Idaho Treatment Group, LLC Advanced Mixed Waste Treatment Project

Report from the Department of Energy
Voluntary Protection Program
Onsite Review
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U.S. Department of Energy
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Office of Health and Safety
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Foreword

The Department of Energy (DOE) recognizes that true excellence can be encouraged and guided but not standardized. For this reason, on January 26, 1994, the Department initiated the DOE Voluntary Protection Program (VPP) to encourage and recognize excellence in occupational safety and health protection. This program closely parallels the Occupational Safety and Health Administration (OSHA) VPP. Since its creation by OSHA in 1982 and DOE in 1994, VPP has demonstrated that cooperative action among Government, industry, and labor can achieve excellence in worker safety and health. DOE's former Office of Health, Safety and Security assumed responsibility for DOE-VPP in October 2006. In May 2014, the Office of Environment, Health, Safety and Security (AU) was established and has the responsibility to manage DOE-VPP. AU expects to expand contractor participation complex-wide and coordinate DOE-VPP efforts with other Department functions and initiatives and continue to utilize the components of the Integrated Safety Management (ISM).

DOE-VPP outlines areas where DOE contractors and subcontractors using ISM 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.

Requirements for DOE-VPP participation are based 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 designed to apply to all contractors in the DOE complex and encompasses 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 programs with names and functions similar to those in OSHA's VPP: Star, Merit, and Demonstration. The Star program is the core of DOE-VPP. This program is aimed at truly outstanding protectors of employee safety and health. The Merit program is a steppingstone for participants that have good safety and health programs, but need time and DOE guidance to achieve true Star status. The Demonstration program, expected to be used rarely, allows DOE to recognize achievements in unusual situations about which DOE needs to learn more before determining approval requirements for the Merit or Star program.

By approving an applicant for participation in DOE-VPP, DOE recognizes that the applicant exceeds the basic elements of ongoing, systematic protection of 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 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 evaluation of Idaho Treatment Group, LLC (ITG), at the Advanced Mixed Waste Treatment Project during the period of June 3-12, 2014, and provides the Associate Under Secretary for Environment, Health, Safety and Security with the necessary information to make the final decision regarding ITG's continued participation in DOE-VPP.

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ABBREVIATIONS AND ACRONYMS

AMOW	Approved Method of Work
AMWTP	Advanced Mixed Waste Treatment Project
AU	Office of Environment, Health, Safety and Security
AU-12	Office of Worker Safety and Health Assistance
BBWI	Bechtel BWXT Idaho, LLC
BBS	Behavior-Based Safety
BLS	Bureau of Labor Statistics
CAM	Continuous Air Monitor
CARB	Corrective Action Review Board
CAS	Contractor Assurance System
CBT	Computer-Based Training
CCE	Contamination Control Enclosure
CRA	Contractor Readiness Assessment
CTS	Comprehensive Tracking System
DART	Days Away, Restricted or Transferred
DOE	Department of Energy
DSA	Documented Safety Analysis
EOC	Emergency Operations Center
EDF	Energy Drive Facility
ESH	Environment, Safety and Health
ESIT	Employee Safety Improvement Team
HEPA	High-Efficiency Particulate Air
HPI	Human Performance Improvement
HSC	Hazard Screening Checklist
HSS	Office of Health, Safety and Security
ID	Idaho Operations Office
IH	Industrial Hygiene
INL	Idaho National Laboratory
IS	Industrial Safety
ISM	Integrated Safety Management
ISMS	Integrated Safety Management System
ITG	Idaho Treatment Group, LLC
IUOE	International Union of Operating Engineers
JHA	Job Hazard Analysis
KEYS	Keep Everyone and Yourself Safe
MLLW	Mixed Low-Level Waste
MOP	Management Observation Program
NAICS	North American Industry Classification System
OSC	On-scene Commander
OSHA	Occupational Safety and Health Administration
POWER	Plant Operations Walkdown for Excellence and Reliability
PPE	Personal Protective Equipment
PSHAT	Planning/Scoping Hazard Assessment Team
Psi	Pounds Per Square Inch
PU-238	Plutonium 238
PVC	Polyvinyl chloride
RCE	Retrieval Contamination Enclosure

RI	Rich Industries
RWMC	Radioactive Waste Management Complex
RWP	Radiological Work Permit
SCBA	Self-Contained Breathing Apparatus
SME	Subject Matter Expert
Team	Office of Environment, Health, Safety and Security DOE-VPP Team
TRC	Total Recordable Case
TRU	Transuranic
TRUPACT-II	Transuranic Package Transporter Model 2
TSA	Transuranic Storage Area
TSA/RE	Transuranic Storage Area/Retrieval Enclosure
TSR	Technical Safety Requirement
VPP	Voluntary Protection Program
WIPP	Waste Isolation Pilot Plant
WMF	Waste Management Facility

EXECUTIVE SUMMARY

Idaho Treatment Group, LLC (ITG), is the service contractor operating the Advanced Mixed Waste Treatment Project (AMWTP). Located within the Radioactive Waste Management Complex at the Idaho National Laboratory, the function of AMWTP is to retrieve a variety of wastes stored aboveground on asphalt pads, characterize, sort, treat, and ship the wastes to their final disposal sites, primarily the Waste Isolation Pilot Plant (WIPP) in New Mexico. ITG won the contract and took over AMWTP management and operation in October 2011 from Bechtel BWXT Idaho, LLC (BBWI). BBWI received the Department of Energy (DOE) Voluntary Protection Program (VPP) Star in 2009.

AMWTP's accident and injury statistics are significantly lower than the average for the comparable industry. AMWTP has maintained a very low total recordable case rate and days away, restricted or transferred case rate with no lost workday cases in the last 10 years and over 15 million hours worked. This is a remarkable achievement given the nature of the work performed. Waste Handling Teams have moved over 550,000 waste containers since October 2011, averaging 18,000 container moves per month or over 600 container moves per day in fiscal year 2014 alone. As of this report, the number of recordable injuries for 2014 is approximately 40 percent lower than the previous 2 years. In 2014, ITG focused on strains and sprains, which accounted for 19 of the 35 cases (including first-aid cases) since 2013. In response to the high number of strains and sprains, AMWTP implemented a *Move Smart* program that has resulted in fewer worker injuries. No subcontractor injuries have occurred over the past 3 years.

Initially, after the contract transition, ITG experienced unanticipated instability in its senior management team. The initial team focused heavily on meeting challenging production goals and had difficulty establishing trust with the workforce. ITG has overcome those issues, stabilized its management team, gained approval of its Integrated Safety Management System, and regained the trust of the workers. It has invested in safety controls and processes necessary to protect workers from potential exposures and encouraged greater worker involvement.

Workers are more involved and active now than observed in the 2009 evaluation. The Employee Safety Improvement Team (ESIT) remains the primary safety committee for workers to raise and address safety issues and concerns. The ESIT meetings provide an effective forum for a very involved workforce to address issues and voice a strong commitment to the safety and health of AMWTP work and workers. Keeping Everyone and Yourself Safe, the ITG Behavior-Based Safety (BBS) program, raises employee awareness of safety and performance concerns and continues to search for new ways to engage and improve the ITG BBS program.

ITG continues to demonstrate an effective work control and hazard analysis process. ITG has improved the process by incorporating many suggestions and recommendations from the subject matter experts and work planners who use the system daily. These improvements help tailor the system to worker needs, and improve the efficiency of the process.

ITG uses the hierarchy of controls on hazards at AMWTP with an emphasis on engineered controls. ITG has shown it continues to improve engineered controls with capital investments, such as contamination enclosures, to control worker exposures and reduce personal protective equipment stresses. ITG is also working to improve controls in the boxline to reduce exposures and contamination of plutonium 238 (PU-238). The Office of Environment, Health, Safety and

Security DOE-VPP Team (Team) observed a number of individual conditions (eyewash stations, fire extinguishers, housekeeping, and extension cords) that indicate ITG should encourage workers to pay greater attention to their normal workplace inspections to ensure controls do not degrade over time.

The training and qualification processes ensure that AMWTP employees, subcontractors, and temporary employees are trained and proficient in performing plant operations. ITG uses position descriptions and a needs analysis for that position to tailor an individual training plan for each employee. Training at ITG is composed of both classroom and computer-based training. ITG considers employee suggestions to improve training and continues to improve its program based upon those inputs.

Since winning the contract to manage and operate AMWTP, ITG has overcome initial difficulties and confusion to institute strong worker involvement and ownership of its safety program. The management leadership team has stabilized and demonstrates its value for safety as a necessary precondition for mission success. Although some worker distrust remains from initial workforce reductions in 2012, most workers now trust their managers to correct safety issues and honor worker concerns. Workers are actively involved in efforts to correct safety issues, particularly related to the increased hazards associated with PU-238 waste processing. The Team identified many opportunities for improvement, but these do not indicate significant noncompliances with safety standards or regulations. ITG continues to invest in safety improvements and demonstrates the performance expected of a DOE-VPP Star participant in each of the five tenets. The Team recommends that ITG continue to participate in DOE-VPP at the Star level.

TABLE 1

OPPORTUNITIES FOR IMPROVEMENT

Opportunity for Improvement	**Page**
ITG should add more elements to the MOP to focus managers on listening to workers, enabling workers to implement solutions, and encouraging workers to identify other problems and issues in the workspaces.	**5**
ITG should increase its efforts to identify leading safety and health indicators and automate integration and presentation of those indicators on its performance dashboard.	**7**
ITG should revise its annual review process to incorporate more information from the CARB and the Collective Significance Review and establish specific and relevant safety and health goals.	**7**
ITG should consider adding KEYS observation metrics to the Corporate Performance Dashboard so employees can see how their contributions are affecting safety.	**9**
ITG should consider rewarding positive contributions to its safety culture for employees that demonstrate good safety practices.	**9**
AMWTP should continue to evaluate the feasibility of adopting the Respirex® or similar suit to control hazards associated with working within a PU-238 contamination environment and working with the vendor to modify the suit as necessary to accommodate worker concerns.	**15**
ITG should ensure that the next revision of the IH procedure includes the use of CTS.	**16**
ITG should consider alternative inspection marking methods that eliminate confusion over the inspection status for fire extinguishers.	**18**
ITG should secure the extension cords onto the building infrastructure to eliminate the tripping hazard, and ITG should take down the outdated CAM placards.	**18**
ITG should ensure the eyewash station service contractor is aware of the contract inspection requirements, remove the eyewash canister with the broken gauge from service, and develop a new eyewash inspection card so the inspector can record the pressure and activation of the canister.	**19**
ITG should review EDF-0034, *Critical Safety Analysis for TRU Waste Storage,* to remove internal inconsistency, and ensure criticality safety postings do not introduce alternative interpretations.	**19**
ITG should consider using drum spacers (engineered control) in all drum storage locations requiring criticality spacing controls.	**19**

AMWPT should consider options to control the proliferation of PU-238 surface and air contamination within the boxlines.	**20**
ITG should consider using real-time metabolic monitoring of workers in the boxline cells to determine when workers should rest and return to work rather than relying on calculated work/rest cycles.	**21**
ITG should improve its documentation and tracking of operationally significant requests to prevent unnecessary delays in implementing safety improvements.	**21**
ITG should ensure the flowrate of each sampling line is accurately determined when technicians use a single pump to collect two simultaneous samples or cease that practice.	**22**
ITG should consider phasing some initial training elements to allow new employees the time to absorb all the information presented.	**25**
ITG should consider providing additional safety training opportunities to workers who show an interest and desire to expand their contribution to a safer workplace.	**26**

I. INTRODUCTION

The Advanced Mixed Waste Treatment Project (AMWTP) is a radioactive and hazardous waste storage and treatment facility designed and built to safely and compliantly retrieve, characterize, treat, certify, package, and ship transuranic (TRU) and mixed low-level waste (MLLW) to offsite treatment and disposal facilities. British Nuclear Fuels Limited constructed and initially operated AMWTP as a privatized contractor for the Department of Energy (DOE). DOE converted the contract to a management and operating contract with DOE assuming ownership of the facilities in 2005. Bechtel BWXT Idaho, LLC (BBWI) assumed the contract in 2005. In 2010, DOE recompeted the contract, and the Idaho Treatment Group, LLC (ITG) took over operation in October 2011.

This site has historically managed the stored nuclear waste for shipment to permanent disposal sites outside the State of Idaho. The site also supports the receipt and treatment of TRU waste from other DOE sites for shipment to the Waste Isolation Pilot Plant (WIPP). ITG completed Phase I verification of its Integrated Safety Management System (ISMS) verification in February 2012 and Phase II in August 2013. ITG employs approximately 660 people with 306 represented by the International Union of Operating Engineers Local (IUOE) 370.

AMWTP is located within the Radioactive Waste Management Complex (RWMC), which consists of two main areas: the approximately 88-acre Subsurface Disposal Area and the 55-acre Transuranic Storage Area (TSA). Two additional areas provide support: the Administrative Area and the Operations Area. AMWTP facilities are located in TSA, and AMWTP activities take place within this area. AMWTP operations are broadly split into two areas: retrieval and treatment. Retrieval covers the removal of waste from storage locations, Waste Management Facilities (WMF) 634/610/628/635, onsite and offsite transportation, and Transuranic Package Transporter Model 2 (TRUPACT-II) or Type B Container loading before shipping. Primarily, treatment covers the entirety of operations performed within the Advanced Mixed Waste Treatment Facility, WMF-676, including the sorting of box contents into drums, handling of special case waste, and size reduction. The scope of treatment extends beyond WMF-676 to include other waste treatment operations requiring contamination control that cannot be performed within WMF-676. This scope includes drum repacking in temporary confinement structures (soft-sided tents or hard-sided structures). Drum repacking involves activities, such as handling, visual examination, or treatment of waste. Treatment may include overpacking of drums, crushing empty drums, absorbing aqueous or organic liquids, decanting aqueous or organic liquids, relidding, sorting, and reducing the size of plywood removed from storage arrays in the TSA/Retrieval Enclosure (TSA/RE). The scope of retrieval operations allows containers requiring no treatment to be removed from storage, certified, and shipped. Due to the type and quantity of materials present in the facility, AMWTP is a Category 2 Nuclear Facility.

ITG employees may encounter hazardous materials associated with AMWTP processes. These may include asbestos, beryllium, lead, mercury, organic compounds, or polychlorinated biphenyls. Radiological hazards are present in some waste streams and may be mixed with hazardous materials discussed above. Physical hazards may include heat, cold, noise, or ergonomic hazards. Biological hazards are not present in the waste streams, but may be present at the facility, such as insects, reptiles, bloodborne pathogens, or Hantavirus.

The ITG contract is valued at approximately $456M and runs until the end of September 2015. Two years prior to the contract change, BBWI achieved DOE-VPP Star status in May 2009. In

accordance with DOE-VPP requirements, ITG submitted a request to the DOE Office of Worker Safety and Health Assistance (AU-12) to enter DOE Voluntary Protection Program (VPP) transition status, which allows the new contractor 2 years to prepare for a DOE-VPP onsite review. There were several senior management changes early on in the contract and the Idaho Operations Office (ID) required several improvements to the ISMS verification, which delayed the submission of the VPP supplemental application until January 2014. Per DOE-VPP requirements, transition of an existing VPP certification to a new contractor requires an onsite review by AU-12. This report provides the results of that onsite assessment conducted by the Office of Environment, Health, Safety and Security (AU) DOE-VPP Team (Team) June 3-12, 2014.

II. INJURY INCIDENCE/LOST WORKDAYS CASE RATE

Injury Incidence/Lost Workdays Case Rate (AMWTP)					
Calendar Year	Hours Worked	Total Recordable Cases (TRC)	TRC Rate	DART* Cases	DART Case Rate
2012	1,284,793	7	1.09	4	0.62
2013	1,254,260	7	1.12	2	0.32
2014	636,623	2	0.97	2	0.32
3-Year Total	3,175,676	16	1.01	8	0.50
Bureau of Labor Statistics (BLS) Average for NAICS** Code: 562 "Waste Management and Remediation Services" Note: Using latest 2012 BLS Average			5.4		3.4
Injury Incidence/Lost Workdays Case Rate (Subcontractors and Vendors)					
Calendar Year	Hours Worked	TRC	TRC Rate	DART Cases	DART Case Rate
2012	1,030	0	0.0	0	0.0
2013	420	0	0.0	0	0.0
2014	351	0	0.0	0	0.0
3-Year Total	1801	0	0.0	0	0.0
Bureau of Labor Statistics (BLS) Average for NAICS Code: 238 "Specialty Trade Contractors" Note: Using latest 2012 BLS Average			3.9		2.2

* Days Away, Restricted or Transferred

** North American Industry Classification System

ITG's accident and injury statistics are significantly lower than the average for the comparable industry. AMWTP has maintained a very low TRC rate and DART case rate with no lost workday cases in the last 10 years and over 15 million hours worked. This is a remarkable achievement given the nature of the work performed. Waste Handling Teams have moved over 550,000 waste containers since October of 2011; averaging 18,000 container moves per month or over 600 container moves per day in fiscal year 2014 alone. As of this report, the number of recordable injuries for 2014 is approximately 40 percent lower than a similar point in each of the previous 2 years. In 2014, ITG focused on strains and sprains, which accounted for 19 of the 35 injuries (including first-aid cases) since 2013. In response to the high number of strains and sprains, AMWTP implemented a *Move Smart* program, which has resulted in fewer worker injuries. No subcontractor injuries have occurred over the past 3 years.

III. MANAGEMENT LEADERSHIP

Management leadership is a key element of obtaining and sustaining an effective safety culture, and implementing the guiding principles of Integrated Safety Management (ISM). The contractor must demonstrate senior-level management commitment to ISM and occupational safety and health, in general, and to meeting the expectations of DOE-VPP. Management systems for comprehensive planning must address health and safety requirements and initiatives. As with any other management system, authority and responsibility for employee health and safety must be integrated with the management system of the organization and must involve employees at all levels of the organization. Elements of that management system must include: (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 must be visible, accessible, and credible to employees.

In 2009, the Team identified that BBWI had a strong management team that was personally committed to accomplishing the AMWTP mission safely, compliantly, and efficiently. Improvements in safety and health had been used to drive other improvements across the plant; establish a strong, caring safety culture; and build a sense of team and community throughout the workforce. Appropriate goals were established and resources were appropriately prioritized and applied to meet those goals. Senior managers' visibility in the workspaces and familiarity with both workers and their jobs were excellent and clearly modeled expectations for middle managers and supervisors.

Initially following contract transition, ITG experienced significant turmoil in its senior management team. The original president/project manager left the project after only one month, followed by another president/project manager that remained for approximately 6 months. The original Environment, Safety, and Health (ESH) manager remained on the project for about 12 months. Many workers identified that the first two presidents and the ESH manager demonstrated a very strong production orientation, often implying that safety could, or should, be compromised to meet production goals. Although replacing these and other senior leaders brought significant scrutiny and a potential for a reduced award fee, the management changes have resulted in significant improvement in workers' trust and support of the senior leadership team. The president/project manager ensured the new ESH manager understood that the position was to advocate for worker safety and health, no matter the potential effect on production, and to alleviate worker concerns stemming from the previous ESH manager. All managers interviewed, including senior and middle managers, demonstrated significant commitment to worker safety and health as a means to achieve safe, compliant production and an essential means of meeting contract goals.

The impact of the contract change at ITG remains palpable. The new contract is heavily weighted towards achieving challenging milestones. Although it is a cost-plus-award fee contract, year over year funding levels fluctuate, presenting ITG with challenging resource constraints to meet production goals and milestones. The February 2014 events that resulted in suspension of waste shipments to WIPP in New Mexico caused ITG to shift its focus from shipping TRU waste to WIPP to focusing on processing MLLW that it can ship to other sites. Despite the challenging resource constraints, ITG has committed the necessary resources to encourage worker participation in the worker safety and health program and find safer methods to accomplish work. ITG has made significant investments in improved engineered controls,

including confinement of the retrieval areas, use of mockups to train workers, identify alternative work methods, and reduce exposures.

Many managers, at all levels, are highly visible in the work areas. Several managers demonstrated a very active presence in the workplace, taking several tours daily of areas under their purview. In some cases, senior managers have not established a regular and visible presence in work areas. In particular, the president and project manager described a recent all employees meeting where a worker specifically challenged him for not being more visible. The president thanked the worker for the comment and committed to getting out frequently.

ITG established a Management Observation Program (MOP) as a means of encouraging managers' presence. Since contract transition, ITG has been altering the MOP to drive more focused reviews in specific topical areas, and rely on MOP as an element of its Contractor Assurance System (CAS). In most cases, managers are only expected to perform one or two management observations each month. An unintended consequence in this change is that some managers are not spending time in the workspaces focusing on mentoring, coaching, and listening to workers, but spend the limited time focused on identifying problems. In this environment, workers become more concerned about managers identifying superficial problems rather than contributing to problem resolution. In order to increase manager trust and presence, ITG should add more elements to the MOP to focus managers on listening to workers, enabling workers to implement solutions, and encouraging workers to identify other problems and issues in the workspaces.

Opportunity for Improvement: ITG should add more elements to the MOP to focus managers on listening to workers, enabling workers to implement solutions, and encouraging workers to identify other problems and issues in the workspaces.

At contract transition, ITG cut project staffing significantly. Those staffing cuts created significant difficulties for remaining personnel, and created weaknesses in some management systems. Critical staffing cuts occurred in contract assurance, project performance management, and communication functions. In these cases, the cuts left a single person to perform functions previously performed by several people. DOE-ID's expectations for timely response to problems or events did not change, but the staffing cuts hindered ITG's ability to meet those expectations. As a result, both DOE-ID and ITG managers have become frustrated. DOE-ID personnel are frustrated that ITG does not respond faster to requests and ITG managers expressed frustration with DOE-ID requests or directed actions that they perceive require resource expenditure without a commensurate benefit in achieving a safe, compliant performance. Both the CAS and performance reporting managers are making significant revisions to improve self-assessments and identify meaningful performance indicators, including leading indicators. The Team provided ITG with several suggestions for leading safety and health performance indicators. ITG should continue to focus its efforts to identify and implement leading indicators for both its internal performance monitoring, as well as its CAS.

In order to establish more effective responses to issues or concerns, ITG uses a Corrective Action Review Board (CARB) chaired by the president and project manager. The CARB reviews all incidents and occurrences to determine which corrective action plans it will review. The CARB meets periodically and determines whether corrective actions are complete or not. ITG also maintains a Collective Significance Review and an Executive Risk Register to look for lower

threshold events that might collectively identify a safety issue and ensure management priorities align with risk profiles.

The ITG communication staff consists of only one person, who has a background in journalism. This individual helps managers use several means of communication, including meetings, newsletters, and daily project notes, to communicate with workers. He attends company special functions, takes photographs, and prepares articles of interest for all workers. All personnel praised the communications manager for his sense of humor and ability to provide entertaining messages.

ITG has a complete set of safety and health policies that are readily available and understood by all personnel. As part of the transition, ITG successfully completed the Phase I verification of its ISMS in February 2012 and the Phase II verification in August 2013. Those verifications concluded that ITG systematically integrated safety into its management and work practices, processes, and organizational culture.

The ITG ESH organization structure supports plant operations. The ESH manager is organizationally equivalent to the plant manager with both positions reporting directly to the president/project manager. The ESH manager assigns industrial hygiene (IH), industrial safety (IS), and radiological control personnel to the plant operations organization in order to support continuous operation. The IH/IS and radiological control staff are adequate for the normal expected workload.

The IUOE Local 370 represents approximately 300 workers at AMWTP. Slightly over half of those represented workers are dues-paying union members. The union provided a written statement of support for ITG's continued participation in DOE-VPP. Both the chief steward and the Union co-chair of the Employee Safety Improvement Team (ESIT) were vocal in their belief that ITG managers support and encourage workers to pursue excellence in worker safety and health.

ITG uses a collective *dashboard* to present a variety of performance measurement data, including safety and health statistics. ITG performs multiple management assessments annually, including multiple assessments under CAS. When ITG took over operation of AMWTP, it significantly reduced the number of personnel assigned to perform contractor assurance and monitor performance. The weaknesses in contractor assurance have been an issue of concern for DOE-ID. Recently ITG began working to significantly change and improve its CAS. Improvements include streamlining the number of self-assessments with integrated assessment activities. The CARB reviews all assessment results and determines what actions from the assessment warrant additional followup by the CARB. ITG has had little success developing and using meaningful leading statistical indicators. ITG focuses solely on accident or injury statistics, including first-aid cases, for its safety and health performance indicators. Although workers perform Keeping Everyone and Yourself Safe (KEYS) observations (see Employee Involvement), ITG has not yet expanded the program to the point where it can track and trend those observations. ITG does not sort and analyze KEYS data for other important parameters and does not yet take full advantage of the data collected (e.g., contact rate, active observer rate, most at-risk behavior, percent safe). ESH personnel manually collect and derive safety and health-related performance indicators rather than use automated data retrieval tools, placing additional stress on limited personnel resources. Improving use of leading indicators and automating retrieval and integration of raw data will help ITG identify adverse trends or

conditions before they lead to reportable occurrences and lead to a more effective overall performance. ITG should increase its efforts to identify leading safety and health indicators and automate integration and presentation of those indicators on its performance dashboard.

Opportunity for Improvement: ITG should increase its efforts to identify leading safety and health indicators and automate integration and presentation of those indicators on its performance dashboard.

ITG performs an annual assessment using the five tenets of DOE-VPP using a combination of ESIT members, subject matter experts (SME), and managers. Personnel review many sources of information to identify accomplishments and improvements made during the previous year. The annual report does not effectively establish improvement goals for the coming year that are measureable. Improvement initiatives identified in the report tend to be generic in nature. In order to be more effective and reduce duplicative assessment efforts, ITG should revise its annual review process to incorporate more information from the CARB and the Collective Significance Review and establish specific and relevant safety and health goals.

Opportunity for Improvement: ITG should revise its annual review process to incorporate more information from the CARB and the Collective Significance Review and establish specific and relevant safety and health goals.

Conclusion

Initially after contract transition, ITG experienced unanticipated instability in its senior management team. The initial team focused heavily on meeting challenging production goals and had difficulty establishing trust with the workforce. ITG has overcome those issues, stabilized its management team, gained approval of its ISMS, and regained the trust of the workers. It has invested in safety controls and processes necessary to protect workers from potential exposures and encouraged greater worker involvement. ITG meets the expectations for continued participation in DOE-VPP at the Star level.

IV. EMPLOYEE INVOLVEMENT

Employees at all levels must continue to be involved in the structure and operation of the safety and health program and in decisions that affect employee health and safety. Employee 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 must work together to establish an environment of trust where employees understand that their participation adds value, is crucial, and welcome. Managers must be proactive in recognizing, encouraging, facilitating, and rewarding workers for their participation and contributions. Both employees and managers must communicate effectively and collaboratively participate in open forums to discuss continuing improvements, recognize and resolve issues, and learn from their experiences.

The 2009 Team review found that AMWTP workers were actively engaged in the safety and health programs. Workers were encouraged to participate in company and site-safety activities and were familiar with the tenets of DOE VPP. The 2014 Team validated that these conditions still exist and that workers remain committed to the safe operation of the facility. The 2014 Team found AMWTP workers involved with ESIT, KEYS observations, safety walkdowns, and actively involved in Planning/Scoping Hazard Assessment Team (PSHAT).

The ESIT remains the primary safety committee for workers to raise and address safety issues and concerns. ITG updated the *AMWTP Employee Safety Improvement Team Charte*r, CTR-005, Rev 6 in May 2014. The company-level ESIT has a bargaining unit co-chair elected by the bargaining unit, and a co-chair elected by the representatives of the ESIT. The management champions for the company-level ESIT are the company president and the operations manager. Since 2009, there have been slight changes in the makeup of the subordinate ESIT units that report to the company-level ESIT, but the structure and operation are essentially unchanged. Each of the 11 ESIT units has its own chair, co-chair, and management champion.

The Team attended the June ESIT meeting and observed a very involved workforce addressing issues and voicing a strong commitment to the safety and health of AMWTP work and workers. Examples of employee-generated issues at the ESIT meeting included exit doorways that have door latches located too close to the door jam and could injure someone opening the door; the resolution under consideration includes installing crash-type latches. The ESIT members are very involved in evaluating forklift drum handling attachments, as well as recommending safe ways to handle drums that have deteriorated over time. ESIT members are addressing pendent lighting issues in the retrieval building that present an obstruction to forklifts as they move through doorways. The points of contact for individual issues provided updates to the corrective action progress during the meeting.

In addition to the ESIT unit activities, ESIT members chair 10 ESIT subcommittees. Each subcommittee also has a designated manager that champions the subcommittee. One of the subcommittees is the KEYS committee. KEYS is a program that carried over from the previous contractor sponsored by the ITG Senior Executive Council. It is the ITG Behavior-Based Safety (BBS) program to raise employee awareness of safety and performance concerns. Similar to ESIT, KEYS also has a charter (CTR-012, Rev 2), but the last revision was in October 2012 when ITG assumed the contract. ITG is having difficulty increasing worker participation in the KEYS program. From June 2013 to June 2014, there were 1,015 observations submitted by

141 observers out of a population of 617 employees, or approximately 23 percent of the employee population. The KEYS chair currently relies on drawings for prizes as the primary means to encourage employee participation. Employees enter the drawing by completing a KEYS observation card. Quarterly prizes include parking places, electronic notepads and e-readers, camping stoves, coolers, headphones, and cell phone accessories. Employees with multiple observations have more chances to be selected. To foster greater employee participation in KEYS observations, ITG should identify better incentives, and tie specific rewards to identified participation levels. The rewards should ensure everyone reaching that level receives the prize, and the rewards should ensure lasting visibility to the rest of the workforce. ITG should also consider using KEYS observations and group rewards to drive competition between workgroups as a means of increasing participation. In addition, ITG should include KEYS metrics on the Corporate Performance Dashboard so employees can see how their contributions are affecting safety.

Opportunity for Improvement: ITG should consider adding KEYS observation metrics to the Corporate Performance Dashboard so employees can see how their contributions are affecting safety.

ITG relies on cash rewards and drawings to provide incentives to encourage greater employee involvement. For example, ITG has the *Good Catch* program for supervisors and managers to reward employees for identifying issues. Supervisors, managers, and ESIT members carry cards and can present the card on the spot to an individual. That individual can then redeem the card for a $50 gift card. The ESIT may adopt the *Good Catch* as an issue to resolve if committee members believe it is appropriate. Supervisors and managers can also recommend individuals or groups for larger cash rewards, although those rewards typically take more time and need approval through human resources and senior management. Workers contributed many suggestions that have improved safety and operations. Examples include identifying ways to improve retrieval operations or to eliminate hazards during retrieval.

ITG currently does not use a system of rewards for reinforcing positive behaviors for everyday activities, such as using handrails, helping coworkers lift items, reminding workers to use doors for entry and exit of shop areas instead of rollup doorways, or securing gas bottles that are unsecured. ITG should consider rewarding positive contributions to its safety culture for employees that demonstrate good safety practices.

Opportunity for Improvement: ITG should consider rewarding positive contributions to its safety culture for employees that demonstrate good safety practices.

ITG recently reinstituted the periodic Plant Operations Walkdown for Excellence and Reliability (POWER) identified as an excellent practice during the 2009 review. After transitioning to the new ITG contract, the new management team discontinued the POWER walkdowns (see Worksite Analysis). In May 2014, ITG reinitiated the POWER walkdowns when it issued *Plant Operations Walkdown for Excellence and Reliability*, MP-COPS-9.41, to encourage workers to actively participate and take ownership of safety, housekeeping, and conduct of operations. The Team observed a POWER walkdown that included the plant manager, ESH manager, ESIT members, and other workers. The POWER walkdown team identified several opportunities for

improvement and corrective actions. For example, the POWER walkdown identified items and material stored on top of available flat surfaces, such as file cabinets. The plant manager recommended the work area have an effective storage capability to minimize clutter and potential for falling material. He took it upon himself to initiate a requisition request to provide more effective storage options for the workspace.

The ITG PSHAT process actively involves workers in the revised work control process. Workers, planners, SMEs, and operational personnel walkdown new work activities and identify hazards, analyze those hazards, and develop work documents that incorporate the controls necessary to provide a safe working environment (see Worksite Analysis).

Workers are more involved and active now than during the 2009 evaluation. Workers are deeply involved in problem resolution. The ESIT respiratory protection subcommittee addressing the Level B encapsulated suit contamination issues in the treatment facility demonstrates strong worker participation and excellent management support. The Team observed numerous examples of workers demonstrating a questioning attitude and raising questions for use in real-time mockup testing strategies to help determine potential Level B suit weaknesses and develop corrective measures as a result (see Worksite Analysis and Hazard Prevention and Control).

AMWTP workers provided significant process improvement suggestions in the retrieval building. Their suggestions included modifying the ventilation system to improve airflow and minimize the potential for airborne contamination. In the contamination control enclosure (CCE) mockup, workers suggested using the gantry crane and conveyors to minimize rolling stock in small work areas. A worker suggested placing the thermographic imaging gun on the forklift to minimize forklift operator exposure. ITG frequently modifies containment enclosures based upon worker suggestions.

Employees know their ESIT representatives and are familiar with the managers at AMWTP. The current culture expressed by employees is one of respect and appreciation for managers, and they are comfortable approaching the management staff with issues and suggestions. As discussed in the Management Leadership tenet, the current management team empowers the workforce and values their input and involvement. The number of new ideas and improvements adopted by the project that improved safety, efficiency, or production demonstrates this management approach. Examples of worker input and involvement include discovering drum-handling equipment attachments that did not work with some of the drums due to drum size; identifying wrong drums and boxes shipped to AMWTP by another contractor; identifying improperly stacked drums that started leaning; and preventing a forklift from lifting an overweight box that exceeded the lifting capacity of the forklift. In addition, operator input to changing procedures has improved usability, and employee feedback has improved rolling stock qualifications.

No employees expressed any concerns about raising safety issues, asking safety questions, pausing, stopping, or stepping back from work. The Team observed several cases of stop work/step back during this assessment. For example, a worker stopped work in a waste storage building when he observed crystals adhering to one of the pallets. By procedure, ITG personnel assume any crystals on floors, drums, or pallets in waste storage areas to be leaking waste from a container until proven otherwise. Further investigation identified the crystals as magnesium chloride that ITG uses to melt snow and ice in the winter. The magnesium chloride from wet

truck tires transferred to the pallet and left the crystallized residue when it dried. The ITG stop work/step back process requires the person stopping the work to agree with the resolution. In this case, a chemical analysis showed the worker that the material was indeed magnesium chloride and work resumed.

Conclusion

Workers are more involved and active now than observed in the 2009 evaluation. The ESIT remains the primary safety committee for workers to raise and address safety issues and concerns. The ESIT meetings provide an effective forum for a very involved workforce to address issues and voice a strong commitment to the safety and health of AMWTP work and workers. The KEYS program raises employee awareness of safety and performance concerns and continues to search for new ways to engage and improve the ITG BBS program. ITG meets the expectation of a DOE-VPP Star participant for the Employee Involvement tenet.

V. WORKSITE ANALYSIS

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

ITG recently revised, and DOE-ID approved, the Documented Safety Analysis (DSA) and associated Technical Safety Requirements (TSR) for receipt, retrieval, treatment, storage, and shipment of TRU waste at the site. This DSA categorizes AMWTP as a Category 2 Nuclear Facility and describes, analyzes, and documents the hazards and consequences of upset conditions or accidents for the facility. The DOE-approved TSRs document those high-level controls DOE depends upon for safe operation of the facility. The DOE Safety Evaluation Report (documents the DOE approval of the DSA and TSRs. DSA requirements are applied through operating procedures and work authorizations. MP COPS-9.14, Rev. 15, *Operations Procedure,* governs procedures that apply to activities that require specific direction for operating systems and equipment to ensure the facility is safely and reliably operated and maintained within its design basis while ensuring environmental, safety, health, and quality compliance. The MP COPS-9.14, Rev. 15, *Operations Procedure,* is consistent with the process reviewed in the 2009 review. The only significant change is the incorporation of the recently implemented Hazard Screening Process discussed later in this section.

As required by the ITG *Work Management Planning and Control Process*, MP-COPS-9.18, Rev. 4, ITG analyzes the hazards associated with the planned work by following the expectations of the *Hazards Assessment Procedure,* INST-COPS-9.18.4, Rev. 28.

The work management and control procedure requires that all activity level processes and procedures that are instructional in nature and not determined to be administratively exempt will have a job hazard analysis (JHA) performed. There are two basic types of hazard assessments: JHA and operational exempt JHAs. ITG has developed a site hazard list, which addresses all AMWTP general hazards (per the Energy Facility Contractors Group Work Control recommendations), and all personnel entering AMWTP must understand the hazards and mitigations.

ITG trains personnel to develop a JHA following a standardized approach using a hazard screening checklist (HSC) program in determining hazards and mitigations. ITG recently upgraded the HSC process and the supporting Excel® workbook that supports that process.

The HSC process facilitates the initial work planner walkdown of the activity that identifies the necessary SME involvement based on an established set of hazard identification questions contained within the HSC Excel workbook. The first worksheet in the Excel workbook identifies the required SMEs based on the work planner's initial review of preset hazard identification questions. The SMEs then participate in the PSHAT walkdown and analysis of the

identified hazards. The workbook then incorporates the SMEs' analysis and recommendations for controls into the JHA for that work activity. The unique aspect of the HSC process is that the Excel workbook structure applies all the elements of the hazard analysis from the SME identification to the final JHA controls. If planners, workers, or SMEs identify changes later in the JHA process, additional SMEs may be required to provide input. The system captures the original analysis that subsequent SMEs can review.

In addition, the ESH organization has vigorously tested and evaluated the HSC process to solicit recommendations for improvement from the work planners and the SMEs. As a result, ITG has incorporated many improvements into the HSC process since its initial rollout in 2013. This approach has greatly improved the overall effectiveness of the HSC process by incorporating user input.

The *Work Management Planning and Control Process* defines and implements a systematic and graded approach to work controls based on the scope, complexity, and hazards associated with the work. High-hazard work that involves safety-significant systems, structures, or components has high/medium complexity, hazard or consequence, or involves complex/multiple hazard controls requires a Type 1 work package that includes step-by-step procedures. ITG plans lower complexity work using Type 2-4, which use progressively less detail, down to and including, work that a skilled craftsperson can perform without additional planning. The *Work Management Planning and Control Process* includes Appendix A, *Work Package Type Decision Tree*, which provides criteria for determining work package type as the planning process evolves and prior to approval of the work package. The type of work package may change based on scope and PSHAT walkdowns input.

Type 1,2, and 3 work all require the use of a PSHAT, which is an effective approach that assembles and incorporates the knowledge and experience of workers, planners, operations, and SME personnel in a physical walkdown of a work activity to develop an effective analysis of hazards and to recommend controls. The PSHAT participates in work package preparation and JHA development and approval. The work control planner leads the PSHAT. Other necessary personnel may include the workgroup supervisor/shift supervisor/job supervisor, worker(s), radiological controls, engineering, IH/IS, and SME representatives (as required by workscope and hazards identified on the HSC), environmental, nuclear safety, etc.

Where feasible, ITG expects the PSHAT to conduct planning activities as a single group, and the team should include a worker(s) who will be accomplishing the work as part of the PSHAT. Workers are involved in work planning to draw upon their knowledge and experience, to address their concerns, and to get their input concerning preferred methods and approaches to work. This approach also helps to familiarize workers with the task, and to obtain their consent with the selected approach for the work. ITG also encourages planners to use prior worker feedback from work histories and maintenance logs if available.

For work in or affecting operations and production, the PSHAT interacts with Operations as part of the planning process. Operations must have full understanding of the scope of the planned work and provides operations-related input, including the facility conditions and operating modes required before the work proceeds.

With the revision of the work control process, ITG retained the use of the Approved Method of Work (AMOW) process reviewed in the 2009 review. An AMOW is a permit prepared from

Form-1444, *Job Hazard Analysis*, for applicable activity level instructions, and Form-2105, *Radiological Work Permits (RWP)*. The AMOW also identifies the mitigation of general hazards for operations and routine work activities when conditions are predictable and expected to remain constant for a long time (similar to a standing automated JHA approach used at other DOE sites). AMOWS cannot include work on safety-significant components or work that may affect a safety-significant component.

Observations by the Team demonstrated the revised work control process is effective. Worker involvement in PSHAT is strong and results in more usable work packages. In addition, the process empowers workers to suggest changes and improvements to work processes. For example, the workers involved in retrieval operations identified a potential concern when excavating older, degraded wasteboxes. The older boxes sometimes failed (structurally) when being handled by the retrieval forklift. The workers recommended improving the box-retrieval forklift carriage with adjustable sides to keep degraded boxes from collapsing outwardly during transport. AMWTP managers listened to the workers' suggestion and contacted the fork truck manufacturer to determine if such a device existed. The manufacturer declined to support the design. AMWTP managers then funded the AMWTP engineering group to design, certify, test and build the device. Per the DOE *Hoisting and Rigging Standard 1090*, chapter 9 requirements, an ITG professional engineer certified the device, and ITG performed an appropriate load test before using the device.

Since the implementation of the work control procedure in 2013, additional revisions have occurred to incorporate enhancements based on feedback from SMEs and work planners. These revisions have been highly effective in ensuring users more readily accept and implement the new process.

AMWTP currently uses the Rich Industries (RI) Level B suit (bubble suit) for maintenance and operational activities in the boxline cells. The RI Level B suit is made of Saranex™ and provides a micro protection environment with independent breathing air for the worker within the suit. The suit is designed to be used in conjunction with the MSA Safety, Inc. PremAire® Self-Contained Breathing Apparatus (SCBA) unit equipped with dual-air supply and a vortex cooler that provides cooling air to the worker within the suit environment and exhausts any additional air outside the suit. Air pressure within the suit protects the worker from potential contamination even in the event of a suit failure. AMWTP has used the suit since 2004 with occasional enhancements to the suit over the years.

Recent events indicate that the RI suit material is permitting plutonium 238 PU-238 contamination to migrate into the suit during boxline maintenance activities. The respiratory protection subcommittee is working with SMEs and the manufacturer to analyze recently experienced contamination migration through potential failure points and to identify improvements. For example, the workers recommended additional arm liners within the suit, which has reduced contamination to the forearms. Mockups and testing validated this improvement. AMWTP sent workers to the vendor in Ohio to thoroughly understand the suit development process. Analysis by those workers recommended raising the procurement to quality level 3 to prevent receipt of defective suits. Additionally, workers, SMEs, and the vendor experimented with relocating the suit exhaust valve from the forearm to the back of the suit to help reduce contamination entry by backflow through the valves.

Committee discussions included the observation that Savannah River Nuclear Solutions, LLC, at the Savannah River site has adopted the use of a different suit, the Respirex® polyvinyl chloride (PVC) bubble suit, specifically designed to address the unique characteristics of PU-238. The Respirex® suit is a fully encapsulated 12 mil. PVC suit that operates at a much lower pressure (6 to 21 pound inlet air pressure compared to the 60 to 90 pound inlet required in the RI suit with the MSA PremAire® SCBA System). The MSA PremAire® SCBA System has an operating requirement of 60 pounds per square inch (psi) minimum and 90 psi maximum. Of the air supplied, 6 cubic feet per minute (cfm) is needed to effectively supply the full-face respirator and the remaining air is directed through the vortex cooling unit's exhaust into the RI suit, creating a pressurized micro-environment. Thus, the closer to the 60 psi minimum requirement, the less air there is to inflate the suit as opposed to the closer to the 90 psi maximum, the greater the inflation), and is more effective against potential breakthrough due to worker sweat and exertion. Since the Respirex® suit operates at a lower pressure, it does not crush when workers bend or squat. However, the AMWTP workforce is skeptical of the change because the Respirex® suit is self-contained with supplied air provided through the suit, not a respirator. The workers are accustomed to wearing a respirator inside the suit and believe it provides additional protection in the event the suit fails or gets a tear while in the boxline.

AMWTP should continue evaluating the Respirex® suit (or similar PVC Level B suit) in order to control hazards associated with working within a PU-238 contamination environment. AMWTP should consider working with the Respirex® vendor to modify the Respirex® suit to include an additional airline port to accommodate a full-face respirator inside the suit and using an outer Saranex™ shell to protect the suit from punctures or tears.

Opportunity for Improvement: AMWTP should continue to evaluate the feasibility of adopting the Respirex® or similar suit to control hazards associated with working within a PU-238 contamination environment and working with the vendor to modify the suit as necessary to accommodate worker concerns.

The Team observed some conditions that indicate existing routine inspections are not identifying all safety inspection-related issues (see Hazard Prevention and Control discussion). ITG discontinued its POWER ESIT and SME safety inspections 2 years ago after assuming the new contract. ITG managers believed that the multitude of inspections it conducted already satisfied the VPP inspection expectations making the POWER walkdown inspections redundant. Last year, citing conditions similar to the Team's observations, the ESIT members requested ITG reinstate the POWER walkdown inspections. POWER walkdowns restarted approximately 1 month prior to this assessment.

As mentioned in the 2009 review, ITG continues to execute an effective baseline assessment program through the IH/IS group. ITG adopted the Comprehensive Tracking System (CTS) from Open Range Software to capture sampling data and results that allows for the efficient retrieval of any sampling data. The Team's review of the CTS demonstrated that it was easy to use and easily recalled data. Unfortunately, the sampling software used by the previous contract was not compatible with CTS, so ITG is in the process of backloading all the previous contracts' sampling data into CTS. In addition, the ITG IH procedure does not include any reference to the expectations for the use of CTS. ITG should ensure that the next revision of the IH procedure includes the use of CTS.

Opportunity for Improvement: ITG should ensure that the next revision of the IH procedure includes the use of CTS.

Conclusion

ITG continues to demonstrate an effective work control and hazard analysis process. Revisions to its processes have been made more effective with the solicitation of continuous improvement ideas from SMEs and work planners who use the system daily. These improvements helped tailor and improve the efficiency of the process. ITG continues to meet the expectations for a DOE-VPP Star participant in the Worksite Analysis tenet.

VI. HAZARD PREVENTION AND CONTROL

The second and third 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 the implementation of effective controls (engineered controls, administrative controls, or Personal Protective Equipment (PPE)). Equipment maintenance processes to ensure compliance with requirements and emergency preparedness must also be implemented where necessary. Safety rules and work procedures must be developed, communicated, and understood by supervisors and employees. 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.

Since the last assessment, the Team observed an improvement of engineered controls at AMWTP. The Retrieval Contamination Enclosure (RCE) is a capital investment built within Building 636 to enclose the remaining drums and containers. The RCE's high-efficiency particulate air (HEPA) filtered industrial ventilation system controls airborne radiological contamination to lessen worker exposures. The RCE is equipped with a PPE donning and doffing room, contamination-monitoring area, and a control room where operators monitor the retrieval work via several cameras and communicate with the retrieval workers. Through worker suggestions, ITG developed an Inner Contamination Enclosure to further isolate an active retrieval area. The enclosure is a fabric draped onto a support structure and an overhead crane moves the support structure to different areas of stack retrieval. The enclosure's negative pressure ventilation system controls radiological contamination to provide additional worker protection.

Engineers work with operators to prioritize the removal of drums or boxes and prevent the collapse of the stacked containers. To improve communications, production engineers use daily photos and video of the container stacks to indicate which containers to remove. This visual method of identifying and sequencing container moves is easier for workers to understand than the previous written plan describing which containers to remove.

Workers collaborate with engineers to improve the safety of moving containers. ITG removes drums that are lying sideways on the retrieval stack using a forklift tine attachment that inserts underneath the drum and lifts it off the stack. ITG experienced two events where drums tipped off the forklift tines. ITG resolved that issue by using pneumatic tires on forklifts and correcting poor driving practices. A third dropped drum event occurred when a drum tipped off the tines due to uneven weight distribution in the drum. Workers and engineers collaborated to design a bale attached to the forklift tines to secure the drum to the forklift tine. Workers and engineers continue to improve the bale with repositioned grips to reduce awkward worker reach.

ITG is developing the procedures to unload cargo containers of drummed waste stored in Building 636. ITG built the CCE mockup to test and improve procedures prior to actual work. The CCE is a flame-resistant, soft-sided structure that will accept the cargo containers and use HEPA ventilation to control radiological contamination. Once the container is placed in the CCE, a hole is cut on the top of the container to accept a ventilation hose to control any contamination in the container. Then operators can access the container and drums. Workers optimized the placement of thermographic imaging equipment on the forklifts to help them identify any exothermic reaction in the container. During this assessment, a contractor readiness assessment (CRA) of the CCE was suspended. ITG determined additional improvements to the

procedures were necessary based on the initial observations and will resume the CRA once those improvements are complete.

During walkdowns of several storage facilities, the Team observed some confusion regarding fire extinguisher inspections. The inspection tag for the type A/B/C fire extinguishers has data on both sides of the tag, and the fire inspectors use a hole punch to indicate extinguisher data and completed inspections. The inspector punches holes on both sides of the tag, and the holes interfere with interpreting the inspection tag because the holes from one side of the tag indicate another condition on the other side of the tag. Although the Team and the AMWTP eventually determined the fire extinguisher was inspected, punching holes in the tag caused confusion. ITG should consider alternative inspection marking methods that eliminate confusion over the inspection status for fire extinguishers.

Opportunity for Improvement: ITG should consider alternative inspection marking methods that eliminate confusion over the inspection status for fire extinguishers.

The continuous air monitor (CAM) and alarm system in buildings WMF-631 and WMF-632 uses extension cords to power the system. The cords were on the ground and in the walking path of the aisle, presenting a potential tripping hazard. Additionally, the Team found old placards for the CAM system with outdated calibration schedules on the placard. Each CAM is barcoded and its information (location, next calibration date) is tracked electronically. The placards are remnants of an old system and ITG should remove them. ITG should secure the extension cords onto the building infrastructure to eliminate the tripping hazard and ITG should take down the outdated CAM placards.

Opportunity for Improvement: ITG should secure the extension cords onto the building infrastructure to eliminate the tripping hazard, and ITG should take down the outdated CAM placards.

During a walkdown of the vehicle maintenance shop, Building 659, two portable eyewash canisters were available. The portable eyewash canister uses a pressure gauge to indicate the desired pressure for operation. The Team found the pressure gauge broken on one of the portable eyewash canisters. The canister appeared to have pressure, but since part of the gauge backing was missing, it was impossible to obtain an accurate reading of the pressure.

A service contractor to ITG maintains all eyewash stations located on AMWTP. As part of the monthly inspection, the service contractor activates the eyewash station and verifies the pressure reading. The inspection tag indicated the canister had passed inspection. After the Team informed ITG about the broken pressure gauge, ESH queried the service contractor. The service contractor stated he knew the gauge backing was broken, but allowed the canister to pass inspection because the pressure needle indicated a pressure reading. ITG should review the eyewash station contract requirements with the service contractor to ensure the service contractor understands the criteria to pass inspection of an eyewash station. ITG should remove the canister until it can pass inspection. ITG should develop an eyewash inspection card to record pressure readings and activation of the eyewash station.

Opportunity for Improvement: ITG should ensure the eyewash station service contractor is aware of the contract inspection requirements, remove the eyewash canister with the broken gauge from service, and develop a new eyewash inspection card so the inspector can record the pressure and activation of the canister.

Storage facilities house containers of waste waiting for processing at the Treatment Facility. The Team observed a cordoned section of the storage facility WMF-631 and a criticality control placard stating…

"- Minimum 16-inch spacing between containers;

- Minimum 16-inch spacing from other fissile materials."

The escort obtained a tape measure, proceeded to measure all the distances between the storage containers, and found all containers exceeded the distance of 16 inches. According to *Critical Safety Analysis for TRU Waste Storage*, (EDF-0034), RPT-NFCS-01, Rev. 1, March 14, 2013, Section 2.0, *Description of Operation*, "Planar Overmass Storage Areas (POSA): Containers (drums and boxes) with a fissile gram equivalency (FGE) loading greater than 380 but less than or equal to 1,500 will be stored in a planar array with 16 inch edge-to-edge spacing between all containers." This statement stipulates an exact 16 inches must exist between the containers, no distance greater or less than 16 inches.

In section 7.3.9 of EDF-0034, *Critical Safety Analysis for TRU Waste Storage,* it states that containers shall be stored "…at least 16 inches edge-to-edge spacing between containers…" This statement allows for greater than 16 inches between containers, but is in conflict with section 2. Additionally, the placard does not quote the words of either section and another interpretation is implied. ITG should review EDF-0034, *Critical Safety Analysis for TRU Waste Storage,* to remove internal inconsistency, and ensure criticality safety postings do not introduce alternative interpretations.

Opportunity for Improvement: ITG should review EDF-0034, *Critical Safety Analysis for TRU Waste Storage,* to remove internal inconsistency, and ensure criticality safety postings do not introduce alternative interpretations.

Although none of the containers was stored less than 16 inches from one another, drums can be accidentally moved. In some locations, ITG uses drum spacing rings to maintain the appropriate spacing requirements. In other drum storage areas, ITG relies solely on an administrative posting to maintain drum spacing. ITG should consider using drum spacers (engineered control) in all drum storage locations requiring criticality spacing controls.

Opportunity for Improvement: ITG should consider using drum spacers (engineered control) in all drum storage locations requiring criticality spacing controls.

Recently, ITG began processing containers that contain high levels of PU-238, primarily in the boxline cells. Opening, dumping, and sorting the waste in the boxlines resulted in high levels of PU-238 contamination within those boxlines. The design of the boxlines requires frequent personnel entries into the boxlines to maintain or repair equipment. ITG believed controls and

practices developed over the years for other radiological contaminants would be adequate to protect workers, but events over the past few months, primarily an increase in skin contaminations, has proven otherwise. ITG is taking several actions to improve controls to prevent the spread of contamination and protect workers.

Significant efforts were in progress during this assessment to evaluate and improve the PPE workers use during boxline cell entry. The respiratory protection subcommittee, which consists of managers, SMEs, operators, and maintenance personnel, is taking the lead. The efforts to date include mockups with simulants (pixie dust) using various modifications to the suit, tests of other Level B suits, variations of supply-air pressure to the suit, evaluation of procurement specifications, and improved quality assurance inspections (see Worksite Analysis). Other actions being pursued include decontaminating the boxlines to reduce PU-238 contamination levels, and the use of a fixative in the boxlines to prevent migration of existing contamination. The subcommittee meetings observed by the Team demonstrated effective participation by all members and enthusiastic workers that were eager to contribute to solutions.

A concern raised by workers about the proposed use of an alternative Level B suit (PVC encapsulated suit) is the lack of resistance of the suits to punctures from the accumulated, nonfunctional equipment within the boxline and *sharps* contained within the boxline sorting trough. In addition, the nonfunctional equipment restricts workers' movements in the cells, impairs effective decontamination efforts, and may tear or puncture suits. ITG should ensure nonfunctional or excess equipment is removed from the boxlines to address workers' concerns, eliminate the unnecessary hazard the equipment presents, and continue to evaluate the potential effectiveness of the alternative Level B suit.

ITG should consider additional controls to address the radiological issues associated with the handling and processing of the PU-238 waste. Due to the need to perform maintenance frequently in the boxlines, ITG should consider options to control the proliferation of PU-238 surface and air contamination within the boxlines. Those controls might include more frequent radiological surveys that identify PU-238 hotspots within the boxlines to better identify safe rest zones for workers during maintenance operations. ITG could also consider installing isolation tents with localized HEPA ventilation over the shredder and processing line conveyor. The ventilation may draw away and capture airborne PU-238 material before it has the opportunity to spread throughout the boxline area.

Opportunity for Improvement: AMWPT should consider options to control the proliferation of PU-238 surface and air contamination within the boxlines.

ITG has conducted comprehensive evaluations of the potential for heat stress during work in the boxline cells. Elevated temperatures in the cells in combination with the layers of PPE and the Level B encapsulation suit make heat stress one of the primary worker concerns. ITG's evaluation used conservative estimates and industry standard methods to determine stay times, and work/rest cycles. Workers receive physiological monitoring to determine temperature, heart rate, blood pressure, and body weight prior to entering. However, during worker interviews, several workers expressed concerns that the resulting heat stress controls may not be adequate. Those workers believe the temperatures in boxline cells have been increasing. During work, humidity levels inside the Level B suit reach saturation, and the cooling vortex in the suit may not be effective. Workers indicated that even when the cell temperatures were within the

prescribed operating range (under 69 degrees), they often felt very hot within the suit. Because of the time necessary to enter and exit the cell, including donning and doffing the Level B suit, workers take their rest cycle inside the cell. Workers reported that these rest cycles frequently provide little or no relief. Consequently, the reliance on work/rest cycles to minimize heat stress may not be effective. ITG should consider using real-time metabolic monitoring of workers in the boxline cells to determine when workers should rest and return to work rather than relying on calculated work/rest cycles.

Opportunity for Improvement: ITG should consider using real-time metabolic monitoring of workers in the boxline cells to determine when workers should rest and return to work rather than relying on calculated work/rest cycles.

The respiratory protection subcommittee recognized that ITG should seek better contamination control in the boxlines rather than using additional PPE. The subcommittee suggested better engineering controls and planning to address the PU-238 contamination issue. The committee recommended developing a new process to analyze and control the amount of PU-238 materials entering the cells during individual campaigns to reduce the potential for contamination issues.

During the February/March 2014 timeframe, the operations group recognized the need for additional controls to address the challenges associated with handling PU-238. Operations managers formally requested the criticality safety group to evaluate and approve the use of a fixative within the boxline cells. The criticality safety group completed its evaluation and approved the use of fixatives within the boxlines in March 2014; however, the operations and radiological safety groups did not learn of that approval until June 2014. This delay prevented timely implementation of the control. ITG should improve its documentation and tracking of operationally significant requests to prevent unnecessary delays in implementing safety improvements.

Opportunity for Improvement: ITG should improve its documentation and tracking of operationally significant requests to prevent unnecessary delays in implementing safety improvements.

The ESH professionals provide leadership to the safety, health, and radiation protection programs. Several are certified in IH, safety, and health physics. Several radiological control technicians obtained the National Registry of Radiation Protection Technician certification. In addition, radiological engineers provide expertise to complete the radiological assessment program. The ESH staff provides expertise on safety, health, and radiological issues, and workers seek their advice.

During a tour of the safety and health office in the Treatment Facility, the Team noticed that ESH uses one pump to sample for both, the beryllium and radiological contaminants. The sampling train is split with a ”Y” junction to connect each cassette. It is normal practice to use only one pump per sample to ensure the measured volume of air for the sample is accurate. By splitting the sample line and using a single pump, the volume of air sampled in each train may be different. This can happen when filter media have different pressure drops due to the collection media or the buildup of material on the filter. ITG should ensure the flowrate of each sampling

line is accurately determined when technicians use a single pump to collect two simultaneous samples, or cease that practice.

Opportunity for Improvement: ITG should ensure the flowrate of each sampling line is accurately determined when technicians use a single pump to collect two simultaneous samples, or cease that practice.

In 2013, the DOE Office of Enforcement and Independent Oversight reviewed the radiation protection program. The review generated five opportunities for improvement, which are not mandatory, but were offered to the project for review and modification as appropriate. In response to the review, the radiological controls manager developed an RWP procedure, which is briefed at the prejob meeting. Additionally, ITG purchased the Sentinel® software license for automated radiological access control. Some of the Sentinel® features include checking training requirements, verifying bioassay status, tracking the number of times an individual performs work to RWPs, and other functions. ITG is completing a statement of work for Idaho National Laboratory (INL) to administer and support the Sentinel® software.

The Emergency Management program continues to improve its operations with strong management support. For instance, the emergency operations center (EOC) updated its phones to digital, but in case of failure, analogue and satellite phones are available. The EOC can tap into any camera on AMWTP and display the image on wall-mounted monitors. This powerful tool gives the EOC almost the same visual knowledge of the accident scene as the field response team and enhances the decisionmaking of both teams. The site Emergency Planning Hazards Assessment was updated on February 25, 2014, and is well organized. In 2013, DOE-ID rated emergency management with *effective performance* and noted major rewriting of procedures emphasizing philosophy changes in the emergency response organization. DOE-ID noted five observations to help ITG improve its operations.

The emergency manager schedules four drills and one exercise annually to ensure effectiveness of personnel response and emergency procedures. During this assessment, the Team observed ITG and DOE-ID conduct and evaluate an exercise. The scenario involved a forklift accident at the CCE caused by a forklift operator who passed out. The forklift punctured drums with potential chemical and radiological contamination. The on-scene response included the INL fire department that took control of the scene and transported patients as needed. The coordination between the on-scene commander (OSC) and the EOC improved when the EOC used the software program to view the scene with cameras in the area. The cameras helped the EOC find another damaged drum at the accident scene and advised the OSC. After the exercise was completed, the emergency manager conducted a 2-hour hot wash of the exercise to record everyone's input for improvement. A report from DOE-ID is forthcoming.

ITG contracts its occupational medical doctor, but provides a full-time registered nurse onsite. The nurse provides medical support during the day shift and is on-call for medical issues on the weekend. The doctor is available 2 weeks out of each month (every other week) and is physically onsite 1 day every other week or 2 days per month. The doctor is always available by phone and the nurse consults the doctor frequently. The doctor provides oversight of all medical evaluations (including preplacement), examinations, treatment, restrictions, and return-to-work approval.

While the nurse treats first-aid injuries during day shift, the medically trained IH/IS cover the other shifts. If the injury is recognized as an emergency, INL ambulance support is only 10 minutes away. All injuries are reported on Form 1945, *ISIH Injury/Illness Report*. Although first-aid injuries are documented, ESH should consider performing accident investigations on some first aids in addition to recordable injuries. First-aid cases are leading indicators of injury trends that can be used to prevent injuries that are more serious.

Conclusion

ITG uses the hierarchy of controls on hazards at AMWTP with an emphasis on engineered controls. ITG has shown it continues to improve engineered controls with capital investments, such as contamination enclosures to control worker exposures and reduce PPE stresses. ITG is also working to improve controls in the boxline to reduce exposures and contamination of PU-238. The Team observed a number of individual conditions (eyewash stations, fire extinguishers, housekeeping, and extension cords) that indicate ITG should encourage workers to pay greater attention to their normal workplace inspections to ensure controls are not degraded over time. ITG meets the Hazard Prevention and Control expectations for participation in the DOE-VPP at the Star level.

VII. SAFETY AND HEALTH TRAINING

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

DOE Order 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*, establishes the contractor training and qualification requirements for operating DOE nuclear facilities. ITG implements those requirements in MP-RTQP-14.4, Rev. 22, *Personnel Qualification and Certification.* The qualification processes ensure that AMWTP employees, subcontractors, and temporary employees are trained and proficient in performing plant operations. In addition, MP-RTQP-14.4 implements training requirements of MP-TRUW-8.1, *Certification Plan for INL Transuranic Waste*; and MP-TRUW-8.2, *Quality Assurance Project Plan*.

For classroom training, ITG ensures they use qualified instructors that thoroughly understand the subject. ITG uses SMEs to conduct most of its training onsite. ITG provides them with specific instructor training from ITG's professional training that qualifies them to conduct training in their particular area of expertise. SME-led training includes hoisting and rigging, electrical safety, and fall protection. The Team attended an introduction course to fall protection and a health physics quarterly training provided by ITG SMEs. Both classes had active student participation and dialogue with the instructor. For some INL-wide programs, ITG relies on other site contractors to provide training. In a few cases, ITG has sent personnel to specific vendors to become qualified instructors. For example, the Team observed a *Move Smart* class led by the ESIT chair who was trained and certified by the vendor that developed the class.

All new employees, vendors, contractors, and visitors must take and pass Facility Access Training. Facility Access Training includes general site safety, general employee radiological training, fire safety, environmental safety, employee programs, conduct of operations, hazard communications, and emergency management. In order to complete the course, students must answer challenging questions that effectively test their knowledge of the core safety programs. Newly hired personnel interviewed by the Team were well aware of the site hazards, and their roles and responsibilities relative to those hazards.

Each employee has an individual training plan tailored for them based upon their position description and the needs analysis of that position. Examples of training that new employees receive include DOE-VPP, cyber security, employee conduct, beryllium-related worker, area evacuation, and Hantavirus awareness and cleanup. Employees also receive training on ergonomics, human performance improvement (HPI), KEYS, ISMS, and title 10, Code of Federal Regulations, part 851, *Worker Safety and Health Program*, in addition to training and expectations for their job duties.

New employee training occurs over a 2-week period dependent upon job function. According to one employee interviewed by the Team, the required culture changes focus on safety, and conduct of operations are daunting to some new employees that have never been to a DOE site. Employees readily sought assistance from their immediate supervisor for questions or concerns. Interviewed employees identified that training consisted of a mix of computer-based training

(CBT) and classroom training and required them to absorb a lot of information quickly. Some employees only demonstrated vague recollection of material presented related to DOE-VPP, ISMS, and other safety programs. ITG should consider phasing some initial training elements to allow new employees the time to absorb all the information presented.

Opportunity for Improvement: ITG should consider phasing some initial training elements to allow new employees the time to absorb all the information presented.

ITG retained the previous contractor's safety and health training program for supervisors and managers defined in PD-RTQP-01, *Training Program Description*. Managers and supervisors receive additional training on prejob briefings, hazard analysis, HPI principles, how to check employee qualifications prior to assigning work, positive reinforcement, DSA, and criticality training. Two new courses are just beginning for supervisors and managers: a management-coaching course that will be offered monthly (not mandatory), and new manager and supervisor training for workplace observation/contract assurance (4 hours). ITG piloted the initial contract assurance course with a small group, and an initial class of 16 completed the class prior to this assessment. ITG plans for all managers and supervisors to complete the course by August 2014.

Interviews with the training manager indicated that ITG bases the training venue (classroom or CBT) on the needs of the workforce. For example, electrical safety training was initially a CBT course. Employee feedback to the training organization overwhelmingly requested this course change to a classroom setting. The training department was responsive to the needs of the employees and changed it to classroom training led by the electrical safety SME. The manager indicated that the employees frequently use the feedback form, and this was just one example of how they respond to worker suggestions for improvement. Several employees, including administrative support employees, indicated to Team members that the training department should also convert KEYS and HPI to classroom training because they believed that CBT was not an effective way to present these two classes.

The Team attended several training sessions during this review. One classroom training session presented fundamentals of fall protection. The instructor was knowledgeable, the class consisted of six people, and there was significant instructor-student dialogue that kept the class interesting and moving. Included in the instruction was a student hands-on inspection of fall protection equipment. Another class attended by the Team was radiological worker quarterly training. The instructor was very knowledgeable and classroom participation was good. The Team attended a class titled *Move Smart*. This class taught, via student interactive participation, the relationship of muscle groups to lifting and pulling activities used by ITG employees. This class was excellent with many takeaways for reducing stress and strains during work and at home.

The Training manager measures the effectiveness of the training program by the course completion comments provided by the students. He indicated that the students frequently offer comments for improvement or corrections. Students are very engaged and their suggestions are frequently implemented. In addition to student critiques, trainers frequently go into workspaces and evaluate applied training as a mechanism to improve training content. The Training department tracks and trends missed training, training extensions, and training feedback. According to its records, from April 2013 to May 2014, ITG had an 8 percent failure-to-attend-training rate. The Training manager indicated that this average was within the expected training goals. Feedback forms turned in by students averaged 41 percent for the same time.

During the 2009 review, the Team suggested that the contractor consider additional training for employees in the safety arena. The Team recommended that the Safety-Trained Supervisor course would benefit the company and the workforce by empowering workers with the knowledge and support to expand their contribution to a safer work environment. In addition to this course, the Occupational Safety and Health Administration offer a 10-hour and a 30-hour course to workers who wish to pursue further education and career enhancement relative to safety. The Team believes that ITG can benefit from these training opportunities if offered to the workers. To assist workers that volunteer to chair or co-chair ESIT, KEYS, or other leadership roles, ITG might consider task-specific training. ITG should consider providing additional safety training opportunities to workers who show an interest and desire to expand their contribution to a safer workplace.

Opportunity for Improvement: ITG should consider providing additional safety training opportunities to workers who show an interest and desire to expand their contribution to a safer workplace.

Conclusion

The training and qualification processes ensure that ITG employees, subcontractors, and temporary employees are trained and proficient in performing AMWTP plant operations. Each employee has an individual training plan tailored for them based upon their position description and the needs analysis of that position. Training at ITG is both classroom and CBT. ITG considers employee suggestions to improve training and continues to improve its program based upon those inputs. ITG meets the expectation of a DOE-VPP Star participant for the Safety and Health Training tenet.

VIII. CONCLUSIONS

Since winning the contract to manage and operate AMWTP, ITG has overcome initial difficulties and confusion to institute strong worker involvement and ownership of its safety program. The management leadership team has stabilized and demonstrates its value for safety as a necessary precondition for mission success. Although some worker distrust remains from initial workforce reductions in 2012, most workers now trust their managers to correct safety issues, and honor worker concerns. Workers are actively involved in efforts to correct safety issues, particularly related to the increased hazards associated with PU-238 waste processing. The Team identified many opportunities for improvement, but these do not indicate significant noncompliances with safety standards or regulations. ITG continues to invest in safety improvements and demonstrates the performance expected of a DOE-VPP Star participant in each of the five tenets. The Team recommends that ITG continue to participate in DOE-VPP at the Star level.

Appendix A
Onsite VPP Audit Team Roster

Management

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