

RAS J-79

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UISNRC

April 15, 2008 (10:00am)

OFFICE OF SECRETARY
RII EMAKINGS AND
ADJUDICATIONS STAFF

required by 10 CFR 54.21(d).

3.0.3.1.13 Water Chemistry Control - BWR Program

Summary of Technical Information in the Application. LRA Section B.1.32.2, "Water Chemistry Control - BWR," describes the existing Water Chemistry Control-BWR Program as consistent with GALL AMP XI.M2, "Water Chemistry."

To manage aging effects caused by corrosion and cracking mechanisms the program relies on monitoring and control of water chemistry based on EPRI Report 1008192 (Boiling Water Reactor Vessel and Internals Project (BWRVIP)-130). BWRVIP-130 has three sets of guidelines: for primary water; for condensate and feedwater; and for control rod drive (CRD) mechanism cooling water. EPRI guidelines in BWRVIP-130 also include recommendations for controlling water chemistry in the torus, condensate storage tanks, demineralized water storage tanks, and spent fuel pool. The Water Chemistry Control - BWR Program optimizes the primary water chemistry to minimize potential loss of material and cracking by limiting causative contaminant levels in the reactor coolant system. Additionally, the applicant has instituted hydrogen water chemistry to limit the potential for intergranular stress corrosion cracking (IGSCC) through the reduction of dissolved oxygen in the treated water.

Staff Evaluation: During its audit and review, the staff confirmed the applicant's claim of consistency with the GALL Report and documented a detailed evaluation of this AMP in Audit and Review Report Section 3.0.3.1.13.

GALL AMP XI.M2 recommends that for "susceptible locations" a one-time inspection program verification program may be appropriate. The staff asked the applicant whether it intended to implement a one-time inspection program for this water chemistry control program and, if so, why this intent is not included in the UFSAR supplement, Appendix A.

In response, the applicant stated that the One-Time Inspection Program described in LRA Section B.1.23 includes inspections to verify the effectiveness of the water chemistry control AMPs by confirming that unacceptable cracking, loss of material, and fouling has not occurred. The discussions in LRA Section 3, Table 1 link the One-Time Inspection Program and water chemistry control programs for susceptible components; however, for clarity, in its response dated July 19, 2006, the applicant stated that the effectiveness of the Water Chemistry Control - Auxiliary Systems, BWR, and Closed Cooling Water Programs is confirmed by the One-Time Inspection Program.

With the change to Appendix A the staff finds the applicant's response acceptable.

The staff finds the applicant's Water Chemistry - BWR Program acceptable as consistent with the recommended GALL AMP XI.M2, "Water Chemistry."

Operating Experience. LRA Section B.1.32.2 states that from 1998 through 2004 after several condition reports of adverse trends in parameters monitored by the Water Chemistry Control - BWR Program the applicant acted within the corrective action program to preclude unacceptable parameter values. Continuous confirmation of water quality and corrective actions taken before adverse trends reach control limits provide evidence that the program effectively manages component aging effects. From 1998 through 2004, after several condition reports of

U.S. NUCLEAR REGULATORY COMMISSION

In the Matter of Entegry (Pilgrim Nuclear Power Station)

Docket No. 56-293-LR Official Exhibit No. 49

OFFERED by: Applicant/Licensee Intervenor

NRC Staff

Other NRCE/EPRI/ET/LL

IDENTIFIED on 4-10-08 Witness/Panel

Action Taken: ADMITTED REJECTED WITHDRAWN

Reported/Clerk Thibault

Temp = SEC4-027

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parameters monitored by the Water Chemistry Control - BWR Program were outside administrative limits but still within EPRI acceptance criteria and the applicant acted within the corrective action program to preclude violations of EPRI acceptance criteria. Continuous confirmation of water quality and corrective action before parameters reach control limits provide evidence that the program effectively manages component aging effects.

From 1998 through 2004, there were two incidents in which parameters monitored by the Water Chemistry Control-BWR Program were outside of EPRI acceptance criteria:

- (1) Following a power outage on March 29, 2002, dissolved oxygen measurement from the B high-pressure feedwater (HPFW) train was ~28 ppb below the minimum required reading of 30 ppb (EPRI action level 1). Dissolved oxygen measured from the A HPFW train and condensate demineralizer effluent (CDE) were acceptable (~ 70 to 80 ppb). The root cause was B HPFW sample line contamination, not actually low oxygen in the feedwater. The B HPFW sample line was replaced.
- (2) On October 28, 2002, HPFW and CDE dissolved oxygen levels spiked to 400 to 500 ppb for about 15 minutes before returning to normal. EPRI action level 1 for HPFW dissolved oxygen is 200 ppb. The root cause was inadequate filling of the D demineralizer prior to its return to service. The procedure states, "It is EXTREMELY important that all air is vented from a Cond Demin before it is placed in service to prevent air injection into the Feedwater System." Procedural steps were emphasized for proper venting to mitigate elevated oxygen levels in the feedwater system.

The applicant further stated that continuous confirmation of water quality and timely corrective action provide evidence that the program effectively manages component aging effects. QA audits in 2000 and 2002 revealed no issues or findings with impact on program effectiveness. A QA audit in 2004 revealed that reactor coolant sodium and lithium analyses had not been weekly during the first half of 2004. The applicant took corrective action to replace the analysis instrument and to complete the analyses as required. A corporate assessment in 2003 found areas for improvement in administrative controls but no issues or findings with impact on program effectiveness.

The staff also reviewed the operating experience presented in the LRA and interviewed the applicant's technical personnel to confirm that the plant-specific operating experience revealed no degradation not bounded by industry experience.

The staff confirmed that the "operating experience" program element satisfies the criterion defined in the GALL Report and in SRP-LR Section A.1.2.3.10. The staff finds this program element acceptable.

UFSAR Supplement. In LRA Section A.2.1.37, the applicant provided the UFSAR supplement for the Water Chemistry Control - BWR Program. The staff reviewed this section and determined that the information in the UFSAR supplement is an adequate summary description of the program, as required by 10 CFR 54.21(d).

Conclusion. On the basis of its audit and review of the applicant's Water Chemistry Control - BWR Program, the staff finds all program elements consistent with the GALL Report. The staff concludes that the applicant has demonstrated that the effects of aging will be

adequately managed so that the intended function(s) will be maintained consistent with the CLB for the period of extended operation, as required by 10 CFR 54.21(a)(3). The staff also reviewed the UFSAR supplement for this AMP and concludes that it provides an adequate summary description of the program, as required by 10 CFR 54.21(d).

3.0.3.2 AMPs That Are Consistent with the GALL Report with Exceptions and/or Enhancements

In LRA Appendix B, the applicant stated that the following AMPs are, or will be, consistent with the GALL Report with exceptions or enhancements:

- Buried Piping and Tanks Inspection Program
- BWR CRD Return Line Nozzle Program
- BWR Feedwater Nozzle Program
- BWR Penetrations Program
- BWR Stress Corrosion Cracking Program
- BWR Vessel ID Attachment Welds Program
- BWR Vessels Internals Program
- Diesel Fuel Monitoring Program
- Fatigue Monitoring Program
- Fire Protection Program
- Fire Water System Program
- Metal-Enclosed Bus Inspection Program
- Oil Analysis Program
- Reactor Head Closure Studs Program
- Reactor Vessel Surveillance Program
- Service Water Integrity Program
- Structures Monitoring Program
- Water Control Structures Monitoring Program
- Water Chemistry Control - Closed Cooling Water Program

For AMPs that the applicant claimed are consistent with the GALL Report, with exception(s) and/or enhancement(s), the staff performed an audit and review to confirm that those attributes or features of the program for which the applicant claimed consistency were indeed consistent. The staff also reviewed the exception(s) and/or enhancement(s) to the GALL Report to determine whether they were acceptable and adequate. The results of the staff's audits and reviews are documented in the following sections.

3.0.3.2.1 Buried Piping and Tanks Inspection Program

Summary of Technical Information in the Application. LRA Section B.1.2, "Buried Piping and Tanks Inspection," describes the new Buried Piping and Tanks Inspection Program as consistent, with exception, with GALL AMP X1.M34, "Buried Piping and Tanks Inspection."

This program includes (a) preventive measures to mitigate corrosion and (b) inspections to manage the effects of corrosion on the pressure-retaining capability of buried carbon steel, stainless steel, and titanium components. Preventive measures are in accordance with standard industry practice for maintaining external coatings and wrappings. Buried components are