Washington TRU Solutions, LLC/Waste Isolation Pilot Plant
Carlsbad, New Mexico
Department of Energy Voluntary Protection Program Review
March 23-26, 2010

Background:

The Waste Isolation Pilot Plant (WIPP) is the Nation's solution for permanent disposal of defense-related transuranic waste currently in temporary storage at Department of Energy (DOE) sites across the country. Authorized by Congress in 1979 and operational since March 1999, WIPP has received over 8,300 waste shipments, safely disposing more than 65,000 cubic meters of transuranic waste in the repository located nearly one-half mile underground. Washington TRU Solutions, LLC (WTS) is the managing and operating contractor for WIPP. WTS is a partnership between Washington Government Environmental Services Company and Weston Solutions.

In September 1994, WIPP, managed by Westinghouse Waste Isolation Division, was certified as a DOE-Voluntary Protection Program (VPP) Star site, the first in DOE. In February 2009, the Office of Health, Safety and Security (HSS) conducted the fourth triennial recertification of WTS. During that review, HSS determined that WTS had been subjected to increasing production pressures. WTS had responded to those production pressures, for the most part, by increasing the pace of operations while trying to maintain its focus on safe, compliant operations. In some cases, however, those production pressures resulted in decisions that appeared to some employees as detrimental to workers and safe operation. These decisions, however well-intentioned by managers and supervisors at the time, had contributed to perceptions by some workers that the safety culture at WIPP had deteriorated. Both managers and the workforce were committed to making improvements and changes to address the necessary cultural changes. WTS had made many changes in the months preceding that assessment that needed the opportunity to mature and demonstrate its effectiveness in the long term. Consequently, the HSS DOE-VPP Team (Team) recommended that WTS be permitted to continue as a participant in DOE-VPP at the Star level on the condition that WTS address the Opportunities for Improvement identified in that report, as well as those conditions and issues identified in the Expert Review Team and VPP Gap Analysis reports.

That recommendation required HSS to perform a progress review after 12 months in order to make a final determination regarding WTS' continued participation in DOE-VPP. A followup review was scheduled and conducted March 23-26, 2010. The Team focused on the required improvements identified by the 2009 assessment by conducting interviews with senior managers, workers, and staff, and performing walkthroughs of the entire site. This report is being prepared as an addendum to the 2009 assesment report and documents the results of the followup review.

Results

Since February 2009, WTS has implemented extensive improvements in all five tenets of DOE-VPP. Additionally, WTS successfully completed negotiations with the United Steel Workers Union to establish a new contract. Some improvements made in the contract have further contributed to improvements observed by the Team. Two significant changes were the appointment of an additional union health and safety representative (for a total of two) and the appointment of a union ombudsman to work directly with workers and managers to clarify and resolve issues before they become safety problems or grievances. These two changes have been viewed by union workers as significant improvements in the labor management relationship.

In the Management Leadership tenet, opportunities for improvement in 2009 were focused on building trust and teamwork between managers and workers, improving communication with the workforce, improved employee share goals, more critical self-assessment, continuing improvements in training for managers and supervisors, and ensuring corrective actions to previous assessments were adequately addressed. WTS has taken action in the past 12 months that effectively addressed each of these opportunities.

In 2009, it was noted that the Radiation Control Technicians (RCT) perceived a production pressure because their time cards were being approved by operations personnel (Waste Handling Managers). Since that time, RCTs have been reorganized into the Safety and Health Organization. Interviews with managers and technicians demonstrated a significant improvement in morale among the RCTs as a result of this change, with no loss of productivity or production support.

In order to improve trust between managers and workers and improve the overall culture at WIPP, WTS has taken several actions. Those actions included communication training for managers and supervisors, leadership training, a "Pursuit of Excellence" contest for managers, and development of new tools for managers and supervisors to provide worker recognition. Managers interviewed during this followup review reported positive experiences as a result of these efforts, including a better understanding of their personal leadership style, how that style worked with different worker personalities, and what they were doing to ensure they were not communicating the wrong message. Many workers interviewed by the team reported that their managers were more visible in the field, and no workers reported any sense of undue production pressure at the expense of safety.

With respect to safety goals, WTS has significantly restructured its process for establishing individual safety plans and has revised the Employee Share to reflect divisional and personal safety goals. Total Recordable Case (TRC) and Days Away, Restricted or Transferred (DART) rates are still included in the final Employee Share, and account for approximately $200 (30 percent) of an available $679 per employee. An additional 30 percent is available for completing Hazard Recognition Training, Conduct of Operations Training, and participating in safety goal-setting sessions. The remaining 40 percent of the Employee Share is targeted at environmental compliance (15 percent), nuclear safety compliance (15 percent), and production goals (10 percent). These employee share goals were established in cooperation with managers, bargaining unit, and the Carlsbad Field Office. None of the employees interviewed by the team expressed

any hesitation about reporting injuries for fear of losing a portion of the employee share. A workforce survey conducted in 2009 showed only 1-2 percent of respondents did not believe they could stop work for safety concerns. The vast majority of workers at the site do believe they have the right to stop work. Personal safety plans reviewed by the team showed a clear bias toward positive actions employees could take in improving safety, not just avoiding injuries.

WTS, for the second year in a row, used URS corporate personnel to assist with its annual self-assessment. This review mirrored the VPP Gap Analysis Team from December 2008. That team noted significant improvements, while also pointing out areas that needed continued attention. Additionally, WTS performed more detailed reviews of previously closed actions from the 2008 Gap Analysis. In several cases, WTS identified additional actions that needed followup in order to ensure the corrective actions were effective. The willingness to perform a critical self-assessment in connection with its annual VPP assessment, review the previous corrective actions and identify further improvements, and the positive feedback from workers and managers alike all point toward establishment of a positive safety culture that values and encourages safety improvements.

A clear example of the positive cultural shift was evident when a problem surfaced in the remote Transfer Cell last year. The lid alignment tool was identified as being bent and was coming into contact with the shield valve port. The manager and the cognizant engineer called a meeting with the Remote Handling crew to discuss a path forward. As a group, they identified an acceptable path forward that involved entry into the Transfer Cell to replace the alignment tool. A shift instruction was generated and a second meeting convened to review the steps. Several changes to the shift instruction were proposed by the workers, and the meeting was adjourned to make the corrections and finalize the instruction. A prejob meeting was held to go over the work instruction, and additional worker concerns were identified. These new changes were incorporated to everyone's satisfaction. The team then set up the workspace and completed the work evolution with no delays. After the successful completion of testing for operability, a postjob review was held to identify what worked well and what needed improvement. The team discussed this work evolution with some of the participants, and all agreed it was a very positive experience that forged open communication and trust between management and the labor force.

Since the 2009 assessment, WTS has taken positive steps to ensure that the bargaining unit and managers continue building and strengthening their relationship regarding the handling of safety concerns. Representatives from the bargaining unit and management meet monthly to discuss and resolve the safety concerns. The bargaining unit VPP representative coordinates the employee concerns with the bargaining unit and management. Each concern is documented and tracked to completion. WTS also initiated several Solution Assist Teams to handle broader concerns/issues that include the bargaining unit, managers, and professionals from various disciplines.

The VPP Team noted two success stories of the Solutions Assist Team. The first is the preparation and distribution of a notebook that identifies accidents between large and small vehicles titled "Large vs. Small Vehicle Driving Awareness Book." This topic is of

particular importance at WIPP given the number of powered industrial carts used across the site and their proximity to large vehicles like miners, haulers, forklifts, and trucks. The book contains the pictures and descriptions of many accidents involving small and large vehicles and is easily understood by the vehicle operators. The book points out that in general industry many accidents happen because the drivers of small vehicles fail to move out of the way, or pull in front of, the large vehicles. Many of these accidents cause serious injuries and are sometimes fatal. These books have been placed in lunchrooms and break rooms of the underground, maintenance shops, waste handling and other areas throughout WIPP to make them readily available to the small and large vehicle operators to raise awareness of this problem. The Solutions Assist Team plans to produce a short video on this subject that can be used for safety meetings or the plan-of-the-day meetings.

The second example that highlighted the effectiveness of the Solutions Assist Team involved a fork truck in the waste handling building with a chronic oil leak. Every day the fork truck would deposit a "puddle" of oil on the waste handlers' concrete floor. The work crew responsible for cleaning the shop floor submitted several action requests to get the leaky fork truck fixed. Mechanics had been unable to find the source of the leak. Engineers determined that the amount of fluid present on the floor did not represent an out-of-specification condition nor did it present a hazard to the facility with regards to the Documented Safety Analysis (DSA). Therefore, no action was required. As a result of the lack of progress, a Solutions Assist Team was assigned the task in coordination with the original manufacturer to resolve the issue. Refocusing its efforts to solve the issue, not justify the acceptability of the condition, the team set out to evaluate the cause of the leak. After significant analysis and input from the manufacturer and the team members, three separate issues were identified that contributed to the leak. First, the calibration levels on the hydraulic fluid dipstick were incorrect for that model, which may have resulted in overfilling. Second, the baffles in the hydraulics fluid reservoir were turning too fast and causing the fluid to "froth." As a result, the fluid would leak out a breather hole in the rear of the truck and collect on a subfloor pan within the truck's frame. The resulting pool would then leak from that pan after the truck had been parked and set for the night. These causes could not be identified or resolved by any of the groups involved independently.

WTS has taken steps to encourage and reward workers for reporting of injuries, near-misses, close calls, or safety concerns without any fear of retribution. These steps include dissemination of lessons-learned on reporting to all WTS and subcontractor employees, on-the-spot rewarding for reporting, and requiring each section to develop section safety goals with input from its employees. The Team found safety goals posted in employees' offices, and the employees interviewed stated that they would report all injuries and incidents without any fear of retribution.

In 2009, WTS received approval from DOE to operate to the new set of controls contained within the DSA that was approved in February 2009. This effort resulted in the revision of plant-wide procedures and controls to assure implementation of those high-level controls that assure operational safety to DOE. This new DSA simplified the Technical Safety Requirements without reduction in safety margins, and WTS has had no violations of those requirements since implementing the new DSA.

The 2009 VPP assessment identified some weaknesses in the development of hazard analyses at WIPP. Since 2009, WTS evaluated different processes across the DOE complex for hazard analysis and adopted the Automated Job Hazard Analysis (AJHA) process developed several years ago at the Hanford site. This process walks the Team through a series of questions to assure adequate hazard identification and control selection. The Team had discussions with site personnel relative to the newly adopted process and pointed out that in the new implementing procedure and the automated process there is no mechanism to capture the rationale for control selection. Suggestions were discussed on how to address this issue, to capture corporate memory, and institutionalize the logic that links the hazard to the controls. WIPP has trained 100 percent of the bargaining unit and management on the recognition of hazards since the 2009 visit. Also, to support the implementation of the AJHA process, WIPP has trained 120 of its personnel to utilize the AJHA computer program as scribes during teaming sessions for hazard analysis. This translates to a trained scribe for each work crew for AJHA development.

Opportunity for Improvement: WIPP should continue to improve the AJHA process by assuring the rationale for control selection is captured in the newly implemented system.

During this assessment, it was noted that the dialog and team efforts by WIPP organizations had been improved. The previous Job Hazard Analysis (JHA) procedure had positive aspects on both the maintenance and operations sections that could have been utilized by both organizations. Discussions with maintenance management and operations personnel indicated that those positive aspects of the process were being shared and utilized by both groups. The Integrated Hazard Analysis Committee has been formed to "ensure comprehensive, coordinated, and effective" hazard identification and analysis are performed. The committee consists of facility operations, maintenance, mining operations, waste handling operations, and others as approved by management. Although new, this effort will likely enhance awareness, sharing of ideas, and mutual communication avenues between work groups.

In 2009, WTS identified elevated levels of Volatile Organic Compounds (VOC) being released from recently emplaced waste. This waste stream contained high levels of carbon tetrachloride that was venting from the drums into the underground panel where it was placed. Although not in excess of permitted levels, the monitored levels were approaching permitted levels and were cause for proactive concern. An extensive review and sampling effort was instituted to identify which containers might be the source for the higher-than-normal VOC samples. The waste stream was identified, more specific sampling was conducted, airflow paths were identified, and actions were taken that included restricting access to areas of the mine where VOC levels are higher, installing activated-carbon filters to absorb the VOCs, and implementing entry procedures for those areas affected. The underground workforce was notified and continues to be updated about the issue. Industrial Hygiene (IH) personnel went into the mine and answered questions the miners had on hazard, exposure, and limits. IH personnel presented the miners with sample data, regulatory requirements, and proposed mitigations. WTS continues to monitor those containers with an aggressive sampling program while they

seek changes to the Environmental Permit with the State of New Mexico. The IH department continues to closely monitor the current situation, and further receipts of that waste stream have been halted until container requirements have been agreed to by WTS and the waste generator. WIPP is also analyzing potential engineered controls on the ventilation ports on the drums to better control the ventilation process from the drums without affecting the drum venting required capability.

WTS has an extensive tracking and trending program. While effective in evaluating lagging indicators, WTS should consider developing leading indicators and making those positive improvements visible to employees. For example, in its quest to identify accident precursors, those efforts could be recognized as positive employee interventions and made available to employees at safety meetings or on bulletin boards.

WTS' efforts to improve the work control program continue. In the 2009 VPP review, the WTS work control group had initiated changes to improve how action requests (work requests) were processed and prioritized and to minimize maintenance-related delays in day-to-day activities. This change was a result of self-identified weaknesses related to operational delays that resulted from preventive and corrective maintenance activities that were not incorporated into day-to-day operations. Changes incorporated the action request review process into the morning plan-of-the-day meeting. By doing this, the action requests are simultaneously reviewed by safety, maintenance, operations, and transportation/receiving personnel. The prioritization of the action request is designated at this point as well. In addition, WTS has compiled and reviewed a list of "lost" action requests (action requests never added to the work control system for completion) to ensure those actions are now appropriately prioritized, tracked, and completed.

With that effort completed, the work control group initiated several other reforms to improve process efficiencies that are still in progress. Some of those changes include: upgrading the CHAMPS Computerized Maintenance Management System, developing "Optimum Performance Windows" that will group related systems and components into subsets to streamline "downtime" maintenance efforts, and the recently acquired AJHA system for use in conjunction with the work package system to assist JHA development for individual work packages.

Due to questions raised during the 2009 WIPP review, WTS implemented tighter requirements for workers stationed in the underground maintenance office and underground break rooms regarding the proximity of miners' lamps and self-rescuers during breaks and office activities. In the 2009 VPP review, it was determined that the analysis of requirements for these areas was not in conformance with Mine Safety and Health Administration (MSHA) codes and standards. To address those concerns, WTS revised the underground access procedure to include a note that established expectations for personnel desiring to remove their helmets, miners' lamps, and self-rescue breathing devices in designated areas. That change requires that in those designated areas lamps and self-rescuers must be within arm's reach and illuminated, or the self-rescuer is being worn and other supplemental lighting is on the person and illuminated. Interviews and observations of workers in the underground office and break areas demonstrated there was still some confusion regarding the specifics of the new requirements and how they were to be implemented. In the break room, workers were observed leaving belts with

their self-rescuers on the side tables (beyond arm's reach) while using the lunch tables on break. Other workers were reminded by coworkers to turn their miner lights on when setting their hardhats down for break. Personnel relying on other supplemental lights (such as pocket pen lights) did not have those lights illuminated. Training on this procedure change consisted of required reading for all personnel accessing the underground. Observations suggested that training on the new requirements had not been sufficient to ingrain the new requirements into day-to-day practices. Satisfying this new requirement also presents some concerns from a human performance perspective. Workers do not have convenient locations to locate the belts and self-rescuers during breaks in the underground break room or when utilizing the conference room table in the underground maintenance office space. WTS should evaluate methods or tools that would ensure workers understand and follow the new requirements. In addition to conducting refresher training with underground personnel to ensure the revised requirements are fully understood and followed, WTS should consider providing designated racks or belt hooks at the break room tables or on the break room and conference room chairs to ensure the arms-reach provision is met.

Opportunity for Improvement: WIPP should look for more effective means to ensure underground workers understand and follow requirements for removing helmets, miners' lamps, and self-rescuers in designated areas.

WIPP recently experienced a seismic alarm from one of the surface seismic alarm systems. Response to the alarm by employees identified several opportunities for improvement. For example, many personnel were disturbed that they were not being removed from the mine quickly, indicating they did not understand that the elevator shafts are at the highest risk during a seismic event. During the response, WTS determined that the alarm was a false indication by correlating the alarm with other indicators from neighboring mines and the University of New Mexico. This information took a long time to reach workers in the underground, and workers were upset at reaching the muster points (20-30 minutes later in some cases) only to be told it was a false alarm. Also, the underground alarm indicator lights did not activate to warn workers in the outer sections of the mine that a seismic alarm had occurred. Without the warning lights, employees working on the heavy equipment were not alerted to listen for the muster announcements issued on the PA system. The Safety and Health group was in the process of conducting a review to ensure they captured these and other lessons learned from the event and is planning to incorporate those changes into the governing procedures.

The 2009 assessment identified some weakness in the General Employee Training (GET). WTS has revised GET and the WIPP Safety Program Employee Handbook to help the employees understand the relationship between Integrated Safety Management and VPP, the five tenets of VPP, and employees' role in maintaining the DOE-VPP Star status. WTS has also launched an awareness campaign through safety newsletter articles and porcelain press articles. Further, all of the WTS employees have received training in fundamentals of Human Performance Improvement to recognize error precursors and to recognize and reduce human errors.

In response to the 2009 assessment, the Subject Matter Expert (SME)/ On-the-Job-Training (OJT) process has been enhanced. The Job Performance Measures were updated; more hands-on demonstrations were added. More written examinations are now required in the requalification process to ensure consistency and comprehensiveness in the oral boards in all areas, including RadCon, WIPP operations for waste handling, maintenance, equipment operators, and underground haul trucks. The training for SMEs to conduct OJT (Train the Trainer) has also been enhanced. The SME must personally verify that each trainee possesses the skill and knowledge required to safely operate equipment or process.

WTS has revised its procedure governing access to the underground to address the weaknesses identified in the 2009 assessment and comply with MSHA mine safety standards. The 5-day, unescorted underground provision has been removed. Any one going to the underground must have 8-hour hazards recognition training and an escort. However, government officials visiting the mine site are exempted from the training requirement if they are escorted by an experienced miner and provided with appropriate safety equipment and self-contained rescuer training. Forty-hour mine safety training is required for unescorted access to perform work underground.

The 2009 assessment identified a concern that some workers were hesitant to report injuries, and that hesitancy could be masking an adverse trend in accident and injury statistics. For 2009, WTS recorded a TRC rate of .71 (5 recordable cases) and a DART case rate of .14 (1 case). This rise is probably partly attributable to an increased willingness of workers to report injuries. Additionally, TRC and DART rates are lagging indicators of the cultural issues identified during the 2009 assessment, so some rise was also expected. The 3-year average TRC rate (0.35) remains well below the comparison industry average of 2.9, and actions being taken in connection with the above improvement initiatives should result in a reversal of the adverse trend in calendar year 2010.

Conclusions

Since the 2009 Triennial Recertification, WTS has demonstrated significant improvement in its safety culture. Improved communication, better processes for accountability, rewards, recognition, increased management and worker cooperation, more effective analysis, improved hazard controls, and more effective training were all evident to the Team. WTS must remain vigilant to ensure improvements made in the past year do not lose momentum. As a result of the evident improvements, the Team recommends that WTS be restored to DOE-VPP Star status without condition.