

PUBLIC MEETING WITH BOILING WATER REACTOR OWNERS' GROUP

Target Rock Safety Relief Valve
Setpoint Drift Issue for
Boiling Water Reactors
September 12, 2018

Agenda

- Background
- Safety Relief Valve (SRV) Design Function
- Safety Significance
- Technical Specification (TS) Compliance
- Industry Actions Considered in Past
- Next Steps
- Boiling Water Reactor Owners' Group (BWROG) Feedback

Background

- **Purpose:** To discuss Target Rock 2-stage SRV setpoint drift issue for boiling water reactors (BWRs).
- Licensees continue to experience a large number of surveillance test failures with 2-stage Target Rock SRVs.
- Typically TSs allow only one SRV failure.
- TS operability allowance for setpoint drift for most plants is ± 3 percent.
- As found setpoint drift for a number of BWRs ranges between +3 to +10 percent.
 - Most significant instance being a setpoint drift of +18.5 percent.

Background (cont.)

- Originally, the issue was addressed by Generic Safety Issue (GSI) B-55, “Improved Reliability of Target Rock Safety Relief Valves.”
- GSI B-55 concluded the following:
 - Safety significance is low.
 - There is margin to reactor coolant system stress limits.
 - Industry was already pursuing actions to correct the setpoint drift.
 - Staff was satisfied with industry actions to resolve issue.
 - Regulations already require licensees to correct the setpoint drift (no new regulatory requirements are needed).
 - TSs, 10 CFR Part 50 Appendix B, 10 CFR 50.55a, and 10 CFR 50.65.
- Therefore, GSI B-55 was closed in December 1999.

SRV Design Function

- The SRVs are part of the nuclear pressure relief system and, in part, prevent overpressurization of the nuclear process barrier.
- A select number of SRVs are used by the automatic depressurization system (ADS) to rapidly decrease reactor pressure during specific small-break loss-of-coolant accidents during loss of high-pressure injection scenarios.
- The setpoint drift issue does not affect the ADS function.

Safety Significance

The NRC staff reviewed the licensee event reports (LERs) considering the following design aspects for determining the safety significance for SRVs that do not open at their expected setpoints:

- ASME Code pressure/service limits on the primary system.
- Hydrodynamic loads on SRV discharge piping.
- Performance of high-pressure injection systems.

Safety Significance (cont.)

Based on the review of LERs, the NRC staff determined the safety significance associated with Target Rock 2-stage setpoint drift to be **low**.

TS Compliance

- In the Standard Technical Specifications for General Electric BWR plants, Limiting Condition for Operation (LCO) 3.4.3 states: “The safety function of [11] S/RVs shall be OPERABLE.”
- SR 3.4.3.1 states: “Verify the safety function lift setpoints of the [required] S/RVs” are within a specified range.
- Surveillance Requirement 3.0.1 states that “[f]ailure to meet a Surveillance, whether such failure is experienced during the performance of the Surveillance or between performances of the Surveillance, shall be failure to meet the LCO.”

TS Compliance (cont.)

- Following the guidance of Inspection Manual Chapter (IMC)-0326, “Operability Determinations & Functionality Assessments for Conditions Adverse to Quality or Safety,” if there is not a reasonable expectation of operability, the SRVs should not be considered operable.
- NRC staff considers the repeated failure of Target Rock SRVs a challenge to a reasonable expectation of operability. This could lead to determination of inoperability and non-compliance with TSs.

Past Industry Actions

Industry has identified corrosion-induced oxide bonding to be the cause of the current setpoint drift issue for 2-stage Target Rock SRVs. The licensees have tried the following options since the closure of GSI B-55, but with limited success:

- Application of platinum coatings to SRV pilot valve discs.
- Change the pilot valve disc material to Stellite 21 in an effort to prevent corrosion bonding.
- Enhanced SRV insulation to reduce corrosion and improve reliability.
- Return to modified Target Rock 3-stage SRV (subject to downward setpoint drift concerns).

Next Steps

- Based on the history of Target Rock SRV setpoint drift, the NRC staff has determined that this potential TS non-compliance issue needs to be addressed in a timely fashion.
- NRC staff will coordinate with licensees as they work to determine a path towards restoring reasonable assurance of operability for this low safety significance issue.
- The NRC staff is considering enforcement discretion guidance, among other options, for resolution of the issue in a reasonable time frame.

BWROG Feedback

- The NRC staff would like the BWROG to address potential corrective actions being considered for a timely resolution.
- Based on the past history of repeated failures, what is the confidence level that corrections actions being considered are likely to succeed and why?
- What is the expected time frame for the industry to demonstrate reasonable assurance of operability and TS compliance?