



National Security Technologies, LLC

**Report from the Department of Energy
Voluntary Protection Program
Onsite Review
January 26-February 5, 2009**



U.S. Department of Energy
Office of Health, Safety and Security
Office of Health and Safety
Office of Worker Safety and Health Assistance
Washington, DC 20585

Foreword

The Department of Energy (DOE) recognizes that true excellence can be encouraged and guided but not standardized. For this reason, on January 26, 1994, the Department initiated the DOE Voluntary Protection Program (VPP) to encourage and recognize excellence in occupational safety and health protection. This program closely parallels the Occupational Safety and Health Administration (OSHA) VPP. Since its creation by OSHA in 1982 and DOE in 1994, VPP has demonstrated that cooperative action among Government, industry, and labor can achieve excellence in worker safety and health. The Office of Health, Safety and Security (HSS) assumed responsibility for DOE-VPP in October 2006. Assessments are now more performance based and are enhancing the viability of the program. Furthermore, HSS is expanding complex-wide contractor participation and coordinating DOE-VPP efforts with other Department functions and initiatives, such as Enforcement, Oversight, and the Integrated Safety Management System.

DOE-VPP outlines areas where DOE contractors and subcontractors can surpass compliance with DOE orders and OSHA standards. The program encourages “stretch for excellence” through systematic approaches, which emphasize creative solutions through cooperative efforts by managers, associates, and DOE.

Requirements for DOE-VPP participation are based on comprehensive management systems with associates actively involved in assessing, preventing, and controlling the potential health and safety hazards at their sites. DOE-VPP is designed to apply to all contractors in the DOE complex and encompasses production facilities, research and development operations, and various subcontractors and support organizations.

DOE contractors are not required to apply for participation in DOE-VPP. In keeping with OSHA and DOE-VPP philosophy, *participation is strictly voluntary*. Additionally, any participant may withdraw from the program at anytime. DOE-VPP consists of three programs with names and functions similar to those in OSHA’s VPP: Star, Merit, and Demonstration. The Star program is the core of DOE-VPP. This program is aimed at truly outstanding protectors of employee safety and health. The Merit program is a steppingstone for contractors and subcontractors that have good safety and health programs, but need time and DOE guidance to achieve true Star status. The Demonstration program, expected to be used rarely, allows DOE to recognize achievements in unusual situations about which DOE needs to learn more before determining approval requirements for the Star program.

By approving an applicant for participation in DOE-VPP, DOE recognizes that the applicant exceeds the basic elements of ongoing, systematic protection of associates at the site. The symbols of this recognition provided by DOE are certificates of approval and the right to use flags showing the program in which the site is participating. The participant may also choose to use the DOE-VPP logo on letterhead or on award items for employee incentive programs. DOE will provide the opportunity for contractors to work cooperatively with the agency to resolve health and safety problems. Each approved site will have a designated DOE staff person to handle information and assistance requests from DOE contractors.

This report summarizes the results from the evaluation of National Security Technologies, LLC, during the period of January 26-February 5, 2009, and provides the Chief Health, Safety and Security Officer with the necessary information to make the final decision regarding its application for participation in DOE-VPP as a Star site.

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ABBREVIATIONS AND ACRONYMS

AED	Automated External Defibrillator
ALARA	As Low As Reasonably Achievable
BEEF	Big Explosives Experiment Facility
BLS	Bureau of Labor Statistics
caWeb	Issues Management System
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CPR	Cardiopulmonary Resuscitation
CSP	Certified Safety Professional
DART	Days Away, Restricted or Transferred
DAF	Device Assembly Facility
DOE	U.S. Department of Energy
DSC	Downtown Safety Committee
EAT	Emergency Action Team
ESH&Q	Environment, Safety, Health and Quality
FWIP	Formal Workplace Inspection Program
HHE	Health Hazard Evaluation
HSS	Office of Health, Safety and Security
IH	Industrial Hygiene
ISMS	Integrated Safety Management System
JASPER	Joint Actinide Shock Physics Experimental Research Facility
JHA	Job Hazard Analysis
LASC	Labor Alliance Safety Committee
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
NAICS	North American Industry Classification System
NNSA	National Nuclear Security Administration
NSO	Nevada Site Office
NSTec	National Security Technologies, LLC
NTS	Nevada Test Site
OS&H	Occupational Safety and Health Department
OSHA	Occupational Safety and Health Administration
PM	Preventive Maintenance
PPE	Personal Protective Equipment
RSL	Remote Sensing Laboratory
SME	Subject Matter Expert
STL	Special Technologies Laboratory
Team	Office of Health, Safety and Security Team
TRC	Total Recordable Case
VERB	Visualization, Examination, and Repackaging Building
VPP	Voluntary Protection Program

EXECUTIVE SUMMARY

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 Test Site (NTS) and has satellite operations across the country, which include operations in Livermore, California; Santa Barbara, California; Nellis Air Force Base, Nevada; and Andrews Air Force Base, Maryland. The Livermore operations applied independently to the Department of Energy (DOE) Voluntary Protection Program (VPP) and were awarded Star status prior to this assessment. This report addresses the balance of NSTec facilities in Nevada, California, and Maryland. NSTec submitted its application for participation in DOE-VPP to the National Nuclear Security Administration's Nevada Site Office (NSO). After reviewing the application, NSO forwarded the application to the DOE Chief Health, Safety and Security Officer on May 28, 2008. The Office of Health, Safety and Security DOE-VPP Team (Team) reviewed the application and, after consulting with the site, scheduled the onsite review for January 26-February 5, 2009.

NSTec's primary mission is managing operations at NTS and related facilities and laboratories. In connection with that mission, NSTec also works on projects for other Federal Agencies, such as the Defense Threat Reduction Agency, National Aeronautics and Space Administration, Nuclear Regulatory Commission, Department of Homeland Security, U.S. Air Force, U.S. Army, and U.S. Navy.

NTS is a massive outdoor laboratory and national experimental center. Larger than the State of Rhode Island and approximately 1,375 square miles, NTS is one of the largest restricted access areas in the United States. The remote site is surrounded by thousands of additional acres of land withdrawn from the public domain for use as a protected wildlife range and for a military gunnery range, creating an unpopulated land area comprising some 5,470 square miles.

Based upon discussions and interviews with more than 200 workers, supervisors, and managers, as well as extensive observation of work activities at all the facilities managed and operated by NSTec, the Team determined that NSTec has established a culture of safety excellence, is committed to continuous improvement, and has the safety and health programs in place, which are sufficiently mature and fully meet the tenets of DOE-VPP. Accordingly, the Team recommends that NSTec be approved for entry into DOE-VPP at the Star level.

The standard for Star status is not perfection, but rather in addition to an excellent safety record, managers and workers are dedicated to, and effectively pursuing, continuous improvement and excellence in safety performance. Consistent with that goal, the Team identified a number of opportunities for improvement. These opportunities reflect those areas where NSTec can further improve its performance (see table 1). While no formal action plan is required to address those opportunities, NSTec is expected to consider and specifically address them in its annual status reports.

TABLE 1
OPPORTUNITIES FOR IMPROVEMENT

Opportunity for Improvement	Page
Middle managers should be encouraged to spend more time in the field interacting directly with workers, emulating the senior managers' "boots on the ground" approach.	6
The senior management team should ensure the Employee Safety Committee is treated on par with the Labor Alliance Safety Committee, and the Downtown Safety Committee.	6
NSTec supervisors and managers should evaluate options to increase the number of employees, including those at remote facilities, giving safety presentations at safety or staff meetings on a rotating schedule.	7
Remote facility managers should explore the interests of their employees and customize promotional and informational activities to their particular work groups.	10
NSTec should ensure the current schedule for implementation of the new work control process is met and that all workers and planners are adequately trained in the new requirements and expectations.	14
NSTec should revise the Formal Workplace Inspection Program to provide sufficient detail to address legacy issues with older facilities and rotate inspection topics to reduce the potential for complacency.	15
NSTec should review the collection of recommendations from ergonomic assessments to determine if there are opportunities to prevent ergonomic problems during equipment purchase and workstation setup for new or transferred employees.	15
NSTec should revise its General Safety Rules to provide a short list of minor first aid cases that do not need to be treated by site medical personnel and reinforce the concept that all injuries should be reported, no matter how minor.	16
NSTec should revise its FWIP procedure to include a review of the issues and corrective actions for possible tracking in caWeb.	17
NSTec should ensure signs and postings are reconfigured to reflect the actual hazard involved and the expectation as to when the PPE is required to be worn.	20
NSTec should verify that welding exhaust systems across the site are properly tested and monitored.	21

I. INTRODUCTION

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Established as the Atomic Energy Commission's on-continent proving ground, NTS has seen more than four decades of nuclear weapons testing. Since the nuclear weapons testing moratorium in 1992 and under the direction of DOE, test site use has diversified into many other programs, such as hazardous chemical spill testing, emergency response training, conventional weapons testing, and waste management and environmental technology studies.

Larger than many small countries, NTS offers an enormous amount of space, including more than a 1,000 square miles of completely undisturbed land available for new projects. The vast site also offers security. The boundary and security areas are guarded, and the area is isolated from population centers.

Located within the boundaries of NTS, the base camp of Mercury has many of the amenities found in a typical small town. Housing, medical services, fire protection, law enforcement and security, and a cafeteria are all onsite. There are more than 1,100 buildings valued at more than \$700 million. There is housing for more than 1,200; offices, laboratories, warehouses, training facilities, a hospital, a post office, a fire station, a sheriff's substation, and a large motor pool complete with repair facilities. There are 400 miles of paved roads and 300 miles of unpaved roads, three airstrips, and 10 heliports, as well as several active water wells and an electric power transmission system. Programs are in place to ensure environmental protection and the safety and health of the workforce.

NTS is also home to several facilities with missions important to the Nuclear Stockpile Stewardship program, Homeland Security, military training and tests, or DOE Environmental Restoration. Facilities include the Device Assembly Facility (DAF), the Joint Actinide Shock Physics Experimental Research (JASPER) facility, the U1A Sub-Criticality Experiments complex, the Non-Proliferation Test and Evaluation Complex, the Big Explosives Experiment Facility (BEEF), the Critical Experiment Facility, Visual Examination and Repackaging Building (VERB), and several others. In addition to the facilities at NTS, NSTec also manages operations at the Remote Sensing Laboratories at Nellis Air Force Base and Andrews Air Force Base, and the Special Technologies Laboratory (STL) in Santa Barbara, California. These facilities develop and deploy special sensing technology often used in conjunction with the Departments of Defense and Homeland Security.

The Team had contact with more than 200 employees, managers, and supervisors either formally (during scheduled interviews) or during observation of work activities. Hazards at the NSTec facilities run the entire gamut, including residual radioactive contamination from historical operations, hazardous chemicals, high-voltage electricity, hazards associated with mining and underground activities, aviation, weather extremes, heavy equipment, shop machining and welding, and the range of biological hazards associated with the desert southwest.

II. INJURY INCIDENCE/LOST WORKDAYS CASE RATE

Injury Incidence/Lost Workdays Case Rate (NSTec)					
Calendar Year	Hours Worked	Total Recordable Cases (TRC)	TRC Incidence Rate	DART* Cases	DART* Case Rate
2006	5,247,543	55	2.10	15	0.57
2007	5,089,845	39	1.53	17	0.67
2008	4,834,578	38	1.57	17	0.70
3-Year Total	15,171,966	132	1.74	49	0.65
Bureau of Labor Statistics (BLS-2007) average for NAICS** Code # 5612 Facilities support services			6.2		2.6
Injury Incidence/Lost Workdays Case Rate (NSTec Subcontractors)					
Calendar Year	Hours Worked	TRCs	TRC Incidence Rate	DART* Cases	DART* Case Rate
2006	318,614.76	2	1.26	1	0.63
2007	346,117.92	5	2.89	2	1.16
2008	276,824.00	1	0.72	0	0.00
3-Year Total	941,557.00	8	1.70	3	0.64
Bureau of Labor Statistics (BLS-2007) average for NAICS** Code # 5612 Facilities support services			6.2		2.6

* Days Away, Restricted or Transferred

** North American Industry Classification System

TRC Incidence Rate, including subcontractors: 1.74**Lost or Restricted Workday Case Incidence Rate, including subcontractor: 0.65**

A review of the accident and injury statistics at NSTec over the past 3 years revealed that the 3-year average rates are well below the comparative industry average and meet the expectations of DOE-VPP. TRC and DART rates appear to have reached a plateau, indicating that NSTec needs to find ways to make the next step change in safety.

III. MANAGEMENT LEADERSHIP

Management leadership is a key element of obtaining and sustaining an effective safety culture. The contractor must demonstrate senior-level management commitment to occupational safety and health in general and to meeting the requirements of DOE-VPP. Management systems for comprehensive planning must address health and safety requirements and initiatives. As with any other management system, authority and responsibility for employee health and safety must be integrated with the management system of the organization and must involve employees at all levels of the organization. Elements of that management system must include clearly communicated policies and goals, clear definition and appropriate assignment of responsibility and authority, adequate resources, and accountability for both managers and workers. Finally, managers must be visible, accessible, and credible to employees.

Pursuit of DOE-VPP Star status was a stated goal of the NSTec management team as part of its original bid for the NTS Management and Operating contract. Many of the senior management team have been part of VPP in past assignments, and the value of VPP has been clearly recognized since the day NSTec took over. Since assuming the contract, NSTec has made great strides in improving the safety and health culture of the NTS workforce. Initiatives by NSTec are contributing to this improvement. For example, several of the high hazard facilities at NTS were previously operated by the National Laboratories. This resulted in situations where workers had to live by different processes and procedures depending on which facility they were working in. This situation has been repeatedly identified as a concern in DOE Independent Oversight reports. Recognizing the difficulties this structure presented, DOE/NNSA decided to transfer all facility operational responsibilities at NTS to NSTec. Now, the National Laboratories provide NSTec with a requirements document defining construction, fielding, diagnostic, engineering, and nuclear readiness support. NSTec works collaboratively with the laboratories to collect data from experiments. Workers have consistent work rules and expectations that are not facility dependent, and experiments can be safely set up and performed in a fraction of the time previously required. NSTec has also successfully brought in new business from other governmental customers, in no small part due to the efficiencies and improvements introduced. This increase in mission has had a significant effect on worker morale across the site, giving workers the sense of contribution to national security, as well as helping remove previous concerns about job security.

The safety culture at NSTec is strong, driven by a personal awareness of safety as a value across the organization. It is NSTec philosophy that all managers and employees are ultimately responsible for the health and safety of the work environment. This core value is institutionalized in the corporate NSTec policy statement as posted on its Web site:

NSTec is committed to effective integration of Environment, Safety & Health (ES&H) requirements into all facets of work planning and execution. This policy establishes NSTec's overriding commitment to conduct all work safely in a manner that is protective of our employees and environmental resources and is in full compliance with all applicable ES&H regulations. NSTec will execute technical and management services for our customers in a responsible, safe, and compliant manner. It is NSTec's policy to prevent occupational injuries and unplanned exposures to chemical, radiological, or biological hazards.

The safety policy is appropriately implemented through a series of company policies and documents that define roles, responsibilities, and authority for safe performance of the NSTec mission.

NSTec is led by a very experienced and qualified team of senior managers. The senior management team leads by example and has committed to establishing an environment that promotes active involvement by every member of the workforce. Managers have established high standards in all aspects of the operation and expect those high standards of performance to be pushed down through the organization.

Managers have firmly supported safety improvements. None of the people interviewed, whether managers, supervisors, or workers, identified any concerns or safety issues that had not been addressed. Employees are encouraged to report any safety concerns through the “Great Catch” awards: monthly, quarterly, and annual safety suggestion awards. Further, managers are much attuned to safety performance statistics below the reporting thresholds. For example, the senior management team meets regularly with the Parent Organization Oversight Committee, which is made up of representatives from each of the parent companies that make up NSTec. The senior managers must report safety performance statistics to that committee. Consequently, NSTec formally tracks first aid cases and near-misses as leading indicators of potential safety problems. When negative trends are identified, senior managers provide expertise and resources as necessary to address and reverse those trends. Improvement plans and corrective actions are tracked to closure and then appropriately verified for effectiveness.

While each individual is responsible for safe conduct of his or her activities, there is a functional Environment, Safety, Health and Quality (ESH&Q) division led by a senior manager that reports directly to the NSTec President and Chief Operating Officer. This division is made up of a variety of certified safety professionals, industrial hygienists, and other subject matter experts (SME) that are deployed to supplement company organizations. In all cases, appropriate expertise was readily available when asked for by personnel.

NSTec has formed an Executive Leadership Council that meets monthly for the purpose of reviewing corporate performance. The council consists of the President, Chief Operating Officer, Senior Management Team, Division Directors, and representatives from the safety committees. The first half of that meeting is dedicated to discussion and analysis of safety performance indicators and status of corrective actions. Managers are held accountable for corrective action completion by the company president. If corrective actions cannot be completed on the original schedule, the responsible manager must explain to the company president why the schedule cannot be met before the president agrees to an extension. Two of the three safety committees (See Employee Involvement) also attend the Executive Leadership Council meetings and are active participants in identifying corrective actions and program improvements.

NSTec managers have worked to strengthen relationships with the bargaining units at NTS (Labor Alliance) and North Las Vegas (Building Trades Council). Several years ago the Labor Alliance formed a Labor Alliance Safety Committee (LASC). Recognizing the value of such a committee, NSTec formed a “Downtown Safety Committee” (DSC) composed of both bargaining and nonbargaining unit members from the North Las Vegas facilities. NSTec managers have actively supported and encouraged these committees by participating in the committee meetings when invited, inviting the committee chairs to sit on the Executive

Leadership Council, and cultivating an open-door policy between the union membership and the company managers.

One area where NSTec can make improvements is by encouraging middle managers and supervisors to emulate senior managers in leading the workers in safety. Middle managers encountered by the team were very focused on the management aspects of ensuring safe performance of work (cost, schedule, problem solving) but did not demonstrate the same proactive, enthusiastic leadership shown by the senior management team. While senior managers clearly made their presence known in the facilities and forward areas, middle managers found much less time to get into the field. Management presence in the field and a proactive approach to asking the workers what they need is a proven method of encouraging workers to identify improvements and convincing them of managers' dedication to safety. This approach will also help improve employee involvement in forward areas by demonstrating middle managers willingness to overcome the "distance barrier."

Opportunity for Improvement: Middle managers should be encouraged to spend more time in the field interacting directly with workers, emulating the senior managers' "boots on the ground" approach.

A second opportunity for improvement exists with the Employee Safety Committee. This committee has existed at NTS for many years and is intended to represent all employees. Although longstanding, the Employee Safety Committee has not received the same level of management attention as LASC and DSC. Consequently, the committee has had difficulty recruiting new members and new committee leadership. When this was pointed out to the Chief Operating Officer, he immediately pledged that the situation would change, and he was already working on ideas to enhance recognition and participation of the Employee Safety Committee members.

Opportunity for Improvement: The senior management team should ensure the Employee Safety Committee is treated on par with the Labor Alliance Safety Committee and the Downtown Safety Committee.

Conclusion

NSTec managers have clearly demonstrated their commitment and leadership toward safety excellence. They are actively involved in monitoring key performance indicators, have developed a trusting relationship with the workforce, provided necessary resources and expertise, and clearly established expectations that NSTec will accomplish its mission safely. They have successfully overcome cultural issues that have long stood between the National Laboratories and previous site contractors, as well as successfully marketing NTS to other Government users. The combination of commitment to safety and the importance of the NTS mission to national security have had a positive effect on the entire workforce.

IV. EMPLOYEE INVOLVEMENT

Employees at all levels must continue to be involved in the structure and operation of the safety and health program and in decisions that affect employee health and safety. Employee participation is in addition to the individual right to notify appropriate managers of hazardous conditions and practices. Field observations and interviews indicate that NSTec workers are committed to their personal safety, as well as the safety of their coworkers and facility visitors.

NSTec offers its employees several means of actively participating in its safety and health program. One such avenue is through the participation in monthly safety meetings. Employees present safety topics that they feel are pertinent to safety at the monthly meeting, or they may use NSTec's Corporate Safety Topic, which is posted monthly on NSTec's ESH&Q Web site. The monthly safety meeting is also an avenue for employees to discuss safety issues, safety items found during the monthly safety walkaround conducted by the employees, and safety events that have occurred at other DOE sites. Several employees provided examples of topics that they either presented or were given by fellow coworkers. Employees indicated this is an excellent opportunity for them to share information that not only may be pertinent to the workplace but also, in many cases, can be used at home and shared with family members, neighbors, and friends.

Although several employees indicated they have participated in presenting safety topics during safety and/or staff meetings, some organizations/units expand employee involvement by expecting each employee to give a presentation on a rotating basis while others are primarily given by supervisors or division heads. Employees can use a predetermined topic or provide a topic of their own choosing. Employee participation in safety presentations can be expanded across the organization.

Opportunity for Improvement: NSTec supervisors and managers should evaluate options to increase the number of employees, including those at remote facilities, giving safety presentations at safety or staff meetings on a rotating schedule.

Another opportunity for employees to actively participate in the safety and health program is during the monthly safety inspections (Safety Walkaround Action Team). The detail and quality of these inspections varies, often dependent upon the type and location of work. Employees are encouraged to inspect their own work areas and bring to the attention of their supervisors/managers any concerns or issues they may discover. The Team observed a variety of different work environments and conditions and saw that, in almost all cases, employees actively participated in daily inspections of their workspaces. Interviews and Team walk-throughs confirmed employees throughout NSTec's offices, shops, laboratories, and site facilities, including all remote locations, maintained a high standard of housekeeping for their work environment.

Work packages, where applicable, are a key tool at NSTec facilities to ensure that employees understand the hazards of their work. This process requires employee involvement through the reading and comprehension of the hazards of the work that they perform. Depending on the level of hazard associated with the work package, employees participate in an annual review of Job Hazard Analysis (JHA) and standing work packages. Typically during the pre-job briefing or prior to starting work, employees go over the tasks and associated hazards so that everyone is

comfortable with task expectations and any safety issues that may be encountered. This process is defined in the Pre-Job Briefing and Post-Job Debriefing. At the end of the job or the close of the work package, employees may participate in a post job debriefing to determine how to improve on the tasks performed or any valuable lessons learned. Managers ensure pre-job and post-job debriefings are documented in accordance with company procedures.

Another program that allows employee involvement is the Emergency Action Team (EAT). Employees volunteer to participate on NSTec EAT. These teams participate in biannual drills, one shelter-in-place and one fire evacuation drill, and live fire extinguisher training classes. Yellow triangle shaped signs are strategically placed on the outside of each EAT member's office or cubicle identifying them as an EAT member. The Team confirmed EAT training and identification was consistent throughout the NSTec facilities.

All employees interviewed by the Team clearly understood their rights under title 10, Code of Federal Regulations (C.F.R.), part 851, including the right to pause or stop work in the event of a safety concern. They further understood their rights to access safety and health information, how to report safety issues and concerns, and were comfortable exercising those rights with the confidence that safety issues would be addressed in a timely manner. **Stop Work, CCD-QA05.001-008**, applies to work performed by the employee, work performed by other employees, and work performed by subcontractors. In all interviews, employees indicated that they not only were responsible to stop work if they felt a potential hazard or unsafe condition was present, but felt that they would not be punished if work was stopped. NSTec has also developed an informal process called "Time-Out." A "Time-Out" allows an employee to step back, take a fresh look at the situation, and resolve the concern. Some interviewed employees, although aware of their "Stop Work" authority, indicated that they had never stopped work but had given several examples of how they may have taken a "Time-Out" to reassess the work at hand. One employee noted she used a "Time-Out" recently during a deployment where she was required to drive in snow. She had never driven in the snow and felt uncomfortable doing so. Her colleague was an experienced driver under these conditions and agreed to drive the vehicle. The employee went on to describe the procedure she had followed to notify her supervisor of the change in drivers and indicated there were absolutely no signs of reprisal. During the Presidential Inauguration, several Remote Sensing Laboratory (RSL) employees were deployed and were exposed to extreme weather conditions and long work hours. Interviewed employees gave numerous examples of how, on several occasions, they had to reassess their working conditions due to large crowds and extreme weather conditions in order to carryout their work in the safest manner possible for both themselves and the general public. In all examples given, employees indicated their supervisors supported their input wholesale and implemented those employees' decisions. Employees repeatedly mentioned their managers were always supportive of doing work safely and encouraged and appreciated their input.

Employees can become involved through participation in the NSTec Safety Suggestion Program. Employees may submit their suggestion through a local suggestion box, submitting a suggestion electronically through the ESH&Q Web page, by calling the safety suggestion coordinator, or speaking directly with their supervisors. Any safety suggestion receives a voucher towards the corporate store where employees can purchase items, such as NSTec and NTS T-shirts, hats, and mugs. Furthermore, suggestions are reviewed monthly with the following monetary awards being presented: monthly (\$100), quarterly (\$500), and annually (\$5,000). Last year, NSTec chose to provide three \$5,000 awards because each of those suggestions added value to the safety program. The Team confirmed the process is consistently carried out throughout the company,

including the remote facilities. Throughout the course of the review the Team observed several examples of employee suggestions and engineered safety solutions that helped improve safety in many work areas. For example, an employee at RSL-Andrews Air Force Base was recognized for making a suggestion that the laboratory purchase a lift with a scale to eliminate having to lift heavy boxes onto a scale designed and used for weighing pallets. Employees gave several other examples of how their suggestions were implemented and contributed to the reduction of chemical usage, elimination of potential lifting hazards, preparation for long work hours during deployment, working under extreme weather conditions, and the elimination of several office-related hazards. NSTec employees also provided examples of solutions that were developed solely by them and specific to their work. In many cases where purchases were made to improve safety, employees continued to look for better tools and solutions.

Another program designed to encourage and reward employee participation is the “Great Catch” award. These awards (typically a \$25 Gift Card) can be given for any act or suggestion that makes an improvement. Nominations are submitted through a Web page.

There are several safety and health committees at NSTec that promote safety awareness and a positive safety culture. The Employee Safety Committee, VPP Implementation Working Team, LASC, DSC, Labor/Management Committee, As Low As Reasonably Achievable (ALARA) Committee, and the Senior Electrical Review Board all provide opportunities for employees to become involved in safety improvement. NSTec also participates in the NTS Integrated Safety Management Council, tasked with monitoring long-term implementation of Integrated Safety Management System (ISMS) at NTS.

The Employee Safety Committee was established in February 1999. Employees who wish to be a representative submit a nomination form to participate in the committee, and the committee votes and approves the nomination. The Employee Safety Committee is a company-wide program and has representation from all remote facilities (RSL-Nellis, RSL-Andrews, and STL). The employer representatives are selected by management to support the committee and members. The Employee Safety Committee meets monthly, and the majority of the members must be available to vote on issues or the issues will be tabled for vote/discussion at a later date. The committee’s secretary is responsible for taking and distributing meeting minutes to all members.

The NSTec Employee Safety Committee is dedicated to promoting safety and empowers employees at all levels to be actively involved in maintaining a safe and healthful workplace. The Employee Safety Committee actively promotes safety at work and at home through a variety of means. For example, they sponsor an Annual Safety Calendar Artwork contest. Children of employees submit artwork demonstrating safety awareness. Winners are recognized at the NSTec Children’s Holiday Celebration and receive an advanced copy of the final production calendar. The Employee Safety Committee also sponsors quarterly safety contests and promotions, participates in the NSTec Open Houses at North Las Vegas and NTS, maintains a videotape library of safety topics, and provides safety topics and puzzles on its Web site. Additionally, people that are not committee members, but assist the committee in promotional activities, are designated as “Busy Bees,” referring back to the committee’s slogan and logo – “We Care, Bee Safe.” In addition, the committee receives safety information from the ESH&Q Advisor, and also the "Safety Stuff" newsletter is sent to committee members weekly.

The VPP Implementation Working Team is a joint employee-management team that promotes the development and communication of VPP within the NSTec programs and operations. This team was originally formed and chartered to perform the self-assessment and develop a plan for NSTec to achieve VPP Star status. Due to its effectiveness, NSTec has decided to leave the team in place as a way of ensuring continuous improvement in safety-related processes. This team will be responsible for the annual self-assessments and reports required of all VPP participants, and will continue to work closely with all the safety committees to fulfill its mission.

LASC is a craft employee-based group focused on safety improvement exclusively for NTS operations. This committee was formed by the Labor Alliance several years ago as a means of bringing attention to safety issues considered important by the union. Not originally part of any effort to achieve VPP Star status, the committee has become an important tool for organized labor to gain management attention. The committee has managed to not become embroiled in labor-management disputes, but functions effectively as an agent for safety improvements. Senior managers are regularly invited to attend meetings. This committee is significantly responsible for improved trust between the management team and the labor unions.

DSC was formed in May 2008 in response to the positive experience with LASC, and the need to ensure workers at North Las Vegas and RSL-Nellis facilities are similarly represented. DSC encourages active employee participation in achieving an accident/incident free, safe workplace; it also encourages improved communications between employees and managers and provides employee involvement in the Local 501/NSTec safety culture. DSC represents approximately 26 Union Members from Local 501, Operating Engineers; 14 Union Members from Local 12, Operating Engineers; 13 Nonbargaining Employees; and any other employees who work at North Las Vegas or RSL facilities who wish to participate in DSC activities.

Most employees indicated they felt comfortable with the amount of information they receive from their safety committees and by the means of receiving that information (e-mail, newsletter, etc). The Team reviewed several newsletters developed by the various safety committees that primarily covered a number of safety topics submitted by employees. The recently developed DSC newsletter, which started out as a 2-4 page publication, has increased in size (currently 12 pages in length) and is seen as another tool for employees to become involved in their safety program.

Although NSTec employees demonstrated involvement in the company safety and health program, in some remote locations safety managers rely too heavily on the corporate program for direction in keeping employees fully engaged; thus, managers are overlooking opportunities to develop their own unique activities that highlight the interests of their employees. Managers and employees alike at remote or distant locations should find ways to supplement corporate safety activities with their own ideas and interests.

<p>Opportunity for Improvement: Remote facility managers should explore the interests of their employees and customize promotional and informational activities to their particular work groups.</p>

Conclusion

Interviews with managers and employees revealed that keeping employees fully engaged in the safety program is a top priority at NSTec. The Team observed a mutual respect between employees and managers indicating communications flow freely and issues, concerns, suggestions, and recommendations are given the appropriate level of attention. Management has empowered employees to proactively administer the safety and health program at this site.

V. WORKSITE ANALYSIS

Management of health and safety programs must begin with a thorough understanding of all hazards that might be encountered during the course of work and the ability to recognize and correct new hazards. There must be a systematic approach to identifying and analyzing all hazards encountered during the course of work, and the results of the analysis must be used in subsequent work planning efforts. Effective safety programs also integrate feedback from workers regarding additional hazards that are encountered and include a system to ensure that new or newly recognized hazards are properly addressed. Successful worksite analysis also involves implementing preventive and/or mitigative measures during work planning to anticipate and minimize the impact of such hazards.

Baseline health and safety surveys and analyses are required to be conducted by qualified medical personnel, industrial hygienists, and safety specialists to identify hazards, determine risks, and ensure awareness and control of those risks. Baseline surveys have been performed and are documented for hazards at NSTec through the Health Hazard Evaluation (HHE) process. HHE documents the final report of the analysis and includes a list of deficiencies, recommendations, and corrective actions. The Team discussed this process with the Industrial Hygiene Manager and reviewed several baseline documents and determined that overall the process is effective at capturing the details with respect to baseline hazard exposure analysis. The basis for this discussion was the presence of several contaminants of interest, such as lead, beryllium, hexavalent chromium, cadmium, and silica in the shop areas. Employees interviewed were in health monitoring programs with industrial hygiene monitoring occurring at the work sites. Interviews with safety and health professionals indicate that occupational health (doctors and nurses) are included in periodic safety walk downs to identify hazards and recommend appropriate controls.

Hazards associated with project and/or process activities are identified in the Support Execution and Project Execution plans. Hazards associated with the facility are identified during the initial occupancy inspection and also during followup routine inspections. Process hazards are identified in work packages, procedures, and other work authorization documents. Hazard analysis documents include safety and health reports, industrial hygiene surveys, fire hazards analysis, health physics surveys, documented safety analysis, execution plans, criticality assessments, etc.

In February 2008 at the request of NSTec, the Department's Criticality Safety Support Group analyzed the criticality accident alarm for the Criticality Experiments Facility modifications of DAF. After reviewing applicable requirements and standards (including the American National Standards Institute/American Nuclear Society standards), the group made several observations and recommendations for four separate areas of operations within DAF. NSTec has adopted and implemented the recommendations concurrently with followup evaluations performed by NSTec, Lawrence Livermore National Laboratory, and Los Alamos National Laboratory.

NSTec performs evaluations of all planned, new, or newly acquired equipment, materials, and processes before use to identify hazards, assess risks, and plan for prevention and control in accordance with the *Activity Level Hazard Analysis Process, CCD-QA05.001-003*. For higher hazard laser laboratories, individual work packages for specific activities have been documented. Within some work areas, such as the Phoenix Seed Bank Laboratory in North Las Vegas, specific work activities are controlled by procedures that are developed along with the associated

JHAs. The Phoenix Seed Bank Laboratory performs pulsed energy experiments that utilize stored energy in very large capacitors. Engineering controls have been employed to contain hazardous energy sources within the capacitor banks and the small amount of mercury contained there also. Rigorous procedures were developed due to the high electrical hazards during experiments.

NSTec has established processes to identify potential hazards associated with proposed work activities, assess the potential worker injury/illness risk, as well as evaluate facility conditions. These processes include design reviews, task level hazard analysis, readiness reviews, monthly facility walk-throughs, inspections, and operations evaluations. Other processes used to support identification and assessment activities include:

- Comprehensive Health Hazard Evaluations;
- Formal Workplace Inspection Program;
- Radiological Surveys;
- Electrical Inspections;
- Fire Extinguisher Inspections;
- Facility Equipment Inspections; and
- Phase 2 Management Assessments.

The performance frequency of these processes is determined by a series of factors, including operational risk and governing regulatory criteria, and provides the basis for ensuring worksite areas of NTS and satellite locations are evaluated at least quarterly.

NSTec currently uses **Work Package Process, CD-4000.002**, for all contact work. A work package is prepared and approved using a multidisciplinary team. As a minimum, work packages contain a scope of work and a hazard analysis. A Traveler is required for work packages performed outside the performing organization's assigned work area. Commensurate with the risks identified within the scope of work, NSTec provides a graded approach to work control via three work package types:

- Type 1 - Involves work on safety class and safety-significant structures, systems, and components as defined in the facility's authorization basis;
- Type 2 - Involves work not classified as Types 1 or 3 (all subcontractor work); and
- Type 3 - Involves routine, low hazard work that is listed as a Skill of Craft activity by the performing organization.

The work package type determines the rigor of hazard analysis, depth of planning, detail of packaging, and approval authorities required. Work package Types 1 and 2 require a JHA. A Pre-Task Hazard Review is used for Type 3 work packages. Work conducted in restricted areas (Radiological Controlled Areas, Confined Space, etc.) require additional reviews and approvals.

Work packages and procedures were reviewed in each of the operating facilities. In addition to standard operating procedures for facilities, such as VERB, JASPER, and BEEF, NSTec generates approximately 43,000 work packages each year for tasks, such as preventive and corrective maintenance. The vast majority (~ 96 percent) of those work packages are Type 3 packages. These documents were found to be comprehensive in most cases. During the Team's

visit, an inadvertent arc to ground occurred during a trouble-shooting evolution, which may indicate a need to revisit the Hazard Analysis for that laboratory. Typical work packages across NSTec identify scope, hazard, and controls; however, there is a longstanding weakness for documented hazard analysis. This weakness was previously identified during the Independent Oversight Inspection in June 2007.

In response to that weakness, NSTec has developed a completely revised work control program, but that process has not yet been fully implemented. The Team reviewed the process and believes the revisions will address the previously identified deficiencies. The most significant changes to the process are the addition of a fourth type of work, the use of an activity hazards identification checklist, and a documented evaluation of the hazards and complexity of the work to determine the classification of the work as Type 1, 2, 3, or 4. Further, in the new process, skill of the worker is treated not as a type of work but as an acceptable control for certain repetitive, routine, low hazard tasks. The new process also includes the involvement of appropriate SMEs and workers in the hazards analysis process and the scope determination of Type 4 work that will allow the worker to perform specific tasks in accordance with established hazard analysis and controls. In addition, planners can now make use of new tools that will allow them to better identify hazards, involve SMEs, and provide proper controls. The Activity Hazards Inventory Checklist provides “Hot Links” to applicable company reference documents and responsible SMEs, which will provide a more effective and comprehensive hazards review. Also, the Planning and Tabletop/Walkdown Checklist provides a means for the planner to effectively identify the scope and bound of the work. Essentially, the new process now uses the analysis of hazards to determine the required level of planning and assigns the appropriate level (1,2,3,4) Integrated Work Document, rather than using the chosen level of planning to determine the hazards analysis that will be performed.

The new work control process also includes an expanded scope of covered activities. NSTec has changed from using a definition of “contact” work to “activity level” work. This definition now includes operations, maintenance, and construction. NSTec has adopted a policy that all activity level work will be performed in accordance with a technical procedure, an approved work package, or a drawing approved for construction. Each of these processes includes the development of a hazard analysis. Controls identified during the hazard analysis are then integrated into the procedure or work package as appropriate, and the hazard analysis becomes part of the record file for the procedure or work package. This will reduce the amount of paperwork provided to the worker while retaining the ability of the worker to review the hazard analysis if desired, if additional hazards are subsequently identified, or if the worker needs to revise the identified control set.

<p>Opportunity for Improvement: NSTec should ensure the current schedule for implementation of the new work control process is met and that all workers and planners are adequately trained in the new requirements and expectations.</p>
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In addition to the work planning processes, NSTec has implemented a Formal Workplace Inspection Program (FWIP). Under this program, each facility receives a baseline inspection for facility hazards and legacy conditions. Results from that inspection are supposed to be documented, either in the NSTec corrective action tracking system (caWeb) or through the work order system (MAXIMO). The Team had the opportunity to observe the baseline inspection at DAF, as well as compare inspection results with the Team’s observations in other facilities.

While the FWIP process is fundamentally sound, it may not be performed to the level of detail desired. There are a number of legacy conditions, especially in the installation of electrical equipment and 110/120 volt electrical distribution that have not been identified. Common observations were electrical distribution panels missing the required distribution schedules and missing covers and holes in junction boxes. These conditions may not be obvious to workers that are not familiar with electrical codes and standards. The checklists provided to workers for these inspections do not drive the workers to ask for additional expertise, and the conditions go unrecognized and unreported. NSTec should consider revising the checklists to ensure appropriate subject matter expertise is applied, that the checklists have a greater level of detail for common legacy issues. Further, NSTec should consider rotating inspection focus areas over a 12-month period to ensure that workers do not overlook conditions out of habit.

Opportunity for Improvement: NSTec should revise the Formal Workplace Inspection Program to provide sufficient detail to address legacy issues with older facilities and rotate inspection topics to reduce the potential for complacency.

NSTec has a program to perform ergonomic assessment for employee workstations. By definition, this program is normally implemented in response to an employee request. However, some managers have taken the initiative to sponsor complete area evaluations and also to provide funding for recommended controls, such as chairs, keyboards, wrist pads, etc. Although NSTec has performed many ergonomic evaluations, there has not been an effort to review those evaluations in total to determine if there are patterns that could be systemically improved (e.g., standardization of ergonomically designed workstations, purchasing only ergonomically designed desks, chairs, and other office equipment).

Opportunity for Improvement: NSTec should review the collection of recommendations from ergonomic assessments to determine if there are opportunities to prevent ergonomic problems during equipment purchase and workstation setup for new or transferred employees.

Employee reports of hazards at the facility are not only expected but also strongly encouraged. Interviews indicated that all personnel were comfortable with the ability and the expectation to identify and report hazards. There was no indication that they had any fear of reprisal. These rights are found in the *Worker Safety and Health Program Description, PD-P200.001, and Stop Work, CCD-QA05.001-008*. This process is supplemented with Time Out for Safety, which is less formal, can be called by anyone, is almost always safety-related, and allows one to step back and take a fresh look at the issue and resolve the concern. The company has instituted the "Great Catch Program" to identify hazards either via electronic or written media to management for corrective actions. Employees who submit a Great Catch are rewarded for participation. There are multiple ways for employees to identify hazards, including the Safety Suggestion Program; Safety Hotlines; and Potential Hazards Cards. Additionally, personnel felt very comfortable talking directly to managers about issues; again, with no fear of reprisal. The site has a mechanism to track responses and corrective actions. Employees indicated that managers openly solicit input from employees in this area during team or safety meetings. Employees can also notify their supervisor/manager through the NSTec open-door policy. Employees can voice concerns and have access to management to discuss and resolve these concerns. If managers and/or supervisors are unavailable, employees can contact the ESH&Q Division at anytime with any questions or concerns.

NSTec has a system in place that evaluates upsets and identified abnormal conditions, investigates to determine root causes, and applies corrective actions. The NSTec accident/incident investigation system includes written guidance, written reports of findings and hazard correction tracking, identification of causes, and provisions for preventive or corrective actions. The system also provides for a narrative report suitable for dissemination to all employees containing root causes, analysis, and lessons learned. ***Accident Investigation, Reporting, and Recordkeeping, CM-0444.001-007***, requires employees to report all injuries/illnesses and near-misses to their supervisor immediately. The supervisor is responsible for filling out a Preliminary Accident Investigation Report within 24 hours and turning it into the Occupational Safety and Health Department (OS&H). After receipt of the Preliminary Accident Investigation Report form, OS&H reviews this to determine if the injury/illness or near-miss requires a formal accident investigation. Injuries/illnesses that are considered Occupational Safety and Health Administration (OSHA) recordable injuries and illnesses require an Accident Investigation Team Final Report. A team is assigned by the responsible manager of the injured employee and can include a safety and health professional, witnesses, the injured employee, etc., to conduct a formal investigation. ***CM-0444.001-007*** requires the performance of a critique for occupational illnesses and injuries involving days away from work and near-misses with high potential consequences.

Results of accident, injury, and illness reports are maintained electronically in the Safety Management System. This system provides an excellent means of analyzing, tracking, and trending causes. The critiques and accident investigations that the Team reviewed demonstrated that critiques are clearly focused on factfinding, not fault finding. NSTec understands and uses aspects of human performance improvement in analyzing and preventing accidents and injuries. Results of accident/incident investigations are presented at the Executive Leadership Council on a monthly basis. Unplanned events, Occurrence Reporting and Processing System reportable events, etc., and associated root cause analysis and corrective actions are presented at the Executive Leadership Council for management review, input, and tracking.

As previously discussed, NSTec managers regularly review first aid case statistics as a leading indicator. The General Site Safety Rules contain a list of those injuries that must be reported to medical. In practice, workers and supervisors are interpreting that rule as not requiring reports to site medical for other injuries. Workers can self-treat for minor first aid cases, but these may go unreported. Senior managers have repeatedly emphasized that they want all first aid cases reported, but there are still first aid cases that are not being reported, including minor strains and sprains. NSTec could begin to remedy this situation by creating a list of minor injuries that need not go to site medical for treatment, but must still be reported for statistical tracking.

<p>Opportunity for Improvement: NSTec should revise its General Site Safety Rules to provide a short list of minor first aid cases that do not need to be treated by site medical personnel and reinforce the concept that all injuries should be reported, no matter how minor.</p>

As previously discussed in the Management Leadership section, a comprehensive trend analysis system for issues relating to the health and safety program (including injury and illness experience, inspections, and employee reports of hazards) is in place at NSTec. A review of documentation and employee interviews confirms that this process is effective. Trend analysis occurs for TRC and DART statistics as identified in the site application. Additionally, tracking

and trending is conducted regarding issues identified in safety inspections. Trending data reports include lost workday case rate, recordable injury case rate, number and severity of electrical incidents using Energy Facility Contractors Group hazard severity tool, progress on improvement initiatives, vehicle accident rates, inspection results, and ALARA trends.

NSTec has implemented an excellent system for tracking ES&H Issues in the caWeb system. This system contains those issues that have been previously screened as warranting additional management attention and additional accountability for completion. The system provides for identification of specific corrective actions, assignment of the action to a responsible individual, and provides for tracking, verification, and validation of corrective actions. Input to caWeb can be from multiple sources, including external and internal management assessments, safety suggestions, violations, or accident and injury reports. Corrective actions and completion dates are actively tracked and regularly reviewed. Overdue corrective actions require justification by the responsible manager to the company president. The Team noted that results from FWIP are not screened for inclusion in caWeb. NSTec should revise its FWIP procedure to include a review of the issues and corrective actions for possible tracking in caWeb.

<p>Opportunity for Improvement: NSTec should revise its FWIP procedure to include a review of the issues and corrective actions for possible tracking in caWeb.</p>
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Conclusion

NSTec has a documented system to guide the workforce through evaluation of hazards and the development of controls. Employees subscribe to and utilize these processes in performance of their daily work activities. The proposed changes to the existing hazard analysis system will provide a more robust multitiered approach to analyzing hazards in the workplace.

VI. HAZARD PREVENTION AND CONTROL

Once hazards have been identified and analyzed, they must be eliminated (by substitution or changing work methods) or addressed by the implementation of effective controls (engineered controls, administrative controls, and/or Personal Protective Equipment (PPE)). Equipment maintenance processes to ensure compliance with requirements and emergency preparedness must also be implemented where necessary. Safety rules and work procedures must be developed, communicated, and understood by supervisors and employees. Those rules/procedures must also be followed by everyone in the workplace to prevent mishaps or control their frequency/severity.

ESH&Q is staffed to ensure processes and programs are in place to protect the workers, the public, and the environment. Project resources include, but are not limited to, Fire Protection Engineers and Mine Rescue personnel who are called upon by ESH&Q staff as necessary for technical reviews and regulatory interpretations. NSTec Safety and Health professional expertise is very extensive. OS&H has 13 certified safety professionals (CSP) and certified industrial hygienists (CIH), including several with advanced or multiple degrees, and 2 PhDs. The staff has 1 Certified Health Physicist and 13 members of the National Registry of Radiation Protection Technology. The medical staff has three licensed physicians and four clinical nurses. Various individuals performing hazard analyses are qualified environmental specialists, radiological engineers, radiological technicians, degreed mining experts, CSP, CIH, and Certified Fire Protection Engineers.

The Team observed many examples of hazard controls that had been implemented throughout the NSTec spaces. The preferred approach was to eliminate hazards through substitution where possible. However, when substitution was not possible, the Team observed the use of engineered controls, administrative controls and finally PPE as a last line of defense. The following list of examples demonstrates the extensive efforts NSTec has made to use substitution to reduce or eliminate hazards.

- NSTec replaced most of the Tritium and battery-powered, backup emergency exit signs with National Fire Protection Association-approved photo luminescent signs that require little or no maintenance; thereby, reducing both the waste footprint and hazards to personnel involved in periodic maintenance/inspections.
- In North Las Vegas, ladders are only used for access; there is no work allowed from ladders that are over 6 feet in height.
- Wire lifting ropes (chokers) have been replaced with poly straps, which are inspected annually and prior to use. The use of poly straps makes inspections easier and provides less risk of injury to the user should a strap fail.
- During a review of the original specifications addressing a proposed contamination-resistant coating system for a new project at NTS, NSTec Industrial Hygiene (IH) noted that the coating contained di-isocyanates. IH personnel discussed with project representatives the very low permissible exposure levels of 0.02 ppm and special hazard controls necessary (e.g., supplied air vs. powered air purifying respirators) to protect the workers and others collocated in the facility during application of the coating. Subsequently, a decision was made to use a less hazardous coating that would meet the project requirements, but had far less hazardous properties.

- NSTec RSL Nellis Photo/Video Department has been converting to digital photography for the last few years. This has led to a reduction in photochemical usage and associated potential exposures, as well as reducing resulting photochemical hazardous waste.
- In support of a lead cleanup at a North Las Vegas facility, the potential waste stream was significantly reduced by substituting paper towels for cloth rags. This strategy also lowered the costs of managing the waste stream.
- As a part of the NSTec Unneeded Materials and Chemicals program, 409 tons of unneeded furniture, equipment, and tools were excessed; 259 tons of scrap metal were sold to recyclers; 25 boxcars were disposed; and 130 chemicals were either redeployed to new users or disposed.

When substitution to eliminate hazards is not practical, engineered controls are put in place. The Team noted numerous engineered controls throughout the site. Many of these controls were implemented as a result of improvements suggested by employees. Examples of these controls include “point source ventilation” in VERB to reduce the risk of contamination, increased volume of air exchange (49 times per hour) in VERB to provide a “cleaner” working environment with respect to radiation and contamination, and use of specialized tools built to perform hazardous tasks involved in waste handling. Heat stress in “bubble suits” had also been addressed by utilizing Vortex Tubes to condition the air to a much lower temperature as it is delivered into the suits. The conditioned air not only reduced the risk of heat stress, but also provided a more comfortable working environment for the worker. Workers also incorporated lessons learned from other sites by applying nonflammable hair spray to bubble suits to help control the spread of contamination as suits are doffed. In addition, machine guards had been developed for shop tools above and beyond those provided by the manufacturer (e.g., shields for drill press stations, screens for collocated workers around weld shops, and extra metal guards for large band saws). Engineered controls had also been implemented to reduce the risk to workers when lifting was required. This was accomplished by installing mechanical hoist devices, forklifts, motorized pallet jacks, etc. At STL, explosion experiments are performed in small explosion chambers. Also at STL, the workforce developed detailed procedures from the JHA process and developed and installed a door interlock system to prevent inadvertent access during experiments. The procedures effectively reduced the number of people in proximity to the experiment, eliminating distractions to the critical work being performed.

Other examples of employee-developed controls were observed at RSL Nellis, where they are required to deploy personnel and equipment within 4 hours of notification. The laboratory utilizes a warehouse to store deployable equipment that can be easily retrieved and palletized for air transport. Dependent upon the needs of the customer or situation, there are many variables in relation to equipment required. Inherent to deployment, the equipment needs to be protected from weather and the environment. Employees developed a cover for deployed equipment that does not require personnel to climb onto the palletized shipment, but allows them to inventory and access equipment safely and quickly.

At U1-A an electric powered TamRock Rock Bolter (Jumbo) for placement and driving of 8-12 feet long rib securing bolts into the mine shafts ribs has replaced older drilling technology for the same task. The TamRock nearly eliminates the need for miners to pneumatically drive these bolts into the tunnel walls. This machine removes the strain of manual pneumatic driving of bolts, distances the worker from the activity, and reduces dust and noise exposure.

The aviation department at RSL Andrews developed a fall protection method for changing rotors on the helicopter. Since there are no locations to tie off on the aircraft and they cannot effectively utilize platforms, the workers developed a safety net system to protect the maintenance workforce. Again, the use of engineered controls was prevalent during operations observed in the course of this assessment.

Small explosion experiments at STL are conducted within explosion chambers located in the basement of an aging building. Facility personnel recognized the need to provide interlocks to the experiment area and control the numbers of people to reduce distractions. Further, they proceduralized their controls and verified implementation through a checklist before initiation of the experiment.

Administrative controls are used to supplement substitution efforts and engineered controls. These include controlled access lists for space entry, hazard analyses, work packages, desktop instructions, required certifications, permits, signs, and postings. A suite of administrative controls was observed during the assessment. In one example, the manager at the Radioactive Waste Management Site had restricted overtime work to only those employees that rode the company vanpool or carpooled with others to reduce the risk of vehicle accidents before and after shifts. During the inauguration, RSL Andrews provided support with airborne and ground sensing equipment. Personnel worked very long hours and to preclude fatigue-induced accidents after their work shift, personnel were offered hotel rooms or transport to their residence.

In 2008, the Mine Safety and Health Administration (MSHA) issued a new diesel particulate requirement that reduced allowable diesel particulate emission from 350 to 160 $\mu\text{g}/\text{m}^3$. Due to the age of U1A's diesel equipment, even the addition of catalytic converters could not satisfy the new requirement. U1A compared sample results and equipment run times and used that data to establish restrictive administrative controls that limit diesel equipment allowable run times (3-minute limit) and total daily run times of no more than one hour. Subsequent sampling demonstrated that these controls are reducing diesel particulate emissions below the MSHA standard. NSTec also recognizes that should mining activity increase in the future, additional controls will need to be implemented, or new equipment will need to be procured.

While warning signs were in place at the entrance to spaces, some postings were not consistent or designed to be effective. Postings cited hardhats required, hearing protection required, etc. Signs were found to be generic in nature and not specific to the hazard likely to be encountered in the area. For example, signs stating "hearing protection required" were observed in many locations. However, the sign did not provide any information as to "when equipment is operating" or "within 15 feet," etc. This resulted in many areas where employees were observed inside the posted area without the required PPE because they did not perceive there to be a hazard. Signs should be reconfigured to reflect the actual hazard involved and the expectation as to when the PPE is required to be worn.

Opportunity for Improvement: NSTec should ensure signs and postings are reconfigured to reflect the actual hazard involved and the expectation as to when the PPE is required to be worn.

The team identified two local ventilation exhausts in designated welding shops at Mercury that were 2 years overdue for inspection. These exhausts provide assurance that welders are not

overexposed to welding fumes (which may contain Chromium). NSTec needs to verify that welding exhaust systems across the site are properly tested and monitored.

Opportunity for Improvement: NSTec should verify that welding exhaust systems across the site are properly tested and monitored.

NSTec has a strong set of safety and health rules in the hierarchy of policies, procedures, and work packages. NSTec site safety and health rules are found in the Safety & Industrial Hygiene Manual. Potential hazards are addressed and controlled using engineering and administrative controls, JHAs, work permits, checklists, and PPE. Site safety rules, work practices, and usage of PPE were found to meet all requirements. A local Web site delivers a comprehensive set of requirements and processes that provide staff with the standards, procedures, guidelines, and safety information needed to perform work safely. Hardcopies of Material Safety Data Sheets (MSDS) are maintained in the appropriate areas. Additionally, MSDS' are available online.

Overall, the Team found that safety and health rules are followed by all employees. Interviews with employees indicated they know and understand the disciplinary process should these rules not be adhered to. Those interviewed felt this process was both fair and consistent and gave examples of positive reinforcement received from supervisors and managers for good work practices.

NSTec has implemented a comprehensive Preventive Maintenance (PM) program for the entire organization. PM is used to mitigate the chances and effects of unplanned equipment failure. PM schedules are based on manufacturer's recommendations and operating experience. The program consists of individual departments performing equipment maintenance for both performance and safety reasons as required. Department level PM is discussed in the organizational instruction Maintenance Plans. These plans describe the daily, weekly, monthly, quarterly, and annual maintenance performed by the organization. The maintenance schedules are reviewed periodically by cognizant line managers. Equipment is maintained pursuant to the equipment manufacturers' recommended service intervals and scope. In addition, select safety and/or security systems are maintained and tested at levels that exceed manufacturers' recommendations due to NSTec corporate policies and requirements. NSTec procurement develops and implements maintenance contracts with manufacturer-recommended and -approved service providers based upon equipment maintenance requirements as defined by the manufacturer's recommendations, maintenance standards, craft recommendations, past experiences, and information provided through the NSTec Intranet. Using this information, a schedule is developed and entered into MAXIMO. This PM schedule includes all maintenance activities for all three sites. NSTec uses caWeb to track and correct hazards in a timely manner.

A long range emergency management plan was prepared by NSTec and approved by NNSA/NSO management. The ***Emergency Management Plan (PLN-1004, Rev. 1)*** states that each NNSA/NSO facility under the responsibility of the Facility Manager/Facility Owner conducts evacuation and shelter-in-place drills annually, or as often as needed to ensure employees are able to safely respond as required by DOE Order 151.1, other Federal regulations, local ordinances, or National Fire Protection Association Standards. ***The Emergency Services and Operations Support (ESOS) Emergency Preparedness & Response Manual, CM-2120.001***, outlines a complete emergency management program that includes development of qualification programs; ongoing and specialized training courses; ongoing drills and exercises;

and development and revision of emergency management procedures, both onsite and offsite. All employees know how to respond to an emergency. Skills are acquired through NSTec training, planning, and drill.

NSTec has a formal emergency response program that meets and exceeds the intent of the DOE/NNSA and contractual agreements with clients. The program is evaluated on a frequency that will identify deficiencies and make corrections to maintain an effective emergency response capability for anticipated emergencies. Staff members interviewed by the Team understood their responsibilities in the event of an emergency in their facility.

The NSTec Occupational Medicine Program provides high quality medical services that are designed to ensure a healthy workforce. These services meet applicable regulations and provide early detection, mitigation, and prevention of occupational injuries and illnesses.

The Occupational Medicine Program operates clinics at the North Las Vegas complex and at NTS. These clinics offer occupational medicine and limited primary care services to employees. A variety of clinical and nonclinical functions are conducted, including screening for alcohol and drugs, wellness activities, records management, and employee counseling. Each clinic is staffed with licensed Occupational Physicians, Physician's Assistants, and Occupational Health Nurses that work side by side with safety professionals and industrial hygienists, as required, to coordinate medical surveillance, wellness, and physical examination programs. All medical personnel are trained and certified in first aid, cardiopulmonary resuscitation (CPR), and/or CPR-Automated External Defibrillator (AED) where appropriate. Paramedics are physically located onsite at NTS during operational hours. Physicians are oncall after hours for emergency calls and consultation. Coordination between the medical staff and emergency response personnel is excellent and injured employees are promptly transported to hospital emergency rooms if needed. Satellite locations in Santa Barbara and RSL Andrews contract with local medical clinics for occupational medical services.

The medical staff actively participates in monthly meetings held by the Occupational Health Working Group to discuss issues of concern and topics of interest common to the Safety, Industrial Hygiene, Occupational Medicine, and Radiological Control groups. The Medical Director is a member of the VPP Executive Leadership Council.

The Occupational Medical Program has a Master's trained, certified professional ergonomist who performs industrial ergonomics and office workstation evaluations. Newly hired employees are encouraged to complete an ergonomic self-assessment form to request an evaluation of their work environment. In addition, the medical group has two employee assistance counselors who help employees deal with personal problems that might adversely impact their work performance, health, and well-being. Employee Assistance Program (EAP) counselors conduct assessments, counseling, and referral services for employees and their household members. If needed, EAP counselors can refer employees to other counselors in the community. The Santa Barbara and RSL Andrews satellite locations use community providers.

The Occupational Medicine staff conducts proactive random worksite visits of NTS and North Las Vegas facilities to evaluate environmental conditions and potential hazards that may affect employees and potentially lead to medical problems. The staff physician or Physician's Assistant conducting the visit uses the services of safety and health personnel as needed. When workplace hazards are identified, the medical staff consults with safety and health professionals

to develop and implement a correct action plan. For instance, after an Industrial Hygienist conducts a health hazard evaluation, a Medical Service Request form identifying employee exposures is completed. Physicians review the form and make a determination as to the proper testing and followup required for that employee. Monitoring programs (e.g., hearing conservation) and OSHA and DOE-required medical testing (e.g., Lead, Asbestos) are identified, and determination for eligibility and inclusion in specific medical surveillance programs is made accordingly.

The Occupational Medicine staff has a medical records clerk that compiles, indexes, and files each patient's medical records. A medical folder is developed and maintained for each employee, and the folders are retained for a period of 75 years. The Program uses standardized forms that are required to be completed for the various functions performed by the clinic. The integrity and confidentiality of medical records is maintained. Employees have access to their medical records in accordance with 10 C.F.R. 851. The medical staff is also required to notify personnel of their right to have access to, and inspect, their medical folder. An Injury and Illness Surveillance Program allows the medical staff to track and trend key indicators, such as return to work, and occupational injuries and illnesses to help assess strengths and weaknesses of the Occupational Medicine Program.

Conclusion

NSTec employees use safety and health rules to assure that a safe work environment exists and to reduce hazards and potential exposures. Hazards are controlled via the hierarchy of controls with PPE used only when other controls cannot be practically applied. NSTec is served by experienced and certified safety professionals to provide continuous proactive services and programs.

VII. SAFETY AND HEALTH TRAINING

Managers, supervisors, and employees must know and understand the policies, rules, and procedures established to prevent exposure to hazards. Training for health and safety must ensure that responsibilities are understood, that personnel recognize hazards they may encounter, and they are capable of acting in accordance with management expectations and approved procedures.

The Team reviewed the training program as defined in NSTec *Training Program Manual, CM-TRNG.001*. The review also included annual training plans, training records, course curricula and reports, and interviews with workers and managers. Personnel encountered by the Team understood the hazards of their work and believed they had been adequately prepared for the hazards and conditions they might encounter. Office workers at North Las Vegas and at the remote facilities credited the quality of training they received for helping them identify potential hazards associated with their work environments. All interviewees indicated that their personal lives have benefited from the training received from NSTec.

NSTec has established and maintains an effective safety and health training program that addresses initial qualifications and continuing training. Within this program, training requirements and completions are tracked through an integrated training matrix system. The system is managed centrally by the training organization, a functional element within the Human Resources Department. This organization is responsible for developing and delivering effective training using well-qualified trainers and a formal and systematic approach to training that enables employees to perform quality work in support of NNSA/NSO and company objectives. Training organization personnel work with SMEs within the ESH&Q Division to develop the required training that clearly explains the tasks to be performed, the associated hazards, how the hazards are mitigated, and how workers are protected.

The training organization maintains a comprehensive catalog of available training courses, performs annual training needs, and develops and schedules training courses based on identified needs. Course registration and completion are tracked, and the training portfolio is modified as necessary to ensure the training needs of the entire company are met. The training organization uses a Web-based learning management system (Plateau) for recordkeeping to ensure that required training for each employee is documented and is accessible in a timely manner. Specifically, Plateau is used to keep track of students (employees), their training histories and training requirements, as well as available training and training schedules. Plateau automatically generates messages to employees reminding them of their training requirements; the system also notifies managers and supervisors when employee training is delinquent. All formal training is tracked within the NSTec Plateau software. After an employee completes a class, the instructor submits a class roster to the NSTec Training Department for entry into Plateau. Course completion of Web-based training is recorded by Plateau. ES&H Web-based training courses provide the option to complete a course evaluation form at the end of each course. The course evaluation assists the NSTec Training Department in fine tuning Web-based training to better meet the needs of employees and the organization as a whole.

At NSTec, managers, supervisors, workers, and SMEs are all involved in identifying training and qualification requirements for individual positions. Managers are expected to use a training requirement questionnaire to develop a training matrix (based upon the employee's job description and functions) that identifies the minimum initial and refresher training requirements

and qualifications. Additional required training for various positions is pre-defined in qualification standards that are added to an individual's training plan when required. Completion of those training and qualification requirements is tracked, and status reports are provided to managers and supervisors. Those reports include notifications of training or qualifications that will expire in 30, 60, or 90 days to allow supervisors and managers to schedule refresher training before it prevents a worker from performing their duties. Individual training and qualification plans are reviewed annually, normally in connection with annual performance reviews.

New employees attend General Employee Training or General Employee Training for Outlying Locations. These courses provide the minimum safety and health requirements for access to their work area. This training includes: ISMS; VPP; 10 C.F.R. 851; Worker Safety and Health Program; safety and health policy; unexploded ordnance; general safety rules; fire safety; electrical safety; lockout/tagout; hantavirus prevention; radiological and ALARA awareness; and hazard communication, including MSDS. This training is accomplished through instructor-led classroom sessions and computer-based segments. Craft employees supporting environmental restoration type activities receive Site-Specific Safety and Health Plan training, as well as qualification training addressing 29 C.F.R. 1910.120 (HAZWOPER) criteria. Craft employees also participate in and receive hazard recognition and control briefings.

NSTec has also been effective identifying special training needs when providing support to other Federal Agencies. For example, RSL-Andrews provided support services to the Department of Homeland Security during the 2009 Inauguration. As part of that support, RSL-Andrews employees received additional training on extreme weather safety, large crowds, and managing the long hours.

Conclusion

NSTec has a comprehensive and systematic approach to training that ensures personnel are appropriately trained and qualified prior to performing work within NSTec-managed facilities.

VIII. CONCLUSIONS

When they took over as the Management and Operating contractor for NTS 3 years ago, NSTec established a goal of achieving DOE-VPP Star status. That goal was not born of a desire for recognition by DOE, but rather of a corporate understanding that the pursuit of VPP Star had many benefits to the site and to the workers. NSTec has overcome significant obstacles to improvements due to aging facilities, long distances, and previous workforce morale issues. The improvements made in the past 3 years are significant, and the improvements are evident in all five tenets. More active and present senior management leadership, improved employee involvement, more effective worksite analysis, improved hazard prevention and controls, and more rigorous and systematic approaches to training all combine to reduce accident and injury statistics well below the NAICS comparison industry. While the team did identify some important improvements that still need to be made (new work control program implementation), the strength of the management commitment to those improvements, and the confidence that employees will be continuously involved in making those improvements are sufficient for the Team to recommend that NSTec be admitted to DOE-VPP at the Star level.

Appendix A**Onsite VPP Audit Team Roster****Management**

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