



Oak Ridge Associated Universities Oak Ridge Institute for Science and Education

**Report from the Department of Energy
Voluntary Protection Program
Triennial Onsite Review
September 9-13, 2019**



U.S. Department of Energy
Office of Environment, 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's (OSHA) VPP. Since its creation by OSHA in 1982, and implementation by DOE in 1994, VPP has demonstrated that cooperative action among Government, industry, and labor can achieve excellence in worker safety and health.

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

DOE bases requirements for DOE-VPP participation on comprehensive management systems with employees actively involved in assessing, preventing, and controlling the potential health and safety hazards at their sites. DOE-VPP is open to all contractors in the DOE complex, including production facilities, laboratories, 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 any time.

DOE-VPP consists of three levels with names and functions similar to those in OSHA's VPP: Star, Merit, and Demonstration. The Star level is the core of DOE-VPP. This level recognizes outstanding protectors of employee safety and health. The Merit level is a steppingstone for participants that have good safety and health programs, but need time and DOE guidance to achieve Star status. The Demonstration level allows DOE to recognize achievements in unusual situations about which DOE needs to learn more before determining approval requirements for the Merit or Star level.

By approving an applicant for participation in DOE-VPP, DOE recognizes that the applicant exceeds the basic elements of ongoing, systematic protection of employees at the site. The symbols of this recognition provided by DOE are certificates of approval and the right to use flags showing the program level 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.

This report summarizes the results from the triennial onsite review of Oak Ridge Associated Universities (ORAU) at the Oak Ridge Institute for Science and Education in Oak Ridge, TN, conducted September 9-13, 2019, and provides the Associate Under Secretary for Environment, Health, Safety and Security with the necessary information to make the final decision regarding ORAU's continued participation in DOE-VPP at the Star level.

TABLE OF CONTENTS

FOREWORD	ii
ABBREVIATIONS AND ACRONYMS.....	iv
EXECUTIVE SUMMARY	vi
OPPORTUNITIES FOR IMPROVEMENT.....	viii
I. INTRODUCTION	1
II. INJURY INCIDENCE/LOST WORKDAYS CASE RATE.....	3
III. MANAGEMENT LEADERSHIP	5
IV. EMPLOYEE INVOLVEMENT.....	10
V. WORKSITE ANALYSIS.....	14
VI. HAZARD PREVENTION AND CONTROL.....	17
VII. SAFETY AND HEALTH TRAINING	23
VIII. CONCLUSIONS	25
Appendix A.....	A-1

ABBREVIATIONS AND ACRONYMS

AED	Automated External Defibrillator
AU	Office of Environment, Health, Safety and Security
AU-12	Office of Worker Safety and Health Assistance
Be	Beryllium
BLS	Bureau of Labor Statistics
CAIRS	Computerized Accident Injury Reporting System
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
DART	Days Away, Restricted or Transferred
DOE	Department of Energy
EAS	Employee Award System
ES&H	Environment, Safety, and Health
FTD	Facilities and Transportation Department
HSM	Health and Safety Manual
HVAC	Heating, Ventilation, and Air-Conditioning
HWA	Hazardous Work Authorization
HR	Human Resources
ISO	International Organization for Standardization
ISM	Integrated Safety Management
ISMS	Integrated Safety Management System
JHA	Job Hazard Analysis
LN2	Liquid Nitrogen
LOTO	Lockout/Tagout
MHE	Material Handling Equipment
NAICS	North American Industry Classification System
NEC	National Electrical Code
ORAU	Oak Ridge Associated Universities
ORISE	Oak Ridge Institute for Science and Education
OSO	Oak Ridge National Laboratory Site Office
ORFD	Oak Ridge Fire Department
ORFPD	Oak Ridge Fire and Police Departments
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
QEA	Qualitative Exposure Assessment
REAC/TS	Radiation Emergency Assistance Center/Training Site
REAL	Radiation Environmental Assessment Laboratory
RRA	Roles, Responsibilities, and Authorities
RTC	Required Training Checklist
SCATS	Safety Corrective Action Tracking System
SSR	Site Safety Representative
Team	Office of Environment, Health, Safety and Security DOE-VPP Team

TRC	Total Recordable Case
VPP	Voluntary Protection Program
WSHC	Work-Specific Hazard Checklist
Y-12	Y-12 National Security Complex

EXECUTIVE SUMMARY

The Department of Energy's (DOE) Voluntary Protection Program (VPP) Assessment Team (Team) from the Office of Environment, Health, Safety and Security (AU) recommends Oak Ridge Associated Universities (ORAU) at the Oak Ridge Institute for Science and Education (ORISE) in Oak Ridge, TN, continue to participate in DOE-VPP at the Star level based on the triennial onsite review conducted September 9-13, 2019.

ORAU is a nonprofit research and training organization sponsored by 105 United States doctorate-granting universities. ORISE is a DOE institute located in Oak Ridge, TN operated by contract with ORAU. DOE's Oak Ridge National Laboratory Site Office (OSO) awarded the current contract in 2016 as a 5-year contract with five 1-year extension options. Each year for the past 3 years, OSO has executed a 1-year extension option based on ORAU's performance. The current contract runs through 2023.

ORAU is responsible for promoting a broad spectrum of programmatic activities that support the DOE mission through the ORISE contract. It provides technical and program management services to DOE; conducts reimbursable work for other Federal and non-Federal entities in the areas of science and education; and maintains certain research, training, educational, and support facilities.

ORAU employs approximately 800 full-time personnel, with about 600 full-time equivalents supported by the ORISE contract. It also maintains several laboratories and training facilities under the ORISE contract, and appoints research participants to full-time positions at DOE National Laboratories across the country.

ORAU entered DOE-VPP at the Star level in December 2003. In accordance with DOE-VPP requirements, DOE conducted triennial onsite reviews in April 2008, October 2011, and again in January 2015. In accordance with DOE Technical Standard, 1232-2019, *U.S. Department of Energy Voluntary Protection Program*, personnel from the Office of Worker Safety and Health Assistance (AU-12), within AU, performed a triennial onsite review from September 9-13, 2019.

ORAU has experienced only nine recordable injuries over the past 3 years, resulting in an injury and illness rate 90 percent below the comparison industry rates for professional, scientific and technical services published by the Bureau of Labor and Statistics. In the past three years ORAU has not been subject to any health and safety-related regulatory actions by DOE, OSHA, or the State of Tennessee.

The results of the review indicated that ORAU continues to:

- Maintain appropriate management systems, policies, and procedures to implement its Integrated Safety Management System. ORAU managers understand safety as a competitive advantage and assign resources that reflect that understanding. Managers are visible, accessible, and credible to the workforce, and regularly communicate institutional values and priorities, beginning with safe performance of work. ORAU managers seek to identify and implement good practices that improve worker trust and engagement.
- Demonstrate strong employee involvement in its safety program. Employees believe ORAU managers provide excellent support and leadership. ORAU introduced a new employee recognition program that is a true peer-to-peer program, eliminating delays awaiting Safety

Council or manager approval; and the Site Safety Representative program provides an excellent communication platform for employees and managers to discuss safety issues.

- Ensure its predominately low-hazard work is well understood by the workforce, although the current work planning system still permits workers or supervisors to make assumptions about hazards or controls and could lead to implementation errors, primarily in unplanned skill-based work. The Team identified some improvements that would strengthen ORAU's work planning process by better defining a systematic process based on hazard analysis to determine if work packages are *low*, *medium*, or *high* risk, and incorporating source document references, industry standards, and requirements on the Worker Safety and Health Checklist for the specific hazards to help users identify appropriate controls.
- Develop, communicate, and implement safety rules and work procedures, which all personnel understand and follow. Personal protective equipment is available and worn to prevent or reduce exposures or severity. ORAU employs certified professionals within the environment, safety, and health staff commensurate with the potential risks on the site. Managers and supervisors seek and respect the workers' opinions and ideas before finalizing work packages or implementing solutions. ORAU is controlling hazards using the hierarchy of controls. Managers involve workers in work planning and package development to leverage workers' understanding of conditions that create hazards and workers' experience controlling those hazards. ORAU provides a full range of medical services, emergency response and planning, and wellness program support.
- Maintain a well-established training and qualification program that trains workers appropriately to recognize hazards and protect themselves and coworkers. The ORAU training program continues to evaluate new and improved methods by which it can improve the training experience for employees.

Although most workers are never exposed to any hazards beyond the normal office environment, some tasks do involve more hazardous work, particularly in laboratory or field work. In those cases, ORAU's processes and procedures ensure it identifies, analyzes, and controls the hazards. Workers are willing to stop work when conditions are uncertain or potentially unsafe, and have a history of stopping or delaying project work if as-found conditions differ from expectations. ORAU expects all work to meet its high expectations of safety and quality. The Team did not identify any programmatic non-compliances with DOE, OSHA, State or local health and safety requirements. The Team identified some opportunities for improvement that will help ORAU ensure it implements all applicable safety standards and requirements, particularly for routine tasks where workers rely on personal knowledge and experience

**TABLE 1
OPPORTUNITIES FOR IMPROVEMENT**

Opportunity for Improvement	Page
ORAU should contact personnel that signed up for <i>VPPhD</i> but are not participating to determine what barriers or shortcomings of the program are preventing them from completing the program, and make revisions to respond to those issues.	7
ORAU should review data already collected through a variety of systems and determine if it provides usable leading indicators for organizational culture and safety performance measurement.	8
ORAU should work with both the Safety Culture Improvement Panel and AU to find ways to integrate the safety culture assessment process into DOE-VPP evaluations.	8
ORAU should capture the RRAs of the SSRs in a single easily accessible location, such as a renewed SSR handbook or on the Safety 1st website.	11
ORAU should define low-hazard/low-complexity activities, and then use a general JHA that identifies the activities that fall within that category, and identify the controls workers should use.	15
ORAU should modify the WSHC to include source document references, industry standards, and requirements for the specific hazards as a starting point for users in identifying appropriate controls.	16
ORAU should review existing JHAs and replace general or undefined PPE controls with specific controls (e.g., specific glove thickness and material, specific respirator).	19
ORAU should hardwire machine shop equipment per the NEC and prevent unauthorized use without using LOTO devices. Potential controls might include keyed access to power supplies or locked access to the machine shop.	19
ORAU should develop an internal system for employees to submit safety concerns anonymously, giving ORAU an opportunity to resolve the concern before involving DOE.	20

I. INTRODUCTION

This report provides the Department of Energy's (DOE) Associate Under Secretary for Environment, Health, Safety and Security (AU) the results of the triennial onsite review of Oak Ridge Associated Universities (ORAU) at the Oak Ridge Institute for Science and Education (ORISE) located in Oak Ridge, TN. The AU DOE Voluntary Protection Program (VPP) Assessment Team (Team) recommends that ORAU at ORISE continue to participate in DOE-VPP at the Star level.

The DOE-VPP encourages excellence in occupational safety and health protection by recognizing DOE contractors and subcontractors who maintain safety programs that surpass compliance with DOE, Occupational Safety and Health Administration (OSHA), local, State and Federal safety standards.

The Star level is the core of DOE-VPP. This level recognizes outstanding protectors of employee safety and health. A participant at the Star level should be a model for other members of its industry and other DOE contractors and subcontractors. Because this is a dynamic and continuous improvement program, participants cannot allow their efforts to stagnate. Approvals are not limited to set durations, but are subject to triennial reevaluation by DOE to ensure that the participant still warrants Star level participation.

ORISE is a DOE institute located in Oak Ridge, TN, operated by contract with ORAU, a nonprofit research and training organization sponsored by 105 doctorate-granting Universities in the United States. DOE's Oak Ridge National Laboratory Site Office (OSO) manages the ORISE contract and provides oversight. Approximately 70-80 percent of ORAU funding comes through the ORISE contract. The remaining funding comes from other sources. Unless otherwise noted in this report, references to ORAU refer to work on the ORISE contract.

Approximately 600 of the 800 ORAU employees support the ORISE contract, either full or part time. Under the ORISE contract, ORAU is responsible for promoting a broad spectrum of programmatic activities that support the DOE mission. It provides technical and program management services to DOE; conducts reimbursable work for other Federal and non-Federal entities in the areas of science and education; and maintains certain research, training, educational, and support facilities. Its primary activities include:

- Illness and injury surveillance;
- Independent environmental assessment and verification;
- Radiation accident management;
- National security and emergency management;
- Professional and technical training;
- Science education programs; and
- Scientific and technical resource integration.

ORAU operates and maintains the following facilities included in the ORISE contract:

- The Radiation Emergency Assistance Center/Training Site (REAC/TS) that provides radiation incident response, consultation, and preparedness training, and participates in simulation exercises to address the medical aspects of human exposure to radiation.

- The Cytogenetic Biodosimetry Laboratory that supports the medical community in the evaluation, triage, and management of patients with acute radiation injuries.
- The Beryllium (Be) Testing Laboratory, which is one of only two laboratories in the United States performing beryllium lymphocyte proliferation testing.
- A Radiochemistry Laboratory that performs independent analysis of environmental samples collected at survey sites.
- The ORAU Center for Science Education that helps make K-12 science, technology, engineering, and mathematics education more effective nationwide.
- The Pollard Technology Conference Center, located on ORAU's main campus that provides a central meeting place for science and technology leaders, as well as community members.

ORAU entered DOE-VPP at the Star level in December 2003. In accordance with DOE-VPP requirements, DOE conducted onsite reviews in April 2008, October 2011, and again in January 2015. In accordance with DOE Technical Standard, 1232-2019, *U.S. Department of Energy Voluntary Protection Program*, personnel from the Office of Worker Safety and Health Assistance (AU-12), within AU, performed an onsite review from September 9-13, 2019. ORAU has not been subject to any health and safety-related regulatory actions by DOE, OSHA, or the State of Tennessee since the last onsite review.

The onsite review included walkthroughs and site tours of the ORAU South Campus located off Scarborough Road, and the ORAU Main Campus in Oak Ridge, TN. The Team interviewed personnel at all levels of the organization, and conducted observations as necessary to review all the tenets of DOE-VPP and the progress made on the Opportunities for Improvement identified in the 2015 assessment report.

Since entering the DOE-VPP in 2003, ORAU has maintained an excellent safety performance record, consistently maintaining injury rates 75 percent or more below its comparison industry.

This report contains a review and discussion of ORAU injury and illness rates, and an assessment of safety management system elements compared to the DOE-VPP tenets of Management Leadership; Employee Involvement; Worksite Analysis; Hazard Prevention and Control; and Health and Safety Training. The report also supports the Team's recommendation that ORAU continue participating in DOE-VPP at the Star level.

II. INJURY INCIDENCE CASE RATES

Injury Incidence Case Rates (ORAU – CAIRS* Org 4004203)					
Calendar Year	Hours Worked	Total Recordable Cases (TRC)	TRC Incidence Rate per 200,000 hours	Days Away, Restricted or Transferred (DART) Cases	DART Case Rate per 200,000 hours
2016	1,593,431	2	0.25	0	0.00
2017	1,232,508	4	0.65	0	0.00
2018	1,175,092	3	0.51	2	0.34
3-Year Totals	4,001,031	9	0.45	2	0.10
Bureau of Labor Statistics (BLS-2017) average for NAICS** 5419 All other professional, scientific, and technical services			5.40		0.9
Injury Incidence Case Rates - (ORAU Service Subcontractors - CAIRS Org 4004204)					
Calendar Year	Hours Worked	TRC	TRC Incidence Rate per 200,000 hours	DART Cases	DART Case Rate per 200,000 hours
2016	11,170	0	0.00	0	0.00
2017	14,810	0	0.00	0	0.00
2018	11,260	0	0.00	0	0.00
3-Year Totals	37,240	0	0.00	0	0.00
Bureau of Labor Statistics (BLS-2017) average for NAICS** 5419 All other professional, scientific, and technical services			5.40		0.9

* Computerized Accident Injury Reporting System

**North American Industry Classification System

TRC Incidence Rates, including subcontractors: 0.45

DART Case Rates, including subcontractors: 0.10

Discussion

ORAU employs approximately 800 workers, approximately 600 of which are primarily on the ORISE contract. ORAU tracks and records accidents or injuries occurring under the ORISE contract separately from other work. For the 3 years prior to this assessment, 2016 to 2018, ORAU experienced two, four, and three recordable cases respectively, resulting in a 3-year TRC rate of 0.45. During the same period, ORAU had only two DART cases, both in 2018, resulting in a total DART rate of 0.10. ORAU has had zero recordable TRC and DART cases for the current year-to-date. The nine recordable cases included a punctured finger, skin irritation from a respirator, lung irritation from the inhalation of strong disinfectant, a cut to a hand from a glass pipette, two knee injuries, a rotator cuff tear from a fall, a fractured wrist from a fall from a pickup truck, and a laceration to a finger when cutting zip ties with pliers.

ORAU Environment, Safety, and Health (ES&H) staff receive reports of an accident or injury in person, by e-mail, phone call, from the occupational health nurse, or submission of the ES&H Incident Notification Form, which is located on the Safety 1st and Command Forms website. Upon receipt of an accident or injury report, managers or supervisors initiate the Manager's Investigation Form, which starts an internal investigation and report. The occupational health nurse processes the report and forwards it to the ES&H director. The ES&H director makes the determination if a report warrants an in-depth investigation and assigns an accident/injury investigator. Employees do not fear reprisal for reporting and acknowledge that managers encourage the reporting of an injury or first-aid case.

The site maintains accurate recordkeeping logs, including the OSHA 300 Log and 300A Summary. The 300A Summary meets the requirements of the recordkeeping standard, is accessible to all personnel, and is available throughout the calendar year. The recordkeeper documents all injuries in the DOE CAIRS database. Personnel maintaining recordkeeping standards are well versed in recordkeeping, OSHA 300 Log, and CAIRS requirements. ORAU's injury and illness rates are 92 percent less than the comparison industry and meet the expectations for continued DOE-VPP participation.

III. MANAGEMENT LEADERSHIP

Management Leadership is a key element to obtaining and sustaining an effective safety culture and implementing the guiding principles of Integrated Safety Management (ISM). The contractor shall demonstrate senior level management commitment to ISM and occupational safety and health and to meeting the requirements of DOE-VPP. Management systems for comprehensive planning shall address health and safety requirements and initiatives. Elements of that management system shall include: (1) clearly communicated policies and goals; (2) clear definition and appropriate assignment of responsibility and authority; (3) adequate resources; (4) accountability for both managers and workers; and (5) managers shall be visible, accessible, and credible to employees. As with any other management system, the organization shall integrate authority and responsibility for employee health and safety with its management system and shall involve employees at all levels of the organization.

In 2015, ORAU continued a longstanding appreciation of excellence in safety and health as a competitive advantage. Managers accepted employees' suggestions, ideas, and recommendations. ORAU managers had a disciplined process to identify, evaluate, and accept corporate risks. They continually reinforced safety as an expectation and a value and provided the appropriate resources to ensure implementation of ISM.

Over the past 3 years, ORAU has continued this appreciation. In interviews, managers consistently expressed their belief that safety was a core value and was "in ORAU's DNA." ORAU's contract performance history reinforces its belief in safety as a competitive advantage. DOE's Oak Ridge National Laboratory Site Office (OSO) office awarded the current contract in 2016 as a 5-year contract with five 1-year extension options. Each year for the past 3 years, OSO has executed a 1-year extension option based on ORAU's excellent performance, including safety and health. OSO measures contract performance against seven goals. In its self-assessments for Goal 5 (Safety), ORAU cites both DOE-VPP participation and International Organization for Standardization (ISO) 14001 (a series of standards for effective environmental management systems) certification as demonstrating its commitment to worker safety and health.

Over the past year, ORAU trained its leaders and managers on skills that improved its organizational culture and provided leadership training to all ORAU employees. That training centered on accountability and a set of leadership standards promoted by the ORAU President and Chief Executive Officer (CEO). ORAU provided employees with 5"x7" cards identifying leadership standards in three focus areas: Accountability, Communications, and Leadership. Managers incorporated these leadership standards into the catalytic coaching approach ORAU uses to help managers and their workers identify common goals, growth opportunities, and focus areas for the coming year.

In another leadership development initiative, ORAU senior managers studied and discussed *Multipliers: How the Best Leaders Make Everyone Smarter* by Liz Wiseman¹. The senior management team used this book as a means to understand its personal management style, recognize strengths and potential weaknesses with that style, and used that information to improve their interactions with their staff. The ORAU Chief Financial Officer (CFO) used it within his organization to make the organization more effective. The CFO emphasized to his staff the importance of earning workers' discretionary efforts, using the maxim "Discretionary

¹ Wiseman, L. [2017] revised and updated edition New York, NY: Harper Business, an imprint of Harper Collins Publishers

effort must be given, not taken.” The CFO will continue using this book, along with others, as a resource over the coming months, providing monthly topics derived from the book for All-Hands Meetings within the business operations organization. In an organizational culture survey in 2019, the CFO saw dramatic improvement in scores related to trust and communication, which he attributed to use of this book.

ORAU managers are visible and accessible to their staff. In many cases, ORAU defines managers as personnel supervising two or more employees. Consequently, personnel interviewed by the Team had frequent contact with their direct supervisors (first line managers). In most cases, managers and supervisors have been promoted from within the organization, resulting in a high degree of worker familiarity and credibility. However, a consistent comment heard by the Team from some personnel was that they did not see senior managers very often. Senior managers are aware of this perception, and want to change it. Most interactions between senior managers and staff occur at staff meetings or other group activities. To change this perception, senior managers might consider scheduling time to “walk around” and interact with personnel.

Over the past 20 or more years, ORAU has expanded its corporate activities, and now has approximately 20 to 30 percent of its funding from non-DOE sources. This growth has created some difficulty separating work performed under the ORISE contract with DOE from other work. The distinction between the ORISE contract and other ORAU work is important from both, a regulatory and a financial management perspective. OSO requested ORAU to better define the difference between the ORISE contract and other work. In response, ORAU split the ORAU president/chief operating officer position from the ORISE director’s position. The ORISE contract now has a dedicated director that reports directly to the president. Over the next several months, ORAU is moving other organizations under the ORISE director, including the ES&H office. This reorganization will help clarify applicable roles, responsibilities, and authorities for safety within the ORAU organization, and ensure ORAU identifies appropriate safety standards for work.

ORAU has a single safety program expectation that meets title 10, Code of Federal Regulations, part 851 (10 CFR 851), *Worker Safety and Health Program*, requirements. Because some work falls under other regulatory requirements, ORAU ensures its safety program incorporates those requirements as well. Annually, OSO approves ORAU’s updated 10 CFR 851 Worker Safety and Health Program Description. This document describes ORAU’s processes for compliance with worker safety and health requirements and provides cross-references to implementing systems, programs, and subject areas. It also describes how ORAU integrates worker safety and health requirements with other worker protection activities. The description also explains that a number of ORAU activities do not fall under the regulatory requirements of 10 CFR 851. However, the description also explains that ORAU’s safety requirements apply to all employees and subcontractors in ORAU-controlled facilities. ORAU has a single policy, ESH-100, *Integrated Safety Management*, which applies to all ORAU work. That policy establishes a corporate requirement that “every individual working at ORAU, regardless of employment status, will be involved in ensuring and improving safety.”

ORAU further defines its program through its *Integrated Safety Management System (ISMS) Program Description*. This document provides the corporate expectations and requirements for ISM and is reviewed and approved at least annually by OSO. Organizational unit ISM plans convey these requirements and approaches to managers and workers. ORAU has

21 unit-specific ISM plans in place that follow a standard format, and describe how the unit managers and workers incorporate the ISM guiding principles and core functions into their daily activities. These documents are readily available to managers, supervisors, and workers electronically on ORAU's Safety 1st website, and in hardcopy.

ORAU determined there is a risk in the ORISE Workforce Development program, which places students and post-doctoral personnel in DOE National Laboratory positions throughout the country. This program has expanded from placing approximately 2,000 personnel to nearly 10,000 personnel nation-wide. Most of those personnel are not employees of the laboratory where ORAU places them, nor are they ORAU employees. Therefore, neither workers' compensation programs nor corporate health insurance programs cover these personnel in the event of an injury. Before placing these people in a position that might expose them to laboratory or other work hazards, ORAU requires they provide proof of health insurance coverage so they can access adequate medical treatment in the event of an injury.

ORAU provides excellent resources for safety and health. In fiscal year 2019, ORAU had \$1.26 million budgeted for health and safety staff and programs. For organizational culture improvement, ORAU has budgeted \$450,000 for its *High Five* employee recognition program (see Employee Involvement).

In 2016, ORAU initiated its *VPPhD* promotion to increase employee involvement and awareness of DOE-VPP (see Employee Involvement). ORAU self-assessments over the past 3 years have referenced participation in the *VPPhD* promotion as an indicator of safety culture excellence. Approximately 25 percent of ORAU personnel initially signed up for the *VPPhD* program, but nearly half of those individuals have not followed up after enrolling. ORAU has not analyzed this statistic. Although resources for safety promotions, like the *VPPhD* are available, some employees perceive performing these activities on personal time as a potential barrier to participation. ORAU has not budgeted resources that employees could charge their time to support participation in these activities. ORAU may need to identify more flexibility to allow personnel to get *VPPhD* credit for activities that integrate safety into their normal work tasks (e.g., fieldwork). ORAU should contact personnel that signed up for *VPPhD* but are not participating to determine what barriers or shortcomings of the program are preventing them from completing the program, and make revisions to respond to those issues.

Opportunity for Improvement: ORAU should contact personnel that signed up for *VPPhD* but are not participating to determine what barriers or shortcomings of the program are preventing them from completing the program, and make revisions to respond to those issues.

ORAU shares corporate strategic information and performance data with all employees through a *Metrics, Accomplishments, Issues, and Look-ahead* report to all employees every 2 weeks. This report allows employees to learn about corporate plans or issues. Each organizational unit has a section of the report identifying that organization's metrics. In most cases, the metrics are either "none" or lagging indicators. In the ES&H area, the only metrics are TRC and DART rates. ORAU has not identified leading indicators, particularly for ES&H performance. In interviews, managers continue to believe workers are safety conscious and willing to raise issues based on their own empirical observations and communications with staff. ORAU has statistical expertise on staff that might be able to help develop leading indicators using data it already collects. ORAU should review this data and determine if it provides usable leading indicators for

organizational culture and safety performance measurement. For example, ORAU might use *VPPHD* participation and activity statistics, or *High Five* usage statistics, for organizational trends.

Opportunity for Improvement: ORAU should review data already collected through a variety of systems and determine if it provides usable leading indicators for organizational culture and safety performance measurement.

ORAU is leading a key initiative in the DOE Safety Culture improvement initiatives. It has developed a Safety Culture Assessment process that uses a combination of surveys, individual interviews, and focus group interviews that help gauge employee perceptions. ORAU has conducted over 30,000 surveys and interviews, and published results of those surveys last year that demonstrated the link between leadership and employee perceptions. That study provides statistical evidence of the importance of manager's visibility, credibility, and accessibility in establishing a strong safety culture. ORAU should work with both the Safety Culture Improvement Panel and AU to find ways to integrate the safety culture assessment process into DOE-VPP evaluations.

Opportunity for Improvement: ORAU should work with both the Safety Culture Improvement Panel and AU to find ways to integrate the safety culture assessment process into DOE-VPP evaluations.

ORAU continues to perform the required annual safety and health program evaluations. The annual assessments evaluate information from quarterly ES&H inspections, internal reviews, periodic operational awareness visits, accident reports, personnel exposure reports, and other reports requiring management attention. The assessment reports contain descriptions of improvement efforts over the past year structured around the DOE-VPP tenets and examples of safety promotions. The assessment reports also include a review of the safety and health goals for the year and a list of the safety emphases for the coming year.

ORAU includes subcontractor safety and health in subcontracts. It resolves safety issues and questions at pre-bid, preconstruction, and construction phase meetings with ES&H staff as appropriate. The most recent workers safety and health program description identified that ORAU retained 10 percent of subcontractors' total fee, and that to earn the full fee, the subcontractor could not have any recordable accidents or injuries. The Team identified this provision as a potential disincentive for subcontractors to notify ORAU of an injury. Such disincentives may disqualify a participant from DOE-VPP. Upon further investigation, ORAU determined that the Worker Safety and Health Protection Program Description used an outdated version of the procurement manual. ORAU updated the procurement manual in May 2019 and removed that provision. Further, ORAU could not identify any instances where it had reduced subcontractor fees based on injuries. ORAU inserts language in subcontracts that state serious safety violations or willful repeated violations of safety and health laws, regulations, and requirements may be cause for termination or suspension of work.

ORAU has held subcontractors accountable for not following safety procedures, rules, and regulations. During a recent construction project, ORAU instructed a subcontractor to perform the application of a chemical concrete sealant after normal work hours, or secure the building ventilation prior to conducting the work. The subcontractor supervisor ignored that instruction,

and vapors from the sealant entered the building ventilation system, prompting a building evacuation. ORAU held the subcontractor accountable for not following the procedures as described in the work project plan, which resulted in the replacement of the subcontractor's project supervisor.

Conclusion

ORAU has appropriate management systems, policies, and procedures to implement its ISMS. ORAU managers understand safety as a competitive advantage and assign resources that reflect that understanding. Managers are visible, accessible, and credible to the workforce and regularly communicate institutional values and priorities beginning with safe performance of work. Some workers would like to see senior managers more frequently. ORAU managers seek to identify and implement good practices that improve worker trust and engagement. ORAU continues to exhibit Management Leadership that meets or exceeds DOE-VPP expectations.

IV. EMPLOYEE INVOLVEMENT

Employees at all levels shall 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 involvement is a major pillar of a strong safety culture. Employee participation is in addition to the individual right to notify appropriate managers of hazardous conditions and practices. Managers and employees shall work together to establish an environment of trust where employees understand that their participation adds value and is welcomed. Managers shall be proactive in recognizing, encouraging, facilitating, and rewarding workers for their participation and contributions. Both employees and managers shall communicate and collaborate in open forums to discuss continuing improvements, recognize and resolve issues, and learn from their experiences.

The 2015 review concluded that ORAU continued to demonstrate strong employee ownership across its facilities and that employees believed the ORAU managers provided excellent support and leadership. The ORAU Site Safety Representative (SSR) program provided an excellent communication platform for employees and managers to discuss safety issues.

In 2019, employee ownership remains strong across the ORAU organization. ORAU encourages its workers to participate in the DOE-VPP to improve safety at work and at home. Employees stated that ORAU managers fully support participation in safety committee activities and safety awareness campaigns. ORAU employees engage in the safety and health programs. Employees believe the company's statements on building a safe work environment and taking safe working habits home. Several employees expressed the opinion that working at ORAU was similar to a "family environment" and that performing work safely and looking out for their coworkers was a natural extension of that belief. The ORAU occupational health office continues to provide multiple opportunities to participate in wellness activities throughout the year, including the annual ORAU Health and Safety Fair and *Safety Fest Tennessee*.

The Safety 1st website is ORAU's primary source for employees to access relevant safety and health information, policies, and plans. Employees know about the Safety 1st website and often access it for relevant safety communications and DOE-VPP information.

ORAU's primary safety committee is the Safety Council. The Safety Council meets bimonthly and consists of managers, SSRs, and senior executives. Although led by managers (including the ORAU CEO as its chair), the Safety Council provides an important forum for SSRs to share employees' ideas and concerns with the managers who can address the issues. A charter describes the responsibilities of the chair, co-chair, and members. Council members regularly attend the meetings, and ORAU promptly addresses ES&H issues brought to the meeting. ORAU enters any issue that it cannot address in a timely manner into the management's Safety Corrective Action Tracking System (SCATS).

ORAU relies on the SSRs to provide a direct and rapid link for bringing employee safety concerns to managers. ORAU has approximately 56 primary and alternate SSRs. The SSRs typically represent a specific building (usually one SSR per floor), area, or program. Managers select SSRs from volunteers within their organizations. Employees interviewed knew their SSR and explained that if they observed a safety issue, they would inform the SSR or their manager to get it resolved. SSRs also provide feedback to their organizations from the Safety Council

meetings. SSRs serve as a conduit for addressing employee safety concerns via the Safety Council.

SSRs' responsibilities in their assigned areas include quarterly safety inspections using a standardized checklist. The ORAU ES&H office reviews and retains the completed safety inspection checklists, and enters any identified issues that it cannot close immediately into SCATS. Managers show their appreciation for success in ES&H performance by providing lunches for SSRs. Several SSRs and other personnel attended the annual regional and National Voluntary Protection Programs Participants' Association Inc. conferences.

In 2015, ORAU used an SSR handbook that described SSR roles, responsibilities, and authorities (RRA). Maintaining those notebooks became an administrative burden and ORAU discontinued them. ORAU now relies on a new and improved annual training course for all SSRs provided by an ES&H professional. ORAU also uses a shadowing approach to orient new SSRs. Under this approach, before an SSR steps down from their position, their alternate representative "shadows" them for a period to ensure the new SSR understands their responsibility and is familiar with the employees they represent. ORAU has a Health and Safety Manual containing several procedures that identify roles and responsibilities for the SSRs, including safety inspections and stop work.

Since eliminating the SSR notebook, ORAU has not issued a policy or procedure that collects all SSR roles and responsibilities in a single document. Employees and managers rely on SSRs to promote safety and address safety issues, but without a clear definition of their RRAs, individual SSR's understanding of those RRAs may decay over time. ORAU should capture the RRAs of the SSRs in a single easily accessible location, such as a renewed SSR handbook or on the Safety 1st website.

Opportunity for Improvement: ORAU should capture the RRAs of the SSRs in a single easily accessible location, such as a renewed SSR handbook or on the Safety 1st website.

Overall, ORAU employees understand their rights under 10 CFR 851 to take time out or stop work if they see a situation involving an imminent danger to themselves or others. Employees understand this authority is a responsibility and do not hesitate to exercise it without fear of reprisal. The employees also stated that they would report all injuries, regardless of how minor, to their supervisors.

ORAU produces multiple quarterly newsletters to provide effective communication to its employees. The ORAU newsletters include the ORAU News, the Diversity Newsletter, Safety Shares Newsletter, and the Employee Relations Newsletter. The Team's review of the various newsletters determined that the publications were well prepared and served to provide topical information to ORAU employees.

ORAU provides numerous methods to recognize workers' efforts through its Employee Recognition Programs. Those recognition programs include the *High Five*, *VIPPY*, and *Employee Award System* (EAS) Level 2, described below. Workers collect credits from all these programs and use them to purchase award items through a commercial online award system established by the ORAU Human Resources (HR) department.

ORAU introduced the *High Five* employee recognition program as a peer reward program. The *High Five* program empowers all employees to recognize other workers for any reason, including

safe work performance, without manager or committee approval. The program allows any ORAU employee to recognize another employee through the online *High Five* program. Each ORAU employee has 250 points per year to award to other employees through the online system. Managers have additional points based on the number of employees in their organizations. Each point has a \$1 value. Employees redeem *High Five* points using the previously mentioned online program for hotels, vacations, Amazon[®], or gift cards. ORAU provides up to \$450K for this program.

The *High Five* program has effectively replaced ORAU's On-the-Spot awards program. The policy and procedure for On-the-Spot awards remain in place, but managers no longer use it. The ES&H director continues to follow the On-the-Spot Award approach to recognize safe performance acts by employees. The *High Five* program does not require direct contact between the person giving and the person receiving the award. The ES&H director prefers recognizing personnel individually and in person as the On-the-Spot award intended. Rather than using gift cards, which entailed additional administrative requirements and approvals, the ES&H director uses the *High Five* program to give the award.

ORAU continues to support the EAS at level 2 (\$500 and up) for employee recognition for exemplary service for safety or improved performance recognition. The ORAU HR department manages this program, which requires vetting and evaluation through the requisite committee. For example, ORAU recognized the employee responsible for developing and suggesting the *VPPhD* program through this program.

While not specifically directed at safety recognition, the ORAU president has also occasionally presented footballs and baseball bats for excellence in safety-related matters. Managers continue to present the *Vippy* award, initiated in 2008, for individuals demonstrating outstanding leadership and involvement in the safety program. In 2018, 12 individuals received these awards for promptly reporting potential hazards, taking action at the department/program level, initiating *suspend work* notices, reporting *close-calls*, and making recommendations for improvements to facilities and programs.

The *VPPhD* Program operates through the ORAU Center for Safety Studies. The *VPPhD* program, which originated from an employee suggestion in 2016, is ORAU's attempt to entice employees to learn more about safety-related practices, terminology, DOE-VPP, and the Environmental Management System of ISO 14001. ORAU believes this knowledge will strengthen employees' commitment to a safe lifestyle at home and at work. The program also assists newer employees understand the safety program and safety culture at ORAU. The program requires voluntary completion of a series of qualifications/tasks with each completed task earning point values towards a goal. The accumulation of points leads to earning a *Bachelor of VPP*, a *Masters of VPP*, and ultimately, a *VPPhD*. As of September 11, 2019, 251 employees have signed up for the *VPPhD* program. One hundred thirteen have attained their Bachelor's degrees, 72 have completed their Masters, and 52 have completed their *VPPhD*.

ORAU was a cohost and title sponsor of *Safety Fest Tennessee*, held April 29-May 3, 2019, in Oak Ridge, TN. *Safety Fest Tennessee* is the combined effort of Federal, State, and local agencies; large and small businesses; and nonprofit organizations. The event provided free safety-based training and forums to academia, industry, and local government sites in the East Tennessee region. This year, more than 1,400 people registered for the event, representing 268 companies, institutions, and organizations from 135 cities in 23 States. Five ORAU subject

matter experts presented topics during the event, including the ORISE Director of Scientific Assessment and Workforce Development who participated on a panel titled “Workforce Development – Facing Future Workforce Needs.” ORAU encouraged all ORAU employees to attend and to present if interested. Overall, the *Safety Fest* has increased its impact towards safety and health at the Oak Ridge site.

Conclusion

ORAU demonstrates strong employee involvement in its safety program. Employees believe ORAU managers provide excellent support and leadership. ORAU introduced the new *High Five* employee recognition program that is a true peer-to-peer program, eliminating council or manager approval. The SSR program provides an excellent communication platform for employees and managers to discuss safety issues. ORAU should capture the RRAs of the SSRs in a single easily accessible location. ORAU meets the Employee Involvement expectations for continued participation in DOE-VPP.

V. WORKSITE ANALYSIS

Management of health and safety programs begins with a thorough understanding of all hazards that workers might encounter during the course of work, and the ability to recognize and correct new hazards. The first two core functions of ISM, defining the scope of work and identifying and analyzing hazards, form the basis for a systematic approach to identifying and analyzing all hazards encountered during the course of work. Work planners shall use the results of the analysis in subsequent work planning efforts. Effective safety programs also integrate feedback from workers regarding additional hazards that they encounter and include a system to address new or newly recognized hazards. Successful worksite analysis also involves implementing preventive and/or mitigating measures during work planning to anticipate and minimize the impact of such hazards.

In 2015, ORAU used established processes, such as laboratory analytical procedures or work requests, based on department missions and project plans. Although most work was low hazard work, ORAU had opportunities to strengthen its work planning process by better defining a systematic process based on hazard analysis to determine if work packages were low, moderate, or high risk. The work planning system permitted workers or supervisors to make assumptions about hazards or controls, which could have led to implementation errors. Documenting the hazard analysis in the Job Hazard Analysis (JHA), not just the hazard identification and hazard controls, and incorporating the results from the industrial hygiene Qualitative Exposure Assessments (QEA) would also benefit ORAU.

ORAU's ISMS Program Description, Health and Safety Manual, Radiation Protection Manual, Emergency Management Plan, Subcontractor and Non-Employee Handbook, and Environmental Management System constitute the overall framework for integrating safety requirements into work planning. Most ORAU employees, subcontractors, and nonemployees work in low-hazard environments. When hazards increase, the formality and hazard control rigor increases.

To support ISM and VPP, the ES&H office has developed several forms and checklists employees can use to identify potential hazards and exposures so they can complete job tasks safely. For instance, at an individual worker level, the *Physical Readiness and Work Conditions Form* identifies standard physical and position-specific requirements for each job position. ORAU categorizes, plans, and controls work activities using *Section 16* of the Health and Safety Manual, *Hazardous Work Authorization* (HWA). ORAU develops JHAs to prevent workplace injuries, establish job procedures, and train workers in safe and efficient work methods. When evaluating new or modified work that is not addressed in an organizational unit's ISM plan, workers complete the ORAU *Work-Specific Hazard Checklist* (WSHC) to determine appropriate actions regarding hazard controls to promote workplace safety and environmental protection, worker qualification training, and monitoring requirements. To identify and control potential laboratory hazards and exposures, the ES&H certified industrial hygienists (CIH) complete an industrial hygiene *QEA Field Form*. To ensure subcontractors provide a safe work environment for ORAU employees, ORAU Facilities and Transportation Department (FTD) and ES&H personnel work with the subcontractor to complete a *Facilities Management Subcontractors Work Permit*.

The HWA screens work into one of four work categories based on work and the hazards involved with that work. The decision to classify work into what is known as worker planned work is determined by coordination between supervisors and workers. Unlike other more

hazardous and complex types of work described below, hazard analysis for worker-planned work uses knowledge, experience, and skills of the supervisor and worker. This people-based approach (versus formal hazard analysis methods such as JHAs) uses “skill-of-the-craft” to informally determine hazards and their controls. People-based systems place the emphasis on the individual analyzing the hazard to have the experience to make the proper determination, whereas a process-based system leads the hazard analysis through its established requirements. The HWA does not specifically define “low hazard, low complexity” work, and workers and supervisors may not adequately identify and implement the appropriate controls. After the 2015 assessment, ORAU added categorization definitions for low, medium, or high hazard work on its WSHC webpage to assist the project managers in determining the level of controls needed. The Team identified some situations where workers did not use appropriate controls for worker-planned work (see Hazard Prevention and Control). ORAU should define low-hazard/low-complexity activities, and then use a general JHA that identifies the activities that fall within that category, and identify the controls workers should use.

Opportunity for Improvement: ORAU should define low-hazard/low-complexity activities, and then use a general JHA that identifies the activities that fall within that category, and identify the controls workers should use.

Prescribed Work is routine or standardized work that has moderate to low hazards and limited complexity. Prescribed Work requires the use of procedures and approved hazard analyses. ORAU defines any new or modified work not fully addressed by existing procedures or hazard analyses as Nonroutine Work. Nonroutine Work requires a thorough and comprehensive hazard analysis by the ES&H office. The final category is Permit Planned Work and involves high hazards, such as radiological work, critical lifts, elevated work, and excavation, and requires a HWA and an approved permit for the task. This category could include both Routine and Nonroutine Work. The work type then defines the hazard analysis process used for the work.

Permit and Routine Work use documented processes; Nonroutine Work uses the most rigorous analysis. Prior to the startup of new or modified work (i.e., work that is not addressed in the organizational unit ISM plan and has potential hazards associated with it), the responsible manager must complete the WSHC form. This serves as a hazards inventory for the work. The checklist is not a plan, work instruction, or work procedure. When the potential hazards require a specific plan, the responsible manager completes an *ISM Plan for New or Modified Work Form*. For large construction, maintenance, or maintenance-like projects, ORAU uses a formal Health and Safety Plan addressing the ISM Core Functions and Guiding Principles. The ES&H director or designated subject matter expert reviews and approves each completed WSHC form, ISM Plan, or Health and Safety Plan. Approvals ensure the analysis is complete, appropriate, and in accordance with the correct standards, and identified controls are adequate. Personnel can use the JHA form to analyze hazards for any of the four types of work discussed above.

The WSHC, implemented in 2013, is an interactive computer/web-based form used to evaluate all new or modified work that is not included in organizational unit ISM plans. The “Details” section of the checklist identifies the hazards requiring controls and allows the user to select from three control options: JHA, HWA, and/or Radiological Work Permit. The intent of the checklist is to engage the project manager to identify hazards and choose a method of control. The checklist user identifies anticipated hazards and documents the method used to analyze and control the hazard. When a “Yes” box is checked, a “Controls Required” section appears.

Hazard control methods listed on the WSHC include a JHA, an HWA, and “Other.” In some cases, WSHC has customized choices for control methods for the listed hazard. For instance, ionizing radiation hazards typically require a Radiation Work Permit. The method most commonly used is the JHA. Using the WSHC SharePoint site, representatives of the ES&H office (safety, industrial hygiene, radiological control, and training), and the Occupational Health staff review completed WSHCs for completeness, the potential to generate waste, and the need for medical monitoring requirements. The current form requires the users and reviewers to rely on their personal knowledge to ensure they use or reference appropriate regulations or standards for the hazards. To make the WSHC more effective, ORAU should modify the checklist to include source document references, industry standards, and requirements for the specific hazards as a starting point for users in identifying appropriate controls.

Opportunity for Improvement: ORAU should modify the WSHC to include source document references, industry standards, and requirements for the specific hazards as a starting point for users in identifying appropriate controls.

During the 2015 assessment, the Team recommended that ORAU modify its JHA process to validate and document the basis for identified controls. To address the recommendation, ORAU performed a retrofit on over 50 percent of its JHAs to include specific information to ensure accurate hazard analysis. Presently, ORAU has 208 JHAs available on the *Safety 1st* website. A goal for the 2017-2018 years was to improve the content of a majority of the JHAs and to reduce the redundancy of several JHAs. ORAU reduced the number of JHAs from 267 in 2014 to 208 current JHAs. ORAU added a fourth column, titled “Potential Effect” to the JHA form. The additional column provides insight into the selection of the control, but does not provide a complete basis for the choice of the control. More detailed information about the analysis of hazards, the conditions, processes, and tasks for which the controls apply, and the validity of the controls is available by referring to the ORAU Hazard Survey and industrial hygiene QEA data. The industrial hygiene QEA collects and analyzes employee exposure data for the ORAU Employee Exposure Assessment Plan. The industrial hygiene QEA provides detailed information about the hazard, such as quantity of chemicals, the relative risk from the hazard, and the basis for the controls.

Conclusion

The work completed by ORAU is mainly low-hazard and well understood by the workforce. Over the past three years, ORAU has implemented some changes to its work planning process, including adding an additional “Potential Effects” column to its JHA form and providing definitions of low, moderate, and high hazards on its WSHC webpage. However, the work planning system still permits workers or supervisors to make assumptions about hazards or controls that could lead to implementation errors. ORAU can strengthen its work planning process by using the JHA process to identify low, moderate, or high-risk work, and incorporating source document references, industry standards, and requirements on the WSHC for the specific hazards to help users identify appropriate controls. ORAU can also benefit by including hazard analysis information in the JHAs (not just the hazard identification, hazard controls, and potential effects). ORAU meets the Worksite Analysis expectations for continued participation in DOE-VPP.

VI. HAZARD PREVENTION AND CONTROL

The third and fourth core functions of ISM, identify and implement controls and perform work in accordance with controls, ensure that once hazards have been identified and analyzed, they are eliminated (by substitution or changing work methods) or addressed by implementing effective controls (engineered controls, administrative controls, or personal protective equipment (PPE)). The equipment maintenance processes and emergency preparedness plans shall ensure compliance with requirements. The organization shall develop and communicate safety rules and work procedures that all employees understand and follow to prevent, control the frequency of, and reduce the severity of mishaps.

In 2015, hazards at ORISE were well controlled. ORAU followed the hierarchy of controls using engineered controls, administrative controls, and PPE to minimize its workers' exposure to hazards. Workers demonstrated an ability to conduct work safely, had an effective awareness of hazards, and were continually seeking ways to make work safer.

Since 2015, hazard prevention and control has improved. ORAU continues to use the hierarchy of controls to eliminate or mitigate hazards. The site shared, exhibited, and demonstrated several examples of improved controls. The Team also identified other controls during the site walkthrough and interviews with site workers. The following are a few examples of these controls:

- A recent site visit by a different DOE assessment team noted several nitrogen and carbon dioxide cylinders in use in the Beryllium (Be) Laboratory and the potential for leaks causing an oxygen deficient environment. ORAU researched and benchmarked other DOE laboratories' controls, then procured and installed a combination carbon dioxide and oxygen monitor, which evaluates and detects oxygen deficient atmospheres in the Be Laboratory. Installation of additional monitors in areas using liquid nitrogen and carbon dioxide is pending the results of the trial period (engineered).
- Workers rotate job tasks when working in laboratory vent hoods to prevent repetitive motion injuries and limit time spent in awkward positions, which helps prevent ergonomic stress injuries (administrative).
- Previously, liquid nitrogen (LN2) dewars in the Radiological and Environmental Analytical Laboratory used to keep the germanium detectors cool were manually topped off at least once a month. The site installed a LN2 recycling system that captures the nitrogen, recompresses and cools it, then returns it to the dewars. Now workers only top the system off annually, thus reducing risk of exposure to LN2 (engineered).
- Because ORAU facilities are in the emergency planning area around the Y-12 National Security Complex (Y-12), emergencies at Y-12 required ORAU maintenance personnel to go to multiple buildings to manually switch off heating, ventilation, and air-conditioning (HVAC) systems on the ORAU south campus. This practice required time and potentially put maintenance personnel at additional risk. ORAU installed a single emergency HVAC shutoff device in each building and trained personnel in the building on the location and operation of the shutoff devices (engineered).
- Swabs taken and sampled at the end of each workday in the Be Laboratory identify potential surface area contamination. A monitor inside the laboratory displays the color-coded map of swab results. The monitor, visible from outside the laboratory, allows workers to confirm the

contamination status, with green representing no contamination, yellow potential contamination, and red representing contamination (administrative).

In addition to the controls described above, ORAU ensures the safety of all workers and visitors. ES&H staff conduct annual hazard surveys. The Subcontractor and Non-Employee Handbook provides guidance for personnel not covered under the ORAU Health and Safety Manual (HSM). The HSM provides policy and procedures for providing a safe work environment for ORAU employees. The HSM directs personnel responsible for site-specific programs not covered in detail in the HSM to develop a written program, policy, and procedures to protect workers performing work under those program requirements.

ORAU embraces ISM in the conduct of daily operations. ESH-100, *ORAU Integrated Safety Management Policy*, and the ORAU ISMS Program Description updated in August 2019, establish the ISM procedures ORAU expects every employee to incorporate in planning and task completion. Through the revision or development of surveys, inspections, assessments and hazard controls, the site has made improvements in eliminating or controlling hazards and exposures to personnel since the 2015 VPP onsite review.

During site walkthroughs, which included informal employee interviews about processes and procedures, the Team observed some potential practices and conditions that do not meet standards and requirements. The Team reviewed two laboratory, and three material handling equipment (MHE) JHAs (BeLab-50001 Beryllium Laboratory, ORAU/Radiation Environmental Assessment Laboratory (REAL) 40005 AP4 – Determination of Radioactive Strontium in Environmental Samples; and FTD 60012 Operation of the Two Person Lift Platform, FTD 90003A Electric Sit-down Forktruck, and FTD 90003C Electric Standup Forktruck, respectively). Review of these JHAs revealed the following:

- Laboratory JHAs contained many unexplained PPE requirements. These JHAs listed a general or undefined statement, such as “use heat-resistant gloves, wear suitable respiratory equipment, wear chemical-resistant gloves, wear appropriate gloves, and/or wear acid-resistant gloves.” Personnel in the REAL laboratory had several types of gloves available, but the JHAs did not address which procedures required the specific type of glove, which could result in the worker not changing gloves from one process to a more hazardous process.
- The forktruck JHAs did not mention conducting the preoperational inspection as reflected in the lift platform JHA;
- None of the MHE JHAs mention disconnecting the forktrucks from the battery charger (if on charge) before use or the specific PPE required for connecting to, or removal from, the battery charger;
- The lift platform JHA does not mention any steps with regard to charging or removal from charging; and
- Both JHAs for forktrucks list “proper lockout/tagout (LOTO) procedure” as a step rather than a control.

ORAU should review existing JHAs and replace general or undefined PPE controls with specific controls (e.g., specific glove thickness and material, specific respirator).

Opportunity for Improvement: ORAU should review existing JHAs and replace general or undefined PPE controls with specific controls (e.g., specific glove thickness and material, specific respirator).

In an attempt to prevent unauthorized backshift or weekend use of machine shop equipment (denial of usage) by unauthorized personnel, ORAU facilities maintenance personnel attached LOTO-labelled plug clamshell devices to several pieces of maintenance shop equipment. While the locks used were not the same type as those used for the LOTO program, the clamshell isolators and the labels were from the ORAU LOTO program. This practice is contrary to 29 CFR 1910.147(c)(5)(ii) requirements, which states: “*Lockout devices and tagout devices shall be singularly identified; shall be the only devices(s) used for controlling energy; shall not be used for other purpose.*” While reviewing this issue, the Team recognized the shop equipment is bolted to the floor, and thus cannot be moved routinely. The equipment should be hardwired per National Electrical Code (NEC) 400.7.A.(8) which states: “*Use flexible cords and cables where the fastening means and mechanical connections are specifically designed for ready removal for maintenance and repair.*” ORAU should hardwire machine shop equipment per the NEC and prevent unauthorized use without using LOTO devices. Potential controls might include keyed access to power supplies or locked access to the machine shop.

Opportunity for Improvement: ORAU should hardwire machine shop equipment per the NEC, and prevent unauthorized use without using LOTO devices. Potential controls might include keyed access to power supplies or locked access to the machine shop.

ORAU continues its commitment to maintaining a safety culture by ensuring certified professionals are available when needed. ES&H personnel have a variety of certifications, including CIHs, certified safety professionals (CSP), and several others. A fire protection engineer is available via subcontract. ORAU allows financial support for two certifications and two professional memberships for each employee. ES&H personnel have the tools and equipment available for the performance of testing or surveying as applicable. Site personnel are aware that subject matter experts and certified personnel are available. Safety personnel noted in many discussions that managers do not skimp when it comes to funding resources for safety.

Until recently, a master list of all equipment, alarms, HVAC, vent hoods, sprinkler systems, eye-wash stations, generators, manlifts, forktrucks, elevators, etc., preventive maintenance was scheduled/tracked via the Facility Maintenance Operational Tracking System using an Excel spreadsheet. ORAU is currently transitioning to a maintenance database program called Worxhub, which, so far has resulted in a one hundred per cent on time maintenance completion rate. Worxhub is a closed loop system providing tracking for job/work order submission, completion, and feedback to the originator. ES&H staff, SSRs, and employees are also able to enter ES&H issues directly into Worxhub.

Facility maintenance personnel track annual and monthly fire extinguisher inspections using the Firebug program. Inspectors install a new color-coded, anti-tamper pin seal corresponding to the current year upon completion of the annual inspection. The inspector scans the barcode attached to each fire extinguisher, and the system generates a record in Firebug for annual or monthly inspections.

Employees can report hazards internally by calling and/or e-mailing their SSR, manager, ES&H staff, or the ES&H hotline. The SCATS is the primary resource for entering and tracking reported hazards. SCATS notifies the employees of the status of their reports. The submission processes for these methods requires the employee to provide their name. Although the employee can request confidentiality, the submission is not anonymous. ORAU personnel have access to the DOE Employee Concerns Program that does allow for anonymous submissions, but that system is normally used for concerns that contractors have not, or will not, address through the contractor's system, and should not be the first, or only means, to report concerns anonymously. DOE-VPP expectations are that employees shall have the option to submit written notices, anonymously if desired. The reporting system shall protect employees from reprisal, provide timely and adequate response, and track correction of identified hazards to completion. The DOE Employee Concerns Program can meet that expectation, but ORAU should develop an internal system for employees to submit safety concerns anonymously, giving ORAU an opportunity to resolve the concern before involving DOE.

Opportunity for Improvement: ORAU should develop an internal system for employees to submit safety concerns anonymously, giving ORAU an opportunity to resolve the concern before involving DOE.

ORAU annually updates its Emergency Management Plan to ensure it addresses its area of responsibility, as well as the risks/hazards of its location near the Y12 facility and ORNL. The plan defines the emergency responsibilities for all persons, including each facility's emergency staff, and defines ORAU's emergency procedures and systems in relation to all Oak Ridge facilities. The plan provides information on emergency mitigation, preparedness, response, and addresses some recovery operations at facilities owned or managed by ORAU. ES&H personnel complete an Annual Hazard Survey for emergency management planning, integrate the results in the review/update process to ensure the plan remains current, and identify any other necessary changes. For example, the installation of single HVAC shutoff devices in each building previously discussed demonstrates the effectiveness of the annual review.

The senior individual in each building is responsible for coordinating emergency response for their assigned facility. SSRs identify runner, escort, and doorkeeper responsibilities in their respective facilities. All personnel wear an information card on their badge lanyard, which provides emergency procedures and phone numbers. In addition to ensuring adequate emergency response for ORAU facilities, ORAU is prepared to assist others through its cadre of technical specialists in the ES&H office and REAC/TS.

ORAU recently completed a full-scale, insider threat exercise to validate mitigation, response, and recovery. The name of the exercise was "Lone Wolf," and premised on a disgruntled employee destroying the main campus data center. Employee information and warning, operational coordination, situational assessment, and operational communications were core capabilities assessed for each of the three Emergency Management Plan internal teams: Management, Advisor, and Communication. ORAU is compiling results and documenting action items from the exercise.

ORAU uses the Everbridge® emergency reporting system to provide up to 176 types of emergency notifications (National Weather Service, local, OSO, organizational, etc.) to employees. ORAU managers, Safeguard and Security, HR, and ES&H staff prepare

notifications. ES&H staff monitors notification sources like the National Weather Service and push notifications based on specific locations. ORAU automatically enrolls new employees in the Everbridge® system, and then sends them an e-mail from the ES&H office within one week of new hire onboarding with instructions on how to complete registration and offers to assist the new employees. During registration, employees must select at least three notification methods (e.g., e-mail, text, cell phone, home phone, etc.) and the order of precedence of notification.

ORAU participates as observers during Oak Ridge National Laboratory and Y-12 major emergency exercises. The Emergency Management and Continuity of Operations plans include memoranda of agreement with the Oak Ridge fire and police departments (ORFPD). ORAU conducts site familiarization training with ORFPD each month and/or when new responders are hired. ORAU has provided ORFPD pre-incident plans developed for each building identifying radiation sources and chemicals in each room/laboratory/space. ORFPD reviews the plans annually, after changes, and when responding to site events. As a community service, ORAU continues to work with the Oak Ridge Fire Department (ORFD) providing the Bullex® Fire Extinguisher Training System for its use in training the public. In 2018, the ORFD reported they have trained more than 500 individuals in the Oak Ridge area using this system.

ORAU has a certified occupational health nurse specialist on staff located on the main campus. An occupational health physician is on contract from Covenant Medical Group located at the nearby Methodist Medical Center. The occupational health physician conducts pre-employment and specific programs' required physicals. Occupational health clinic administrative specialists assist with scheduling and program requirements. Personnel successfully completing physicals and program requirements (e.g., respirator, forklift, physicals) wear cards on their badge lanyards that reflect the specific requirement qualification. The occupational health nurse sends a report of successful/failed physical/medical surveillance report to the individual, and notifies their supervisor and ES&H staff. The nurse also tracks upcoming physical/program requirements date and starts notifying applicable personnel 2 months before expiration date. Personnel can review personal medical records by contacting the onsite occupational health nurse.

The Wellness Program, in conjunction with the medical provider, effectively engages employees to seek out ways to improve their health. The wellness program, coordinated by the occupational health nurse, presents an annual *Walk to Wellness* and an annual Health and Safety Fair, and several lunch and learns throughout the year. ORAU's occupational medicine provider counsels employees about health or job-related concerns.

The occupational health nurse or trainers from the International Union of Operating Engineers provide First Aid/Cardio Pulmonary Resuscitation/Automated External Defibrillator (AED) classes. At least one AED is located on every floor of every building at ORAU. The occupational health nurse conducts, or is involved in, ergonomic surveys and hazard analysis checklists.

Supervisors or employees immediately notify the occupational health nurse of any injury or first-aid case unless the nurse is the first to know because of treatment, in which case the nurse initiates the ESH Incident Notification Form. The nurse position is located within the HR department and is seamlessly involved in all workers' compensation claims/cases. The occupational health nurse meets weekly with the ES&H director to discuss program issues and provides new employee orientation on occupational health and safety-related programs.

Conclusion

ORAU has developed, communicated, and implemented safety rules and work procedures, which all personnel understand and follow. PPE is available and worn to prevent mishaps or control their frequency and/or severity. ORAU employs certified professionals within the ES&H staff commensurate with the potential risks on the site. Managers and supervisors seek and respect the workers' opinions and ideas before finalizing work packages or implementing solutions. ORAU is controlling hazards using the hierarchy of controls. Management involves workers in work planning and package development to leverage workers' understanding of conditions that create hazards and workers' experience controlling those hazards. ORAU takes the health and welfare of its staff, staff augments, and subcontractor workforce seriously. ORAU provides a full range of medical services, emergency response and planning, and wellness program support. ORAU's injury and illness rates reflect effective hazard prevention and control methods. The Team did not identify any programmatic non-compliance with DOE, OSHA, State or local safety requirements. ORAU can make additional improvements by making control selections more specific in JHAs, revising how it controls access to machine shop equipment, and creating an anonymous reporting system for employee concerns. ORAU meets the expectations in the Hazard Prevention and Control tenet for continued DOE-VPP participation.

VII. SAFETY AND HEALTH TRAINING

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

The 2015 review determined that ORAU continued to have a well-established and documented training and qualification program that trains workers appropriately to recognize hazards and protect themselves and their coworkers. The ORAU training program routinely evaluated (through employee feedback surveys) new and improved methods by which it could improve the training experience for employees.

ORAU has processes that formally define required training. Employees, supervisors, and managers must complete training commensurate with their job descriptions, responsibilities, and authorities. The ORAU training organization requires supervisors complete the Required Training Checklist (RTC) for new or reassigned employees. The RTC provides a list of training courses, including required training for all employees and optional training for the individual's position. The training organization and workers believe this approach ensures they have the necessary training to perform their work safely.

New employees complete one week of initial training identified as their "Learning Path" on the RTC. The new employee training includes safety and health topics, such as asbestos, drugs/alcohol, General Employee Radiological Training, and ES&H orientation. The ES&H orientation includes ISM, VPP, ES&H, DOE Policies, Hazard Communication, Emergency Preparedness, Occupational Health and Wellness Programs, and other relevant information.

When new employees arrive in their assigned area, SSRs provide specific mentoring, including evacuation routes, rally points, shelter locations, how to handle emergencies, and how to access the Safety 1st and Shortcuts websites. Employees receive lanyard cards with ES&H and Safeguards and Security point-of-contact information. SSRs periodically check back with the newer individuals for any needed follow-up.

Over the past three years, ORAU initiated a graduated approach to improve employees' laboratory training. The safety division manager gives an initial laboratory safety briefing for all new laboratory employees during their new hire training. If the new employee's job exposes them to hazards, they receive additional specific training, which includes demonstrating benchtop laboratory skills and completing specific knowledge quizzes prior to performing laboratory activities.

ORAU maintains its training records in the Oracle Learning Management[®] database. The training group has adopted a new approach to how it schedules training. The last VPP triennial onsite review identified that HR training coordinators prepared special queries to identify employees' upcoming training due in 30 or 60 days. Since much of the required training is computer-based, this approach often resulted in workers postponing training until the last minute and then completing the training in marathon sessions, which limited training effectiveness. The training group now assigns employees two courses at a time (through e-mail notification) and the employees have 4 weeks to complete those two courses. The training manager believes this approach improves worker scheduling for required computer-based training and improves retention of course content.

ORAU continues to assist its employees' career growth through established reimbursement policies, such as the educational reimbursement and professional certification programs. Employees who used this benefit appreciated ORAU's commitment to these programs. ORAU's support for these programs improves morale, encourages employee investment in the company, and strengthens the company's experience by promoting from within.

Conclusion

ORAU continues to have a well-established training and qualification program that trains workers appropriately to recognize hazards and protect themselves and coworkers. The ORAU training program continues to evaluate new and improved methods by which it can improve the training experience for employees. The ORAU Safety and Health training meets the expectations for continued participation in DOE-VPP.

VIII. CONCLUSIONS

ORAU continues to pursue safety and health excellence as a competitive advantage. Although most workers are not exposed to any hazards beyond the normal office environment, some tasks do involve more hazardous work, particularly in the laboratory or fieldwork. In those cases, ORAU processes and procedures identify, analyze, and control the hazards. Workers are willing to stop work when conditions are uncertain or potentially unsafe, and have a history of stopping or delaying project work if as-found conditions differ from expectations. ORAU is working to better define the boundaries of the ORISE contract versus other work it performs to ensure it identifies the appropriate safety requirements, but expects all work to meet its high expectations of safety and quality. The Team did not identify any programmatic non-compliance with DOE, OSHA, State, or local safety requirements that would preclude participation in DOE-VPP. The Team identified some opportunities for improvement that will help ORAU implement all applicable safety standards and requirements, particularly for routine tasks where workers rely on personal knowledge and experience. ORAU continues to meet all the expectations for DOE-VPP, and the Team recommends ORAU continue to participate in DOE-VPP at the Star level.

Appendix A: Onsite VPP Assessment Team Roster

Management

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