

BWROG - Target Rock 2-Stage SRV Performance Improvement

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BWROG/NRC Meeting
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BWR Expertise – Proven Solutions

Current Approach



- Multi-faceted approach to improve Safety Relief Valve (SRV) setpoint performance and safety function focus
- Hardware
 - The current SRVs continue to meet their design safety function, but do experience setpoint drift
 - A new application process to deposit material on the valve disc is being pursued to minimize corrosion bonding and improve setpoint drift
- Licensing
 - Developing a Technical Specification (Tech Spec) change to focus on the demonstration of the safety function of the SRVs rather than the setpoint

Target Rock 2-Stage SRV Performance Improvement Update

Current Committee



BWROG Target Rock 2-Stage SRV Performance Improvement Committee

Established: January 2016

Scope: Address the common causes of repetitive Target Rock 2-stage SRV setpoint test failures in the fleet.

- Technical Exchange Meetings: share site set point drift performance, best practices, roadmap planning.
- Scope focused on setpoint drift not SRV leakage.

Membership: DTE/Fermi, Duke/Brunswick, Exelon/FitzPatrick, NPPD/Cooper, PSEG/Hope Creek, TVA/Browns Ferry

2017 & 2018 Activities



- Industry-shared IBAD procedure (application of Platinum to disc surface).
- Autoclave Screening Test - used to develop sputtering application process of Platinum on test coupons and comparison to IBAD.
- Sputter Coating of (Quantity 3) pilot discs and perform valve testing. Validation of Sputtering application process of Platinum on SRV pilot discs. Testing obtained positive results.
- Two utilities currently moving to utilize the Sputter Coating process during SRV refurbishments, more to follow.
- Static Autoclave Test – establish test conditions and procedure that create corrosion bonding in control group. Final results became available in 2019.

Static Autoclave Test Results



Static Autoclave Material Screening:

Baseline conditions of corrosion bonding with control group and for screening other materials – intent is to develop test conditions to be indicative of relative resistance of material couples to corrosion bonding over an operating cycle.

Goal:

Create enough bonding to allow for quantitative data of bonding strength to allow us to discriminate between test cells.

Results:

Created corrosion bonding which bonded material couples in some samples of a test cell but not 100% of a test cell. For example, only 3 of 5 samples of a test cell of material couples bonded. These were the control groups. Believe longer exposure needs to be explored (this was a 30 day test). Next steps to be determined.

2019 Planned Activities



Test different thickness of sputtered-Platinum coat on pilot discs in valve lift tests.

- Sputtering opens process space for different thicknesses of Platinum Coating.
- Potential for fleet usage
 - Current thickness of Platinum coating provided step-improvement in set point drift performance.
 - Does increase in thickness provide more protection from corrosion bonding?

Evaluate Valve Pilot Discs after operating cycle (Not funded)

- Have data on uncoated but not platinum coated
- Validate assumptions and explore post-cycle status before as-found lift test. May require relief.

2019/Future Potential Activities



Summary

- The 2-Stage Target Rock SRV Performance Improvement Committee will continue to pursue enhancements of the SRVs to improve the reliability and set-point drift. Step changes have occurred in performance improvement over the years, however there is currently not an immediate technical corrective action that can be taken that will solve the on-going set-point drift occurrences.
- Continue to support BWROG Licensing Committee in their efforts to provide the methodology to make changes that would lower the amount of LERs that the industry is experiencing.

Licensing Committee Tech. Spec. Traveler Update

Licensing Approach – Background



Applicable Safety Analysis of Technical Specification (TS) Bases states:

“...that the design S/RV capacity is capable of maintaining reactor pressure below the ASME Code limit of 110% of vessel design pressure (110% x 1250 psig = 1375 psig). This LCO helps to ensure that the acceptance limit of 1375 psig is met during the Design Basis Event.”

TS Definition of OPERABLE – OPERABILITY states:

A system, subsystem, division, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, division, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).

TS Surveillances are performed to verify OPERABILITY of a system (i.e., that it capable of performing its specified safety function(s))

Licensing Approach – Current Status



Review of LERs from 2015 – 2018 (26 total) found safety function of S/RVs was fulfilled in every case

Licensing committee developing a TS change to revise TS 3.4.3 such that the LCO and SR will be met if the safety function is met

Testing of S/RV setpoints will still be required by the ASME Code

- ASME code test will be separate from TS SRs
- Failure of the ASME code test would not result in an LER, provided safety function was fulfilled

Licensing Approach – Actions



Draft approach distributed to Licensing Committee, Reload Analysis and Core Management Committee (RACMC), and S/RV committees for review and comment.

Licensing committee currently working to incorporate or otherwise disposition comments received

Next step will be to arrange pre-submittal meeting with NRC and to submit TSTF Traveler

Targeting submittal of TSTF Traveler mid-summer