WM2015 Conference Panel Report

PANEL SESSION 034: Savannah River Site Site (Part 1 of 3)

Session Co-Chairs: **Jeff Griffin**, *Savannah River National Laboratory*
Kim Hauer, *Savannah River Remediation*

Panel Reporter: **Jeannette Hyatt**, *Savannah River National Laboratory*

Panelists:

- **Dr. Dave Moody**, *SR Manager, US DOE -SR*
- **Carol Johnson**, *President and Chief Executive Officer, SRNS*
- **Dr. Terry Michalske**, *Laboratory Director, Savannah River National Laboratory*
- **Terrel Spears**, *SR Deputy Manager, US DOE-SR*
- **Stuart MacVean**, *President and Project Manager, SRR*
- **Pamela Marks**, *SR Federal Project Director, Salt Waste Processing Facility, US DOE NNSA*
- **Frank Sheppard**, *Vice President and Deputy Project Manager, Parsons*

This panel was well attended with between 80 and 100 people present. This panel consisted of the executive management team providing mission overviews and highlighting where the infusion of technology has been advantageous.

Dedicated to maintain the highest possible safety and security standards, the Savannah River Site (SRS) is a key Department of Energy (DOE) industrial complex responsible for environmental stewardship, environmental cleanup, waste management and disposition of nuclear materials. Specifically, SRS processes and stores nuclear materials in support of national defense and U.S. nuclear nonproliferation efforts. The Site also develops and deploys technologies to improve the environment and treat nuclear and hazardous wastes left from the Cold War. The SRS complex covers 310 square miles, encompassing parts of Aiken, Barnwell and Allendale counties in South Carolina and borders the Savannah River. Today, approximately 11,000 people are employed at SRS, making it one of the largest employers in South Carolina.

Summary of Presentations:

Dr. Dave Moody presented an overview of the strong service the SRS has provided to the nation over the last six decades. His presentation focusses on various aspects of the pioneering development and deployment of nuclear technologies at a scale never before imagined. Dr. Moody shared examples of notable "SRS Firsts": Designed and built the largest radioactive waste vitrification facility in the world; Designated as the first National Environmental Research Park; Discovered natural habitat of bacterium causing Legionnaires Disease; Pioneered use of microbes in environmental cleanup and expanded use in land mine detection, were a few examples he shared.

The ability for SRS to deliver on its mission is predicated on its stellar safety and security record. As a result of the full complement of services and facilities SRS is uniquely able to serve vital nuclear material integration, nationally and internationally. The SRS team stands firm that the success enjoyed by the site is a result of the commitment to be Partners in Progress. The site

mission profile is approximately 55 % Environmental Management (management, stabilization and disposition of nuclear materials as well as solid, liquid and transuranic wastes; spent fuel management; excess facility demolition; environmental remediation.) and 45% National Nuclear Security Administration (Tritium operations and extractions) recovering helium-3, non-proliferation support, mixed oxide fuel fabrication facility, uranium blending and shipping, foreign fuel receipts).

SRS is committed to continuing to make progress in the cleanup mission. To date 5.1 million gallons have run through the Actinide Removal Process/Modular Caustic Side Solvent Extraction Unit; 17.2 million gallons processed into saltstone; 3,931 canisters from Defense Waste Processing Facility, and high-level waste tanks have been closed including the first two in the country. While operations continue, the need to step up risk reduction is evident and the Salt Waste processing Facility centered on the processing experience of ARP/MCU is at 83 % complete. Using its unique assets such this nation's only hardened chemical separation facility; H Canyon, SRS is applying its depth of knowledge and expertise to redefine how we apply these assets to maximize their output. Dr. Moody closed his remarks by highlighting those aspects of greatest importance to SRS sustainability: Priorities – Partners – Proven Progress.

Carol Johnson presented some of the unique attributes of being the management and operations contractor for a large complex site with multiple missions. The key mission areas include nuclear materials management (operations, storage, and disposition); tritium operations /defense programs; environmental remediation and monitoring; solid waste management; Savannah River National Laboratory and general site services. The interface management challenges between five federal agencies, three regulatory bodies and seven operating contractors provide many opportunities to ensure mission alignment and develop effective and adaptive communication protocols.

The environmental management operations of SRNS was very active as they declared readiness and began production of plutonium oxide, completed Sodium Reactor Experimental fuel campaign and initiated the Material Test reactor campaign, finalized construction of expansion of storage vault construction and completed the characterization of all remaining legacy transuranic waste.

The implementation of a Lean Management System to achieve and sustain our operational performance was discussed. The main objectives of this system is to focus of improving processes, transform culture and demonstrate how real problems are solved through using a consistent approach to getting to the right way of doing the work. The desired outcomes will reduce work place frustration, reduce cycle time, and eliminate unnecessary work and thereby making operating funds available for mission activities. To date more than $ 50 million in cost reductions has been realized. The indirect overhead budget shave been reduced more than 25 % and over 200 continuous improvement initiatives were completed in FY14 resulting in greater than 44 million is cost savings, avoidances and productivity /efficiency improvements. The challenges still faced that are driving the need to reduce inefficiencies are centered on the aging infrastructure and the need to bring in the workforce of the future.

Dr. Terry Michalske presented an overview of SRNL focused on the core nuclear capabilities of Environmental Remediation and Risk Reduction; Nuclear Materials Processing and

Disposition; Nuclear Detection, Characterization and Assessments and Gas Processing, Storage and Transfer Systems. His remarks included the announcement of a new SRNL initiative that has just authorized by DOE at CD0. This initiative is a Nuclear Chemical Manufacturing Collaborative facility that will foster partnerships with industry and academia to develop innovative solutions and create new sustainable approaches to the EM mission at SRS. This initiative will also help develop the workforce in the local community and leverage expertise from across the EM complex. It is an exciting new venture between SRNL and DOE-EM to develop new sustainable approaches to the nuclear waste challenges at SRS and the EM complex.

One of the high-lights in the mission expanding portfolio of SRNL this year has been the dedicated supported to the EM Mission. SRNL has provided leadership on priority initiatives with the complex such as expert committee issued comprehensive report of tank vapors and multi-lab WIPP Technical Assistance Team. Other activities include providing program management for the EM Minority Serving Institution program, establishing the EM Liaison position that serves to link HQ/EM Sites and National Labs and leading a five-lab cohort to engage the larger science and technology community for EM.

Terry Spears presented the programmatic approaches to achieve Tank Waste Risk Reduction at SRS. The program focus is safely storing 36 million gallons of radioactive liquid waste, operating major nuclear facilities to support H canyon missions and to treat and disposition tank waste; emptying, cleaning, and closing waste tanks. Terry's presentation highlighted key attributes of the integrated liquid waste program. Safe storage, treatment, and disposition of SRS liquid waste require synchronization of several highly interdependent nuclear facilities and chemical operations. Interim facilities have been in operation since 2008 with over 5.1 million gallons treated to date. Future salt waste treatment capability is under construction and is vital to reducing the volume of radioactive waste requiring vitrification. He highlighted the operational flow chart necessary to successfully meeting operational goals of immobilizing radionuclides in glass; stabilizing chemicals in saltstone; and operationally closing tanks.

The challenges ahead will require development and deployment of new technologies that enable completing the mission in less time and in a more efficient manner. The impact of aging infrastructure on the ability to keep up with the operational enhancement is proving to be a more daunting task than anticipated. These challenges were highlighted in panel 51. Mr. Spears conclude his remarks by emphasizing that the tank waste cleanup mission remains a top EM priority; progress will be paced by available funding; DOE is committed to working with the regulators to address milestones concerns; and continue to support critical H-Canyon missions.

Stuart MacVean presented approaches to optimization of the liquid waste system. The legacy liquid waste program consisted of 43 tanks, 36 million gallons and 268 million curies of radioactivity. The current progress is captured through closing 6 tanks, poured 3933 cans of the projected 8582 there by immobilizing 56 million curies in glass and 17.2 million gallons of saltstone dispositioning 433kCi. The liquid waste system is very diligently working with the Salt Waste Processing Facility to ensure a seamless operational enhancement with the construction is complete. Many of the modifications to DWPF and Saltstone have been technology driven enhancements in conjunction with SRNL and as a direct result of the operating experience gained through the use of ARP/MCU. Specific activities were conducted to identify bottlenecks and put in place enduring solutions rather than quick fixes that were not sustainable.

SRR also uses a LEAN business system approach to drive costs down while ensuring the appropriate rigor in the operating environment. To date they have engaged >15% of their work force in Lean events, included regulators and DOE in the events and realized more than $ 23 million is cost avoidances that enables additional scope to be performed.

Pam Marks presented to role the Salt Waste Processing Facility (SWPF) will play in the SRS clean up mission. SWPF is an essential facility that will reduce the radioactive waste volume requiring vitrification, is based upon the proven actinide and cesium removal processes in use today; is designed to process over 90 % of tank farm liquid radioactive waste. The design capacity is estimated to be 6-9 million gallons per year, the Cs Decontamination factor is > 40,000 and the technology is very mature and the process to incorporate lessons learned from the ARP/MCU is well established. The SWPF is designed as a Category 2 non-reactor nuclear facility, the design life is 40 years, and the design throughput is estimated at approximately 7.3 million gallons per year. Ms. Marks discussed the commissioning program and the critical elements being incorporated to ensure suitable testing is performed on the systems to minimize operational delays during cold and subsequently hot commissioning.

Cold commissioning is currently under way and will continue through construction completion. Key activities during the cold commissioning are demonstrating the ability to process at the design basis throughput, integrated operability of the facility and plant systems using nonradioactive waste simulants and process chemicals (including MST and actual solvent); and generate waste products that meet the waste acceptance limits and/or documented safety analysis of the DWPF and Saltstone facilities. In order to determine successful cold commissioning tests will be performed to validate compliance. The performance testing will include chemical sampling to assess product compliance; peak throughout performance testing and performance evaluations of off-normal conditions, non-routine operations, maintenance and environmental testing.

Hot commissioning is planned to commence in 2019 and will demonstrate that SWPF is ready to commence unrestricted hot operations. All aspects of the integrated facility will be demonstrated including radioactive waste feed, waste transfer to saltstone processing facility and DWPF. Verification that the products and secondary wastes are within specifications will occur. Additional testing will be performed to verify aspects of plant design that could not be fully verified during cold commissioning such as shielding, actinide removal and environmental testing.

Frank Sheppard presented detailed construction status on the SPWF; shared lessons learned and outlined the path forward. During the presentation Mr. Sheppard highlighted some of the challenges with moving construction forward while key components were still be fabricated offsite. Between the sequencing of construction and the need to relocate some site infrastructure components innovative approaches to managing the project's critical path were able to keep the project on track for construction completion in May2016.

As part of the lessons learned Parsons has implemented an extensive test program to demonstrate that the alpha strike process and the caustic-side extraction process met or exceeded 100% capacity. The results of the testing program were used to ensure a robust operating envelope is established to provide flexibility of operations. Ongoing tests results are used to provide

information on the reliability and maintainability of the process all with the primary objective of increasing throughput.

Mr. Sheppard highlighted the project management challenges and offered examples of how the risks were managed or mitigated and means to minimize non-value adding yet costly activities. Construction and subcontracting of fabrication is a high risk area based on the relatively few numbers of nuclear grade fabrication companies available. The skill level and experienced workforce in both fabrication and acceptance testing needs more attention than classical construction projects typically consider. Flexibility in construction sequencing needs to always be on the table while not optimum it enabled progress to be made, retention of trained workforce yet resulted in design iterations and project inefficiencies.

Lessons learned and incorporated pertaining to project management served to improve communication and accountability. The Risk and EAC reviews were reinvigorated, the WBS was simplified, the number of CAMS and FAMS were reduced which increased accountability on performance and metrics. Mr. Sheppard emphasized things that are effective in enabling major projects avoiding pitfalls. Set aggressive targets and goals for CAMS and practice accountability for delivery. Never underestimate the baseline or contingency,. The best case rarely occurs in NQA-1 first of a kind projects. Assesse all risk project wide and identify trends early.

Construction Lessons learned included the establishment of a Constructability Review Team, mandated Construction and Engineering participation. The establishment of this review early in the design phase is critical and should continue through construction. For critical skilled craftsmen it's important to establish and rigorous qualification program and never relax it.

Mr. Sheppard wrapped up the executive session by emphasizing success is possible with good leadership and personnel as the foundation. Stable funding is critical to on time and on budget capital projects. Develop your pans with realism, work the plan including control and accountability. Design with margin and overlap construction, testing and commissioning.