July 28, 1998

Dr. Robert W. Kuckuck
[ ]
Lawrence Livermore National Laboratory
P.O. Box 8078, L-001
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EA-98-06

Subject: Preliminary Notice of Violation (NTS-SAN--LLNL-LLNL-1997-0002)

This letter refers to the Department of Energy's (DOE) evaluation of the facts and circumstances surrounding a series of criticality safety infractions occurring between May and December 1997 in [a building] at the Lawrence Livermore National Laboratory (LLNL). [The building] is the central repository used to process and store [radioactive material]. During the period May 20 through July 15, 1997, Certified [Radioactive Material] Handlers violated criticality safety procedures for mass limits and form controls 12 times. Subsequent to these violations, the operations at [the building] were curtailed by LLNL, but [radioactive material] movements that were still allowed resulted in additional violations of criticality safety procedures. In October 1997, [radioactive material] parts were received at the [ ] storage vaults, [building], and placed into storage in a vault location which violated the mass limits, criticality safety controls for the vaults. A subsequent review by your staff of vault storage compliance to criticality safety controls identified an additional ten criticality safety control infractions in the vaults. Finally, in December 1997 during a limited operation to repackage and ship [radioactive material], a criticality safety control was violated when [radioactive material] was removed from a sealed metal container.

The Office of Enforcement and Investigation (EH-10), in coordination with the DOE Oakland Operations Office (DOE-OAK), conducted an investigation of these events and provided you with an Investigation Summary Report dated May 21, 1998. Based upon our evaluation of these events, DOE has concluded that violations of DOE's nuclear safety requirements involving the Quality Assurance Rule (10 CFR 830.120) likely occurred. An Enforcement Conference was held with you and members of your staff on June 23, 1998, to discuss the circumstances surrounding these events, the safety significance, and your corrective actions. An Enforcement Conference Summary is enclosed.

The violations described in the enclosed Preliminary Notice of Violation (PNOV) involve numerous failures to implement established Quality Assurance requirements. DOE's

investigation of these failures, in addition to your own incident investigations established that a significant breakdown of the Quality Assurance Program requirements occurred at [the building]. Multiple and recurring failures to follow criticality safety requirements established by you were identified involving multiple personnel in this facility. In some cases, certified [radioactive material] handlers were not familiar with the current procedure requirements for criticality control in their assigned work area, and were not knowledgeable of limitations in the computer based inventory tracking system for determining compliance with criticality safety controls. Personnel who violated the criticality safety controls were also responsible for training new workers on compliance with these controls. Finally, numerous self-assessments were performed in [the building] by your organization which failed to identify and correct
(1) the inadequate conduct of operations by your workers, and (2) inadequate training and qualifications of personnel, both of which led to the criticality infractions.

Additionally, LLNL established requirements to perform a formal audit of criticality safety at least once per year. However, for 19 months, between April 1994 and October 1996, the [Building] SAR mandated Annual Criticality Safety Discipline Audits did not take place. When the October 21, 1996, Criticality Safety Audit of [the building] was performed, it did not identify any findings regarding corrective actions, despite a previous DOE-OAK criticality safety appraisal, issued in May 1996, which identified significant problems with the [building] criticality safety program.

Although a criticality event did not occur as a result of these violations, the loss of positve control of [radioactive material] over an extended period of time, coupled with numerous opportunities to identify and correct the problems, is a significant safety concern. Therefore, in accordance with the "General statement of the Enforcement Policy," 10 CFR 820, Appendix A, the violations discussed in the enclosed PNOV involving (1) work controls, (2) quality improvement, and (3) training and qualification have been classified as Severity Level II problems.

I am issuing the enclosed PNOV in response to these violations. LLNL is exempt from civil penalty by statute; however, because of the safety significance of these violations, DOE would have issued a Proposed Imposition of Civil Penalty in the amount of $153,750 ($28,125 for four Severity Level II violations which occurred prior to the November 1997 effective date of the revised Enforcement Policy, and $41,250 for the Severity Level II violation occurring in December 1997 after the effective date of the new policy).

The Severity Level II violations could each have been assessed at $37,500 for each of the four violations occurring before November 1997 and at $55,000 for the December 1997 violation. In considering potential mitigation, DOE concluded that no mitigation was warranted for prompt identification and reporting of the noncompliances. DOE concluded that LLNL failed to self-identify these problems in [the building].

Specifically, LLNL did not perform adequate oversight and assessments of the criticality safety program compliance over a number of years. In addition, the programmatic implication arising from the May through July 1997 and the December 1997 events were not identified and reported to DOE. DOE did, however, conclude that partial mitigation,
25 per cent of the base civil penalty was warranted for the resumption plans comprehensive corrective actions. Although DOE has been working closely with LLNL, in the development of corrective actions to support the resumption of operations in [the building], the failure to implement the improvements in the Quality Assurance Program for oversight and assessment of operations could result in an additional enforcement action.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. Your response should include specific corrective actions to address each PNOV and your corrective action to improve your oversight and assessment activities. After reviewing your response, DOE will determine whether further action is necessary to ensure compliance with the applicable nuclear safety requirements.

Sincerely,

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

Enclosures:
Preliminary Notice of Violation
Enforcement Conference Summary

cc: M. Zacchero, EH-1
K. Christopher, EH-10
D. Trevillian, EH-10
S. Hurley, EH-10
G. Podonsky, EH-2
O. Pearson, EH-3
J. Fitzgerald, EH-5
V. Reis, DP-1
V. Stello, DP-2
D. Minnema, DP-45
J. Turner, OAK
M. Cornell, OAK

R. Kopenhaver, OAK
A. Garcia, LLNL
D. Thompson, DNFSB
J. Lieberman, NRC
Docket Clerk, EH-10

# Preliminary Notice of Violation

Lawrence Livermore National Laboratory
[Building]
EA 98-06

As a result of a Department of Energy (DOE) evaluation of work control deficiencies that resulted in several failures to meet facility procedural requirements governing movement and placement of [radioactive] as well as neutron moderation and reflection materials during the period of May 6, 1997, through December 2, 1997, at Lawrence Livermore National Laboratory (LLNL) [building], violations of DOE nuclear safety requirements were identified. In accordance with the "General Statement of Enforcement Policy," 10 CFR Part 820, Appendix A, DOE is issuing this Preliminary Notice of Violation. The particular violations are set forth below.

A. 10 CFR 830.120 (c)(2)(i) "Work Processes" requires that work shall be performed to established technical standards and administrative controls using approved instructions, procedures, or other appropriate means. Items shall be identified and controlled to ensure their proper use.

Contrary to the above, LLNL personnel did not perform work to established technical standards and administrative controls in that

1. LLNL Operational Safety Procedure No. [ ].2, "[Radioactive] Material Machining Operations Rooms [ ], [ ], and [ ] Workstations No. [ ], No. [ ], No. [ ], and No. [ ]" in Control 4.1.4 requires that, "Only <u>one</u> condition (Generic or Defined) and its associated mass limit from Table 2 can exist in any workstation at any one time. The mass limit for a specific Defined Condition applies only if <u>all</u> [radioactive material] in the workstation fit the criteria for that Defined Condition. Otherwise, the mass limit for Generic Conditions will be in effect." However, on May 29 and 30, July 8, 10, 11, 13, and 15, 1997, LLNL personnel violated Control 4.1.4 of OSP [ ].2 nine times by transferring [radioactive material] parts into workstation (WS) No. [ ] while the WS contained two clad hemishells. Specifically, the workstation contained three [radioactive material] HOLOG parts and two clad [radioactive material] hemishells, which met neither the Generic Condition nor a Defined Condition (i.e., the allowed conditions for the WS as listed in Table 2 of OSP [ ].2).

2. LLNL Operational Safety Procedure No.[ ].2, "[Radioactive Material] Machining Operations Rooms [ ]*, [ ], and [ ] Workstations No. [ ], No. [ ], No. [ ], and No. [ ]" in Control 4.1.6 requires that "The [radioactive material] mass limits in Table 2 apply to bare metal units ONLY. Close fitting assemblies which include [radioactive material] and any other material(s) (such as beryllium, steel, tungsten, or tantalum) must be evaluated by the Criticality Safety Engineer prior to their use. (See Section 3.2 for the approval process.) This restriction does not apply to the use of cladding materials with a thickness ≤ 0.25" provided the total mass of the item ([radioactive material] plus cladding) does not exceed the limits listed in Table 2." However, between May 20 and July 15, 1997, LLNL personnel violated Control 4.1.6 of OSP [ ].2 in that the two clad rigid metal [radioactive material] hemishells present in WS No.[ ] had a combined total mass exceeding the applicable mass limit from Table 2.

3. The Facility Safety Procedure (FSP) for LLNL [the building], Section 5.1.2.2 requires that "If operating personnel discover that the authorized mass limit in a workstation or storage location, or the administrative mass limit for a room has been inadvertently exceeded,... Immediately notify the H&S Technician and the Facility Manager or FSO of the mass limit violation, and then notify the programmatic supervisor." However, on July 13, 1997, a Certified [Radioactive Material] Handler knew that WS No. [ ] was out of compliance with OSP No.[ ].2 but waited two days before communicating the violation of OSP [ ].2.

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

B. 10 CFR 830.120 (c)(2)(i) "Work Processes" requires that work shall be performed to established technical standards and administrative controls using approved instructions, procedures, or other appropriate means. Items shall be identified and controlled to ensure their proper use.

Contrary to the above, LLNL personnel did not perform work to established technical standards and administrative controls in that

1. LLNL Operational Safety Procedure No.[ ].84, "LLNL Storage Activities [Building] Rooms [ ], [ ], and [ ]" Control 4.1.12, requires that "The [radioactive material] mass limits in Appendix C apply to bare metal, oxide or compounds ONLY. The following items must be reviewed and approved by the Criticality Safety Engineer and the Facility Safety Officer prior to their storage in any location. Close-fitting assemblies which include [radioactive material] and any other material(s) (such as ...). This requirement does not apply to the use of cladding materials with a thickness <0.25" provided the total mass of the item ([radioactive material] plus cladding) does not exceed the limits listed in the

appropriate table from Appendix C." However, on October 30, 1997, two separate containers, each holding an item each with a net weight which exceeded the applicable mass limit of Table C-4, were placed in two separate storage locations without the requisite reviews or approvals by the Criticality Safety Engineer and the Facility Safety Officer.

2. LLNL Operational Safety Procedure (OSP) No.[ ].84, "LLNL Storage Activities approval shall be documented individually as Criticality Safety Administrative Memoranda (CSAMs). The item serial number, approved storage location, and reference CSAM shall be added to Table C-9." However, on November 21, 1997, LLNL personnel identified ten existing instances in which this criticality hazard mass control was violated in seven separate [building] storage locations, in that the required evaluations and approvals had not been performed or documented.

3. The LLNL "Material Control & Accountability Manual" includes "Procedure MM-VI-

   13-Storage of Nuclear Material" which requires in Section 6.3 that "At LLNL's Livermore site, the Operations Group Technologist is responsible for assuring that accountable nuclear material received for storage is correctly packaged and labeled before it is accepted for storage. Placing all items into proper storage locations. (and) Assuring that the [radioactive] material mass limits are not exceeded." Section 7.2 requires that "The experimenter shall fill out a Materials Management Nuclear Material Controlled Item Label." However, in October 1997 a CPH failed to include important required information on the labels for the two items submitted for storage referenced above in Violation B.1, and the items were accepted for storage with their incomplete labels. The accepted items were then placed in inappropriate storage locations in violation of the mass limits specified in OSP [ ].84.

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

C. 10 CFR 830.120 (c)(2)(i) "Work Processes" requires that work shall be performed to established technical standards and administrative controls using approved instructions, procedures, or other appropriate means. Items shall be identified and controlled to ensure their proper use.

Contrary to the above, LLNL personnel did not perform work to established technical standards and administrative controls in that

1. LLNL Operational Safety Procedure No.[ ].5 (and supplements), "[Radioactive Material] Recovery, Waste Packaging, and Mass Weighing Room [

], Workstations No. [ ], No. [ ], No. [ ], No. [ ], No. [ ], No. [ ], No. [ ], No. [ ], and No. [ ]" Control 4.1.12.1, under Section 4.1.12 "Additional Mass Controls for Workstations No. [ ] and No. [ ]," requires that "All [radioactive material] brought into workstation No. [ ] or No. [ ] shall be in crimp sealed metal containers tightly sealed metal slip-lid containers, shipping container inner containment vessels or encapsulated welded assemblies at all times." However, on December 2, 1997, LLNL personnel repackaged six pieces of [radioactive material], each in its own container, by removing each from its container and placing them in six different containers. When the six pieces of [radioactive material] were thus repackaged they were, for a time, contained only in (double) plastic wrap which did not meet the containment requirements of Control 4.1.12.1.

This constitutes a Severity Level II violation.
Civil Penalty - $41,250 (Waived)

D. 10 CFR 830.120(c)(1)(iii) requires that processes to detect and prevent quality problems shall be established and implemented. Items, services, and processes that do not meet established requirements shall be identified, controlled and corrected according to the importance of the problem and the work affected. Correction shall include identifying the causes of the problems and working to prevent recurrence. Item characteristics, process implementation, and other quality-related information shall be reviewed and the data analyzed to identify items, services, and processes needing improvement.

Contrary to the above, LLNL failed to correct violations of criticality safety procedures in that

1. Building [ ] FSP requires that managers and supervisors of programmatic and support personnel working in the [radioactive material facility] are responsible for "monitoring the work area for compliance with the H&SM, ECM and applicable safety procedures" and for "correcting ES&H-related problems and noncompliances immediately..." Walkthroughs of WS No. [ ] by a supervisor and specifically one performed on or about July 2, 1997, were not effective in identifying and correcting ES&H noncompliances with OSP No. [ ].2.

2. On October 21, 1996, LLNL performed a criticality safety audit of [the building]. This audit failed to identify significant problems with the criticality safety program despite a criticality safety appraisal issued in May 1996 by DOE which identified significant problems with the criticality safety program in [the building].

3. Beginning in October 1997 recurring violations of criticality controls occurred in the storage vault area of [the building]. Specifically, OSP[ ].84, "LLNL Storage Activities Building [ ] Rooms [ ], [ ] and [ ], requires that a Criticality

Safety Expert review close fitting assemblies that exceed administrative mass limits for storage in [the building] vaults. Between October 30, 1997 and November 21, 1997, twelve items exceeding the administrative mass limits for storage in [the building] vaults had been stored in the vaults without the required review by a Criticality Safety Expert.

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

E. 10 CFR 830.120(c)(1)(ii) requires that personnel shall be trained and qualified to ensure they are capable of performing their assigned work. Personnel shall be provided continuing training to ensure that job proficiency is maintained.

Contrary to the above, personnel involved in the handling of [radioactive material] in [the building] did not understand criticality controls applicable to their assigned work in that

1. Two CPHs and their supervisor did not understand the criticality controls in the OSP for Workstation [ ], resulting in inappropriate interpretation of the OSP and 12 violations of criticality safety controls in the workstation between May 20, 1997, and July 15, 1997.

2. The two CPHs and their supervisor were confused about the function of a computer based [radioactive material] inventory tracking system and incorrectly assumed that they could rely on the system to alert them of a potential overmass condition. This false assumption caused workers not to verify the conditions in Workstation [ ] between May 20, 1997 and July 15, 1997, and contributed to the overmass conditions in the workstation.

3. Training in the specific elements of the OSP were not effectively conducted. Specifically, controls were incorrectly taught to the two CPHs through on-the-job training by an unqualified trainer, and the testing of these employees did not comprehensively cover controls in the OSPs.

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

Pursuant to the provisions of 10 CFR Part 820. 24, LLNL 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, Attention: Office of the Docketing Clerk, EH-10, P.O. Box 2225, Germantown, MD 20875-2225, with copies to the Manager, DOE Oakland 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 for each violation: (1) admission or denial of the alleged violations; (2) the long term corrective actions that will be taken, and (3) the date when completion of corrective acctions will be achieved.

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

Dated at Washington, D.C.
this 28th day of July 1998

* [ ] Brackets indicate information which has been determined to be UCNI.