



LR-N17-0080

10CFR50.59(d)(2)

APR 14 2017

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Salem Generating Station, Units 1 and 2  
Renewed Facility Operating License Nos. DRP-70 and DRP-75  
NRC Docket Nos. 50-272 and 50-311

Subject: Report of Changes, Tests, and Experiments

Pursuant to the requirements of 10CFR50.59(d)(2), Salem Generating Station, Units 1 and 2 forwards a summary of changes, tests, and experiments implemented during the period of January 1, 2015 through December 31, 2016.

There are no new commitments in this letter.

If there are any questions, please contact Thomas Cachaza at 856-339-5038.

Sincerely,

A handwritten signature in black ink, appearing to read "C.V. McFeaters", written over a horizontal line.

Charles V. McFeaters –Site Vice President  
Salem Generating Station

Attachments (1)

tjc

- C Mr. D. Dorman, Administrator – Region 1
- Ms. C. Parker, Licensing Project Manager – Salem
- USNRC Senior Resident Inspector – Salem
- Mr. P. Mulligan, Manager, IV, Bureau of Nuclear Engineering
- Mr. T. Cachaza, Salem Commitment Coordinator
- Mr. L. Marabella, Corporate Commitment Coordinator

LR-N17-0080

Attachment 1  
Summary of Changes, Tests, and Experiments  
Salem Units 1 and 2

**Salem Unit 2 Main Generator Automatic Voltage Regulator (AVR) Replacement**  
**Salem PORC S2015-002**

The specific activities included in this Design Change Package (DCP) (80109718) are:

- Replacing the existing AVR with a new AVR to be placed in the same location and on the same pad. The new AVR will also require the installation of a new walk-in enclosure to house the new AVR to mitigate equipment high temperature limitations.
- Installing a new ABB provided Excitation Transformer Cabinet to be located next to the AVR house and on a separate pad.
- Providing dual power feeds from Non-Safety Related 480Vac switchgears to the new AVR. Unlike the existing GE Alterrex system it will not be self-excited.
- Providing an additional 125Vdc power feed to the AVR from the Balance of the Plant (BOP) Battery System 125Vdc Distribution Panel 2CDC.
- Modifying the Main Control Room (MCR) board to accommodate the new AVR requirements.
- Modifying the MCR annunciator display unit H to accommodate the new AVR alarms.
- Replacing current system protective relay functions which will be relocated to the new AVR cabinet.
- Replace the present single phase main generator output current transformer (CT) AVR input with three phase generator output current input.
- Determining the new AVR and PSS settings in order to maintain Grid Stability.
- Replacing existing analog V/Hz relays with ones of the same kind.

**Salem 2 Advanced Digital Feedwater Control System (ADFCS) Upgrade**  
**Salem PORC S2015-013**

DCP 80104783 replaces the Westinghouse WDPF Feedwater Control System (ADFCS) with a Westinghouse Ovation Feedwater Control System and integrates the Steam Generator Feed Pump speed control into the ADFCS. The DCP:

- Replaces control system hardware racks by replacing Racks 18-2 and 19-2
- Upgrades control room interfaces
- Integrates SGFP speed control into ADFCS
- Replaces the ADFCS Engineering Workstation with an ADFCS Infrastructure Cabinet
- Adds field transmitters/probes
- Updates the plant computer interface and integrates with cyber security equipment
- Modifies valve limit switch wiring
- Spares signals in the Auxiliary Annunciator System
- Installs new interface and power cabling
- Modifies the steam flow/feed flow mismatch control strategy for the feedwater regulating valves
- Modifies the feed header/steam header differential pressure control strategy for the feed pump speed control

**Salem 1 Advanced Digital Feedwater Control System (ADFCS) Upgrade**  
**Salem PORC S2015-016**

DCP 80104782 replaces the Westinghouse WDPF Feedwater Control System (ADFCS) with a Westinghouse Ovation Feedwater Control System and integrates the Steam Generator Feed Pump speed control into the ADFCS. The DCP:

- Replaces control system hardware racks by replacing Racks 18-1 and 19-1
- Upgrades control room interfaces
- Integrates SGFP speed control into ADFCS
- Replaces the ADFCS Engineering Workstation with an ADFCS Infrastructure Cabinet

- Adds field transmitters/probes
- Updates the plant computer interface and integrates with cyber security equipment
- Modifies valve limit switch wiring
- Spares signals in the Auxiliary Annunciator System
- Installs new interface and power cabling
- Modifies the steam flow/feed flow mismatch control strategy for the feedwater regulating valves
- Modifies the feed header/steam header differential pressure control strategy for the feed pump speed control

**Removal of Containment Shadow Shields**  
**Salem PORC S2015-032**

The proposed activity is to process revisions to design analyses (calculations) that support removal of the concrete shadow shields from outside of the Salem 1 and Salem 2 containment equipment hatches. The proposed activity does include removal of the concrete shadow shields, which may be performed in accordance with plant procedures.

It has been demonstrated that the outer equipment hatches can withstand a design basis tornado missile impact without the presence of the concrete shadow shields. Calculation S-C-CAN-SDC-2330 documents this analysis. This activity revises dose calculations that demonstrate that the radiation doses at the Control Rooms (CR) (for Salem Unit 1, Unit 2, and Hope Creek), Exclusion Area Boundary (EAB), and Low Population Zone (LPZ) boundary are within the guidance of the current Salem licensing basis-DPR 70 (Unit 1) and DPR 75 (Unit 2) including License amendments 271 and 252 respectively, that adopted the Alternate Source Term in accordance with Regulatory Guide 1.183 and 10CFR50.67. This review has been accomplished for each of the Condition IV Limiting Faults contained in UFSAR Chapter 15.

The following documents have been reviewed and/or revised:

- S-C-V AR-MDC-1518: Post-Accident Access to Vital Areas
- S-C-ZZ-MEE-1934: Post-LOCA EAB Dose with Equipment Hatch Outer Concrete Blocks Removed in Mode 1
- S-C-ZZ-MDC-1920: Fuel Handling Accidents Radiological Consequences
- S-C-ZZ-MDC-1945: Post LOCA EAB, LPZ, and CR Doses-Alternate Source Term (AST)
- S-C-ZZ-MDC-1946: Post LOCA TSC Doses-Alternate Source Term (AST)
- S-C-ZZ-MDC-1947: Post LOCA Vital Access Area Mission Doses-AST
- S-C-ZZ-MDC-1948: EAB, LPZ, and CR Doses-Control Rod Ejection Accident-AST
- S-C-ZZ-MDC-1949: EAB, LPZ, & CR Dose-Steam Generator Tube Rupture Accident-AST
- S-C-ZZ-MDC-1950: EAB, LPZ, & CR Doses -Main Steam Line Break Accident-AST
- S-C-ZZ-MDC-1951: EAB, LPZ, & CR Doses:--RCP Locked Rotor Accident-AST
- S-C-ZZ-MDC-2005: Hope Creek CR Habitability for a LOCA Occurring at Salem 2 Plant
- S-C-CAN-SDC-2330: Containment Hatch Tornado Missile Evaluation

**DS1.8-0098, 80116362 NSAL14-5 Implementation**  
**Salem PORC S2016-015**

Lower than expected critical heat flux (CHF) results were obtained from 5x5 rod bundle tests simulating the Westinghouse 14 foot 17x17 Robust Fuel Assembly (RFA) design without intermediate flow mixer (IFM) grids. The test data showed lower than expected CHF results from the 5x5 rod bundle tests for a subset of conditions that were previously untested, resulting in non-conservative predictions by the WRB-2M CHF correlation, which is applicable only to 17x17 RFA-type fuel. This issue was

communicated in Nuclear Safety Advisory Letter NSAL-14-5. [While the new test data are not directly applicable to the WRB-1 and WRB-2 correlations, the new test data for the 17x17 RFA fuel without IFMs (Intermediate Flow Mixer grids) were also analyzed using the WRB-1 and WRB-2 correlations. Trends observed for the predictions with the WRB-1 and WRB-2 correlations for the new non-IFM RFA test data indicate a potential non-conservatism for other fuel types in the newly tested high quality sub-region.]

This issue is resolved by applying a conservative penalty if the fluid conditions are in the potentially non-conservative sub-region of conditions. Identification of the potentially non-conservative sub-region for the [WRB-1, WRB-2, and WRB-2M (IFM application)] correlations is simplified by employing threshold values of only local quality at the point of MDNBR (minimum departure from nucleate boiling ratio) identified in the technical basis document. Therefore, if the results of a future plant DNB safety analysis show that the local quality at the location of the MDNBR does exceed the applicable quality threshold, the plant DNB safety analysis is assumed to be in the potentially non-conservative sub-region of the local fluid parameters of the current [WRB-1, WRB-2, or WRB-2M] correlation. If the local quality at the location of the MDNBR exceeds the applicable quality threshold value from the technical basis document (Reference 1 in the 10CFR50.59 evaluation), a conservative margin reduction to the CHF correlation prediction (penalty) is applied which effectively uses up all of the DNBR margin to the approved 95/95 DNBR limit (assumes fuel rod failure has occurred due to DNB). The use of this penalty does not impact the correlation or the approved range of applicability included in the approved topical report. Additional detail is included in the attached technical basis.