

**National Security Technologies, LLC  
Livermore Operations  
Voluntary Protection Program Assessment  
June 15-18, 2015**

**Background**

National Security Technologies, LLC (NSTec), was formed in 2005 as a joint venture between Northrop Grumman Corporation (managing partner), AECOM, CH2M HILL, and Nuclear Fuel Services. Headquartered in Las Vegas, Nevada, NSTec manages operations at the Nevada National Security Site (NNSS) and has satellite operations across the country, including NSTec/Livermore Operations (NSTec/LO). NSTec/LO operates a leased facility in Livermore, California. The leased facility occupies approximately 35,000 square feet, with 17 laboratories and associated office space. The scope of activities within the facility include applied science and engineering operations engaged in testing and field operations for Lawrence Livermore National Laboratory (LLNL), NNSS, and other national laboratories. The workforce at NSTec/LO consists of 61 scientists, engineers, designers, electro-optic/mechanical technicians, and administrative staff. Personnel provide design, fabrication, and implementation of sophisticated diagnostics systems, including ultra-fast, electro-optic and recording systems for capturing fast transient signals. NSTec/LO also supports the National Ignition Facility (NIF) located at LLNL, operating NIF Target Area systems, as well as providing diagnostics, vacuum, and alignment services. In a Memorandum of Understanding with the Department of Energy's (DOE) National Nuclear Security Administration (NNSA) Nevada Field Office, the DOE/NNSA Livermore Field Office provides oversight of NSTec/LO.

DOE admitted NSTec/LO to the DOE Voluntary Protection Program (VPP) at the Star level in 2008 and recertified it in 2012. Continued participation in DOE-VPP requires a triennial reassessment. Two team members from the Office of Environment, Health, Safety and Security (AU) DOE-VPP Team (Team) conducted observations, interviews, and document reviews from June 15-18, 2015, to determine if NSTec/LO continues to meet DOE-VPP requirements and expectations as specified in the DOE-VPP Manual.

The Team is presenting its results and recommendation to the Associate Under Secretary for Environment, Health, Safety and Security (AU) in an abbreviated format because the facility and workforce are small, and the Office of Worker Safety and Health Assistance (AU-12), within AU, conducted an evaluation of the parent NSTec organization in February 2015. A report from that assessment of NSTec Nevada contains detailed descriptions of the NSTec corporate mission and management systems, as well as corporate opportunities for improvement that will affect NSTec/LO.

**Results**

NSTec/LO has only had one recordable injury in the past four years, a soft tissue back injury in 2014. Per the DOE-VPP documents, small contractors (less than 200,000 hours/year) may use the best three out of the last 4 years when comparing injury rates to industry. As such, NSTec/LO's average total recordable case rate (TRC) and days away, restricted, or transferred (DART) case rate are both zero. The Team did not identify any fear or disincentives to reporting

injuries. There was also no indication that injuries were improperly reported or classified. (See Table 1).

The 2012 Team interviewed more than 30 workers, supervisors, and managers, and observed work activities in the laboratories and at NIF. The Team determined that NSTec/LO's pursuit of safety excellence, commitment to continuous improvement, and mature safety and health programs fully met the tenets of DOE-VPP.

The 2015 Team interviewed senior NSTec/LO managers and observed leaders striving for safety excellence who were committed to providing their employees the safest possible work environment. Since the previous assessment, several managers have changed roles and responsibilities, including the Operations Manager. Even with the changes, a safe work culture continues to flourish. The recognition that all employees have a stake in continually improving is pervasive across the workforce. Managers continue to support workers in their efforts to integrate safety and improvements into daily activities. The NSTec/LO managers are visible and accessible to all employees. They frequently solicit and encourage employees to participate in facility safety walkdowns, action teams and safety committees, community outreach, and other activities that enhance the safety culture.

NSTec/LO's budget has declined from approximately \$11 million to approximately \$8 million since 2011. This decline affects the number of employees that perform work at the facility. Currently, there are 14 scientists, 10 engineers, 15 technicians, 4 designers, and 18 management administrative staff. This represents a reduction of approximately 20 employees from 3 years ago. Most have retired or moved on to other positions outside of NSTec/LO.

A new environment, safety and health, (ES&H) professional has been with the company approximately 2 months and is engaging employees and managers to help him understand his roles and responsibilities as expeditiously as possible. He created a document that inventories all the facility rooms and lists the associated hazards, chemicals, applicable work packages or technical procedures, and permits.

In 2012, the Team identified an opportunity for improvement that NSTec/LO should consider annual safety goals that focused on worker actions and measure those actions as a means of determining improved safety performance. In an effort to address the improvement opportunity, NSTec/LO focused on training reports, required reading, Certified Local Trainers (First Aid, Cardio Pulmonary Resuscitation, Electrical Safety, Lockout/Tagout), and a Livermore Operations Quick Reference document. As discussed in the 2012 review, "developing challenging safety goals for NSTec/LO has been difficult because its history and performance are already indicative of a very effective system. While it continues to search for innovative means to improve a very good process, NSTec/LO struggles to identify goals that will drive further improvements." Workers participate in workspace inspections, process development and evaluations, safety committees, and community outreach. By tracking and measuring these actions, NSTec/LO can develop safety goals and desired employee actions that continually improve safety performance. NSTec/LO should reevaluate the 2012 opportunity for improvement and how it measures safety performance.

NSTec/LO managers clearly support rewarding employees for excellence, whether in safety, process improvements, or outstanding customer support. Employees can receive *great catch*

awards for identifying a safety, quality assurance, or efficiency improvement. The Recognition and Awareness Program (RAP) provides recognition for active participation in environment, safety, health, and quality processes. The employee suggestion program (Bright Ideas Awards) recognizes employees who provide other improvement suggestions. Several employees told the Team about awards received and how recipient's pictures are often posted on bulletin boards.

As in 2012, keeping employees fully engaged in the safety program continues to be a top priority at NSTec/LO. Employees and managers communicate freely and address issues, concerns, suggestions, and recommendations. Managers empower employees to proactively administer the safety and health program at this site.

In 2012, employees participated in the monthly safety inspections, formerly identified as the Safety Walk-Around Team (SWAT), called the Formal Workplace Inspection Program (FWIP) team. Randomly selected employees accompany the FWIP team on safety inspections. During inspections, team members from other work areas identified several items overlooked by workspace occupants. For example, a participant not assigned to that particular workspace identified a wire protruding beyond a four-outlet receptacle box that should have been inside the outlet box.

NSTec/LO employees have other opportunities to contribute to a positive working environment. Several employees are members of the Emergency Action Team which, during an evacuation, ensures all employees exit the building and are accounted for. The Livermore Operations Safety Committee is another means for employees to eliminate workplace injuries and maintain a healthy workforce. Its objectives are to identify hazards, provide suggestions for identified issues, and review NSTec/LO safety and health programs. The safety committee also participates in the Annual Safety Calendar Artwork contest sponsored by the NSTec corporate office in Las Vegas, Nevada. Employees can also participate in the Organizational Health team which promotes a positive, safe, and productive work environment. This team conducts surveys to evaluate workers' perceptions related to: work/life balance, social opportunities, the company's reward system, accountability and sufficient workload, management's understanding of the work performed by the employee, and NSTec/LO in terms of safety, security, and comfortable work environment. NSTec/LO employees can also join the NSTec/LO Employee Association. Currently, six employees are members of a committee that organizes activities to raise money for special events and improve morale. Upcoming events include selling roasted chicken in the break room, planning the company picnic, and the company holiday party. NSTec/LO employees are also involved in VPP activities as well as participate in community outreach activities that include local high schools, universities, Toys-4-Tots, Adopt-a-Family, and providing scholarships to local area graduates.

As in 2012, the development and review process for experiments and work activities includes significant worker involvement from the initial stages through completion. The work package process requires employee involvement through the identification and understanding of the hazards of the work they perform. Depending on the level of hazards associated with the work package, employees participate in periodic reviews

Employees clearly understand their rights under Title 10, Code of Federal Regulations, part 851 (10 CFR 851), including the right to pause or stop work in the event of a safety concern. They

also understand their rights to access safety and health information, how to report safety issues and concerns, and are very comfortable with exercising these rights.

Employees indicated they felt comfortable with the amount of information they receive from their safety committees and the means of receiving that information (E-mail, newsletter, etc.). The Howler newsletters (published on every full moon) contain a variety of safety topics and current information about projects and employees.

The NSTec/LO worksite analysis process remains comprehensive. Processes are in place to identify and analyze hazards throughout the laboratory and employees are using the processes in their daily work. A multi-tiered approach identifies and controls hazards, providing for a safe environment. NSTec's corporate office provides processes and procedures for use at the Las Vegas location and all satellite locations, including NSTec/LO.

NSTec corporate processes and procedures define the work control program. Activity level work requires using the NSTec *Integrated Work Control Process*, CCD-QA05.001, to identify hazards, analyze hazards, and apply hazard controls. In 2013, NSTec completed an internal, onsite review of the NSTec/LO work control process; afterwards, NSTec/LO concluded that technical procedures are a better tool for its laboratory processes than the work packages. To accomplish this change in process, NSTec/LO trained five additional employees to perform planning as a collateral duty. They have converted several work packages, such as the laser laboratory and radiological laboratory, to technical procedures and are working on several more.

The Team reviewed several work packages and technical procedures. Work planners use an integrated approach to include workers and subject matter experts (SME) to help build the Activity Hazard Inventory Checklist and identify applicable company documents for the hazardous activity. This group also works together to develop JHAs or pre-task and post-task hazard review (PTHR), which includes the activities, hazards, and controls for that scope of work. In February 2015, AU-12 reviewed the NSTec corporate work control procedures during the VPP assessment at Las Vegas, Nevada. The Las Vegas assessment identified a continuing weakness with JHAs and PTHRs that contained ambiguous hazard identification statements and controls. In addition to that weakness, NSTec corporate guidance did not mandate the documentation of analysis to capture the rationale for control selection. The NSTec VPP assessment recommended revising the corporate JHAs and PTHRs to include analysis that leads to specific control selection.

The NSTec Nevada industrial hygiene (IH) health hazard evaluation conducted October 1, 2014, identified NSTec/LO as a high hazard facility. The report assessed hazards which include lasers, noise in the machine shop, welding fume exposure, and lead exposure from soldering and shielding. The report listed 41 chemical products in the facility that contained carcinogens or reproductive hazards. NSTec/LO is working to eliminate those products that are no longer in use and complete a database to manage the remaining hazardous chemicals. In addition to completing the hazardous chemical database, NSTec/LO is checking the ventilation units to ensure proper airflow. An annual check of the NSTec/LO industrial ventilation units at the wet bench and Room 187 indicated the ventilation rate is below the minimum requirements. NSTec/LO prohibits work with chemicals at these locations.

The Team visited the shipping and receiving area and the machine shop during this assessment. The machine shop had a 21-quart container of eyewash solution mounted on a wall directly above the flammable cabinet that contained several spray containers of lubricants and other chemicals. The shipping and receiving area only has a sink to wash off any spilled chemicals or flush eyes if exposure occurs. NSTec/LO should evaluate the safety data sheets for chemicals and determine if the facility safety controls match the chemical hazards.

**Opportunity for Improvement:** NSTec/LO should evaluate the safety data sheets or material data sheets for chemicals and determine if the facility safety controls match the chemical hazards.

The 2014 IH report listed the results of the lead-swipe samples at nine areas. One area, the frit hood from Room 182, was above the NSTec corporate housekeeping criterion of 50 ug/100 cm<sup>2</sup>. NSTec/LO removed the hood by wrapping it in plastic and placed it in the back dock for disposal. NSTec/LO performs swipe testing and air sampling for lead and performs periodic cleaning of surfaces where lead is stored or used. Testing has not identified any areas other than the hood that exceed the action levels for lead. NSTec/LO should consider testing its employees for levels of lead in blood to validate the effectiveness of its controls for lead exposure.

**Opportunity for Improvement:** NSTec/LO should consider testing its employees for levels of lead in blood to validate the effectiveness of its controls for lead exposure.

NSTec/LO tracks and trends TRC and DART rates for employees and subcontractors. Managers receive notification of minor injuries or first-aid cases via the *First-Aid Notification Form*, FRM-1342. First aid may be self-administered using the first-aid kits, or workers may see their own provider or the contracted occupational health doctor. NSTec/LO reports first-aid cases to the corporate offices, but NSTec/LO does not track first aid cases. Tracking first-aid cases can provide important information for managers to identify potential safety issues before a serious injury occurs. NSTec/LO should work with the corporate office to use its first-aid events as potential indicators of safety issues.

**Opportunity for Improvement:** NSTec/LO should work with the corporate office to use its first-aid events as potential indicators of safety issues.

As in 2012, NSTec/LO consistently uses safety and health rules to reduce hazards and potential exposures. The environment, safety and health professional provides continuous and proactive support to the improvement of controlling hazards. For example, the high voltage laboratory, under design during the previous assessment, is complete. Integrated within the room is a Lexan<sup>®</sup> Plexiglas wall that provides a barrier between the worker and electrical equipment undergoing testing. Holes in the Lexan<sup>®</sup> allow testing and measuring instrumentation to touch the equipment while preventing the worker from inadvertently touching energized components. An interlock near the entrance to the Lexan<sup>®</sup> shuts the power off if it detects a break in the signal. The worker also has a cutoff switch within reach to turn the power off to the experiment. In an effort to communicate hazards within laboratory spaces, NSTec/LO implemented yellow safety information boards in the laboratories that are highly visible and have safety-related

documents posted. As part of a security measure, NSTec/LO installed ballistic film on the windows. The film reduces the amount of radiant heat reaching the inside of the building and the energy costs are lower.

NSTec/LO uses a laser safety officer (LSO) to help manage the hazards associated with its Class 4 and Class 3B lasers, the highest hazard classification. The LSO reviews the hazards and controls to prevent exposure to the laser beam prior to authorizing operation of the equipment. According to American National Standards Institute *Z136.1-2007*, the master switch for Class 4 or Class 3B lasers require a master switch to shutoff the laser with a key. A cipher lockbox provides access control to the keys. Only qualified laser operators, laser workers, and laser maintenance personnel know the cipher combination. However, manufacturers make only one key that fits all their models of lasers, so any Continuum laser key will operate any Continuum laser; thus, key control does not prevent the use of a laser by a nonqualified employee. NSTec/LO should consider an alternative method to control the use of duplicate keys for the same laser and ensure positive key control.

**Opportunity for Improvement:** NSTec/LO should consider an alternative method to control the use of duplicate keys for the same laser and ensure positive key control.

*Laser Medical Surveillance*, OP-3600.029, defines the medical surveillance of laser users. The document lists the roles and responsibilities of various staff within the NSTec/LO organization. Although the LSO is the central authority for laser operation, that procedure does not require notification of the LSO when medical surveillance requirements are current or have expired. The LSO needs to know that workers, operators, and maintainers have a current medical surveillance laser eye examination. NSTec should revise the OP-3600.029 procedure to include the LSO as part of the staff notified of laser eye examinations.

**Opportunity for Improvement:** NSTec should revise the medical surveillance procedure to include the LSO as part of the staff that is aware of laser eye examinations.

The NSTec Las Vegas corporate radiological program supports the radiological surveillance program at NSTec/LO. Since NSTec/LO employs radiation-generating devices, it monitors laboratories with thermoluminescent dosimeters to ensure the safety of NSTec/LO workers from radiation. LLNL or NSTec corporate radiation protection personnel provide periodic radiological surveys to NSTec/LO as required by the NSTec corporate radiation protection program.

Valley Care provides occupational medicine support to NSTec/LO with urgent care provided by a contracted local hospital. Valley Care medically prescreens newly hired workers and sends results to the corporate NSTec occupational medicine program in Las Vegas for review. After completing the prescreening exams, workers may need medical surveillance, such as laser eye exams or beryllium-testing, based on the hazards of their job. The corporate NSTec IH in Las Vegas reviews the medical surveillance recommendation prior to the medical exam. In 2014, NSTec/LO offered beryllium screening exams to workers. One worker assigned to NIF was potentially exposed to beryllium while at NIF. NSTec/LO immediately removed him from NIF and returned him to NSTec/LO to resume work.

NSTec/LO designs and uses highly technical equipment that have high-hazard consequences to accomplish its mission. To accomplish this work, NSTec ensures workers receive extensive training on operating equipment with high hazards. Classroom training, coupled with on-the-job training, provides a basis for managers to authorize employees to operate high-hazard equipment. Typically, experiments go through several iterations and rehearsals to ensure all hazards have the correct controls, and the operator has the training and qualifications to perform the work. The process of demonstrating the ability to work safely permeates the NSTec/LO culture resulting in a high respect for working safely.

### **Conclusion**

NSTec/LO managers clearly support a culture that strives for excellence and encourages individual ownership of safety. Employees are empowered to participate in improving the safety culture, exercise stop work authority, and participate in outreach activities. NSTec/LO employees take great pride in their past accomplishments and demonstrated a commitment to make NSTec/LO a better and safer workplace. NSTec/LO should work with the corporate health and safety organization to improve programmatic guidance on laser key control, lead testing, and medical surveillance requirements, and to use first-aid cases as potential indicators. The Team recommends that NSTec/LO continue to participate in DOE-VPP as a Star participant.

**Table 1**  
**INJURY INCIDENCE/LOST WORKDAYS CASE RATE**

<b>Injury Incidence/Lost Workdays Case Rate (NSTec/LO)</b>					
Calendar Year	Hours Worked	TRC	TRC Rate	*DART Cases	DART Case Rate
2011	159,837	0	0.00	0	0.00
2012	147,935	0	0.00	0	0.00
2013	124,884	0	0.00	0	0.00
2014	139,621	1	1.43	0	0.00
Best Three Years (2011, 2012, 2013)	432,656	0	0.00	0	0.00
Bureau of Labor Statistics (BLS-2013) average for NAICS** Code # 54138 (Testing Laboratories)			1.6		0.8
<b>Injury Incidence/Lost Workdays Case Rate (Subcontractor)</b>					
Calendar Year	Hours Worked	TRC	TRC Rate	DART Cases	DART Case Rate
2011	2,416	0	0.00	0	0.00
2012	1,299	0	0.00	0	0.00
2013	978	0	0.00	0	0.00
2014	1,288	0	0.00	0	0.00
Best Three Years (2011, 2012, 2013, )	4,693	0	0.00	0	0.00
Bureau of Labor Statistics (BLS-2013) average for NAICS** Code # 54138 (Testing Laboratories)			1.6		0.8

\*Days Away, Restricted or Transferred

\*\*North American Industry Classification System

**TRC Rate, including subcontractors: 0**

**DART case rate, including subcontractors: 0**