

OE-3: 2019-02

June 2019

Technical Safety Requirements Implementation at the Savannah River Site

PURPOSE

This Operating Experience Level 3 (OE-3) document describes the Savannah River Site's (SRS) Conduct of Operations and technical improvements to ensure rigorous Technical Safety Requirement (TSR) development, implementation, and execution.

BACKGROUND

Over the period 2014 – 2018, Savannah River Nuclear Solutions, LLC (SRNS) reported TSR violations at a rate of ~6 per year across 11 Nuclear Facilities. Similarly, Savannah River Remediation (SRR) experienced a rate of ~2 TSR violations per year across 3 Nuclear Facilities between the 2016 and 2018 period.

Each TSR violation was analyzed for causes and corrective actions, followed by an expanded review of all TSR violations to determine if programmatic issues existed. As new events occurred, each was evaluated against the previously identified common causes and corrective actions to determine if additional actions were warranted.

ANALYSIS AND OBSERVATIONS

Though causes fell into common themes of less-than-adequate knowledge of TSR controls and their bases, and less-than-adequate rigor with implementation of TSR controls, the diverse underlying reasons for violations complicated the identification of comprehensive improvements. When initial corrective actions did not reduce the incidence of TSR violations, an increased

understanding of the causes and more comprehensive and innovative follow up efforts were taken. For example, though training and increased awareness of safety basis requirements are commonly encountered themes applied to resolving the conduct of operations issues, the necessary set of successful corrective actions needed to be more comprehensive, increasingly integrated across organizations and disciplines, and more innovative. The key necessary corrective actions were:

- Performance of independent assessments of flow-down of controls in each facility.
- Development of an Implementation Verification Review (IVR) process instituted to assess completeness of controls implementation.
- Standardization of the verification techniques for procedures and a standard protocol for entering and exiting Limiting Conditions of Operation (LCO) mode changes.
- Development of improved facility-specific TSR training.
- Development and incorporation of tabletop scenario-based exercises in which Shift Operations Managers (SOMs) and First Line Managers work through situational exercises to reinforce their knowledge base. Participation of engineering and technical personnel is included in the development and execution of the training exercises. Training improvements:
 - Developed ~100 scenario-based training seminars and integrated into Continuing Training Program.
 - Revised Safety Basis training for each facility.
 - Established re-training intervals.

- Piloted Safety System Impact Statements and LCO entry statements with conditions in Corrective Maintenance Work Instructions.
- Added contract modifications to improve availability and time to train operations shift workers.
- Added personnel to expand training shift flexibility to allow training to occur at increased frequency.
- Committed to ongoing effectiveness reviews to ensure the improvements were sustainable.
- Conducted a TSR Effectiveness Review with a cross functional team of Subject Matter Experts (SMEs) from Operations, Training, and Engineering organizations with understanding of proper integration of safety basis, operations, and engineering requirements. The review included Lines of Inquiry (LOIs) that were developed and tailored to assess the effectiveness of corrective actions in each of the SRNS facilities.
- Developed and used LOIs to review the effectiveness of the corrective actions. A key element of the review was the observations of LCO entries, LCO exits, mode changes, continuing training, scenario-based training, and safety basis update training.

In addition to the improvement actions identified in the discussion above, the following cross-cutting areas were identified as essential for sustained improvement based on the broad impacts related to TSR implementation.

Controlling Equipment Status - Integration of Engineering and Operations is essential in the implementation of TSRs, entry and exit of LCOs, and mode changes.

Effective Communication – Communication between the SOMs, Shift Technical Engineers, and System Engineers ensures that system status, operability, and TSR implementation are conducted in an integrated manner. It is important that each role is well understood and that responsibilities are not abdicated based on concurrence by other individuals.

Verification of Safety Basis Controls - A need was identified to elevate expectations for implementing verification of controls. Implementation relies on independent thinking and explicit communication between Operations and Engineering. When and how to utilize Independent Verification/Second Person Verification is essential for TSR implementation.

Use of Scenario-Based Training (SBT) - The operators, engineers, and planners should all be well versed in demonstrating their ability to effectively implement TSR-level controls. The use of SBT is proven to confirm the skills and abilities of personnel to navigate the TSRs, LCOs, and mode changes effectively. Increased use of SBT for all affected personnel has shown positive results in increasing knowledge and effectiveness at SRS.

LONG TERM ACTIONS

To achieve consistent and rigorous TSR implementation, Executive and Senior management have committed to:

- A strong safety basis IVR program to confirm TSR controls are effectively implemented on an ongoing basis.
- Enhanced safety basis training to include scenario-based and continuing training.
- A strong Conduct of Operations program that emphasizes the requirements related to controlling equipment status and use of independent verifications.

CONCLUSION

The nature of TSR implementation in a nuclear facility requires the highest level of status control, verification, and training. To achieve high-reliability operations in all its nuclear facilities, the site's contractors committed to actions for continuous improvements across SRS. An institutional approach to resolving cross-cutting issues was employed to ensure integration of all affected organizations and disciplines, clear communication of management commitment, and consistency of implementation. Periodic

verification of effectiveness (e.g., facility self-assessments, management reviews, Implementation Verification Reviews) should be used to provide feedback of continuous improvement.

REFERENCES

[S-1 Letter to the Defense Nuclear Facilities Safety Board, April 4, 2018](#)

Questions regarding this OE-3 can be directed to

Gregory Sanborn, SRS, at
Gregory.Sanborn@srs.gov or 803-952-6272.

This OE-3 document requires no follow-up report or written response.



Josh Silverman
Director
Office of Environmental Protection and
ES&H Reporting
Office of Environment, Health, Safety and Security