

**AUDIT WORKSHEET**  
**GALL REPORT AMP**

PLANT: \_\_\_\_\_

LRA AMP: \_\_\_\_\_

REVIEWER: \_\_\_\_\_

GALL AMP: **XI.M25, BWR Reactor Water Cleanup System**

DATE: \_\_\_\_\_

Program Element	Auditable GALL Criteria	Documentation of Audit Finding
Program Description	<p>A. The program includes inservice inspection (ISI) and monitoring and control of reactor coolant water chemistry to manage the effects of stress corrosion cracking (SCC) or intergranular stress corrosion cracking (IGSCC) on the intended function of austenitic stainless steel (SS) piping in the reactor water cleanup (RWCU) system. Based on the Nuclear Regulatory Commission (NRC) criteria related to inspection guidelines for RWCU piping welds outboard of the second isolation valve, the program includes the measures delineated in NUREG-0313, Rev. 2, and NRC Generic Letter (GL) 88-01. Coolant water chemistry is monitored and maintained in accordance with the Electric Power Research Institute (EPRI) guidelines in boiling water reactor vessel and internals project (BWRVIP) -29 (TR-103515) to minimize the potential of cracking due to SCC or IGSCC.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No            Document(s) used to confirm Criteria:</p> <p>Comment:</p>
1. Scope of Program	<p>A. Based on the NRC letter (September 15, 1995) on the screening criteria related to inspection guidelines for RWCU piping welds outboard of the second isolation valve, the program includes the measures delineated in NUREG-0313, Rev. 2, and NRC GL 88-01 to monitor SCC or IGSCC and its effects on the intended function of austenitic SS piping. The screening criteria include:</p> <p>a. Satisfactory completion of all actions requested in NRC GL 89-10,</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No            Document(s) used to confirm Criteria:</p> <p>Comment:</p>

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	<p>b. No detection of IGSCC in RWCU welds inboard of the second isolation valves (ongoing inspection in accordance with the guidance in NRC GL 88-01), and</p> <p>c. No detection of IGSCC in RWCU welds outboard of the second isolation valves after inspecting a minimum of 10% of the susceptible piping.</p> <p>No IGSCC inspection is recommended for plants that meet all the above three criteria or that meet criterion (a) and piping is made of material that is resistant to IGSCC.</p>	
2. Preventive Actions	<p>A. The comprehensive program outlined in NUREG-0313 and NRC GL 88-01 addresses improvements in all three elements that, in combination, cause SCC or IGSCC. These elements are a susceptible (sensitized) material, a significant tensile stress, and an aggressive environment. The program delineated in NUREG-0313 and NRC GL 88-01 includes recommendations regarding selection of materials that are resistant to sensitization, use of special processes that reduce residual tensile stresses, and monitoring and maintenance of coolant chemistry. The resistant materials are used for new and replacement components and include low-carbon grades of austenitic SS and weld metal, with a maximum carbon of 0.035 wt.% and a minimum ferrite of 7.5% in weld metal and cast austenitic stainless steel (CASS). Inconel 82 is the only commonly used nickel-base weld metal considered resistant to SCC; other nickel-alloys, such as Alloy 600, are evaluated on an individual basis.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>B. Special processes are used for existing as well as new and replacement components. These processes include solution heat treatment, heat sink welding, induction heating, and mechanical stress improvement.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>
“	<p>C. The program delineated in NUREG-0313 and NRC GL 88-01 varies depending on the plant- specific reactor water chemistry</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Document(s) used to confirm Criteria:</p>

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	to mitigate SCC or IGSCC.	<p>Comment:</p>
3. Parameters Monitored/ Inspected	<p>A. The aging management program (AMP) monitors SCC or IGSCC of austenitic SS piping by detection and sizing of cracks by implementing the inspection guidelines delineated in the NRC screening criteria for the RWCU piping outboard of isolation valves. The following schedules are followed:  Schedule A: No inspection is required for plants that meet all three criteria set forth above, or if they meet only criterion (a). Piping is made of material that is resistant to IGSCC, as described above in preventive actions.  Schedule B: For plants that meet only criterion (a): Inspect at least 2% of the welds or two welds every refueling outage, whichever sample is larger.  Schedule C: For plants that do not meet criterion (a): Inspect at least 10% of the welds every refueling outage.</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No  Document(s) used to confirm Criteria:</p> <p>Comment:</p>
4. Detection of Aging Effects	<p>A. The extent, method, and schedule of the inspection and test techniques delineated in the NRC inspection criteria for RWCU piping and NRC GL 88-01 are designed to maintain structural integrity and to detect aging effects before the loss of intended function of austenitic SS piping and fittings. Guidelines for the inspection schedule, methods, personnel, sample expansion, and leak detection guidelines are based on the guidelines of NRC GL 88-01.  NRC GL 88-01 recommends that the detailed inspection procedure, components, and examination personnel be qualified by a formal program approved by the NRC. Inspection can reveal cracking and leakage of coolant. The extent and frequency of inspections recommended by the program are based on the condition of each weld (e.g., whether the weldments were made from IGSCC-resistant material, whether a stress improvement process was applied to a weldment to</p>	<p>Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No  Document(s) used to confirm Criteria:</p> <p>Comment:</p>

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	reduce the residual stresses, and how the weld was repaired if it had been cracked).	
5. Monitoring and Trending	A. The extent and schedule for inspection in accordance with the recommendations of NRC GL 88-01 provide timely detection of cracks and leakage of coolant. Based on inspection results, NRC GL 88-01 provides guidelines for additional samples of welds to be inspected when one or more cracked welds are found in a weld category.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
6. Acceptance Criteria	A. The NRC GL 88-01 recommends that any indication detected be evaluated in accordance with the requirements of ASME Section XI, Subsection IWB-3640 (2001 edition including the 2002 and 2003 Addenda).	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
7. Corrective Actions	A. The guidance for weld overlay repair, stress improvement, or replacement is provided in NRC GL 88-01. As discussed in the appendix to this report, the staff finds the requirements of 10 CFR Part 50, Appendix B, acceptable to address the corrective actions.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
8. Confirmation Process	A. Site quality assurance (QA) procedures, review and approval processes, and administrative controls are implemented in accordance with requirements of 10 CFR Part 50, Appendix B. As discussed in the appendix to this report, the staff finds the requirements of 10 CFR Part 50, Appendix B, acceptable to address the confirmation process and administrative controls.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
9. Administrative Controls	A. See Item 8, above.	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No Document(s) used to confirm Criteria:  Comment:
10. Operating	A. The IGSCC has occurred in small- and large-diameter boiling	Consistent with GALL AMP: <input type="checkbox"/> Yes <input type="checkbox"/> No

Program Element	Auditable GALL Criteria	Documentation of Audit Finding
Experience	water reactor (BWR) piping made of austenitic stainless steels or nickel alloys. The comprehensive program outlined in NRC GL 88-01 and NUREG-0313 addresses improvements in all elements that cause SCC or IGSCC (e.g., susceptible material, significant tensile stress, and an aggressive environment) and is effective in managing IGSCC in austenitic SS piping in the RWCU system.	<p>Document(s) used to confirm Criteria:</p> <p>Comment:</p>

EXCEPTIONS

Item Number	Program Elements	LRA Exception Description	Basis for Accepting Exception	Documents Reviewed (Identifier, Para.# and/or Page #)
1.				
2.				
...				

ENHANCEMENTS

Item Number	Program Elements	LRA Enhancement Description	Basis for Accepting Enhancement	Documents Reviewed (Identifier, Para.# and/or Page #)
1.				
2.				
...				

DOCUMENT REVIEWED DURING AUDIT

Document Number	Identifier (number)	Title	Revision and/or Date
1.			
2.			
3.			
4.			
....			