Department of Energy
Under Secretary for Nuclear Security
Administrator, National Nuclear Security Administration
Washington, DC 20585

National Nuclear Security Administration

June 8, 2016

VIA OVERNIGHT UPS MAIL CARRIER

Dr. Charles F. McMillan, President
Los Alamos National Security, LLC
Los Alamos National Laboratory
Mailstop A 100, Drop Point 03140071S
Bikini Atoll Road, TA-3
Los Alamos, New Mexico 87545-1663

WEA-2016-02

Dear Dr. McMillan:

This letter refers to the Department of Energy's (DOE) investigation into the facts and circumstances associated with the implementation of the Los Alamos National Laboratory (LANL) electrical safety program as evidenced by a series of events revealing deficiencies in hazardous energy control. The DOE Office of Enterprise Assessments' Office of Enforcement provided the results of the investigation to Los Alamos National Security, LLC, (LANS) in an investigation report dated November 17, 2015. An enforcement conference was convened on December 17, 2015, with you and members of your staff to discuss the report's findings and LANS's response. A summary of the enforcement conference and list of attendees is enclosed.

The National Nuclear Security Administration (NNSA) considers the electrical safety program implementation deficiencies that were the subject of the investigation to be of high safety significance. The May 2015 arc flash event at Technical Area 53 (TA-53) was a near miss to a fatality and resulted in a LANL worker suffering serious injury and extensive long-term medical treatment. The other events that were subject of the DOE investigation were also near misses to more serious worker injury that further illustrate the extent of the weaknesses in regulatory compliance.

Based on an evaluation of the evidence in this matter, including information presented at the enforcement conference, NNSA concludes that LANS violated requirements prescribed under 10 C.F.R. Part 851, *Worker Safety and Health Program*. Accordingly, NNSA hereby issues the enclosed Preliminary Notice of Violation (PNOV), which cites five Severity Level I violations and three Severity Level II violations. NNSA unilaterally reduced LANS' FY2015 earned fee by $7,243,171 because of the LANS' safety and health performance failures associated with the TA-53 Arc-Flash event related to the violations cited in this

PNOV. Therefore, in accordance with 10 C.F.R. § 851.5 (c), DOE proposes no civil penalties for the Part 851 violations cited in this PNOV.

Furthermore, NNSA issued PNOVs to LANS in 2010 (WEA-2010-04) and 2012 (WEA-2012-03) for violations related to the implementation of Part 851 electrical safety program requirements, and DOE issued an Enforcement Letter to LANS in 2008 conveying electrical safety program concerns. Four of the violations cited in the attached PNOV represent a recurrence of the violations cited by NNSA in WEA-2010-04 and WEA-2012-03 that would have warranted escalation if civil penalties were imposed.

After the TA-53 arc flash event, LANS initiated several internal reviews and investigations to understand the underlying causal factors and the extent of the conditions that contributed to the deficiencies in electrical safety program implementation. LANS is implementing corrective actions to address these deficiencies, but continued senior management attention will be necessary to ensure that the corrective actions are sustained to prevent recurrence of weaknesses that have persisted since at least 2008. While LANS appears to have the necessary program elements in place to assess and control electrical safety hazards, NNSA expects LANS to rigorously implement those procedures when performing work that could expose workers to hazardous energy, and to continually meet all of the applicable Part 851 requirements.

Pursuant to 10 C.F.R. § 851.42, *Preliminary Notice of Violation*, you are obligated to submit a written reply within 30 calendar days of receipt of the enclosed PNOV and to follow the instructions specified in the PNOV when preparing your response. If you fail to submit a reply within 30 calendar days, then in accordance with 10 C.F.R. § 851.42(d), you relinquish any right to appeal any matter in the PNOV, and the PNOV will constitute a final order.

After reviewing your reply to the PNOV and any proposed additional corrective actions entered into DOE's Noncompliance Tracking System, NNSA will determine whether any further activity is necessary to ensure compliance with DOE worker safety and health requirements that are the subject of the enclosed. NNSA will continue to monitor the completion of corrective actions until this matter is fully resolved.

Sincerely,

Frank G. Klotz

Enclosures: Preliminary Notice of Violation (WEA-2016-02)
Enforcement Conference Summary and List of Attendees

cc: Kim Davis Lebak, NA-LA
Alex Romero, LANS

Enclosure 1

Preliminary Notice of Violation

Los Alamos National Security, LLC
Los Alamos National Laboratory
Los Alamos, New Mexico

WEA-2016-02

A U.S. Department of Energy (DOE) investigation into the facts and circumstances associated with the implementation of the electrical safety program at the Los Alamos National Laboratory (LANL) revealed multiple violations of DOE worker safety and health requirements by Los Alamos National Security, LLC (LANS). DOE investigated the following four events, which are representative of a series of hazardous energy control events at LANL from 2014 through 2015:

- On September 29, 2014, LANS performed unauthorized electrical work to remove a 480 volt (V) motor control center (MCC) from the Loewy Rolling Mill in Technical Area (TA)-3, Building 66, Room 100 at the SIGMA Complex.
- On October 2, 2014, LANS was installing new programmatic equipment in TA-16, Building 301, without appropriate deenergization and lockout/tagout (LOTO) of the 480 V electrical sources.
- On February 10, 2015, during work on an energized electrical disconnect panel for acceptance testing of a new 480 V vacuum pump in TA-16, Building 202, an electrical arc flash occurred when the exposed energized conductor came in contact with the disconnect panel.
- On May 3, 2015, while performing preventive maintenance (PM) procedures on electrical substation switchgear in TA-53, Building 70, an electrician was severely injured by an arc flash and blast when he entered a substation cubicle to clean a 13.8 kilovolt (kV) electrical bus that was presumed de-energized.

DOE provided LANS with an investigation report dated November 17, 2015, and convened an enforcement conference with LANS representatives on December 17, 2015, to discuss the report's findings and LANS's response. A summary of the conference and list of attendees is enclosed.

The Office of Enforcement's 2009 and 2011 investigations of multiple electrical safety-related events at LANL identified a number of similar deficiencies. In 2010 and 2012, the National Nuclear Security Administration (NNSA) issued two Preliminary Notices of Violation (PNOV) to LANS for violations of 10 C.F.R. Part 851 (Part 851), *Worker Safety and Health Program*, related to the implementation of electrical safety program requirements. Four of the violations cited in this PNOV represent a recurrence of the previously cited violations that would have warranted escalation if NNSA imposed civil penalties.

Pursuant to Section 234C of the Atomic Energy Act of 1954, as amended, and DOE regulations set forth at 10 C.F.R. Part 851, NNSA hereby issues this PNOV to LANS. The violations cited in this PNOV include deficiencies in: (1) general requirements for electrical work, (2) hazard assessment, (3) worker involvement, (4) hazardous energy control, (5) electrical safe work practices, (6) personal protective equipment (PPE), (7) training and information, and (8) applying relevant lessons learned. NNSA has grouped and categorized five Severity Level I violations and three Severity Level II violations.

Severity Levels are explained in Part 851, Appendix B, *General Statement of Enforcement Policy*. Section VI(b)(1) states that "[a] Severity Level I violation is a serious violation. A serious violation shall be deemed to exist in a place of employment if there is a potential that death or serious physical harm could result from a condition which exists, or from one or more practices, means, methods, operations, or processes which have been adopted or are in use, in such place of employment."

Section VI(b)(2) states that "[a] Severity Level II violation is an other-than-serious violation. An other-than-serious violation occurs where the most serious injury or illness that would potentially result from a hazardous condition cannot reasonably be predicted to cause death or serious physical harm to employees but does have a direct relationship to their safety and health."

In accordance with 10 C.F.R. § 851.5(b) and DOE Acquisition Regulation 48 C.F.R. § 970.5215-3, under contract number DE-AC52-06NA25396, Part I, Section I, Clause I-124, *Conditional Payment of Fee, Profit and Incentives - Facility Management Contracts*, between NNSA and LANS, NNSA unilaterally reduced LANS' FY2015 earned fee by $7,243,171 for its performance failures associated with the TA-53 arc flash event, which is reflected, in aggregate, by the worker safety and health program implementation violations identified during DOE's investigation and subject to this PNOV. As a result, and pursuant to 10 C.F.R. § 851.5(c), NNSA proposes no civil penalty for the violations cited in this PNOV.

As required by 10 C.F.R. § 851.42(b) and consistent with Part 851, Appendix B, the violations are listed below. If this PNOV becomes a final order, LANS may be required to post a copy of this PNOV in accordance with 10 C.F.R. § 851.42(e).

I. VIOLATIONS

A. General Requirements for Electrical Work

Title 10 C.F.R. § 851.23, *Safety and health standards*, subsection (a) states: "[c]ontractors must comply with the following safety and health standards that are applicable to the hazards at their covered workplace:…(3) Title 29 CFR, Part 1910, 'Occupational Safety and Health Standards,' excluding 29 CFR 1910.1096, 'Ionizing Radiation.'", (7) 29 CFR 1926, 'Safety and Health Regulations for Construction'", and ". . . (14) NFPA [National Fire Protection Association] 70E 'Standard for Electrical Safety in the Workplace,' (2004)…" Subsection (b) states that "[n]othing in this part must be construed as relieving a contractor from complying with any additional specific safety and health requirements that it determines to be necessary to protect the safety and health of workers."

Title 10 C.F.R. § 851.24, *Functional areas*, subsection (a) states: "[c]ontractors must have a structured approach to their worker safety and health program which at a minimum, include provisions for the following applicable functional areas in their worker safety and health program: . . . electrical safety . . ." Subsection (b) states: "[i]n implementing the structured approach required by [subsection] (a) of this section, contractors must comply with the applicable standards and provisions in Appendix A of this part, entitled 'Worker Safety and Health Functional Areas.'"

Appendix A of Part 851, *Worker Safety and Health Functional Areas*, Functional Area 10, *Electrical Safety*, states: "[c]ontractors must implement a comprehensive electrical safety program appropriate for the activities at their site. [The electrical safety] program must meet the applicable electrical safety codes and standards referenced in § 851.23."

Contrary to the above requirements, LANS failed to effectively implement electrical safety program processes for identifying and controlling electrical hazards in accordance with System Description (SD) document SD100, *Integrated Safety Management System Description Document with embedded 10 CFR 851 Worker Safety and Health Program* (Revision 4, dated October 31, 2013) and its invoked procedures P300, *Integrated Work Management* (Revision 5, dated January 22, 2014, and Revision 6, dated October 16, 2014); P101-13, *Electrical Safety Program* (Revision 2, dated September 26, 2013); and P101-12, *ES&H* [Environment, Safety, and Health] *Requirements for Subcontractors* (Revision 2, dated February 19, 2012). Specific examples of the deficiencies in implementing the invoked procedures include the following:

1. LANS did not develop and authorize work through the required Integrated Work Document (IWD) when removing a 480 V MCC at TA-3.
2. LANS did not ensure that a subcontractor developed an IWD for work to assemble and install programmatic equipment at TA-16, Building 301.
3. LANS did not ensure that standing IWDs used to perform two PM activities simultaneously in the TA-53 electrical substation contained sufficient detail to adequately identify the hazards and the required plans to eliminate or control the hazards.
4. LANS did not provide for an independent peer review of the TA-53 substation IWDs through an individual not associated with performing the work.
5. LANS continued to perform the work at TA-3 after determining that standing IWD did not cover the work scope and that a job-specific IWD needed to be developed before continuing the work.
6. LANS did not fully comply with the IWD and used management discretion and interpretation to perform work, without correcting or changing the IWD for work inside the TA-53 substation.
7. LANS did not ensure that the shift turnover for the TA-53 substation PM was effective in communicating work progress and the status of controls in the substation after the first shift.

Collectively, these noncompliances constitute a recurring Severity Level I violation. (Ref. WEA-2010-04 and WEA-2012-03)

B. Hazard Assessment of Electrical Work

Title 10 C.F.R. § 851.21, *Hazard identification and assessment*, subsection (a), states: "[c]ontractors must establish procedures to identify existing and potential workplace hazards and assess the risk of associated workers injury and illness" and "[p]rocedures must include methods to: (1) [a]ssess worker exposure to chemical, physical, biological, or safety workplace hazards through appropriate workplace monitoring;… (4) [a]nalyze designs of new facilities and modifications to existing facilities and equipment for potential workplace hazards; (5) [e]valuate operations, procedures, and facilities to identify workplace hazards; (6) [p]erform routine job activity-level hazard analyses; and… (8) [c]onsider interactions between workplace hazards and other hazards such as radiological hazards." Subsection (c) states that "[c]ontractors must perform the activities identified in [subsection] (a) of this section, initially to obtain baseline information and as often thereafter as necessary to ensure compliance with the requirements in this Subpart."

NFPA 70E (2009), Article 110, *General Requirements for Electrical Safety-Related Work Practices*, Section 110.7, *Electrical Safety Program*, subsection (F), *Hazard/Risk Evaluation Procedure*, states: "[a]n electrical safety program shall identify a hazard/risk evaluation procedure to be used before work is started within the Limited Approach Boundary of energized electrical conductors and circuit parts operating at 50 volts or more or where an electrical hazard exists." Further, "[t]he procedure shall identify the hazard/risk process that shall be used by employees to evaluate tasks before work is started."

P101-13, Section 1.0, *Purpose*, states: "[t]he purpose of this document is to establish the Los Alamos National Laboratory . . . Electrical Safety Program to meet applicable electrical safety requirements of the . . . . *National Electrical Code*; NFPA 70E, *Standard for Electrical Safety in the Workplace*." Section 1.0 further states: "[u]nless otherwise noted, all document references to NFPA 70E . . . refer to the 2009 version."

P101-13, Section 11.0, *References*, incorporates: "NFPA 70E, *Standards for Electrical Safety in the Workplace (2009).*"

P300, Section 3.1.2, *Identify and Analyze Hazards*, states: "[h]azards and accident scenarios that could cause harm must be identified and analyzed using a graded approach to determine what controls are needed to eliminate or reduce the hazards to manage risks to an acceptable level." In addition, the section states: " . . . the impact of the planned work on workers, co-located activities and workers, [and] ancillary workers . . . must be taken into consideration and addressed."

Contrary to the above requirements, LANS failed to analyze work that presented potential and actual electrical hazards. Specific examples include the following:

1. LANS did not conduct a hazard assessment and arc flash hazard analysis/determination for work to remove a 480 V MCC at TA-3.
2. LANS did not appropriately assess the electrical hazards associated with a 480 V vacuum pump disconnect panel in TA-16, Building 202. LANS did not perform an arc flash hazard analysis to determine the appropriate arc flash protection boundary and PPE for working on or near energized electrical conductors at the disconnect panel of the vacuum pump.
3. When determining the applicable safety and health requirements, LANS did not adequately assess a subcontractor's potential exposure to hazardous electrical energy and the potential energization or startup of machines and equipment for the planned installation of programmatic equipment at TA-16, Building 301. LANS did not adequately address hazardous electrical energy and LOTO requirements for subcontractor work activities after determining that the subcontractor-installed equipment required facility wiring connections that constituted a change in conditions as a result of a different equipment configuration.
4. LANS did not ensure that the hazard analyses conducted for the TA-53 substation PM accounted for the hazards of combined work tasks within a confined work space with air breakers undergoing high potential (hi-pot) testing adjacent to 13.8 kV electrical equipment and potentially blocking workers' access to the exit door; considered the steps and hazards associated with the hi-pot and biddle test of breakers (e.g., a requirement to restrict access to breaker testing area); and consistently identified chemical hazards and the associated PPE requirements for work involving applying a solvent to clean electrical equipment.
5. LANS did not recognize the need for additional hazard analysis and review of the TA-53 IWDs when the work environment changed from a fully de-energized substation (13.8 kV buses) to a partially energized substation.

Collectively, these noncompliances constitute a recurring Severity Level I violation. (Ref. WEA-2010-04 and WEA-2012-03)

C. Worker Involvement

Title 10 CFR § 851.20, *Management Responsibilities and Worker Rights and Responsibilities*, section (a), *Management Responsibilities*, states: "[c]ontractors are responsible for the safety and health of their workforce and must ensure that contractor management at a covered workplace: . . . (4)[p]rovide mechanisms to involve workers and their elected representatives in the development of the worker safety and health program goals, objectives and performance measure and in the identification and control of hazards in the workplace."

LANS procedure P101-13, Chapter 2, *Electrical Safety Roles and Responsibilities*, subsection 2.4.10, *Qualified Supervisors and Foremen Who Approve Safe Work Procedures*, states: "[e]lectrically qualified area work supervisors, team leaders, foremen, line supervisors, group leaders, [Facility Operations Directors], and project leaders who approve electrical safe work procedures will: . . . [e]ngage workers in work planning and pre-job

briefings, including the scope of work, hazard analysis, and hazard mitigation and controls, including requirements for PPE."

LANS procedure P101-18, *Procedure for Pause/Stop Work*, Rev 2, Effective Date: 05/04/11, section 3.4, *Stop-Work Action*, states: "[a] stop-work action is a formal suspension of work activities. Examples of conditions that, depending on severity, may warrant consideration of a stop work initiated at the line level are:

- "Any condition of imminent danger
- "Unsafe condition that is not immediately correctable or cannot be readily mitigated
- "Unsafe work method
- "Work as defined or authorized creates an unacceptable unsafe condition
- "Inadequate or significantly flawed hazard analysis or Integrated Work Document (IWD)
- "Work area conditions and hazards that are not as planned or previously documented."

Contrary to the above requirement LANS failed to effectively implement worker involvement and stop-work procedures. Specific examples include:

1. LANS did not engage workers in the work planning and hazard analysis for the IWDs associated with the TA-53 substation PM work and did not perform a validation walkdown involving the workers to ensure workability and the adequacy of safety controls.
2. LANS did not pause or stop work to correct wiring in the vacuum pump 480 V disconnect and implement a revised IWD to add an appropriate LOTO point for the disconnect panel in TA-16, Building 202. The IWD revision was necessary to protect workers from potential electrical hazards while repairing the incorrect wiring.
3. LANS did not pause or stop work after an unexpected 480 V electrical arc occurred while a worker was manipulating wires in a disconnect cabinet in TA-16, Building 202.

Collectively, these noncompliances constitute a Severity Level II violation.

D. Hazardous Energy Control

Title 29 C.F.R. § 1910.147, *Control of Hazardous Energy (lockout/tagout)*, subsection (c)(1), *Energy control program*, states: "[t]he employer shall establish a program consisting of energy control procedures, employee training and periodic inspections to ensure that before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, start up or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source and rendered inoperative."

Title 29 C.F.R. § 1926.416, *General requirements*, subsection (a), *Protection of employees*, states: "(1)[n]o employer shall permit an employee to work in such proximity to any part of an electrical power circuit that the employee could contact the electric power circuit in the

course of work, unless the employee is protected against electric shock by deenergizing the circuit and grounding it or by guarding it effectively by insulation or other means."

Title 29 C.F.R. § 1926.417, *Lockout and tagging of circuits*, subsection (b), *Equipment and circuits*, states: "[e]quipment or circuits that are deenergized shall be rendered inoperative and shall have tags attached at all points where such equipment or circuits can be energized."

LANS procedure P101-13, section 11.1, *Other References*, identifies as an applicable procedure "P101-3 Lockout/Tagout for Hazardous Energy Control."

LANS procedure P101-3, section 3.0, *Procedure Description*, states: "[a]uthorized workers performing LOTO must lock and tag the equipment energy isolating device(s) with a Laboratory approved red lock and tag when:

- "they are performing any maintenance or servicing on equipment, and
- "any person could be injured if the equipment unexpectedly energizes or starts, or if stored energy or toxic material is unexpectedly released."

LANS procedure P101-3, subsection 3.7, *Verify*, states: "[a]fter placement of a lock on an isolation point, the authorized worker(s) must verify the integrity of the mechanical isolation and verify that the equipment has been deenergized by performing required tests specific to the equipment under red LOTO." Additionally, "[i]f the independent verification is for electrical hazards, the worker performing electrical verification must be a qualified energized electrical worker and have appropriate training according to NFPA 70E."

Contrary to the above requirements, LANS failed to apply LOTO devices to electrical equipment during electrical work activities to protect workers from energized electrical hazards. Specific examples include the following:

1. LANS did not apply a required red lock and tag to an energy-isolating mechanism during the new programmatic equipment installation in TA-16, Building 301, to ensure that electrical circuits would remain de-energized.
2. LANS did not ensure that the 480 V disconnect panel was in the "off" (de-energized) position before applying a lockout device for work intended to correct the wiring in a disconnect panel for a vacuum pump in TA-16, Building 202. In addition, LANS did not have a second authorized energized worker present as required to independently verify the application of LOTO and zero-energy check.

Collectively, these noncompliances constitute a Severity Level I violation.

E. Electrical Safe Work Practices

NFPA 70E (2009), Article 120, *Establishing an Electrically Safe Work Condition*, section 120.1, *Process of Achieving an Electrically Safe Work Condition*, states: "[a]n electrically safe work condition shall be achieved when performed in accordance with the procedures of 120.2 and verified by the following process . . . (1) [d]etermine all possible sources of

electrical supply to the specific equipment . . . (2) [a]fter properly interrupting the load current, open the disconnecting device(s) for each source . . . (3) [w]henever possible, visually verify that all blades of the disconnecting devices are fully open or that drawout-type circuit breakers are withdrawn to the fully disconnected position . . . (4) [a]pply lockout/tagout devices in accordance with a documented and established policy . . . [and] (5) [u]se an adequately rated voltage detector to test each phase conductor or circuit part to verify they are deenergized."

LANS procedure P101-13, Chapter 3, *Managing Electrical Hazards*, subsection 3.5.1, *Modes of Electrical Work*, for Mode 0, *Electrically Safe Work Condition*, states: "[a]n electrically safe work condition is a state in which the electrical conductor or circuit part to be worked on or near has been: 1) disconnected and isolated from an energized source or parts; 2) locked/tagged out (or equivalently controlled) in accordance with established standards; [and] 3) tested to ensure the absence of voltage." Additionally, "[a]ll external sources of electrical energy must be disconnected by some positive action . . . and all internal energy sources rendered safe and verified."

Contrary to the above requirements, LANS failed to implement practices necessary to achieve an electrically safe work condition in accordance with NFPA 70E and P101-13. Specific examples include the following:

1. LANS did not appropriately achieve an electrically safe work condition before commencing work to reverse the wire sequence inside a 480 V disconnect panel in TA-16, Building 202. LANS's zero-energy check of an improperly locked-out circuit (locked in the energized position) did not detect the energized circuit.
2. LANS did not consistently perform zero-energy checks as required by the IWD for the TA-53 electrical substation PM on the work conducted inside the substation as cubicles were opened, including during the opening of the cubicle when the arc flash and blast occurred.

Collectively, these noncompliances constitute a recurring Severity Level I violation. (Ref. WEA-2012-03)

F. Personal Protective Equipment

Title 29 C.F.R. Part 1910, Subpart I, *Personal Protective Equipment*, § 1910.132, *General requirements*, paragraph (d) states: "[t]he employer shall assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE)." Further, it states, "[i]f such hazards are present, or likely to be present, the employer shall . . . (i) [s]elect, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment;" and "(ii) [c]ommunicate selection decisions to each affected employee."

NFPA 70E (2009), Article 130.7, *Personal and Other Protective Equipment*, subsection (A), *General*, states that: "[e]mployees working in areas where electrical hazards are present shall

be provided with, and shall use, protective equipment that is designed and constructed for the specific part of the body to be protected and for the work to be performed."

LANS procedure P101-13, subparagraph 6.4.12.A, *Arc-Rated* [AR] *Daily Wear Protective Clothing*, states: "[l]inemen and electricians will be provided and must use AR daily wear protective clothing."

Contrary to the above requirements, LANS failed to ensure that workers donned the required PPE when exposed to electrical hazards. Specific examples include:

1. LANS did not ensure that workers in TA-16, Building 202, who were working on the 480V disconnect panel, wore appropriate PPE, including appropriate arc-rated clothing, hearing protection, and rubber insulating gloves, in accordance with NFPA 70E, *Hazard/Risk Category 2 Classification (Panelboards or Switchboards Rated greater than 240V and up to 600V).*
2. LANS did not ensure that workers inside the TA-53 substation consistently wore the PPE required by the IWD during the pre-job briefing or throughout the work evolutions.

Collectively, these noncompliances constitute a Severity Level I violation.

G. Training and Information

Title 10 C.F.R. § 851.25, *Training and information*, subsection (a) states: "[c]ontractors must develop and implement a worker safety and health training and information program to ensure that all workers exposed, or potentially exposed, to hazards are provided with training and information on that hazard in order to perform their duties in a safe and healthful manner." Subsection (b) states that: "[t]he contractors must provide . . . (1) [t]raining and information for new workers, before or at the time of initial assignment to a job involving exposure to a hazard; (2) [p]eriodic training as often as necessary to ensure that workers are adequately trained and informed; and (3) [a]dditional training when safety and health information or a change in the workplace conditions indicates that a new or increased hazard exists."

Title 29 C.F.R. § 1910.269, *Electric power generation, transmission, and distribution*, subsection (a)(2), *Training*, states: "(i) [a]ll employees performing work covered by this section to be trained as follows . . . (A) [e]ach employee shall be trained in, and familiar with, the safety-related work practices, safety procedures, and other safety requirements in this section that pertain to his or her job assignments." This subsection further states that "(ii) [e]ach qualified employee shall also be trained and competent in (A) [t]he skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment, . . . (D) [t]he proper use of the special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electric equipment, and (E) [t]he recognition of electrical hazards to which the employee may be exposed and the skills and techniques necessary to control or avoid these hazards."

Contrary to the above requirements, LANS failed to effectively implement training and information program requirements. Specific examples include the following:

1. LANS did not ensure that workers thoroughly understood the work control process that requires work to be conducted using a properly validated and authorized IWD specific to the task when removing a 480 V MCC from a rolling mill at TA-3. LANS did not conduct a pre-job briefing in accordance with P300 and P101-13 to effectively communicate the scope, hazards, and controls associated with the removal of the 480 V MCC.
2. LANS did not ensure that a qualified electrician removed the 480 V rolling mill MCC at TA-3, as required by P101-13.
3. LANS did not effectively communicate to a subcontractor the hazardous electrical energy controls for connecting a 480 V electrical energy source to the subcontractor-installed programmatic equipment in TA-16, Building 301. In addition, LANS did not effectively communicate to the subcontractor when to remove LOTO devices that protect the subcontractor's workers from working on or near energized electrical equipment.
4. LANS did not ensure that a pre-job briefing was conducted when an additional electrician joined a work activity to conduct a LOTO, perform zero-energy checks, and assist in re-wiring a disconnect panel in TA-16, Building 202.
5. LANS did not conduct an effective pre-job briefing with workers at TA-53 that included a review of hazards and controls, any identified contingency actions, and potential human error precursors that might affect the safe and secure conduct of work around an energized bus. LANS did not discuss the extra precautions and measures needed to mitigate the electrical hazard presented by the energized bus, especially since both buses were de-energized the previous day.
6. LANS did not ensure that the four electricians (who had limited substation high voltage experience) met the training and qualification requirements before authorizing work at TA-53.
7. LANS did not properly train electricians to recognize the use of required tags, signs, and barriers to prevent accidental contact with energized parts while using clearance and grounding techniques to ensure electrically safe equipment at TA-53.
8. LANS did not develop implementing procedures or train electrical workers at TA-53 on the National Electrical Safety Code or the NFPA 70E requirements regarding look-alike electrical equipment alerting techniques.

Collectively, these noncompliances constitute a recurring Severity Level II violation. (Ref. WEA-2012-03)

H. Applying Relevant Lessons Learned

Title 10 C.F.R. § 851.26, *Recordkeeping and reporting*, subsection (b), *Reporting and investigation*, paragraph (2) states that: "[c]ontractors must: . . . (2) [a]nalyze related data for trends and lessons learned."

SD100 invokes PD323, *LANL Operating Experience Program* (Revision 2, dated September 10, 2012), as a requirement. PD323, paragraph 3.0, *Program Description*, states: "[t]he

LANL Operating Experience Program uses a system of databases, webpages, communications, and processes to capture operating knowledge related to safe, secure and efficient operations at the Laboratory and communicates this knowledge throughout the Laboratory." Subparagraph 3.1.1., *Operating Experience and Lessons Learned Process*, states that the "Lessons Learned and Operating Experience Archive . . . [c]aptures relevant lessons and best practices reported by the Laboratory managers and workers, contractors, subcontractors, and from other . . . DOE sites and external sources." Further, "[t]he archive enables the workforce to find, share, and use relevant lessons learned and best practices as part of their work processes." PD323, paragraph 4, *Responsibilities*, subparagraph 4.2, *Managers*, states that managers "[w]ill establish mechanisms for identifying lessons learned relevant to their organization's mission and operations from . . . their organization's operating experiences, . . . the LANL Operating Experience Program's communications [including] the *Weekly Lessons Learned and Operating Experience Summary*, [and] the *Lessons Learned and Operating Experience Archive*." Subsection 4.2 further states that managers "[w]ill take effective action for relevant lessons learned that have the potential to avert significant consequences or provide significant benefit."

LANL procedure P101-13, subparagraph 3.6.5, *Electrical Safety Improvement Process (ISM* [Integrated Safety Management] *Step 5)*, states: "[o]n a regular basis, workers, supervisors, and ESOs [electrical safety officers) will . . . [r]e-evaluate the effectiveness of the procedures described in IWDs . . . and use Lessons Learned [LL] from control failures, near misses, or accidents to improve the hazard control system . . . [and] [r]eview LL from other organizations."

Contrary to the above requirements, LANS failed to recognize and take effective action to apply a directly relevant LL to electrical work in the TA-53 substation. DOE LL ID No. R-2009-OR-BJCECP-0302, *Electrical Near Miss When Electrician Initiates Work In Wrong Switch Cabinet*, categorized as "priority red/urgent," described the inadvertent entry into an energized substation cubicle based on misunderstanding of visual cues and entry without conducting a zero-energy check – similar to the circumstances of the TA-53 substation arc flash event. This LL indicates that implementation of NESC Rule 421(B)(2)(b) and/or NFPA 70E, Article 130.7(E)(4), *Alerting Techniques*, is necessary to protect workers from inadvertent entry into energized look-alike electrical equipment.

This noncompliance constitutes a Severity Level II violation.

II. REPLY

Pursuant to 10 C.F.R. § 851.42(b)(4), LANS is hereby obligated to submit a written reply within 30 calendar days of receipt of this PNOV. The reply should be clearly marked as a "Reply to the Preliminary Notice of Violation."

If LANS chooses not to contest the violations set forth in this PNOV, then the reply should clearly state that LANS waives the right to contest any aspect of this PNOV. In such case, this PNOV will constitute a final order upon the filing of the reply.

If LANS disagrees with any aspect of this PNOV, then as applicable, and in accordance with 10 C.F.R. § 851.42(c)(1), the reply must: (1) state any facts, explanations, and arguments that support a denial of an alleged violation; and (2) discuss the relevant authorities that support the position asserted, including rulings, regulations, interpretations, and previous decisions issued by DOE. In addition, 10 C.F.R. § 851.42(c)(2) requires that the reply include copies of all relevant documents.

If LANS fails to submit a written reply within 30 calendar days of receipt of this PNOV, then pursuant to 10 C.F.R. § 851.42(d), LANS relinquishes any right to appeal any matter in this PNOV and this PNOV will constitute a final order.

Please send the appropriate reply by overnight carrier to the following address:

Director, Office of Enforcement
Attention: Office of the Docketing Clerk, EA-10
U.S. Department of Energy
19901 Germantown Road
Germantown, MD 20874-1290

Copies of the reply should also be sent to my office and the Manager of the Los Alamos Field Office.

III. CORRECTIVE ACTIONS

Corrective actions that have been or will be taken to avoid further violations should be delineated, with target and completion dates, in DOE's Noncompliance Tracking System.

Frank G. Klotz
Under Secretary for Nuclear Security
Administrator, NNSA

Washington D.C.
This 8th day of June 2016