcement Letter noted these potential violations and described DOE=s decision to exercise discretion and not take enforcement action at that time due to the plans and commitments by LANL management to correct the work planning and work controls problems that led to the fire and explosion. The letter also indicated that if additional events due to similar breakdowns in work process controls continued to occur, DOE would evaluate taking enforcement action.

The events in question that have occurred since the July 7, 1997, Enforcement Letter have included the following: (1) a series of improper unreviewed safety question (USQ) reviews by LANL indicating potential for operating outside of the approved safety authorization basis, (2) workers= unauthorized actions leading to an inadvertent pressurization of [a wing of the facility], (3) improper response to contamination events, (4) failure to perform airflow checks in an open front box as required by procedures, (5) failure to place Contamination Area postings and restrict personnel access when contamination was discovered in [a wing of the facility], (6) partial lowering of a hot-cell shield door in violation of entry procedures with potential exposure of personnel to an unsuspected source of radioactive material, and (7) ashing of a potentially radioactively contaminated mop head without approved procedures leading to a fire in an oven. All of these events indicated a continuing trend of work control problems for maintenance and research work in the CMR Facility.

EH-10, in coordination with the DOE Los Alamos Area Office (DOE-LAAO), conducted an investigation of these events and provided you with our Investigation Summary Report dated June 29, 1998. Based on our evaluation of these matters, DOE has concluded that violations of DOE nuclear safety requirements involving the Quality Assurance Rule (10 CFR 830.120) and the Occupational Radiation Protection Rule (10 CFR Part 835) likely occurred. An Enforcement Conference was held with members of your staff on July 29, 1998, to discuss the circumstances surrounding these incidents, their safety significance, and the status of corrective actions. An Enforcement Conference Summary is enclosed.

The violations described in the enclosed Preliminary Notice of Violation (PNOV) involve numerous failures by your organization to implement established radiological protection requirements and quality controls to protect workers and the public. These failures occurred at multiple times between July 7, 1997, and the September 2, 1997, stand-down at the CMR Facility. The failures included (1) not performing work in accordance with your own approved procedures, (2) performing work without the required authorizations, (3) failure to place proper radiological postings and appropriately control access to radiological areas, (4) failure to ensure proper operation of systems to prevent release of contamination from open-front boxes, air hoods and containment boxes, and (5) failure to perform correct unreviewed safety question (USQ) determinations.

It is of particular concern to DOE that these problems were not addressed in a more timely and effective manner following the fire and explosion in November 1996 to preclude the continuance of events that could present a risk to workers or the public. It is also of concern that adequate corrective steps were not taken following EH-10's Enforcement Letter of July 7, 1997, to address these problems and preclude recurrence of events with the same underlying problems. DOE believes it is important that such problems are addressed and corrected before a worker is injured, or the problems result in a more serious event.

In accordance with the AGeneral Statement of Enforcement Policy,@ 10 CFR Part 820, Appendix A, the violations described in the enclosed PNOV involving (1) Work Process problems, (2) inadequate Quality Improvement corrective actions, and (3) Radiological Program deficiencies 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 $112,500 ($28,125 for each Severity Level II violation). The Severity Level

II violations could have been assessed at $37,500 for each violation. However, given the progress LANL has made in applying more formal work controls as well as LANL's more aggressive identification and reporting of potentially significant nuclear safety violations, DOE would have allowed a 25 percent mitigation in the base civil penalty for each of the Severity Level II violations. The actions that have now been taken include (1) the September 1997 **B** April 1998 stand-down, (2) change in senior management for CMR by transferring it under the Nuclear Materials Technology Division, (3) instituting a supervisor walk-around program, and (4) other steps embodied in a CMR Get-Well Plan issued in June 1998. Further mitigation was not considered appropriate due to a recent CMR personnel contamination event (NTS-ALO-LA-LANL-LANL-1998-0010) involving similar Work Process problems. Specifically, on August 5, 1998, a CMR worker became contaminated with [radioactive material] and the Work Process failures involved (1) inadequate hazards analysis, (2) inadequate survey instrumentation, and (3) failure of the workers to follow CMR's safety procedures for worker contamination incidents.

In consideration of the initiatives described at the Enforcement Conference, DOE has also decided not to take enforcement action at this time for the recent events at TA-18 involving a scram of the Planet assembly for a reactivity excursion, and failure to implement adequate personnel access control measures prior to a radiography and criticality operations. These events involved the same underlying problems as have been identified at the CMR Facility. DOE understands that LANL management will be addressing the problems at TA-18 in a similar manner, and will ensure that such problems do not exist elsewhere at LANL. DOE will continue to monitor performance for the CMR Facility, TA-18, and other LANL facilities with respect to resolving these safety planning, work control, quality improvement, and radiological program problems. Should these continue, DOE will consider the need for further enforcement action.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. After reviewing your response to this Notice, and the status of your corrective action plan, DOE will determine whether further enforcement action is necessary to ensure compliance with the applicable nuclear safety requirements.

Sincerely,

Peter N. Brush
Acting Assistant Secretary
Environment, Safety and Health

Preliminary Notice of Violation

University of California
Los Alamos National Laboratory
EA 98-10

As a result of a Department of Energy=s (DOE) evaluation of a series of events and activities which led to the shutdown of 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. INADEQUATE WORK CONTROLS AND NON-ADHERENCE TO PROCEDURES

10 CFR 830.120(c)(2)(i) 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 be used to maintain radiation 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

1. Procedure LS114-01.0, "Unreviewed Safety Question Determination," effective July 25, 1994, defined an unreviewed safety question (USQ) as "a proposed or existing physical change to a facility, or a change to approved safety documentation, that causes the bounding accident analysis and/or the approved technical safety requirements/operational safety requirements to be exceeded." On June 19 and July 31, 1997, DOE Los Alamos Area Office notified LANL that 13 unreviewed safety question determinations (USQDs) performed by LANL since July 24, 1994, and classified as negative should have been classified as positive to comply with LANL's Procedure LS114-01.0. Incorrect classification of seven of the USQDs occurred after April 10, 1996, the date that LANL stated that compliance had been achieved for 10 CFR 830.120, (c)(2)(i), AWork Processes.@

2. Procedure CMR-QA-016.R01, "CMR Work Control Procedure," approved March 31, 1997, required that the Facility Operations Group, (CST-26), authorize and control the performance of facility-related work. However, on July 28,

1997,

CST-26 Facility Operations Group did not authorize and control the performance of work since Johnson Controls, Inc. (JCI) employees performed unauthorized, unscheduled maintenance on the air dryer (DAD-6) beyond the preventive maintenance scheduled for that date which resulted in an air pressure inversion in [a wing] of the CMR Facility.

3. Procedure CMR-POL-002, R1, "CMR Policy on Normal Working Hours," effective July 1996, required that work performed "outside 'normal working hours' must be requested in writing to the CMR Facility Manager, who will establish the appropriate administrative controls to ensure safety systems are operational." However, on July 28, 1997, JCI employees started work before normal working hours without the required Facility Manager approval or appropriate administrative controls resulting in an air pressure inversion in [a wing] of the CMR Facility.

4. Procedure CMR-OI-001, R1, "Lockout/Tagout Practices in the CMR Facility," approved October 27, 1995, required that work involving potential energy sources and thus requiring lockout/tagout be approved by the LANL Engineering Sub Team Leader prior to applying safety locks and tags to determine if configuration control is required. However, work planners and the workers did not perform reviews or apply locks and tags as required prior to and during work to re-route air lines to a desiccant air dryer on July 28, 1997.

5. Laboratory Standard LS107-02.2, "Radiological Posting," effective March 11, 1996, Section 6.1 required that Aradiological areas shall be posted according to survey results and knowledge of the radiological operations and conditions.@ However, on August 14, 1997, after surveys confirmed the presence of [radioactive material] contamination measuring [a specified value] disintegrations per minute per 100 square centimeters (dpm/100 cm^2) on the labcoat and personal shirt of an employee, the potentially contaminated room or work area in [a room] was not posted nor were radiological surveys of the area performed to determine the extent of the removable contamination.

6. Procedure CMR-POL-001, R04, "Radiation Protection Practices in the CMR Facility," approved October 31, 1996, stated Aif contamination is detected, . . . notify ESH-1 immediately@ and Ado not leave the controlled area until ESH-1 clears you to do so.@ However, on August 15, 1997, after working in [a room], a worker detected [radioactive] contamination on his labcoat, removed the labcoat, then left the controlled area without contacting ESH-1 for clearance.

7. Procedure CST-SOP5-001/1, "Working With Radioactive Materials," approved February 3, 1996:

   a. Section 3, AChecking Air Flow@ required that Aair flow in open-front boxes must be at least [a specified value] linear feet per minute (LFPM),@ and that Abefore starting to work, check that the air flow is sufficient.@ However, on August 18, 1997, employees performed work in an open front box in [a room] without checking that the air flow was sufficient in that there was no mechanism available on the open front box to demonstrate the adequacy of the air flow, i.e., no flow monitoring devices or alarms or other visual indicators to indicate that the box was operational. Further, the air flow rate in the open front box did not meet the [air flow] requirement in that on August 19, 1998, smoke tests of the open front box demonstrated a negligible air flow due to blockage of the ventilation exhaust vent.

   b. Section 4, AHow Hazardous Chemicals Are Controlled - Air Flow@ required that air flow through the wing in [a specified manner.] However, on August 18, 1997, the direction of the air flow was the reversed in that in [specified rooms] air flowed from the contaminated containment boxes and hoods into the corridors.

8. [ ] On August 18, 1997, visual indicators were not present on the open front box in [a room] to indicate that the ventilation was operating while the open-front box was in use.

9. [ ] On August 19, 1997, as determined by smoke test, the air flow for an open-front box in [a room] was negligible due to a glove clogging the exhaust ventilation. As a consequence, [radioactive material] was released into [a room], the highest level measuring [a specified amount] Derived Air Concentration-hours (DAC-hours).

10. Procedure SOP-MST5-W9-038.1, "Hot Cell Corridor Operation," approved December 15, 1995, Section 7.3 required that A. . . a ›status board‹ is maintained at each corridor entrance. This board lists the operational status of each cell and the corridor.@ However, on August 20, 1997, the status board did not correctly list the operational status of [a Hot Cell] even though radioactive sources were present in [the Hot Cell] that created a radiation field of [a specified value] at one foot from the source.

11. Procedure, CMR-QA-015, R00, "CMR Activity Approval Process," approved June 26, 1996, required that CMR users obtain the CMR Facility Manager's approval before beginning new or changed activities in the CMR Facility.

However, on August, 22,1997, CMR personnel initiated a new activity of drying and subsequent ashing of a cotton mop-head suspected of being radioactively contaminated [ ] without obtaining the CMR Facility Manager's approval.

Collectively, these violations constitute a Severity Level II problem.
Civil Penalty - $28,125 (Waived)

II. QUALITY IMPROVEMENT DEFICIENCIES

10 CFR 830.120(c)(1)(iii), AQuality 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 include identifying the causes of problems and working to prevent recurrence.

Contrary to the above, processes to detect and prevent quality problems were not adequately established and implemented and corrective actions did not prevent recurrence in that

1. On November 14, 1996, a fire and explosion at the CMR Facility resulted from a failure to comply with written procedures and the performance of unauthorized work. Corrective actions were implemented by LANL. However, the corrective actions to prevent recurrence of similar safety related problems were ineffective in that operational events due to failures to follow written procedures and the performance of unauthorized work continued to occur at CMR thus leading LANL management to stand-down all normal operations CMR on September 2, 1998.

2. Procedure CMR-QA-006, R01, "Nonconformance Control," approved July 14, 1997, stated in "Introduction - Overview" that the "CMR Facility Quality Management Plan required that nonconforming quality-affecting items and processes be controlled to preclude use, test, or installation until conformance with specifications is achieved@ and also stated in "Responsibilities" that the CMR Facility Management Team Personnel/Team Leader was to Aidentify and document nonconforming items or processes, stop work, and start the Nonconformance Report process as required.@ However, on August 19, 1997, during ventilation performance testing, although air flow rates from the gloveboxes/hoods in [rooms] were found to be positive rather than negative as required, a nonconformance report was not initiated to effect correction of the problem and the nonconforming ventilation system was not controlled to preclude worker usage.

Collectively, these violations represent a Severity Level II problem.

Civil Penalty - $28,125 (Waived)

III. RADIOLOGICAL CONTROL PROGRAM NONCOMPLIANCES

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

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

10 CFR 835.401(b) requires that area monitoring be routinely performed, as necessary, to identify and control potential sources of personnel exposure to radiation and/or radioactive materials.

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

1. Although radioactive contamination was known to be present in [a room], on August 14, 1997, surveys were not performed to determine the location of the [radioactive] contamination thus preventing the control of worker exposure to sources of radioactive [material]. As a consequence, a worker who had been contaminated on August 14, 1997, was contaminated for a second time while working in the same location on August 15, 1997.

2. On August 19, 1997, once positive rather than the required negative air flow conditions had been confirmed for [rooms] at the CMR, i.e., that the air flowed from the gloveboxes to the personnel corridor, radiological surveys of the affected rooms were not performed prior to allowing workers access to the rooms. Consequently, a employee working in [a room] became contaminated on August 21, 1997.

3. On August 20, 1997, surveys were not performed to detect possible changes in radiological conditions in the workplace as workers initiated entry into [a Hot Cell] by lowering the hot cell door. When the hot cell door was lowered approximately one foot, personnel were permitted access to an unsuspected radiation field which measured [a specified amount] Roentgens per hour at a distance of one foot from the source of radioactive material.

B. 10 CFR 835.404(b) requires that appropriate controls be maintained and verified which prevent the inadvertent transfer of removable contamination to locations outside of radiological areas under normal operating conditions.

Contrary to the above, controls to prevent the inadvertent transfer of removable contamination outside of radiological areas were not maintained and verified in that on February 26, 1997, April 10, 1997, May 7, 1997, May 28, 1997, and May 25, 1997, in [a room], a worker used masking tape to cover a pinhole in an out-of-service glovebox glove, then used the patched glove to transfer samples containing [radioactive material] from the glovebox. The result of the sample transfers was the dispersal of [radioactive material] from the glovebox, a known Contamination Area, to locations outside of the radiological area, i.e., the exterior of an open-front box on the same glovebox train.

C. 10 CFR 835.404(c)(1) requires that any area in which contamination levels exceed the values specified in Appendix D be posted in accordance with 10 CFR 835.603.

10 CFR 835.603(e) requires that each access point to a Contamination Area be posted with the words, Caution, Contamination Area, where contamination levels exceed values listed in Appendix D, (i.e., greater than 20 dpm/100 cm^2 removable [ ] activity).

Contrary to the above, each access point to a Contamination Area where contamination levels exceeded 20 dpm/100 cm^2 [ ] radioactivity, or that had the potential to exceed contamination levels of 20 dpm/100 cm^2 was not posted in that on August 18, and 21 - 29, 1997, although removable [radioactive material] activity was identified that ranged in activity from less than 100 dpm/100 cm^2 to over [a specified amount], Contamination Area postings were not used within the room or on the door of [the room].

D. 10 CFR 835.501(a) requires that personnel entry control be maintained for each radiological area, e.g., Contamination Area.

10 CFR 835.501(b) requires that the degree of control be commensurate with existing and potential radiological hazards within the area.

Contrary to the above, personnel entry control was not maintained for potential radiological hazards in the CMR Facility radiological areas in that although loose contamination in excess of 20 dpm/100 cm^2 was known to be present in [a room] on August 14, 1997, due to a worker contamination incident, efforts to control personnel entry into the area were not implemented in that on August 15, 1997, the worker was allowed to continue working in the same open-front box as the previous day, and again became contaminated.

Collectively, these violations represent a Severity Level II problem.

Civil Penalty - $28,125 (Waived)

IV. HOT CELL EVENT RADIOLOGICAL CONTROL NONCOMPLIANCES

A. 10 CFR 835.502(a) requires that for each entrance or access point to a high radiation area where radiation levels exist such that an individual could exceed a deep dose equivalent to the whole body of 1 rem in any one at 12 inches from the source one or more of the following features be used: (1) a control device that prevents entry to the area when high radiation levels exist; (2) a device that functions automatically to prevent use or operation of the source or field while personnel are in the area; (3) a control device that energizes a conspicuous visible or audible alarm signal so that the individual entering the high radiation area and the supervisor of the activity are made aware of the entry; (4) entryways that are locked - when access is required, positive control over each entry is maintained; (5) continuous direct or electronic surveillance; and/or (6) a control device that will generate audible and visual alarm signals to alert personnel before use or operation of a radiation source.

   Contrary to the above, high radiation area access control features were not in place on August 20, 1997, in that control features, alarm devices or locked entryways with maintenance of positive control during periods of personnel entry were not in effect during an attempted entry into [a Hot Cell] where radiation levels existed such that an individual could have received a deep dose equivalent to the whole body of [a specified amount].

B. 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 0.1 rem in one hour at one foot from the radiation source.

   Contrary to the above, [a Hot Cell] was not posted with the words, ”Danger, High Radiation Area,” and was accessible to individuals in that on August 20, 1997, with dose rates of approximately [a specified amount] at one foot from the radiation sources, the door to the hot cell was lowered approximately one foot.

Collectively, these violations represent a Severity Level II problem.
Civil Penalty - $28,125 (Waived)

Pursuant to 10 CFR 820.24, LANL is hereby required within 30 days of the date of this Notice to submit a written statement or explanation to the Director, Office of Enforcement and Investigation, P.O. Box 2225 Germantown Road, Germantown, MD 20874-2225 Attention: Office of the Docketing Clerk, with copies to the Manager, DOE Los Alamos Area Office; to the Manager Albuquerque Operations Office and to the

cognizant DOE Secretarial Office for the facility that is the subject of this 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 violations, (2) the facts set forth above which are not correct and the reasons for the violations if admitted, and if denied, the reasons they are not correct, (3) the corrective steps that have been taken and the results achieved, (4) the corrective steps that will be taken to avoid further violations, and (5) the date when full compliance will be achieved.

This Preliminary Notice of Violation will become a Final Notice of Violation if the violation is not denied within 30 days and sufficiently justified.

Peter N. Brush
Acting Assistant Secretary
Environment, Safety and Health

Dated at Washington, D.C.
this 21st day of September 1998