Advanced Technologies and Laboratories International, Inc.

Department of Energy Voluntary Protection Program Review

Background

Advanced Technologies and Laboratories International, Inc. (ATL), is the 222-S Laboratory Analytical Services & Testing contractor for Department of Energy's (DOE) Office of River Protection (ORP) at the Hanford Site. ATL receives, analyzes, archives, and disposes of a variety of samples related to the Hanford Tank Farm cleanup activities, as well as other sampling activities at the Hanford Site. ATL uses analytical equipment installed by the Tank Farm contractor, Washington River Protection Solutions, LLC (WRPS), through an interface agreement. In addition, WRPS maintains the facility and analytical equipment, installs new equipment, and operates facility-related infrastructure.

DOE awarded ATL Voluntary Protection Program (VPP) Star status in 2008, and recertified it as a DOE-VPP Star participant in March 2011. ATL employs 72 technicians, analysts, managers, and support staff that work in the 222-S Laboratory. ATL has not had a reportable, restricted, or transferred injury since February 2011. Recently, ATL received recognition for the VPP Outreach Award as part of a team effort with the Hanford Site VPP Champions Team.

Continued participation in DOE-VPP requires a triennial onsite review by the Office of Health, Safety and Security (HSS) DOE-VPP Team (Team) to determine if ATL continues to meet the standard for DOE-VPP Star status. The Team performed the triennial review February 3-6, 2014. The Team evaluated ATL safety programs against provisions of DOE-VPP. During the onsite review, the Team interviewed approximately 50 percent of the workers, supervisors, and managers, and observed plan-of-the-day and workgroup meetings, prejob meetings, and work activities.

Results

Management Leadership

ATL managers remain committed to providing the leadership and resources for employees to perform their duties in a safe manner. Managers support the ATL commitment of: *At ATL Safety is Our Value*, and the concept of *Controlled Quality, Assured Results*. These commitments and concepts resonate from the managers down through the workforce. The Laboratory Manager is in the laboratory workspaces at least once a week in addition to his scheduled safety walkdowns. The workers told the Team that the Laboratory Manager consistently solicits suggestions for improvements outside of his scheduled safety walkdowns. ATL managers continue to use the ATL worker recognition programs, such as the STARZ Safety Recognition Award, Spot Awards, and the Quality Assurance Superior Achievement Reward (QASAR). ATL senior staff attend the ATL Zero Accident Council (ZAC) and the ATL VPP Steering Committees and ensure members are given time to participate, provide funding for initiatives and safety

campaigns, support the Hanford Safety Expo, and provide resources for employees to attend Regional and National VPP conferences.

Since the previous evaluation, ATL has maintained its Total Recordable Case (TRC) and Days Away, Restricted or Transferred (DART) case rates well below the average for its comparison industry. In 2013, ATL performed over 128,412 work-hours at the 222-S Laboratory with no recordable injury cases, and no lost workdays. As of this assessment, ATL has worked 1,090 days with no recordable or lost workday cases.

Employee Involvement

The success of ATL's safety programs is the result of employee ownership. Employee involvement is evident at the 222-S Laboratory with both ATL employees and the WRPS infrastructure support. These two workgroups communicate and ensure that work in laboratory spaces, whether analytical or maintenance is conducted safely and efficiently. Employees were candid and willing to talk with the Team and provided many examples of how they contributed to positive changes in the laboratory. For example, an employee had communicated a concern to the Hanford Atomic Metal Trades Council (HAMTC) safety representative about rainwater occasionally leaking into a room near electrical equipment. WRPS quickly barricaded the area and posted warning signs about the hazard in the affected area. ATL and WRPS relocated ATL employees before the next rainfall.

There are several mechanisms available to employees to convey information, questions, or concerns. Employees bring issues up to ZAC, the VPP Steering Committees, and the HAMTC safety representative. Managers and section leaders also encourage employees to seek them out if they have concerns or questions. The ATL Employee Concerns Program (ECP) and the DOE ECP are also available. Since the last VPP assessment, ATL added an ATL Safety Logbook so employees can submit concerns anonymously. According to the employees, most concerns are resolved through direct conversations with their immediate manager.

Every employee interviewed was knowledgeable of his/her rights and responsibilities regarding his/her safety and health and was aware of the hazards associated with his/her work activities. ATL uses an extensive set of procedures to guide analysis and ensure safety and quality. ATL employees clearly understand that if they cannot follow the procedures, or if unsafe conditions arise, they can stop work. During interviews, employees exhibited their pride in the ownership of the laboratory safety culture where solutions to issues resided with the workers. The Laboratory Manager told the Team that the workers "tell me what they need; it is up to me to make sure that happens."

ATL continues to perform worker-led annual VPP self-assessments and electronic Hanford General Employee Training (HGET)-VPP/Integrated Safety Management System (ISMS) safety culture surveys. ATL compares the current assessments and survey results with past years to identify strengths and potential improvements. ATL interviewed 61 percent of its employees for the 2013 VPP self-assessment, and 100 percent of the employees participated in the HGET-VPP/ISMS safety culture survey.

ATL employees also participate on the Chemical Hygiene Committee, Hanford Site VPP Champions Team, and ATL monthly safety inspections.

Both ZAC and the VPP Steering Committee have documented charters. With a few exceptions, the membership of both committees is identical, so ZAC and the VPP Steering Committee meet together. This allows them to jointly plan and support initiatives at the facility. They jointly develop safety initiatives to remind employees about a variety of safety topics. Past topics have included cold and flu IQ; heart health challenge; healthy food substitutes; schools are back in session; slips, trips, and falls during the winter; insects in the spring; and heat stress in the summer. Additionally, they plan ATL participation at the Hanford Safety Expo. ATL should consider merging the ZAC and VPP Steering Committees to simplify the committees' structure and acknowledge the committees' common purposes.

Opportunity for Improvement: ATL should consider merging the ZAC and VPP Steering Committees to simplify the committees' structure and acknowledge the committees' common purposes.

Worksite Analysis

In 1997, *222-S Laboratory Complex Health and Safety Baseline Evaluation*, HNF-SD-SUP-LB-002, documented the comprehensive baseline hazards assessment for 222-S Laboratory operations. In 1999, the Tank Farm contractor developed a spreadsheet summary from that document so managers could more effectively manage the hazards at ATL. Over the years, that spreadsheet served as an informal mechanism to track and manage the hazards. WRPS and ATL collaborated to review the previous baseline and the collection of spreadsheet summaries to develop the current *Hazards and Controls Inventory for the 222-S Laboratory Complex*, ATS-MP-1033 REV B-6, as their baseline to manage hazards and controls for the laboratory. All iterations of the original baseline and updates to the spreadsheet are available in the Integrated Document Management System (IDMS) for historical reference. The responsibilities for the ATL safety and health representative and the WRPS safety and health professional are captured in the current baseline document.

ATL developed a work control process to address work performed by ATL personnel at the 222-S Laboratory. WRPS is responsible for maintenance of fire systems, ventilation systems, structures, piping, pumps, or to perform lockout/tagouts or confined-space entries. ATL's processes focus on hazardous chemical reactions, physical hazards, health hazards, acute health hazards, carcinogens, mutagens, or teratogens in connection with laboratory work. *ATL Work Control*, ATL-MP-1034, describes the process to develop work instructions at the laboratory. The Laboratory Worksite Hazard Analysis (LWHA) is a checklist that identifies generic chemical hazards encountered by ATL chemists and laboratory technicians and is a starting point to address the unique set of hazards associated with a particular laboratory activity. The checklist includes hazardous chemical reactions, physical hazards, and health hazards, and identifies generic hazard controls that maybe selected, such as material expiration dates, safety showers, eyewash

stations, and restricted access. The preparer selects the activity location, such as a workbench or a fume hood. The preparer can also select personal protective equipment (PPE) for the activity and identify waste disposition. The checklist also includes routes of exposure and any applicable exposure limits.

ATL Work Control, ATL-MP-1034, states, "hazard analysis is performed utilizing the Laboratory Worksite Hazard Analysis (LWHA) process to define the industrial, radiological and chemical hazards and identify the controls necessary to mitigate or eliminate the hazards". ATL does not use LWHA to document hazard analysis; it only identifies the generic hazards and controls determined by laboratory employees engaged in developing the LWHA and the procedure. Analytical details are more specific in the procedure than in the LWHA checklist. For example, the Team reviewed the procedure, *Determination of Carbon by Hot Persulfate Oxidation and Coulometric Detection,* LA-342-100, and the associated LWHA. The safety section of the Laboratory Analytical (LA) procedure contained most of the information expected in a hazards analysis. The safety section also included warnings relating to individual chemicals, carcinogens, oxidizers, acids, heat protection, puncture/cut protection, PPE, eye protection, and requirements for using fume hoods. An example of an individual chemical warning was Dimethyl sulfoxide (DMSO) found at 70 percent concentration in the carbon anode solution. The DMSO warning included wearing butyl rubber gloves over surgeon's gloves and warned that coulometer solutions are flammable and dangerous. To institutionalize the current practice of including the hazard analysis within laboratory technical procedures, ATL should modify the LWHA process, the work control process, or the technical procedure control, to require documentation of the hazard analysis.

Opportunity for Improvement: ATL should modify the LWHA process, the work control process, or the technical procedure control to require documentation of the hazard analysis.

ATL employees and safety staff continue to work with the collocated WRPS safety staff to address safety concerns at the 222-S Laboratory. Interviews with ATL employees and WRPS employees indicate a working environment where both groups are actively seeking to identify, analyze, and reduce the potential for accidents and injuries.

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, or 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. These rules and procedures must also be followed by everyone in the workplace to prevent, control the frequency of, and reduce the severity of, mishaps.

ATL uses the hierarchical approach for hazard control. ATL evaluates chemicals for use in laboratory spaces and determines whether less hazardous substances can be used as substitutes. In many cases, substitution is not possible so ATL uses engineered controls, such as fume hoods, hot cells, remote-handling equipment, and sophisticated analytical equipment using very small quantities of samples, to minimize the potential exposures to technicians and chemists. ATL uses administrative controls to manage hazardous substances in the laboratory (see discussion in Worksite Analysis). Finally, ATL employs PPE to protect employees from exposures that cannot be otherwise controlled or prevented. Due to the variety of chemicals used in ATL workspaces, the selection of PPE is important to prevent dermal exposures.

The ATL health and safety professional evaluates workspaces for ergonomic issues in a proactive approach to prevent repetitive motion injuries. These evaluations include employee office workstations, as well as analytical workstations. The Team reviewed several evaluations where improvements to working conditions and equipment occurred. Examples include steps for laboratory hood and bench work, reaching tools, adjustable workstations, lowering shelves, anti-fatigue matting, and specific PPE sizing, such as extra small nitrile gloves.

The Team observed excellent housekeeping at the 222-S Laboratory. Workspaces occupied by ATL employees exhibited neat and orderly storage of equipment and chemical containers. Aisles were clear of obstructions, and common areas, such as kitchens and bathrooms, were clean and well kept. The postings were current and conspicuous throughout the workspaces.

ATL uses carts to transport samples, equipment, and other items around the laboratory to prevent lifting and twisting injuries. Different workgroups use different types of carts. For example, to transport chemicals or liquid samples, laboratory technicians use carts with solid rectangular baskets to contain any spills or prevent containers from falling to the floor. Health physics technicians use carts to transport survey equipment. Carts with slightly different configurations are used to transport analytical equipment, computers, and supplies to and from workspaces. Within the past year, ATL inspected and replaced all the casters on the carts used in the laboratory.

ATL is testing Radio Frequency Identification (RFID) chemical labels for use at the 222-S Laboratory. The Chemical Hygiene Committee is currently working to install a system to reduce errors and better maintain the quarterly inventory of chemicals used at the laboratory. This effort is in progress and safety personnel believe that upon installation it will reduce risk of injuries associated with reaching from stepladders and physically moving large chemical containers during inventory.

Since WRPS is the proprietor for the 222-S complex, by its contractual obligation with DOE, WRPS industrial hygienists must perform sampling throughout the laboratory on a regular basis. The industrial hygiene (IH) sampling plan for fiscal year (FY) 2013 focused on fuming nitric acid. The sampling plan for FY 2014 includes mercury, carbon tetrachloride, beryllium, methylene chloride, chromium VI, and lead. The ATL Chemical

Hygiene Manager manages the Carcinogen program at the laboratory through implementation of Chemical Hygiene Plan, *(222-S Laboratory Complex Chemical Hygiene Plan, ATS-310, SECTION 4.5, REV D-1),* and Chemical Inventory Tracking System (CITS). Coordination between WRPS and ATL provides the monitoring results and other information back to the ATL laboratory employees.

HPMC provides medical services to ATL, including acting as the medical director, providing medical surveillance, maintaining medical records, providing medical evaluation, and other medical-related services. Kadlec Hospital, in Richland, Washington, provides major emergency medical services and personnel can be transported directly there by Hanford Fire Department Emergency Medical Technicians.

WRPS manages the Emergency Preparedness program at the 222-S Complex and performs one operational drill per quarter at the laboratory. Examples of past drills include: contaminated worker and explosion, safety shower operations drill involving both hydrofluoric acid and methylene chloride, seismic events, waste drum release, minor injury in contamination area and high winds, odor entry, and fire.

WRPS provides radiation protection support to ATL and to the 222-S complex. This includes radiological engineers, certified health physicists, As Low As Reasonably Achievable (ALARA) reviews, technicians, and programmatic support. The Team observed technicians assisting personnel with entry requirements, entering, and exiting radiologically controlled areas. The technicians were professional, helpful, and ready to assist anyone with a question or issue.

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 personnel understand their responsibilities, recognize hazards they may encounter, and are capable of acting in accordance with management expectations and approved procedures.

Training is an essential component of the ATL mission. All ATL employees have completed training on the new Global Harmonization Standard required by the Occupational Safety and Health Administration as part of its new hazardous communication standard. Personnel are routinely exposed to hazardous conditions in the office and laboratory environments. When a new employee arrives at ATL, an employee job task analysis (EJTA) is developed for that employee. The EJTA defines physical and medical examination requirements, any medical baseline testing, and employee training requirements. After satisfying the physical requirements, the employee meets with his or her supervisor to discuss specific training requirements. All new employees receive HGET training; ISMS training; VPP training; and depending on job classification, specific training on beryllium, radiological hazards, and any other training required by their job description.

Formal classroom training, required reading, and on-the-job training (OJT) are among the tools used by ATL to minimize the potential for incidents. In 2013, ATL employees

were scheduled for 1,110 training courses with only one "no show." The training manager indicated that for the initial General Employee Training common to all positions, approximately 61percent is Web-based and 39 percent is classroom training. For analytical and fieldwork supervisory positions, initial training is 2 percent Web-based and 98 percent is classroom. For the Analytical Chemistry Manager's initial training, approximately 11 percent is Web-based and 89 percent is classroom training. Web-based training numbers tend to increase for refresher training. ATL uses the Enterprise Learning Management (ELM) system managed by Mission Support Alliance (MSA), LLC. ELM tracks employees' training, schedules training, and can rollup training metrics for the training organization to manage. MSA maintains and manages the site ELM system, the Volpentest Hazardous Material Management and Emergency Response (HAMMER) training center, and coordinates with other site contractors to meet their training needs.

First-line supervisors and managers can use the Hanford Site Worker Eligibility Tool (HSWET) to validate qualifications and training prior to assigning work to an employee. Examples of employee training and qualifications recorded in HSWET include physicals, Hazardous Waste Operations and Emergency Response (HAZWOPER) training, beryllium worker training, and radiological worker training.

The Team reviewed the 222-S qualification card requirements for the ATL Organic Chemical Technician. The qualification card requires completion of prequalification requirements, such as education and experience, and completion of required reading. The technician must also understand the hazards of methylene chloride, documentation requirements and environmental concerns, and pass a knowledge check.

ATL uses the *worker training worker* approach to OJT/on-the-job-evaluation (OJE). ATL uses a 3-tiered system for workers to train other workers. The first tier has the new worker observe the process, ask questions, and seek clarifications. The second tier has the worker perform the task with direct supervision. This allows the worker to gain hands-on proficiency. The third tier has the worker perform the task while being evaluated using an OJT evaluation. If the worker achieves a 75 percent or better score on the OJE for that particular task, the worker is qualified to perform that work.

ATL maintains its workers' training records for ATL site-specific training, such as required reading. No discrepancies or major changes were observed during this review.

Conclusion

ATL effectively addresses the hazards associated with performing laboratory analyses, technical analytical development support, and chemistry services for environmental, waste, and process facility operations. ATL employees, supported by management, are vigilant, engaged, and involved in making safety improvements. ATL has processes in place to identify and analyze hazards and develop controls to prevent accidents or exposures to employees. The ATL safety and health training program continues to provide personnel with the tools to recognize hazards they may encounter, and they can perform their duties in a safe and reliable manner in accordance with management expectations. The Team recommends ATL continue in DOE-VPP as a Star participant.

Safety Performance Rates: Injury/Illness Data

Table 2.1 Injury Incidence/Lost Workdays Case Rate					
Calendar Year	Hours Worked	Total Recordable Cases (TRC)	TRC Rate	DART* Cases	DART Case Rate
2011	151,547	2	2.64	1	1.32
2012	133,320	0	0	0	0
2013	128,412	0	0	0	0
3-Year Total	413,279	2	0.97	1	0.48
BLS – 2012 average for NAICS** # 56291			3.1		2.3

Table 2.2 Injury Incidence/Lost Workdays Case Rate (Subcontractor)					
Calendar Year	Hours Worked	TRC	TRC Incidence Rate	DART Cases	DART Case Rate
2010	N/A	N/A	N/A	N/A	N/A
2011	N/A	N/A	N/A	N/A	N/A
2012	N/A	N/A	N/A	N/A	N/A
3-Year Total	N/A	N/A	N/A	N/A	N/A
BLS - 2011 average for NAICS** # N/A			N/A		N/A

* Days Away, Restricted, or Transferred

**North American Industry Classification System

ATL had no recordable or lost workday cases reported in calendar year (CY) 2012 or CY 2013. The last recordable/lost workday injury was February 12, 2011. Reviews of the accident and injury logs, as well as interviews with workers, did not reveal any underreporting or incorrect categorization of injuries. ATL's 3-year average injury rates are 31 percent below the averages for the comparable industry and meet the accident injury criteria for continued participation in DOE-VPP at the Star level.