



**Department of Energy**  
**National Nuclear Security Administration**  
Washington, DC 20585

February 16, 2007

OFFICE OF THE ADMINISTRATOR

Mr. S. Robert Foley, Jr.  
Vice President – Laboratory Management  
University of California  
1111 Franklin St.  
Oakland, CA 94607

EA-2006-05

Subject: Preliminary Notice of Violation and Proposed Civil Penalty of \$1,100,000  
(Waived by Statute)

Dear Mr. Foley:

This letter refers to the Department of Energy (DOE) Office of Enforcement's investigation of Los Alamos National Laboratory (LANL) operational performance as reflected in several events and assessments occurring in 2005. The Office of Enforcement is now in the Office of Health, Safety and Security.

These events/ assessments include the March 2005 worker uptake event resulting from the TA-50-66 decontamination operation; the July 2005 Sigma Facility americium offsite contamination event, the November 2005 inspection performed by the Office of Security and Safety Performance Assurance (SSA), and the December 2005 TA-55 airborne contamination event.

Based on the level of review already associated with the above events, the Office of Enforcement found it unnecessary to conduct an onsite review as part of its investigation. Instead, the Office of Enforcement based its investigation on review of existing investigation and assessment reports, as supplemented by additional specific LANL documentation requested directly by the Office of Enforcement. Source documents relied upon as part of this investigation included the April 2005 LANL investigation into the TA-50-66 worker uptakes, the July 2005 National Nuclear Security Administration (NNSA) Type B investigation of the offsite americium contamination event, the November 2005 Environment, Safety and Health Inspection performed by SSA's Office of Independent Oversight, and the March 2006 LANL Summary of Recent Reports for Institutional Price-Anderson Nuclear Safety Noncompliances. A meeting was also held with your staff on August 9, 2006, to discuss University of California perspectives on the above events.

Based upon our evaluation of these issues, NNSA has concluded that violations of DOE's nuclear safety rules have occurred. The violations are described in the enclosed Preliminary Notice of Violation (PNOV). As these violations occurred prior to the June 2006 transition to the Los Alamos National Security (LANS) contract, this PNOV is addressed directly to the

University of California (rather than the current Laboratory Director) as the appropriate responsible authority.

The attached PNOV cites fifteen separate violations, each with multiple examples, of the Department's nuclear safety rules. As part of its investigation, the Office of Enforcement noted that many of the identified deficiencies were common to more than one source document. Specific examples include LANL deficiencies related to inadequacies in work control documents and procedures, lack of Subject Matter Expert involvement in work plan development, failure to implement work and As Low As is Reasonably Achievable (ALARA) controls, and inadequate radiological surveys.

Section I of the PNOV describes violations of the department's Quality Assurance (QA) requirements contained in 10 CFR 830.120. Specific citations in the areas of Work Controls, Training, Quality Improvement, Assessments, Documents and Records, and QA Programs were identified.

Section II of the PNOV describes violations of the Safety Basis requirements contained in 10 CFR 830.200. Specific citations were identified associated with the failure to adequately maintain safety basis documentation, and deficiencies associated with the Unreviewed Safety Question (USQ) Process.

Section III of the PNOV describes violations of the Department's occupational radiation protection requirements contained in 10 CFR 835. Specific citations were identified in the areas of Radiation Protection Procedures, ALARA Workplace Controls, Monitoring, Labeling, Receipt Surveys, and Contamination Control.

The large number of violations and examples cited in the PNOV is reflective of continuing LANL performance deficiencies over the past few years. In 2003, NNSA issued a PNOV (EA-2003-02) citing work process, radiological control and safety basis deficiencies associated with several LANL events. That PNOV included a quality improvement citation, for LANL's continuing failure to adequately address and correct identified deficiencies and for deficiencies in assessments of safety basis implementation. Collectively, the PNOV contained seven Severity Level II citations and one Severity Level III citation, with a waived penalty value (due to LANL's statutory exemption) of \$385,000. As noted in the April 10, 2003, transmittal letter, NNSA considered escalating the quality improvement citation to a Severity Level I violation, but refrained based on commitments made during the Enforcement Conference to strengthen senior laboratory management and implement site-wide corrective actions.

In June 2004, NNSA issued another PNOV (EA-2004-05) in response to a 2003 radiological event resulting in the exposure of two workers in excess of DOE occupational limits. Once again, the PNOV cited deficiencies in work controls, safety basis, and quality improvement. As noted in that transmittal letter, the specific citations were escalated to Severity Level I, based on their long-standing nature and contribution to the subject event. Although not specifically cited in the PNOV, both the enforcement conference discussion and the subsequent NNSA PNOV transmittal letter indicated the need for improved performance in the area of management and

independent assessments. Collectively, the PNOV identified seven Severity Level I citations, with a waived penalty of \$770,000.

NNSA and the Office of Enforcement continued to monitor LANL activities during the subsequent site work suspension/resumption with the hope that significant improvements in performance would be recognized. Upon identification of the TA-50-66 worker uptake event in early 2005, the Office of Enforcement and NNSA initially elected to refrain from enforcement action to provide reasonable opportunity and time for corrective actions to become effective. With the identification of the Sigma Facility americium event in July 2005, however, it became apparent that fundamental improvements had not been fully realized and that further enforcement action was warranted. The Sigma Facility offsite contamination event required offsite radiological response in three states. For both the TA-50-66 and americium contamination events, the resulting worker uptakes were limited by good fortune but had the potential to be significantly greater.

In accordance with the “General Statement of Enforcement Policy,” 10 CFR 820, Appendix A, the violations in the attached PNOV have each been classified according to severity level. Five of the violations (specifically, work controls adequacy, work controls implementation, quality improvement, assessments, and ALARA/radiological workplace controls) have been classified as Severity Level I violations, with a base civil penalty of \$110,000 each. Unlike the 2004 PNOV, this classification does not represent an escalation from Severity Level II. Rather, classification as Severity Level I is appropriate due to the demonstrated programmatic and long-standing nature of the violations with an associated high potential for adverse worker impact. The remaining ten violations are classified as Severity Level II, with an associated base penalty of \$55,000 each. Although safety basis violations have been classified as Severity Level I in the past, in this case the specific violations (safety basis maintenance and USQ implementation) differ from those in the 2004 PNOV.

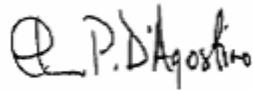
Due to University of California’s statutory exemption, the civil penalties associated with this PNOV have been waived. Had this not been the case, a Proposed Imposition of Civil Penalty in the amount of \$1.1 M would have been issued, which represents the largest single civil penalty in the history of the DOE Nuclear Safety Enforcement Program. Under other circumstances, NNSA would also have responded to LANL’s degrading enforcement history with utilization of the per-day authority to cite violations over multiple days. Consistent with recent enforcement precedent, this may well have resulted in citing the five Severity Level I citations for multiple days each, increasing the penalty for each to at least \$220,000. Given the recent contract transition, however, I determined it more appropriate to focus on the need for significant improvement at LANL, rather than the monetary total of the PNOV (which is waived in any case).

NNSA has also decided to exercise discretion with respect to the December 2005 TA-55 airborne radioactivity event. Although the LANL investigation identifies communication and feedback deficiencies associated with the event, the response actions appeared appropriate and the event displayed fundamental differences from the August 2003 Room 201B pre-inventory event.

With respect to mitigation, NNSA recognizes that the integrated corrective action approach that LANL undertook represents a positive step towards instilling corrective action ownership in both the line organization and the program owners. However, consistent with the approach taken in 2004, NNSA does not find it appropriate to provide mitigation for corrective actions when significant safety events continue to occur as a result of unresolved issues. Consequently, no mitigation is provided in association with this PNOV.

I hope to see improved performance on the part of the University with its participation in the new contract, and will be forwarding a copy of this PNOV to the Los Alamos National Security (LANS) Director under separate transmittal. You are required to respond to this letter and to follow the instructions specified in the enclosed PNOV when preparing your response.

Sincerely,



Thomas P. D'Agostino  
Acting Administrator  
National Nuclear Security Administration

CERTIFIED MAIL  
RETURN RECEIPT REQUESTED

Enclosure: Preliminary Notice of Violation and Proposed Civil Penalty

cc: Dan Glenn, LASO  
Alverton Elliott, LANL PAAA Coordinator  
Richard Azzaro, DNFSB

## Preliminary Notice of Violation

University of California (UC)  
Los Alamos National Laboratory (LANL)

EA-2006-05

As a result of a Department of Energy (DOE)/National Nuclear Security Agency (NNSA) evaluation of Los Alamos National Laboratory (LANL) operational performance as reflected in several events and assessment results during 2005, multiple violations of DOE nuclear safety requirements were identified. These events/assessments included the March 2005 worker uptake event resulting from the TA-50-66 decontamination operation; the July 2005 Sigma Facility americium offsite contamination event, and the November 2005 inspection performed by the Office of Security and Safety Performance Assurance.

In accordance with 10 CFR 820, Appendix A, "General Statement of Enforcement Policy," the violations are listed below. Citations specifically citing the quality assurance criteria of 10 CFR 830.122 represent a violation of 830.121(a), which requires compliance with those criteria. Within the citations listed below, reference is made to the following specific source documents:

1. The NNSA *Type B Accident Investigation of the Americium Contamination Accident at the Sigma Facility, Los Alamos National Laboratory, New Mexico, July 14, 2005* (NNSA Type B)
2. *Inspection of Environment, Safety, and Health Programs at the Los Alamos National Laboratory, November 2005*, performed by the Office of Security and Safety Performance Assurance's Office of Independent Oversight.
3. The *LANL Investigation: Worker Doses from Radioactive Material Inhalation at TA-50-66*, dated April 20, 2005 (LANL Investigation).

### I. Quality Assurance Violations

#### A. Quality Program Violations

10 CFR 830.122(a), *Management/Program*, requires that contractors: "(1) Establish an organizational structure, functional responsibilities, levels of authority, and interfaces for those managing, performing, and assessing the work" and "(2) Establish management processes, including planning, scheduling, and providing resources for the work."

Contrary to the above, LANL failed to adequately establish organizational responsibilities and interfaces, effectively establish management processes, and provide adequate resources. Specific examples include:

1. The NNSA Type B Accident Investigation Board concluded that management of the Materials Science and Technology (MST-6) group, the primary occupant of the Sigma Facility, had failed to adequately document or communicate safety roles, authorities, responsibilities, or interfaces to employees. The Board was concerned that Sigma management appeared to be placing greater emphasis on mission accomplishment to the detriment of safety.
2. The NNSA Type B Accident Investigation Board concluded that even prior to the offsite contamination event, LANL had provided inadequate Radiological Control Technician staffing resources for the Sigma Facility to effectively implement a radiological control program, and that this problem apparently extended across LANL.
3. Based on the broad range of requirement and procedural violations and work control deficiencies noted in its investigation, the NNSA Type B Accident Investigation Board concluded that the MST Division had failed to instill the necessary level of formality of operations at Sigma to effectively establish the defined management processes.
4. As identified during the Office of Independent Oversight 2005 inspection, LANL failed to establish adequate expectations, guidance and tools to ensure that the new Integrated Work Management (IWM) process was effectively established. Specific examples include:
  - a. The IWM process is specified by procedure IMP-300.2, *Integrated Work Management for Work Activities*, dated September 17, 2004. The Office of Independent Oversight 2005 inspection found through interviews that managers were confused with the process and lacked a method to provide feedback for improving the process.
  - b. IMP 300.2 requires assignment of risk levels or hazard grading to work activities, and then application of graduated hazards review and controls based on risk levels. The Office of Independent Oversight 2005 review of various work packages found multiple instances of incorrect application of risk levels, which resulted in incorrect hazards analyses and levels of controls.
  - c. The *Operational Efficiency Project Execution Plan*, dated March 4, 2005, Rev. 0, integrates management of LANL improvements being implemented in various areas, including the IWM process. The Project Execution Plan calls for a management self-assessment of its mission and the implementation plans of each directorate. However, the Office of Independent Oversight 2005 inspection determined that no such self-assessments of implementation had been conducted to ensure that the IWM process was effectively established.

5. As identified during the Office of Independent Oversight 2005 inspection, several LANL divisions failed to take appropriate steps to properly establish and implement the IWM process. Specific examples include:
  - a. IMP 300.2 provides specific criteria for using the “qualified worker” designation, allowing work to be performed using the skill of the craft and not developing Integrated Work Documents (IWD). However, the Office of Independent Oversight 2005 inspection noted that several divisions were inappropriately applying this designation to work activities that should have had appropriate IWD’s established.
  - b. IMP 300.2 provides requirements for activity-specific and work-area information to be included in all IWD’s. However, the Office of Independent Oversight 2005 inspection noted that some division’s IWD’s did not include such required information.
  - c. LANL divisions have not taken effective steps to convey to employees the purpose and benefit of the IWM process, or other steps to ensure support for the IWM process. The Office of Independent Oversight 2005 inspection found that many workers and supervisors interviewed did not believe the process added to safety, and many who believed that the process detracted from safety because of the focus on completing IWD paperwork.
  - d. The Office of Independent Oversight 2005 inspection found that directorates had not established formal implementation plans to ensure that the IWM process was effectively established in their directorate.

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

## **B. Inadequate Work Controls**

10 CFR 830.122(e), *Performance/Work Processes*, requires that contractors  
“(1) Perform work ... using approved instructions, procedures, or other appropriate means.  
(2) Identify and control items to ensure their proper use.”

Contrary to the above, LANL performed work activities without establishing appropriate controls in approved instructions or procedures, failed to adequately label items, and used items without proper documentation to demonstrate they were of the proper quality level. Specific examples include:

1. Activities performed at Sigma Facility on July 14, 2005, involving receipt inspection, opening of the transport container, transfer into the glovebox, and opening of plastic bags were not adequately covered by an approved work control document. IWD-05-44, *Handling of UN Pellets* dated July 22, 2005, was issued to address handling of the

uranium nitride pellets, but it did not address the above activities, and it was developed one week after the shipping package was opened.

2. The NNSA Type B Accident Investigation Board found that the LANL IWM Process lacked sufficient controls when projects are divided across organizational boundaries to ensure that hazards identified in one organization are adequately communicated, recognized, and analyzed in the other organization. In the Am-241 example, the work controls did not ensure that personnel at PF-4 provided adequate documentation or labeling to communicate to the workers at the Sigma Facility the hazards involved, including the potential for contamination.
3. Similarly, the Office of Independent Oversight 2005 inspection found that LANL failed to establish adequate mechanisms to define and control interfaces when multiple LANL groups or divisions occupy the same laboratory to ensure awareness of hazards and coordination of controls. Specific examples include:
  - a. The Office of Independent Oversight 2005 inspection observed that the “high-bay” lab (Room 115) in Building 31 had experiments being performed by two or three groups. Although a person in charge had been established for each experiment, there was no single individual responsible for ensuring that all occupants were aware of all hazards, or to coordinate activities.
  - b. The Office of Independent Oversight 2005 inspection observed that in TA-48 two researchers within the same group and occupying connecting labs were unaware of the hazards associated with each other’s experiments.
  - c. The Office of Independent Oversight 2005 inspection observed electrical contractors conducting fire-alarm system upgrade work in TA-48 RC-1 in areas of the hot cell that are not routinely occupied or surveyed, possibly resulting in unmonitored contamination or spread of contamination.
4. The Office of Independent Oversight 2005 inspection found that LANL failed to adequately address in IWD’s or sufficiently analyze some C-Division research and shop activity hazards, and did not identify the appropriate hazard controls. Specific examples include:
  - a. The IWD for radioactive standards preparation used at TA-48 in the RC-1 facility specified three types of gloves to use as personal protective equipment (PPE), without linking a specific glove to a particular type of activity.
  - b. The IWD for radioactive material handling for transuranic structural and environmental chemistry performed at TA-48 in the RC-1 facility did not provide enough specific hazard information to allow workers to readily identify the appropriate hazard controls. This IWD refers the worker to the Material Safety Data Sheet to select the appropriate glove, without sufficient guidance for glove selection.

- c. The potential explosion hazards for work in the C-Division in handling titanium hydride during material certifications was not sufficiently analyzed to ensure that material conditions in a sieve tray could not result in an explosion, although the potential for such was noted in the MSDS.
5. The Office of Independent Oversight 2005 inspection found LANL's procedures for control of combustibles to contain non-conservative and inadequate controls, for example:
  - a. Procedure TA55-TSR-005-R04, *Transient Combustible Control Inspection*, Section 9.6.3, non-conservatively considered combustibles in gloveboxes or metal containers as not being transient combustibles, although these containers or enclosures are not Underwriters Laboratory (UL)-listed, and provide no limit on ethanol storage in non-UL-listed containers, even though such is assumed in the Fire Hazards Analysis.
  - b. Procedure TA55-TSR-AP-010, R03.1, *Transient Combustible Control Inspection for Designated Gloveboxes*, provides no combustible control criteria on quantities of ethanol or other flammable liquids inside of gloveboxes.
  - c. Procedure TA55-TSR-AP-030, R00, *Heat Loading Log for Temporary Storage of Pu238*, has steps to attempt to verify the safety of Pu-238 contaminated wastes stored in drums. This procedure requires that the drum skin temperature be monitored twice a day, but it gives no specific monitoring intervals, nor locations to take readings. Consecutive readings could be taken at different locations, rendering results inconclusive.
6. The Office of Independent Oversight 2005 inspection identified various inadequacies in specific LANL surveillance procedures, including the following:
  - a. TSR surveillance procedures TA55-TSR-105A, R01.1, *North Ventilation Supply/ Bleed-Off In-Place HEPA Filter Testing*, and TA55-TSR-105C R01.1, *South Ventilation Supply / Bleed-Off In-Place HEPA Filter Testing*, for performing PF-4 HEPA filter efficiency testing do not address the potential bypass leakage from the idle train into the filter outlet plenums of the train being tested, resulting in possible non-conservative test results.
  - b. Test procedures used to conduct diesel fire pump surveillances did not specify test engine speed nor require corrections of test data to account for engine speed in comparing pump performance results to nominal design and baseline acceptance flow curve data. The test results for the annual PF-11 diesel fire pump test of April 26, 2005 determined that rated flow of 1,000 gpm was achieved; however that performance was met at an engine speed of 1,792.7 rpm whereas the pump rating is based on a nominal 1,750 rpm.
7. Surveillance TSR-301-R02, *PF-10 Fire Pump Testing*, performed on September 28, 2005, was observed during the Office of Independent Oversight 2005 inspection. In that

surveillance LANL instituted certain work-arounds due to lightning damage to the fire alarm control and pump controller panels the night before. The work-arounds were conducted informally, without formalizing these changes in the surveillance test procedure.

8. LANL has established a Master Equipment List in accordance with procedure AP-341-502, R0, *Management Level Determination for Structures, Systems and Components*, which specifies the required Management Level for each such item. The Management Level (ML) designation is then used for the graded application of quality controls for the item. However, LANL conducted several work activities at PF-4 without the supporting documentation to demonstrate that replacement parts were controlled to meet the required ML. Specific examples noted in the Office of Independent Oversight 2005 inspection included:
  - a. Several Facility Control System corrective maintenance work packages reviewed in the Office of Independent Oversight 2005 inspection involved use of spare parts that were not certified to the required Management Level, ML-2, for this system.
  - b. The work instruction in Work Order Task 00232719 for replacing a bearing on Fan FE 863 did not specify that the replacement bearing was required to be ML-2, and no documentation in the package indicated that the bearing used was ML-2.
  - c. For Work Order Task 00218968-01 involving replacement of the diesel fire pump heat exchanger filler neck and cap, the work instruction specified that the parts be ML-2. However, no documentation in the package demonstrated that ML-2 parts were used.
  - d. The spare parts storage area in PF-4 for fan replacement parts does not retain the ML-2 receipt paperwork. Thus documentation is not available to demonstrate the quality level of these spare parts in storage, or to demonstrate that parts with the correct quality level are used to meet work orders.
9. The Office of Independent Oversight 2005 inspection found that the PF-4 Operations Center operators use chains and locks to control some major ventilation system valve and damper positions. However, the use of configuration locks is not controlled by an operations procedure, a list of currently applied configuration locks is not maintained, and the application is not verified periodically.
10. The Integrated Work Document (IWD) used to control the TA-50-66 decontamination work during March 2005 did not adequately define the scope of work nor provide suitable identification of potential hazards. As identified during the LANL investigation of the event, the applicable IWD (00191774, *Prepare Vault for Tank Replacement*) did not explicitly define or include paint scraping and painting as part of the planned work activities. As a result, this activity was not sufficiently analyzed in the early stages of the

work planning process, and the resulting high airborne radioactivity levels were not effectively anticipated nor appropriately controlled. The LANL investigation also identified a weakness in that neither the painters nor the Health Physics Operations group were involved in the IWD preparation.

Collectively these violations constitute a Severity Level I problem.  
Civil Penalty - \$110,000 (Waived)

### **C. Violation of Work Controls**

10 CFR 830.122(e), *Performance/Work Processes*, requires that contractors  
“(1) Perform work using approved instructions, procedures, or other appropriate means.”

Contrary to the above, LANL failed to perform work in accordance with approved procedures. Specific examples include:

1. The nuclear materials *NM Custodian Handbook*, dated July 1, 2003, requires that two individuals qualified as Tamper Indicating Device (TID) users conduct the removal of any TID, with one functioning as the remover and the other as the verifier. However on July 14, 2005, a radioactive material shipping container (30 gallon drum) was received at the Sigma Facility. The shipping container had a TID affixed to the outside of the container; there was also a TID affixed to an inner container packed inside the drum. Although the shipping container was logged-in by an individual qualified as a TID user, the container was then turned over to a second individual who transported the container to another area and while working in isolation removed both the outer and inner TIDs while unpacking the container. The second individual was not qualified as a TID user.
2. The NNSA Type B Accident Investigation Board reviewed historical occurrences at LANL that reflect a lack of adequate formality of operations, in particular failures to comply with and fully implement the IWM process in the MST-6 group. The frequency and continuing nature of such events led the Board to conclude that the MST-6 group exhibits institutional problems in complying with the IWM process.
3. Procedure IMP 300.2, *Integrated Work Management for Work Activities*, requires the Responsible Line Manager to assign a Person in Charge, and the Person in Charge selects appropriate Subject Matter Experts to validate an Integrated Work Document. Additionally, Functional Area Managers are responsible to ensure that appropriate Subject Matter Experts are assigned to review and approve the Integrated Work Document. For each area inspected during the Office of Independent 2005 inspection, multiple examples of failures to involve ES&H Subject Matter Experts in certain higher-risk activities were observed. These included failures to involve the radiation protection group in developing radiological work control documents for work potentially involving radiological hazards.
4. Laboratory Implementation Requirement (LIR) 402-700-01.1, Chapter 3, As Low as Reasonably Achievable (ALARA) Program, section 326 identifies that the five-step

process for safe work practices includes "...implementing ALARA control measures (use Appendix 3C, ALARA Review Checklist, for required ALARA techniques)..."

The ALARA Review Checklist developed and used in association with the February - March 2005 decontamination activities at TA-50-66 recommended various work control measures for the work activity, including the use of local ventilation, the use of the most highly skilled available workers to conduct the work activity, and the establishment of a Continuous Air Monitor (CAM) hold point alarm level of 100 Derived Air Concentrations (DAC) for stop work and evacuation.

As identified during the LANL investigation, the above work controls were not effectively implemented during the TA-50-66 decontamination. Local (i.e., supplemental) ventilation was not used during the decontamination; additionally the existing facility ventilation was significantly reduced by facility personnel during the work period but this was not communicated to the decontamination work party and consequently the work was not stopped. Two of the three painters involved in the decontamination work had only recently completed basic radiological worker training and were not experienced in working in high contamination, airborne radioactivity environments. Although a CAM was utilized during the work it sampled air in the protective clothing doffing tent and did not sample the air in the actual work area (the vault).

Collectively these violations constitute a Severity Level I problem.  
Civil Penalty - \$110,000 (Waived)

#### **D. Training**

10 CFR 830.122(b), *Management/Personnel Training and Qualification*, requires that contractors: "(1) Train and qualify personnel to be capable of performing their assigned work."

Contrary to the above, LANL failed to provide required or sufficient training to personnel so they could effectively perform their assigned work. Specific examples include:

1. Procedure IMP 300.2, *Integrated Work Management for Work Activities*, defines the required training for the Person-in-Charge (PIC) and Workers performing work under the IWM process. In conjunction with the planned uranium nitride pellet welding activities in the Sigma Facility, LANL management had assigned a single worker the responsibility to be both the PIC and the Worker. However the NNSA Type B Accident Investigation Board found through review of training records that the worker had not completed the required training for either the PIC or the Worker positions.
2. Additionally, IMP 300.2 requires that the line manager for an activity authorize the individuals to perform that activity, which includes determining that the individuals are up-to-date with their required training. However, for the preparation of the IWD for handling the uranium nitride pellets at Sigma, management failed to determine that the

individual assigned to be the PIC and Worker was not current in their required IWM training.

3. Following the Am-241 offsite contamination event, one of the steps taken by LANL was to place a continuous air monitor in the room at Sigma where the worker had opened the uranium nitride package. However, the NNSA Type B Accident Investigation Board found through interviews that Sigma's health, safety and radiation protection personnel were not adequately trained to be familiar with alarm set points for the continuous air monitor or the DAC value specific for Am-241.
4. The NNSA Type B Accident Investigation Board concluded that in general, and as demonstrated specifically by the Sigma worker involved in the Am-241 offsite contamination, LANL training was inadequate to assure that personnel had an understanding of requirements for responding to frisker alarms at Sigma.

Collectively these violations constitute a Severity Level II problem.

Civil Penalty - \$55,000 (Waived)

#### **E. Documents and Records**

10 CFR 830.122(d), *Management/Documents and Records*, requires that contractors "(1) Prepare, review, approve, issue, use, and revise documents to prescribe processes, specify requirements, or establish design. (2) Specify, prepare, review, approve, and maintain records."

Contrary to the above, LANL did not adequately prepare, use and revise documents to govern various design parameters, and did not properly prepare records for activities that were conducted. Specific examples include:

1. The *Facility Safety Plan for Sigma*, MST-FSP-03-FAC-5042, rev. 3, was issued in August 2002, and requires an annual review of the document by the Sigma operations group and Sigma tenants. The NNSA Type B Accident Investigation Board found that there is no documentation to demonstrate that any annual reviews have been performed in the three years since the issuance of this revision, and that the document was out-of-date for the activities being performed at the Sigma facility.
2. The Office of Independent Oversight 2005 inspection identified that LANL did not have documents for PF-4 to address:
  - a. Environmental qualification for HEPA filters at 500° F.
  - b. HEPA filter loading calculations for the design basis seismic event and fire.
  - c. Basis calculations for the TSR building differential pressure limits.
  - d. Outside building static pressure probe design drawings.

- e. Diesel fire pump exhaust stack seismic and wind qualification calculations.
  - f. Up-to-date piping and instrument drawings for the HVAC and fire protection systems.
3. The Office of Independent Oversight 2005 inspection determined that LANL had not developed adequate documents to effectively support and control PF-4 safety system normal operations, testing and maintenance, including:
    - a. Lack of documents defining component identification numbering.
    - b. Incomplete, incorrect and out-of-date system drawings.
    - c. Lack of documents defining component identification tagging and markings.
    - d. Lack of equipment lineup and status lists in plant technical procedures.
  4. LANL has not established proper document control of PF-4 ventilation alarm response procedures. The Office of Independent Oversight 2005 inspection found that existing procedures had not been reviewed nor updated in several years, were not maintained as controlled documents, and had no revision numbers.
  5. The Office of Independent Oversight 2005 inspection determined that LANL had not established a comprehensive document control process for PF-4 to cover design-related documentation. While a document control process has been established for procedures, virtually no design control documentation is controlled by this process.

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

## **F. Quality Improvement**

10 CFR 830.122(c), *Management/Quality Improvement*, requires that contractors:  
“(1) Establish and implement processes to detect and prevent quality problems;  
(2) Identify, control, and correct items, services, and processes that do not meet established requirements; and(3) Identify causes of problems and work to prevent recurrence as part of correcting the problem.”

Contrary to the above, LANL failed to establish processes to detect and prevent quality problems, identify and correct conditions that did not meet requirements, and identify causes of problems and work to prevent recurrence. Specific examples include:

1. LANL corrective actions taken in response to prior DOE/NNSA enforcement actions have been ineffective in correcting underlying problems and preventing recurring deficiencies, as demonstrated by the citations included in this Preliminary Notice of

Violation (PNOV). Specifically, the two most recent DOE/NNSA LANL Enforcement Actions (EA 2003-02, dated April 10, 2003, and EA 2004-05, dated June 21, 2004) both cited violations in the areas of work processes, safety basis, and radiation protection – all areas cited in association with this current PNOV. Both prior actions cited events involving worker uptakes of radioactive material – all of which had the potential to result in significantly higher exposures to the workers than were actually received. The worker uptakes associated with the events cited in the current PNOV had a similar potential for significantly higher exposures, particularly the Am-241 contamination event. A DOE Enforcement Letter dated July 7, 2003, identified additional examples of LANL work control breakdowns and safety basis implementation issues; however these deficiencies were not cited at that time in recognition of LANL’s ongoing and extensive corrective action efforts. The recurring nature of LANL’s deficiencies in the areas of procedural adequacy, implementation, work control, safety basis and radiation protection implementation clearly indicate that corrective actions taken to date have not been effective in addressing all underlying causes.

2. The NNSA Type B Accident Investigation Board found that the ad hoc management team and command and control structure established in response to the Am-241 offsite contamination event lacked sufficient resources and processes to adequately control conditions and effect the immediate corrective actions required.
3. The NNSA Type B Accident Investigation Board also found that Radiological Control Technicians (RCT) had previously expressed concerns among themselves and to some workers that RCT receipt inspections were not being requested nor performed at Sigma for receipt of radioactive material packages. However, concerns with this condition were not raised to management, and the condition was not documented in a problem resolution process so that it could be corrected.
4. The Management Self-Assessment of the MST Division following the Laboratory Director’s July 2004 stand-down, completed September 10, 2004, noted several safety management deficiencies. The NNSA Type B Accident Investigation Board found that these deficiencies had not been corrected at the time of the Am-241 offsite contamination release event, and that they had contributed to the event. Specific examples include:
  - a. LANL’s failure to correct deficiencies in the MST Facility Safety Plans, including the failure to perform required annual updates,
  - b. Deficiencies in the MST Division’s document control processes,
  - c. LANL failures to adequately engage subject matter experts to identify, evaluate and establish controls for hazards.
5. The Office of Independent Oversight 2005 inspection found that the Integrated Work Management Committee was aware of implementation problems with the new IWM process, including a number of issues identified in a LANL Audits and Assessment Division assessment of IWM in May 2005. However, steps to modify the IWM process or revise the procedure to correct these identified problems were not taken.

6. The Office of Independent Oversight 2005 inspection identified a condition that resulted in loss of safety-class pressure boundary confinement due to open bypass valves on several TA-55 safety-class HEPA filter plenums. When notified of the problem, system engineers did not enter the problem in any corrective action or issues management system, and no corrective actions were taken for this problem for almost two weeks.
7. The Office of Independent Oversight 2005 review of data in the LANL issues management process, I-Track, found that this process was not being used properly to manage resolution of quality problems, including:
  - a. LIR 307-01-05.0, *Issues Management Program*, dated June 30, 2003, requires that each division establish an issues management process to identify, document, track and effectively resolve issues using a risk management approach. However, several line organizations evaluated as part of the Office of Independent Oversight 2005 inspection had not established formal division-level issues management processes.
  - b. Issues input into I-Track are not always adequately addressed or resolved in a timely manner. Many issues going back to 2003 were found to still be open at the time of the Office of Independent 2005 inspection.
  - c. Root cause analyses are not always performed for issues categorized as high-significance. Additionally, programmatic, cross-cutting and roll-up issues reviewed in Office of Independent Oversight 2005 inspection from the DX, NMT and C-Divisions were classified as “Low” or “Medium” significance, and thus not subjected to causal analysis reviews.
  - d. Procedure LIR 307-01-05.0 requires that the Issue Coordinator in the Performance Surety Division perform trending, analysis and synthesis of data in the issues management process, and provide quarterly reports to senior management. The LIR also requires that the Issue Coordinator periodically provide performance metrics on the issues management process to senior management. However, the Office of Independent Oversight 2005 inspection found that no such trending was being performed and no periodic reports containing trending and analysis results and performance metrics were being provided to senior management.
  - e. Programmatic issues identified in internal independent assessments are assigned to program owners. However, these issues are not being placed in I-Track, and implementing actions by line and support organizations are not established. LIR 307-01-05, *Issues Management*, dated June 2003, does not adequately address assignment of responsibility and coordination for resolution of programmatic issues affecting multiple organizations.

Collectively these violations constitute a Severity Level I problem.

Civil Penalty - \$110,000 (Waived)

## G. Assessment Programs

10 CFR 830.122(i), *Assessment/Management Assessment*, requires that contractors: “Ensure managers assess their management processes and identify and correct problems that hinder the organization from achieving its objective.” 10 CFR 830.122(j), *Assessment/Independent Assessment*, requires that contractors: “(1) Plan and conduct independent assessments to measure item and service quality, to measure the adequacy of work performance, and to promote improvement.”

Contrary to the above, LANL has not established and implemented an effective management assessment program to routinely and formally self-assess safety programs to identify and correct problems, and failed to establish effective independent assessment activities to identify performance problems that were subsequently disclosed by the Am-241 offsite release event or found by the OA-2005 inspection. Specific examples include:

1. The Health, Safety and Radiation Protection Division (HSR) self-assessments were found by the NNSA Type B Accident Investigation Board to be deficient in that they failed to identify the programmatic deficiencies in processes and procedures for receiving radioactive material at Sigma.
2. LANL’s institutional independent assessment activities failed to provide an effective means to detect the weaknesses in shipping processes at PF-4, the lack of an adequate formality of operations at Sigma, and the deficiencies in work control and radiological practices at Sigma.
3. The Director’s Instruction 05-007, *Management Self-Assessment*, dated March 2005, specified that management self-assessments be conducted, and that quarterly reports be provided for divisions with nuclear, radiological and high-hazard non-nuclear facilities. However, no such assessments or quarterly reports were found by OA-2005 to have been provided for the NMT division.
4. LIR 307-01-01.4, 6/30/03, *Management Assessment Program*, requires semi-annual frequencies for Functional Managers to conduct assessments of their programs. However, OA-2005 found that Functional Managers responsible for coordinating, monitoring and assessing fire protection, safety basis, and quality assurance programs have not conducted LIR-required program assessments since the spring of 2004.
5. KSL, a maintenance services subcontractor to LANL, had developed no plans or schedules for conducting self-assessments at the time of the OA-2005 inspection.

Collectively these violations constitute a Severity Level I problem.

Civil Penalty - \$110,000 (Waived)

## II. Safety Basis Violations

### A. Maintain Safety Basis

10 CFR 830.202, *Safety Basis*, requires that the contractor "...(c)(1) Update the safety basis to keep it current and to reflect changes in the facility, the work and the hazards as they are analyzed in the documented safety analysis."

Contrary to the above LANL failed to maintain the PF-4 safety basis when new information regarding the facility was discovered, when the facility and its procedures were changed, and when discrepancies or inadequacies were discovered in the current approved FSAR. Specific examples include:

1. No action to update the FSAR was taken when the design basis fire temperature for HVAC systems was increased from 200°F to 500°F.
2. No action to update the FSAR was taken when Laboratory areas with insufficient fire suppression water pressure to meet the spray density requirements were identified.
3. No action to update the FSAR was taken when the Zone 2 bleed-off fan configuration was found to be non-conservative relative to the FSAR.

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

### B. Unreviewed Safety Question Procedure

10 CFR 830.203, *Unreviewed Safety Question Process*, requires that the contractor "...(d)...implement the DOE-approved USQ process in situations where there is a: (1) Temporary or permanent change in the facility as described in the existing documented safety analysis; (2) Temporary or permanent change in the procedures as described in the existing documented safety analysis; (3) Test or experiment not described in the existing documented safety analysis; or (4) Potential inadequacy of the documented safety analysis because the analysis potentially may not be bounding or may be otherwise inadequate."

Contrary to the above LANL failed to effectively implement the LANL Unreviewed Safety Question (USQ) process. Specific examples include:

1. During the Office of Independent Oversight 2005 inspection a number of technical concerns relative to PF-4 were raised for the first time, and LANL staff did not properly enter the USQ Potential Inadequacy in the Safety Analysis (PISA) process. Procedure OST-300-00-06B, *LANL Unreviewed Safety Question Procedure*, Rev. 3, dated September 24, 2004, requires that the USQ process be entered when a potential inadequacy has been identified in the documented safety analysis, and includes specific steps for processing a PISA condition. Conditions in which LANL failed to properly enter the USQ process for such potential inadequacies included:

- a. Non-conservative FSAR analyses of equipment failures for the design basis seismic event.
  - b. Inadequate analyses of important-to-safety HEPA filter loading for the design basis seismic and Zone 2 fire events.
  - c. Inadequate TSR differential pressure limits to account for wind effects.
  - d. Ambiguity as to whether a tornado is a design basis event for the facility.
  - e. Non-conservative design of the outside static air pressure probes, which provide input for control of confinement HVAC systems.
  - f. Loss of safety-class confinement boundary control with discovery of open bypass valves on a number of safety-class Zone 1 and Zone 2 HEPA filter plenums.
2. The Office of Independent Oversight 2005 inspection found that LANL inappropriately screened out from USQ review certain TA-55 changes based on a prior similar USQ Determination (USQD). This included:
- a. Developing a generic USQD (USQD-TA-55-04-084) that addressed new working level implementation documents and procedures used in TA-55 and their revisions. That USQD attempted incorrectly to provide a generic exclusion for such current and future document changes if the changes remained within the confines of any governing Process Hazards Analysis and the Documented Safety Analysis (DSA). Such a generic exclusion process using an undocumented basis that these subsequent changes did not affect the DSA inappropriately circumvents the USQ process.
  - b. The Office of Independent Oversight 2005 inspection identified three new Integrated Work Documents that were inappropriately screened out by reference to the above noted generic USQD (TA-55-05-033, TA-55-05-037, and TA-55-05-099), and thus were not subjected properly to the USQ process.
3. LANL incorrectly screened out changes in violation of the DOE-approved LANL USQ procedure OST-300-00-06B11, *LANL Unreviewed Safety Question Procedure*, Rev. 3, utilizing an incorrect basis for each change as noted below:
- a. TA-55-05-154 involving a change to the site boundary. This was incorrectly screened out as not being a change to the FSAR, even though the FSAR explicitly describes the site boundary.
  - b. TA-55-05-040 involving replacement of a fire barrier door with a type that was not exact with the prior door, and was not evaluated for equivalency. This change was incorrectly screened out as not being a change to a safety-class SSC.

- c. TA-55-05-046 involving a new Integrated Work Document to install a stainless steel, vacuum jacketed, liquid nitrogen supply line inside PF-4. This modification was screened out incorrectly on the basis that the IWD was covered by a previous modification package, when in fact it was not.
- d. TA-55-04-018 involving a change to procedure NMT8-FMP-301-R00, *In-Place HEPA Filter Testing Qualification Card*. The change was to put in place a temporary (6-month) hiatus during which personnel who had not met the qualification requirements would be allowed to perform these surveillance with certain compensatory measures. This procedure change was screened out as not being a procedure change.
- e. TA-55-05-017 addressed a new procedure, NMT9-AP-029, R0, *Control of Material at Risk in the 238Pu Laboratories*, which replaced HS-NMT9-PD-9, R03. This was incorrectly screened out on the basis of not being a change to operations performed in PF-4. Such basis is not allowed in the USQ procedure for screening out a change.

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

### III. Radiological Protection Violations

#### A. Radiological Protection Procedures

10 CFR 835.104, *Written Procedures*, requires that “Written procedures shall be developed and implemented as necessary to ensure compliance with this part, commensurate with the radiological hazards created by the activity and consistent with the education, training, and skills of the individuals exposed to those hazards.”

Contrary to the above, multiple instances were identified in which LANL radiological protection procedures were not effectively implemented. Specific examples include:

1. The *Sigma Facility Safety Plan* (MST-FSP-03-FAC-5042, Rev. 3) requires that radiation and contamination surveys be performed of shipments and packages containing radioactive material. Additionally, Health Physics Operations procedure ESH-1-14-01.4, *Packaging, Transporting and Receiving Radioactive Waste and Material*, requires that the Radiological Control Technicians (RCT) perform various functions for packages that are received, such as checking paperwork, package integrity, and conducting appropriate surveys. However, the NNSA Type B Accident Investigation Board found several violations in this area, namely:
  - a. On July 14, 2005, Sigma failed to have RCTs present for the receipt and opening of the container received from PF-4 containing the Uranium Nitride pellets, leading to the Am-241 offsite contamination.

- b. Sigma routinely failed to have RCTs present to support opening of radiological material containers on other occasions reviewed by the Type B Board.
  - c. Sigma does not have work controls in place to ensure that RCTs are notified and present when radioactive material shipments or packages are received and opened so that appropriate review, surveying and monitoring can be performed.
2. On July 14, 2005 a worker at the Sigma Facility alarmed a hand and foot monitor after handling contaminated paper that had accompanied the uranium nitride pellet transfer. Procedure LIR 402-700-01, *Occupational Radiation Protection Requirements*, requires workers to perform the following actions when a monitor alarms following personal frisking:
- a. Remain in the immediate area.
  - b. Notify ESH-1 (typically, the facility or area RCT).
  - c. Minimize cross-contamination if possible.

Contrary to these required actions, the worker who had alarmed the hand and foot monitor failed to stay in the area or notify the RCTs. Additionally, the worker washed hands and retested, which is not the permitted response to a monitor alarm. Failure to take the required steps allowed the further spread of contamination.

3. The Office of Independent Oversight 2005 inspection found that LANL Nuclear Materials Technology (NMT) radiological work control documents, such as hazard control plans and work instructions, do not contain required radiological information and are not reviewed or approved by health and safety subject matter experts. Specific examples include:
- a. LIR 402-700-01.1, *Occupational Radiation Protection Requirements* establishes Radiological Work Permits (RWP) as the primary radiological work control documents. This LIR permits use of a hazard control plan (HCP) for routine radiological work if these documents include the same standard radiation protection requirements and information that would be included in an RWP. Most NMT programmatic work in radiological areas is controlled by HCP rather than an RWP. However, none of the NMT HCP's reviewed by Office of Independent Oversight contained all the radiological information typically included in an RWP. For example, HCP's and work instructions did not specify anticipated or actual radiological conditions, RCT coverage requirements, or limiting conditions, all of which would normally be covered in an adequate RWP.
  - b. TA-55 procedure TA-55-RD-555, *TA-55 Radiation Protection Requirements* requires that RWPs and procedures used to control radiological work be approved by the Health, Safety and Radiation Protection Division (HSR-1). However, the Office of

Independent Oversight found that HCP's at TA-55, which are the procedures used to control radiological work, had not been approved by HSR-1.

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

## **B. Workplace Controls**

10 CFR 835.1001, *Design and Control*, requires in part that "... (a) Measures shall be taken to maintain radiation exposure in controlled areas ALARA through physical design features and administrative control." 10 CFR 835.1003, *Workplace Controls*, requires that "... During routine operations, the combination of physical design features and administrative controls shall provide that: (b) The ALARA process is utilized for personnel exposures to ionizing radiation."

Contrary to the above, radiological workplace controls to maintain personnel exposure as low as reasonably achievable (ALARA) were not properly developed. Specific examples include:

1. No radiological workplace controls (design or administrative) were established to control work activities associated with the receipt and opening of a package of uranium nitride pellets highly contaminated with Am-241 at the Sigma facility on July 14, 2005. The work activity consequently resulted in the significant spread of radioactive contamination throughout the facility and offsite, and resulted in the unplanned radioactive material uptake by one worker. As noted by the NNSA Type B Accident Investigation Board, the consequences of the event could have been significantly greater except for the chemical form of the contamination, which fortuitously limited its spread.
2. As noted in the "Monitoring" section of this PNOV, radiological surveys of the Sigma facility following the Am-241 offsite contamination event were found by the Type B Accident Investigation Board to be technically flawed, inadequately documented, and insufficiently reviewed. The deficiencies brought into question the ability to fully evaluate and characterize the conditions in Sigma to permit personnel to re-occupy the space. Despite lack of sufficient basis to support re-entry, the ad hoc management team responding to the event permitted personnel to re-enter the facility.
3. The Sigma ad hoc management team established thresholds for re-evacuation of the Sigma facility once personnel were allowed to return to the facility after the offsite contamination event. These thresholds were: (1) consider re-evacuation if contamination of 1,000 dpm was detected on any individual; and, (2) immediate re-evacuation if 10,000 dpm was detected on any individual or an object was found with 600,000 dpm or more. However, no technical basis was established for these thresholds.
4. The Sigma facility was not adequately prepared to respond to a radiological incident, in that insufficient posting materials and instrumentation were provided. Deficiencies included lack of posting signs so that make-shift signs had to be used after the Am-241 event, and only having instrumentation available for uranium hazards even though Sigma

is authorized to accept any radiological material as long as inventories remain below the hazard category-3 threshold.

5. Effective radiological controls were not established to support the TA-50-66 vault decontamination work activity occurring in February – March, 2005. As noted by the LANL investigation, estimates of the radiological hazards associated with the work were inadequate, and were not validated by measuring contamination levels once work had begun. Consequently, inadequate contamination controls and an inadequate level of respiratory protection were prescribed for the work. Specific controls that had been used to successfully control decontamination work in the vault during late 2003 (use of a highly skilled crew, maintaining surfaces damp to minimize airborne contamination) were not implemented during the 2005 work. Indicators of changing radiological conditions and ineffective controls during the ongoing 2005 work activity (respirator contamination, positive nasal swab) were not effectively recognized nor was there an adequate response. As a result, four workers received minor unplanned uptakes of radioactive material.

Collectively these violations constitute a Severity Level I problem.  
Civil Penalty - \$110,000 (Waived)

### **C. Monitoring**

10 CFR 835.401, *General Requirements*, requires that “(a) Monitoring of individuals and areas shall be performed to (2) Document radiological conditions; and (6) Identify and control potential sources of individual exposure to radiation and/or radioactive material.”

10 CFR 835.403, *Air Monitoring*, requires that “(a) Monitoring of airborne radioactivity shall be performed, (2) As necessary to characterize the airborne radioactivity hazard where respiratory protection devices for protection against airborne radionuclides have been prescribed. (b) Real-time air monitoring shall be performed as necessary to detect and provide warning of airborne radioactivity concentrations that warrant immediate action to terminate inhalation of airborne radioactive material.”

Contrary to the above, on multiple occasions LANL failed to adequately perform and/or document radiological monitoring intended to identify radiological conditions, identify potential sources of exposure, or characterize airborne respiratory hazards. Specific examples include:

1. On or about July 7, 2005, bagged swagelok couplings containing Uranium Nitride pellets were brought out of a glovebox line in preparation for shipment to the Sigma Facility. Surveys were performed of the outside of the bags and they were found to be free of contamination; however no surveys were performed of the contamination levels inside the bags on the couplings themselves. Additionally, the results of the surveys on the outside of the bags were not documented.

2. LANL Health Physics Operations procedure ESH-1-14-01.4, *Packaging, Transporting, and Receiving Radioactive Material and Waste*, September 1, 2004, requires that for material to be transported between LANL facilities, a radiation and a contamination survey be performed of the radioactive material. However, such surveys were not performed at PF-4 as part of the packaging of the Uranium Nitride pellets.
3. Radiological surveys conducted from July 25th through August 5th at the Sigma Facility during the response to the off-site contamination event were found by the NNSA Type B Accident Investigation Board to be technically flawed, inadequately documented, and insufficiently reviewed. Thus these surveys were not adequate to demonstrate that the radiological conditions of Sigma had been identified and documented.
4. The RCTs used a whole body personnel contamination monitor to release the worker involved in opening the Uranium Nitride pellet package at the Sigma Facility, rather than performing a more sensitive and comprehensive survey for alpha contamination using instrumentation adequate to detect the contamination present.
5. The routine monitoring processes at the Sigma Facility failed to identify the spread of contamination from this event, which added to the delay in discovering the spread of contamination. The Sigma radiation protection program assumed that the work only involved depleted uranium or small quantities of enriched uranium. Thus instruments and processes were geared toward uranium and not Americium or other isotopes, although Sigma was authorized to receive any type of radioactive material.
6. The Office of Independent Oversight 2005 inspection found that LANL failed to adequately establish personnel and area monitoring for TA-55 hazards of neptunium and isotopes other than uranium, plutonium, americium and tritium. Specific examples include:
  - a. In NMT-11, radiological hazards are identified but the unique hazards associated with use of neptunium during fuel production are not adequately called out, analyzed or documented.
  - b. The process hazards analysis, hazard control plans, and work instructions for actinide fuels work do not adequately define or analyze the special hazards posed by the use of 100-gram quantities of neptunium powders by NMT-11 workers.
  - c. The site's standard bioassay program and TA-55 health physics questionnaire are only designed to account for plutonium, uranium, americium and tritium.
  - d. A documented technical basis has not been established to demonstrate that instruments designed and calibrated for plutonium will function adequately in detecting neptunium airborne contamination.
7. The Office of Independent Oversight 2005 inspection found that LANL NMT management and HSR had not ensured that sufficient radiation surveys were performed during work that involved changing radiological conditions to ensure that

workers were aware of radiological conditions and could take steps to effectively minimize exposures. Specific examples include:

- a. NMT-2 activities separating americium salts from plutonium resulted in contact gamma dose rates greater than 1,000 millirem/hr at the glovebox window, based on informal surveys performed by some workers who borrowed an ion chamber from HSR. There had been no RCT coverage or documented surveying during this work. The actual external dose rate was likely higher than that measured by the ion chamber due to neutron contributions not measured by that gamma device.
  - b. ESH1-06-02.2, *Surveying for External Radiation*, August 1, 2003, requires routine surveys before, during and after work that has the potential to result in significant changes in radiological conditions. However, “significant” is not defined. Lack of specificity in this requirement is leading to lack of adequate survey coverage.
  - c. Procedure TA-55-RD-555, Rev. 1, *TA-55 Radiation Protection Requirements*, requires that workers inform HSR-1 of operations that change or have the potential to change, radiological conditions. For programmatic work NMT has not established a mechanism for such regular notification of HSR-1. Plan-of-the-day meetings do not regularly address programmatic work.
8. As noted in the LANL investigation, radiological monitoring activities performed to support the planning and implementation of the TA-50-66 vault paint removal activities during March 2005 were found to be inadequate. Specific examples include:
- a. During work planning and RWP development, contamination levels inside the vault were estimated by using survey results obtained from a separate location. Actual contamination levels inside the vault were not measured prior to worker entry to the vault (to validate original assumptions), nor were they measured during the work activity to assess the effectiveness of controls.
  - b. Airborne radioactivity monitoring performed during the TA-50-66 vault paint removal work was not adequate to either identify peak airborne concentrations in a timely fashion or verify that assigned respiratory protection was effective. Expected airborne radioactivity concentrations of <100 DAC were predicted based on prior work activities, and respiratory protection with a protection factor of 100 was assigned based on that prediction. The controlling RWP (RWP 05-019) required both fixed head air sampling and the use of a Continuous Air Monitor (CAM), and identified a hold point for airborne radioactivity levels outside of “acceptable range” (specific value not stated). However, although fixed head sampling was performed in the vault, the sampling intervals did not consistently correlate with the work activity, thereby giving erroneously low values for airborne concentration (i.e., in one example a work entry lasted one hour but the sampler ran for 24 hours).

Additionally, although a CAM was utilized for the work it only sampled the air in the doffing enclosure on top of the vault, and did not sample the air within the work area itself. As a result, air-monitoring performed during the work evolution did not provide indication of the rising airborne radioactivity levels associated with the work and the potential for those levels to exceed the protection factor of the respirator.

Collectively these violations represent a Severity Level II problem.

Civil Penalty - \$55,000 (Waived)

#### **D. Labeling**

10 CFR 835.605, *Labeling Items and Containers*, requires that except for specifically identified exceptions, each item and container of radioactive material shall be labeled as such, and that "...The label shall also provide sufficient information to permit individuals handling, using, or working in the vicinity of the items or containers to take precautions to avoid or control exposures".

Contrary to the above, the labeling on the container of Uranium Nitride pellets shipped from the PF-4 facility to the Sigma facility did not provide sufficient information or warning for individuals opening the container and using the material to prevent exposures. Specifically, neither the "Caution Radioactive Material" sticker on the inner shipping container nor the Health Physics Radioactive Material Survey Form (HPRMS) Tag attached to the outer shipping container indicated the presence of the high levels of removable contamination associated with the individual swageloks which held the Uranium Nitride pellets. Instead, the sticker and tag indicated only that no removable contamination was present on the outside of the respective shipping containers. Consequently, there was no obvious indication to the individual opening the containers that a significant removable contamination hazard existed.

This violation represents a Severity Level II problem.

Civil Penalty - \$55,000 (Waived)

#### **E. Receipt of Packages**

10 CFR 835.405, *Receipt of Packages Containing Radioactive Material*, establishes receipt survey requirements for packages received from radioactive material transportation. 10 CFR 835.405(b) requires monitoring of the external surfaces of packages if the package "(1) is labeled with a Radioactive White I, Yellow II, or Yellow III label" 10 CFR 835.405(c) specifies that the monitoring include "(1) Measurements of removable contamination levels and (2) Measurements of the radiation levels..." except for specific exceptions. 10 CFR 835.405(d) requires that the monitoring shall be completed as soon as practicable following receipt, "but not later than eight hours after the beginning of the working day following receipt of the package."

Contrary to the above, on July 14, 2005, a shipping container containing radioactive material and labeled with a Radioactive White I label was shipped by way of radioactive material transportation to the Sigma Facility. No radiological monitoring or surveys of the external surfaces of the container (package) were performed upon receipt. Further, the Am-241 Type B Accident Investigation Board reviewed receipt and inspection records at Sigma for incoming radioactive material shipments and found that such required receipt inspections were not routinely being performed.

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

#### **F. Spread of Contamination**

10 CFR 835.1102, *Control of Areas*, requires that “(a) Appropriate controls shall be maintained and verified which prevent the inadvertent transfer of removable contamination to locations outside of radiological areas under normal operating conditions.”

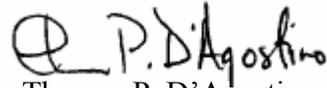
Contrary to the above, LANL did not maintain appropriate controls to prevent the inadvertent transfer of contamination to uncontrolled areas. Specific examples include:

1. On July 14, 2005 a worker improperly opened a package containing Am-241 contamination in an uncontrolled area, allowing a release of Am-241 contamination to the room at the Sigma facility, and contaminating the worker involved.
2. Between July 14 and July 17, the worker unknowingly transmitted contamination to offsite locations, including traveling out-of-state. Identification of contamination that was spread on-site and off-site continued until about August 9, 2005.

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

Pursuant to the provisions of 10 CFR 820.24, the University of California is hereby required within 30 days of the date of this Preliminary Notice of Violation (PNOV) to submit a written reply by overnight carrier to the Director, Office of Enforcement, Attention: Office of the Docketing Clerk, 270 Corporate Square Building, U.S. Department of Energy, 19901 Germantown Road, Germantown, MD 20874-12090. Copies of the reply should also be sent to the Manager, Los Alamos Site Office as well as to my office. 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) any facts set forth which are

not correct; and (3) the reasons for the violations if admitted, or if denied, the basis for the denial. In the event the violations set forth in this PNOV are admitted, this Notice will constitute a Final Order in compliance with the requirements of 10 CFR 820.24.



Thomas P. D'Agostino  
Acting Administrator  
National Nuclear Security

Dated at Washington, DC,  
this 16th day of February 2007<sup>1</sup>

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<sup>1</sup> Erratum copy to correct spelling error