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

August 15, 2017

VIA OVERNIGHT UPS MAIL CARRIER

Mr. James L. Holt
President
National Security Technologies, LLC
P.O. Box 98521, NSF001
2621 Losee Road
North Las Vegas, Nevada 89030

WEA-2017-01

Dear Mr. Holt:

The U.S. Department of Energy (DOE) conducted an investigation into the facts and circumstances associated with the potential deficiencies in National Security Technologies, LLC (NSTec) implementation of the electrical safety program requirements at the Nevada National Security Site, and the August 5, 2016, event involving an employee (groundman) who received an electrical shock while cleaning the inside of a live 5 kilovolt (kV) splice box. The DOE Office of Enterprise Assessments' Office of Enforcement provided the results of the investigation to NSTec in an investigation report dated April 13, 2017. An enforcement conference was convened on May 23, 2017, with you and members of your staff to discuss the report's findings and NSTec's response. A summary of the enforcement conference and list of attendees are enclosed.

The National Nuclear Security Administration (NNSA) considers the near-miss electrocution and widespread electrical safety program deficiencies to be of high safety significance. The incident occurred during preventive maintenance work on electrical equipment at the U1a Complex, involving multiple crews, crafts, and locations. The electrical shock occurred while an employee was using a damp rag to clean the inside of an energized 5 kV splice box. After a determination that the exposed wiring in the splice box was energized (nominal voltage of 2,400 volts, phase to ground and 4,160 volts, phase to phase), the employee was taken to Fire Station #2 and then transported to a local hospital for evaluation. The hospital subsequently released the worker for full duty. The event revealed deficiencies in: (1) hazard identification, assessment, prevention, and abatement; (2) electrical safety; and (3) training and information.

NSTec did not effectively implement its work planning and control processes to ensure that hazards were adequately identified and controlled. NSTec also permitted an unqualified worker to access a mislabeled splice box without testing

for absence of voltage on both the phase-to-phase and phase-to-ground conductors. NSTec has made numerous improvements to the electrical safety program in response to the event; NNSA believes these improvements will decrease the chances of recurrence.

Based on an evaluation of the evidence in this matter, including information presented at the enforcement conference, NNSA concludes that NSTec 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 two Severity Level I violations and one Severity Level II violation with a total proposed base civil penalty, before mitigation, of $225,000.

Because the violations were identified through a self-disclosing event, NNSA is not granting any mitigation for timely self-identification and reporting of violations before the event. However, Part 851 states that civil penalties may be mitigated when a contractor implements appropriate corrective actions after an event, which NSTec has taken to ensure that this type of event does not happen again. NNSA recognizes that NSTec initiated actions to mitigate the immediate hazards and integrate improved processes to prevent recurrence. Also, NSTec has made notable progress in improving the site's electrical safety program, and the additional actions taken since the event should help prevent recurrence. These actions included, among others, improved engagement and transparency between the workers, management, and the field office.

In consideration of these factors, NNSA has concluded that 50 percent mitigation is warranted for NSTec's actions addressing the Part 851 violations cited in the enclosed PNOV. As a result, the proposed mitigated civil penalty is $112,500.

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, including 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 NNSA worker safety and health requirements. 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-2017-01)
Enforcement Conference Summary
Enforcement Conference Attendees

cc: Steven Lawrence, NA-NV
Brian Barbero, NSTec

Enclosure 1

Preliminary Notice of Violation

National Security Technologies, LLC
Nevada National Security Site
Las Vegas, Nevada

WEA-2017-01

The U.S. Department of Energy (DOE) conducted an investigation into the facts and circumstances associated with potential deficiencies in National Security Technologies, LLC's (NSTec) implementation of the electrical safety program requirements at the Nevada National Security Site, and the August 5, 2016, event involving an employee (groundman) who received an electrical shock while cleaning the inside of an energized 5 kilovolt (kV) splice box. The investigation revealed multiple violations of DOE worker safety and health requirements by NSTec. DOE provided NSTec with an investigation report dated April 13, 2017, and convened an enforcement conference with NSTec representatives on May 23, 2017, to discuss the report's findings and NSTec's response. A summary of the conference and list of attendees are enclosed.

Pursuant to Section 234C of the Atomic Energy Act of 1954, as amended, and DOE regulations set forth in 10 C.F.R. Part 851 (Part 851), *Worker Safety and Health Program*, the National Nuclear Security Administration (NNSA) hereby issues this Preliminary Notice of Violation (PNOV) to NSTec. The violations cited in this PNOV include deficiencies in: (1) hazard identification, assessment, prevention, and abatement; (2) electrical safety; and (3) training and information. NNSA has grouped and categorized these deficiencies as two Severity Level I violations and one Severity Level II violation.

Severity Levels are explained in Part 851, Appendix B, *General Statement of Enforcement Policy*. Subparagraph 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."

Subparagraph 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."

Because the violations were identified through a self-disclosing event, NNSA is not granting mitigation for timely self-identification and reporting. NNSA acknowledges NSTec's post-incident measures, which included initiation of two stop-work actions, one of which is still in effect. NNSA also recognizes that NSTec initiated actions to mitigate the immediate hazards and integrate improved processes to prevent recurrence.

In consideration of mitigating factors, NNSA has concluded that 50 percent mitigation is warranted for NSTec's actions addressing the Part 851 violations cited in this PNOV. As a result, the proposed mitigated civil penalty is $112,500.

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, NSTec may be required to post a copy of this PNOV in accordance with 10 C.F.R. § 851.42(e).

I. VIOLATIONS

A. Hazard Identification, Assessment, Prevention, and Abatement

Title 10 C.F.R. § 851.10, *General requirements*, subsection (a), states that "[w]ith respect to a covered workplace for which a contractor is responsible, the contractor must: …(2) [e]nsure that work is performed in accordance with: (i) [a]ll applicable requirements of this part; and (ii) [w]ith the worker safety and health program for that workplace." Subsection (b) states that "[t]he written worker safety and health program must describe how the contractor complies with the: (1) [r]equirements set forth in subpart C [Specific Program Requirements] of this part that are applicable to the hazards associated with the contractor's scope of work."

NSTec Program Description Document PD-P200.001, *10 CFR 851 Worker Safety and Health Program Description* (Rev 8, dated January 13, 2016), incorporates NSTec core company directives (CCDs), company directives (CDs), and organization procedures (OPs) that implement Part 851 and that are cited in this PNOV.

NSTec CCD-QA05.001-001, *Requesting, Processing, and Executing Activity Level Work Requests on Site Operations Real Property*, Rev 5, dated April 21, 2015, Section 4.1, *Submitting a Work Request*, under *Requester*, subsection [1] requires work requesters to "[d]etermine if the work request is for standard baseline services or for above standard baselines services..." Subsection [3] states: "IF the work request is for work above standard baseline services, THEN complete, AND submit [Form FRM-0371] to the CSU [Customer Service Unit]."

NSTec CCD-QA05.001, *NSTec Integrated Work Control Process*, Rev 3, dated September 16, 2013, Section 4.10, *Planning ALW (Activity Level Work)*, under *Planning Team*, subsection [3], requires the planning team to "[c]onduct a walkdown of the proposed scope of work with the SMEs [subject matter experts] identified in the draft activity level hazard analysis in accordance with CCD-QA05.001-005, *Work Package Process*" or CCD-QA05-001-006, "*Technical Procedure Process and Use*, as applicable."

NSTec CCD-QA05.001-005, *Work Package Process*, Rev 6, dated September 16, 2013, Section 4.3, *Planning the Work*, under *Planner*, subsection [5] requires planners to "[c]onduct a walkdown or tabletop when…[t]he consequence of improper performance is serious to extremely severe." CCD-QA05.001, *NSTec Integrated Work Control Process, Appendix C Activity Screening and Binning Tool*, defines the consequences of improper performance of a serious electrical activity as a shock, arc flash not resulting in burns, or

hazardous energy not controlled by authorized lockout/tagout. Appendix C also defines the consequences of improper performance of an extremely severe electrical activity as death by electrocution or arc flash burns.

NSTec OP-4200.002, *Operating Principles*, Rev 4, dated December 14, 2015, Section 4.0, *Procedures*, under *Department Personnel*, subsection [13] requires Department personnel to "[l]ocate and/or procure materials needed to complete the job and ensure they are available on the trucks or at the job site before beginning the work."

NSTec CCD-QA05.001-004, *Skill of the Worker*, Rev 4, dated June 30, 2015, Section 5.7, *Skill of the Worker (SOTW)*, defines SOTW as "[a] defined level of technical proficiency for a worker performing a particular job that is verifiable through some form of qualification or supervisory knowledge."

NSTec CCD-QA05.001-003, *Activity Level Hazard Analysis Process*, Rev 4, dated January 26, 2016, Section 4.1, *Identifying Potential Hazards Associated with Activity Level Work*, under *Work Planner/Technical Writer*, subsection [14] states: "IF a PTHR [pre-task hazard review] is used to identify/mitigate hazards for Type 3…WPs [work packages], THEN develop the PTHR following the instructions provided in Appendix D [*Process Hazard Analysis Applicability Table and Techniques*]."

Contrary to these requirements and as evidenced by the following facts, NSTec did not effectively implement its work planning and control processes to ensure that hazards were adequately identified and controlled. These issues led to confusion about the scope of the work and during work activities, due to inconsistencies in planning procedures, issues with material staging and the operation of testing equipment, and ambiguity about what work is covered under "skill of the worker."

1. Work activities involved a 5 kV breaker in Substation 1-10, five vacuum interrupters, four 5 kV disconnect switches, and the primary of four transformers. The work request was submitted via email, not via the *Work Request Form*, FRM-0371. Further, NSTec did not include the requester, who was the only individual with specific knowledge of the power configuration, in the work package process to refine and bound the work scope. This process was inconsistent with the work request procedures and contributed to uncertainty regarding the work activity.

2. Activity Level Work Document 3002217406, *3-5 year PM* [preventive maintenance] *for equipment associated with the four (4) mining power centers for U1A and 01P-S-10*, was screened as a "Serious (3)" consequence work package, requiring a walkdown of the work activities. However, a walkdown of the proposed work with the planner and the subject-matter-experts was not performed to ensure that the scope was adequately defined and the work could be completed safely.

3. Not all the necessary materials were present at the U1a Complex when the work began. Two workers had to drive to Mercury, Nevada (25 miles away) to pick up missing parts and electrical test equipment leads, necessitating last-minute work preparations. In

addition, work involved test equipment that had not been used previously, leading to confusion about how to operate it and adding to the disorder during work activities.

4. NSTec's skill-of-the-worker program is intended to allow the application of pre-identified and validated skills when developing activity-level work documents. However, for the workers directly involved in the shock event, the program does not sufficiently delineate the activity-level work. For example, NSTec form FRM-1234, *Master Skill of the Worker Record*, approved June 26, 2013, for linemen within the Site Operations organization, outlines various qualifications (e.g., length of experience, possession of a driver's license, completion of specific training) but does not define covered tasks other than stating "[w]orking on or near energized circuits." Further, the *Master Skill of the Worker Record* for groundmen within Site Operations states the worker qualifications but outlines only six general work tasks: prepare tools and equipment, assist in digging holes, deliver materials, test gloves, maintain test equipment, and assist journeymen with work performed on the ground. Allowing the journeyman to assign the groundman to assist with work performed on the ground gives the journeyman too much latitude to assign work outside the groundman's experience, training, and responsibility.

Collectively, these noncompliances constitute a Severity Level I violation.
Base Civil Penalty - $90,000
Proposed Civil Penalty (as adjusted) - $45,000

B. Electrical Safety

Title 10 C.F.R. § 851.23, *Safety and health standards*, subsection (a), states that "[c]ontractors must comply with the following safety and health standards that are applicable to the hazards at their covered workplace…(3) Title 29 [C.F.R.] Part 1910, '*Occupational Safety and Health Standards*'…(14) NFPA [National Fire Protection Association] 70E, '*Standard for Electrical Safety in the Workplace*,' (2004)."

NFPA 70E (2004), Article 120, *Establishing an Electrically Safe Work Condition*, Section 120.1, *Process of Achieving an Electrically Safe Work Condition*, states that "[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…" Subsection (5) requires "[u]se [of] an adequately rated voltage detector to test each phase conductor or circuit part to verify they are deenergized."

NFPA 70E (2004), Article 120, Section 120.2, *Working On or Near Deenergized Electrical Conductors or Circuit Parts That Have Lockout/Tagout Devices Applied*, subsection (D), *Hazardous Electrical Energy Control Procedures*, paragraph (3), *Complex Lockout/Tagout Procedure*, subparagraph (a) states that "[a] complex lockout/tagout plan shall be permitted where one or more of the following exist…(2) multiple crews, (3) multiple crafts, or (4) multiple locations."

NFPA 70E (2004), Article 120, Section 120.2, subsection (F), *Procedures*, states that "[t]he employer shall maintain a copy of the procedures required by this section and shall make the

procedures available to all employees." Paragraph (2), *Elements of Control*, states that "[t]he procedure shall identify elements of control." Subparagraph (f), *Testing,* states that "[t]he procedure shall establish…[a] requirement to retest for absence of voltage when circuit conditions change or when the job location has been left unattended."

NFPA 70E, Article 130, *Working On or Near Live Parts*, Section 130.6, *Other Precautions for Personnel Activities*, subsection (G), *Housekeeping Duties*, states that "[w]here live parts present an electrical contact hazard, employees shall not perform housekeeping duties inside the Limited Approach Boundary where there is a possibility of contact, unless adequate safeguards (such as insulating equipment or barriers) are provided to prevent contact."

NSTec CD-P280-026, *Electrical Safety*, Rev 3, dated September 23, 2013, Section 4.7.3, *Preparations to Approach Energized Parts*, under *Employees*, subsection [7] requires that employees "[d]o not perform housekeeping duties inside the Limited Approach Boundary …where there is a possibility of contact with energized parts, unless adequate safeguards (such as insulating equipment or barriers) are provided to prevent contact."

Title 29 C.F.R. § 1910.303, *General,* subparagraph (h)(2)(iv), states that "[o]utdoor electrical installations having exposed live parts shall be accessible to qualified persons only."

NFPA 70E, Article 130, Section 130.2, *Approach Boundaries to Live Parts*, subsection (D), *Approach by Unqualified Persons*, states that "[u]nqualified persons shall not be permitted to enter spaces that are required under [Section] 400.16(A) [*Live Parts Guarded Against Accidental Contact*] to be accessible to qualified employees only, unless the electric conductors and equipment involved are in an electrically safe work condition."

NSTec CD-P280.026, Section 4.3.3, *Approach by Unqualified Persons (Non-QEW)* [Qualified Electrical Workers], subsection 4.3.3.1 states that "[w]here one or more non-QEWs are working at or close to the Limited Approach Boundary, the designated person in charge of the workplace where the electrical hazard exists shall cooperate with the designated person in charge of the non-QEWs to ensure that all work can be done safely."

NFPA 70E (2004), Article 205, *General Maintenance Requirements*, Section 205.1, *Qualified Persons*, states that "[e]mployees who perform maintenance on electrical equipment and installations shall be qualified persons…and shall be trained in, and familiar with, the specific maintenance procedures and tests required."

NFPA 70E (2004), Article 130, *Working On or Near Live Parts*, Section 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."

NFPA 70E, Article 205, *General Maintenance Requirements*, Section 205.2, *Single Line Diagram*, states that "[a] single line diagram, where provided, for the electrical system shall be maintained."

NSTec CD-P280.026, Section 4.8.5, *Electrical Equipment Maintenance Requirements*, under *Responsible Managers/QEWs*, subsection [2] requires managers/QEWs to "[m]aintain the single line diagrams for electrical systems."

NSTec OP-4200.029, *Electrical Safe Work Practices*, Rev 5, dated February 3, 2016, Section 4.15, *Marking Posting and Signing*, under *QEW*, subsection [2] requires that QEWs "[l]abel electric power distribution equipment to indicate the power source (fed from)."

NSTec CD-P280.026, Appendix L, *Electrical Equipment Maintenance Requirements*, under *Electrical Equipment – General Requirements*, subsection L1.7 states that "[c]ircuit or voltage identification shall be securely affixed and maintained in an updated and legible condition."

Contrary to these requirements and as evidenced by the following facts, NSTec did not effectively implement its electrical safety program.

1. NSTec allowed an unqualified worker access to Splice Box 3541-9 without testing for absence of voltage on both the phase-to-phase and phase-to-ground conductors. Further, NSTec allowed the panel to the splice box to be left open and unattended, exposing workers to live, unguarded parts on two separate instances, once before the event and once afterward.

2. NSTec did not use a complex lockout/tagout procedure to establish an electrically safe work condition to prevent employees from exposure to electrical hazards when multiple crews, multiple crafts, and multiple locations were involved.

3. NSTec allowed workers to perform housekeeping duties (e.g., using a vacuum and a damp rag) inside the Limited Approach Boundary of energized parts without adequate safeguards, such as insulating equipment or barriers, to prevent personnel from contacting the energized parts.

4. NSTec allowed a worker to test for absence of voltage on electrical equipment 1kV and above (a hazard/risk category 4 condition) without wearing category 4 personal protective equipment. This test was performed after the electrical shock event to confirm that the splice box was energized.

5. NSTec did not provide workers with an accurate single line diagram for the electrical system, in that Splice Box 3541-9 was shown as being powered by an incorrect source. Further, NSTec did not maintain an accurate circuit label for the splice box, in that the label said "fed from 5KV-BKR-404" instead of "fed from 5KV-HS-001(4)." These inaccuracies led to the misconception that de-energizing 5KV-BKR-404 would also de-energize Splice Box 3541-9.

Collectively, these noncompliances constitute a Severity Level I violation.
Base Civil Penalty - $90,000
Proposed Civil Penalty (as adjusted) - $45,000

C. Training and Information

Title 10 C.F.R. § 851.25, *Training and information*, Section (a), states that "[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." Section (c) states that "[c]ontractors must provide training and information to workers who have worker safety and health program responsibilities that is necessary for them to carry out those responsibilities."

NSTec CD-P280.001, *General Safety Rules*, Rev 2, dated January 14, 2015, Section 4.9, *Reporting Incidents*, subsection 4.9[1], *Employees*, requires employee to "[p]romptly report to the Supervisor any occurrences that result in injury, property damage, fire, electrical injury/damage, environmental/chemical spills, or 'near-miss' events that have potential for injury or property damage."

NSTec CD-P280.001, Section 4.10, *Injury Treatment Requirements*, subsection 4.10.1 states that "[a]fter sustaining any of the five types of injuries listed below, Employees WILL be transported to the nearest medical facility for observation and evaluation: …E. Electrical Shock."

NSTec CD-P280.026, Section 4.7.5, *Electrical Shock and Emergency Situations*, subsection [1], *Employees*, requires employees to "[c]onsider all electrical shocks to be medically serious." Subsection, [2] *Supervisor*, states: "IF an employee experiences an electrical shock, THEN have the employee escorted to the nearest medical facility for examination, even if the employee shows no apparent signs of injury."

NFPA 70E, Article 130, *Working On or Near Live Parts*, Table 130.2(C), *Approach Boundaries to Live Parts for Shock Protection*, establishes a Limited Approach Boundary of five feet for a nominal system voltage range (phase to phase) of 751 V to 15 kV for exposed fixed circuit parts.

NSTec CD-P280.026, Section 4.7.16, *Alerting Techniques*, subsection [2], *FM/Responsible Managers*, requires "[u]se [of] barricades in conjunction with safety signs where it is necessary to prevent or limit employee access to work areas exposing employees to uninsulated energized conductors or circuit parts (e.g., within the Limited Approach Boundary)."

Contrary to these requirements and as evidenced by the following facts, NSTec did not establish and communicate clear expectations for ensuring a prompt and effective response to an electrical shock event. After the shock event that occurred during the preventive maintenance work activity:

1. Medical care for the shock victim was delayed while actions were taken to confirm the presence of voltage, including retrieval of test equipment that was not at the immediate work location. Medical care was further delayed while various management personnel

were notified of the shock. Approximately 20 minutes after the shock, a co-worker transported the shock victim from the worksite to the closest fire station in one of the few NSTec vehicles lacking an automated external defibrillator. Before their arrival at the fire station (approximately 28 minutes after the shock occurred), no one contacted the fire station to obtain guidance, notify them of the transport in progress, or verify that fire station paramedics would be available. During these response activities, the co-workers acted in accordance with the general response actions established by NSTec procedures, but the procedures were insufficient to ensure prompt medical care for the shock victim.

2. The worksite was not promptly put into a safe configuration. The splice box, which was verified to be energized after the victim was shocked at approximately 10:40 a.m., remained open and energized until the end of the first management review meeting at approximately 4:30 p.m., the same day. While open, the splice box presented a continuing potential contact and/or arcing hazard.

Collectively, these noncompliances constitute a Severity Level II violation.
Base Civil Penalty - $45,000
Proposed Civil Penalty (as adjusted) - $22,500

II. REPLY

Pursuant to 10 C.F.R. § 851.42(b)(4), NSTec 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 NSTec chooses not to contest the violations set forth in this PNOV, then the reply should clearly state that NSTec 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 NSTec 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 NSTec 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), NSTec 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 to the Manager of the NNSA Nevada 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 15 day of August 2017