Department of Energy
Washington, DC 20585

December 23, 2010

Dr. Stephen M. Younger
President and General Manager
National Security Technologies, LLC
P.O. Box 98521 M/S NSF001
Las Vegas, Nevada 89193-8521

WEL-2010-02

Dear Dr. Younger:

The Office of Health, Safety and Security's Office of Enforcement conducted an evaluation of the June 28, 2010, flash fire event at Fire Station No. 1 at the Nevada National Security Site. The flash fire occurred when residual propane gas in a liquefied petroleum gas (LP-gas) system line ignited while a Pahor Mechanical, Inc. (Pahor Mechanical) employee was connecting an LP-gas line to a new gas stove in the kitchen of Fire Station No. 1. The employee received second-degree burns to his left hand, fingers, forearm, and elbow. The flash fire lasted a few seconds, but it could have resulted in more severe injuries to the worker because the LP-gas system was charged with propane gas from a previous leak test, and no hazardous energy controls were implemented. On August 13, 2010, National Securities Technologies, LLC (NSTec) submitted Noncompliance Tracking System (NTS) report NTS-NSO--NST-NTS-2010-0011, *Flash Fire*, to report to the Department of Energy the noncompliances associated with the event.

As construction manager, NSTec is responsible for the planning and execution of all work related to the construction of Fire Stations No. 1 and 2. NSTec awarded construction subcontract No. 107043 to Martin-Harris Construction (Martin-Harris) to build the fire stations. Martin-Harris engaged the services of Pahor Mechanical, which has specific expertise in utilities installation.

The Office of Enforcement reviewed the NSTec fire investigation report, management review report, root cause analysis (RCA), and corrective action plan; the Martin-Harris *Construction Environmental, Safety and Health Plan*; and the construction subcontract and accompanying exhibits. The Office of Enforcement also obtained and reviewed a number of core company directives, assessments, and inspection documents identified in exhibit E of the subcontract.

The Office of Enforcement's evaluation of the circumstances associated with this event disclosed a number of potential violations of 10 C.F.R. Part 851, *Worker Safety and Health Program*, in the areas of construction work planning and control, hazard identification and abatement, compliance with National Fire

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Protection Association (NFPA) code requirements invoked by Part 851, and worker training. These potential violations are identified below:

- NSTec did not ensure that Pahor Mechanical implemented a construction project safety and health plan that met the requirements of 10 C.F.R. 851, appendix A, section 1. Martin-Harris required Pahor Mechanical to use the approved Martin-Harris plan for construction of the fire stations, but that plan did not specify what subsequent activity-level hazard analyses would be necessary. Activities related to installation of LP-gas piping systems, appliances, and equipment would have required such analyses.

- NSTec, Martin-Harris, and Pahor Mechanical did not plan the installation of the utility systems for the new fire stations consistent with the requirements of NSTec Core Company Directive No. CCD-QA05.001-005, *Work Package Process*, to ensure that hazards were accurately identified and analyzed. Martin-Harris prepared job hazard analysis (JHA) No. 0004, *Installation of Plumbing Systems and Fire Protection*, to cover the utility systems installation by Pahor Mechanical under work package No. 107043-007, *Utility Systems Installation*. The JHA did not incorporate job steps, potential hazards, and recommended safe job procedures relative to the installation of LP-gas piping systems, appliances, and equipment. For example, the JHA did not identify safe work practices to mitigate the fire and health hazards associated with the use of LP-gas; did not specify the purging requirements of NFPA 54, *National Fuel Gas Code*; and did not address hazardous energy control procedures for mechanical equipment and electrical sources of ignition.

- NSTec did not ascertain Pahor Mechanical employees' familiarity with and training in the purging requirements of NFPA 54 and the hazards and characteristics of LP-gas. In addition, NSTec did not ensure that Pahor Mechanical employees were able to apply hazardous energy control procedures to eliminate conditions that could adversely affect the installation of LP-gas piping systems and appliances. For example, the Pahor Mechanical pipefitter assigned to perform the LP-gas pipe connection had no previous experience with propane gas and did not consider the potential fire and explosion hazards noted in the applicable LP-gas material safety data sheet.

NSTec, along with Martin-Harris and Pahor Mechanical safety personnel, performed an RCA of the flash fire event. The corrective actions identified in the RCA report and later incorporated in the NTS report appear to address the root and contributing causes identified in the RCA. Before the activity-level work resumed, NSTec identified and completed short-term corrective measures to address the event's most significant causal factors, such as:

- Development of JHA No. 107043-008-2 to address the installation of LP-gas piping systems, appliances, equipment, and related accessories.

- Training of subcontractor employees in the hazards associated with propane gas.

- Subcontractor implementation of hazardous energy control procedures.

- Implementation of provisions for purging flammable gas systems to eliminate potential asphyxiation and explosion hazards.

The Office of Enforcement recommends that NSTec establish additional controls to foster sustained performance in activity-level work and to preclude recurrence of similar events, including:

- Evaluate existing mechanisms to promote effective flowdown of core company requirements, such as work control procedures, to subcontractor organizations so that requirements, controls, and expectations are understood, properly implemented, and followed.

- Establish a review process to ensure that subcontractor safety and health plans incorporate regulatory requirements and safe work practices consistent with the project scope of work and activity-level hazards.

- Reconsider the processes that currently allow hazardous activities to be performed as skill-of-the-craft work and have the potential for over-reliance on the workers' knowledge to identify and understand activity-level hazards and select appropriate controls.

The Office of Enforcement is issuing this notice to NSTec to convey concerns about the level of rigor applied by NSTec and its subcontractors in planning and executing activity-level work safely and in accordance with the Department of Energy's worker safety and health requirements. However, in recognition of NSTec's and the subcontractors' prompt response and identification of causal factors, the Office of Enforcement has determined that further enforcement investigation is not warranted at this time. In conjunction with the National Nuclear Security Administration and the Nevada Site Office, we will continue to monitor NSTec's initiatives to improve safety performance in construction work activities.

No response to this letter is required. If you have any questions, please contact me at (301) 903-2178, or your staff may contact Kevin Dressman, Acting Director, Office of Worker Safety and Health Enforcement, at (301) 903-0100.

Sincerely,

John S. Boulden III
Acting Director
Office of Enforcement
Office of Health, Safety and Security

cc: Jason Prestridge, NSTec
Stephen Mellington, NNSA/NSO