



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION I  
475 ALLENDALE ROAD  
KING OF PRUSSIA, PA 19406-1415

4/9  
ML 102150533

August 3, 2010

MEMORANDUM TO: Arthur L. Burritt, Chief  
Projects Branch 3  
Division of Reactor Projects

THRU: Richard J. Conte, Chief /RA/  
Engineering Branch 1  
Division of Reactor Safety

FROM: Timothy L. OHara, Reactor Inspector /RA/  
Engineering Branch 1  
Division of Reactor Safety

SUBJECT: REVISION OF JULY 30, 2010 - INSERVICE INSPECTION  
ACTIVITIES INSPECTION FEEDER FOR SALEM UNIT 1,  
INSPECTION REPORT 05000272/2010003

The enclosed feeder contains input for the subject report resulting from inspection of Inservice Inspection (ISI) activities during the period from April 5, 2010 to June 28, 2010, at Salem Unit 1. The inspection was conducted using Inspection Procedure 71111.08, Inservice Inspection Activities and Temporary Instruction (TI) 2515/172, Reactor Coolant System Dissimilar Metal Butt Welds. The results of this inspection were presented to Mr. Ed Eilola, Salem Plant Manager, at an exit meeting on June 28, 2010.

Suggested Cover Letter Input

This feeder documents one NRC-identified finding of very low safety significance (Green). This finding was determined to be a violation of an NRC requirement. This feeder also documents a licensee-identified violation, which was determined to be of very low safety significance, in section 4OA7 of this report. Because these violations are of very low safety significance and because the issues were entered into your corrective action process, these findings are being treated as non-cited violations (NCVs) consistent with Section VI.A.1 of the NRC Enforcement Policy.

Issue of Agency Concern; Buried, Safety Related Piping:

Because of an ongoing issue of Agency Concern about the degradation of buried piping, this issue is being documented as a licensee-identified finding in Section 4OA7, in accordance with the guidance of IMC 0612-10.

E-9

No specific action is needed for this concern in light of industry initiatives on buried piping and the NRC Buried Piping Action Plan.

Since this issue, as noted below, is licensee identified, a long discussion was not permitted by IMC0612 format requirements. Documenting an issue of agency wide concern appears to only apply to minor findings, however, this issue is more than minor and licensee identified.

The following finding of very low safety significance was identified by PSEG and is a violation of 10 CFR 50, Appendix B, Criterion III, Design Control, an NRC requirement. PSEG did not provide an effective protective coating for the buried AFW piping. This issue has been evaluated via IMC 0609, Attachment 4, Initial Screening and Characterization of Findings and IMC 0612, Appendix B, Issue Screening.

During a planned excavation and inspection of the Unit 1 AFW buried piping to SG #12 and SG #14, PSEG identified corrosion (significantly below minimum wall thickness for a design pressure of 1950 psi) of the safety related, ASME Class 3, Seismic Class 1 piping. PSEG repaired or replaced the affected Unit 1 buried AFW piping before returning the plant to operation. Portions of the Unit 1 and Unit 2 Auxiliary Feedwater (AFW) System piping is buried piping and has not been visually inspected since the plant began operation in 1977 for Unit 1 and since 1979 for Salem Unit 2. In April 2010, approximately 680 ft. (340 ft. of the #12 SG AFW supply and 340 ft. of the #14 SG AFW supply) of the Unit 1 buried piping between the pump discharge manifold and the connection to the Main Feedwater piping to the affected SGs was discovered to be corroded to below minimum wall thickness (0.278") for the 1950 psi design pressure of the AFW System. The lowest wall thickness measured in the affected piping was 0.077". Preliminarily, PSEG representatives believe that there was an inadvertent omission of coating during construction days. PSEG plans on excavating the Unit 2 buried piping to inspect the condition during the next Unit 2 outage scheduled for the spring of 2011. Although no leakage was evident for these conditions, the inspector questioned if periodic pressure test had been conducted on this underground piping and this resulted in an NRC identified finding, as noted in this feeder, along with an operability determination for Unit 2 and a risk assessment for waiting to do the above noted inspection in 2011 on the Unit 2 buried AFW piping.

10 CFR 50, Appendix B, Criterion III, Design Control, states, in part, "Measures shall be established to assure that applicable regulatory requirements and the design basis, ... , for those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures, and instructions. These measures shall include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled. Measures shall also be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems and components."

Contrary to these requirements, PSEG did not provide engineering evaluations, vendor certification, or testing data to demonstrate that the specified coating would protect the buried AFW piping for the design lifetime of the plant. Also, PSEG did not assure appropriate quality standards which assure that deviations from such standards were controlled. Additionally, PSEG did not provide measures for the selection and review for suitability of the coating materials for the buried AFW piping application, for periodic inspections to ensure that the applied coating was protecting the buried AFW piping, and did not provide engineering details demonstrating the ability of the coating to protect the buried AFW piping for the design life of the plant.

This licensee identified finding affects the mitigating systems cornerstone by affecting the secondary, short term decay heat removal capability. Because the finding did not result in loss of operability or functionality the inspector determined that the finding was of very low safety significance, Green. The inspector determined that this licensee identified finding is more than minor, and that a Cross Cutting Aspect did not exist because the issue was not indicative of current performance because the condition existed since 1977. Specifically, the section of piping under question was identified with degradation that put the system outside its original design basis (1950 psi design rating); and PSEG was required to make significant revisions to the system design analysis to take credit for available margin to show that the system remained operable.

Because PSEG entered this condition into the corrective action process (Notification 20456999) and because the issue is of very low safety significance (Green), this issue is being treated as a licensee identified non-cited violation consistent with Section VI.A.1 of the NRC Enforcement Policy.

#### Follow up Comments for Future PI&R Sample

Because PSEG had not completed the EQ:ACE for the corroded AFW piping, had not completed the Root Cause Evaluation for missing the IWA-5244 pressure tests, and had not completed it's evaluation of Notification 20462034, it was agreed that an annual PI&R sample would be completed to review these documents to determine that the following comments/observations have been addressed by PSEG. It is anticipated that this sample will be performed in September 2010 depending upon PSEG completion of the cause determinations and Notification actions.

The inspector made other observations related to the finding on the AFW pressure testing issue and degradation noted in the AFW yard piping. PSEG intends to address the following observations/comments in the cause determinations and Notification evaluations.

- (1) The PSEG buried piping inspection procedure did not document how a representative inspection sample is selected and did not enumerate the basis for the inspection sample selection(s).
- (2) The PSEG buried piping inspection procedure does not provide a threshold criteria for inspection conditions which must be entered into the corrective action process for evaluation, potential resolution and/or tracking.

(3) PSEG has not defined a design life for the new coating on the replaced buried AFW piping for Unit 1. Also, PSEG has not determined an excavation and inspection frequency for the newly coated, replaced Unit 1 buried piping.

(4) Notification 20459689 reported the failure to perform the ASME, Section XI, paragraph IWA-5244 required pressure tests on the buried AFW piping for Unit 1 and Unit 2. This Notification states, "The system pressure test boundary drawing (S2-SPT-336-0) identifies the piping as YARD piping not buried piping." It is not clear what PSEG is doing to ensure that other system drawings which may contain the same YARD markings and are potentially not being treated as buried piping and components.

(5) PSEG Buried Piping Program assumes that buried piping is protected by a coating system to protect the piping from degradation/corrosion for the design life of the plant. However, the Unit 1 AFW piping was discovered to not have been coated or protected. It is not clear what PSEG is doing to confirm or verify that other buried piping is protected with an effective coating which will protect the piping for the plant life.

(6) PSEG agreed to provide the ASME, NIS-2 forms with ANI approval for the completion of the repair/replacement of the Unit 1 AFW piping.

(7) PSEG has initiated Notification 20462034 to investigate and confirm the basis of the 1950 psig design pressure of the AFW system. Actions included in this Notification were in progress when the inspection ended on June 28, 2010.

Further, although this was not reported in the report, a second opportunity to identify and correct this performance deficiency related to the pressure drop test existed. In 2002 there was a similar condition (failure to perform buried piping pressure tests) documented in NRC Inspection Report 05000286-01-011 for Indian Point Unit 3 as NCV 50-286/2001-011-02. There should have been awareness of this issue by industry operating experience and it should be addressed in the apparent or root causes being completed by PSEG. The inspector should look for this in a PIR sample followup.

Enclosure: Feeder for Salem Unit 1, Inspection Report No. 05000272/2010003,  
05000311/2010003

cc w/Enclosure: (VIA E-MAIL)

- A. Burritt, DRP
- L. Cline, DRP
- D. Schroeder, SRI - Salem
- K. McKenzie, OA - Salem
- T. O'Hara, DRS
- R. Hardies, NRR
- DRS Files

SUNSI Review Complete: TLO/RJC (Reviewer's Initials)

Non-Public Designation Category: MD 3.4 Non-Public A.7

DOCUMENT NAME: g:\DRS\EB1\ohara\salem1-(2010003)(ohara)(isi-rpt)(8-3-2010)FINAL.doc

**ADAMS ACC #ML102150533**

After declaring this document An Official Agency Record" it **will not** be released to the Public.

To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

OFFICE	RI/DRS	RI/DRS	R1/DRS				
NAME	TO'Hara/TLO	WSchmidt/wac for	RConte/RJC				
DATE	07/29/2010	08/03/10	08/03/10				
OFFICE							
NAME							
DATE							

OFFICIAL RECORD COPY

## SUMMARY OF FINDINGS

### Reactor Safety

#### Cornerstone: Mitigating Systems

Green. The inspector identified a non-cited violation (NCV) of very low safety significance (Green) for PSEG's failure to perform auxiliary feedwater system (AFW) discharge piping system pressure tests on buried piping components as required by 10 CFR 50.55a(g)(4) and the referenced American Society of Mechanical Engineers Code (ASME), Section XI, paragraph IWA-5244 for Salem Unit 1. This performance deficiency also applies to Salem Unit 2 but it is not more than minor as noted below. The required tests are intended to demonstrate the structural integrity of the buried piping portions of the system. PSEG entered this condition (missed pressure tests) into the corrective action program (Notification 20459689) for Unit 1 and Unit 2. For Unit 1, PSEG replaced the affected AFW piping. For Unit 2, PSEG evaluated the operability for continued operation until the next refueling outage in the spring of 2011.

For both units the affected piping is safety related, ASME Class 3, Seismic Class 1 piping. This performance deficiency (failure to perform the system pressure testing) was more than minor, for the Unit 1 conditions, because, if left uncorrected, it would have resulted in a more significant condition. That is, in light of the as-found degraded conditions of the coating and the piping discovered during excavation in Unit 1, an undetected failure of the piping would have resulted due to further continued, undetected corrosion, and continued pipe wall degradation eventually resulting in the loss of structural integrity without system pressure testing.

For Unit 2, the performance deficiency is minor because PSEG has not identified corrosion on the Unit 2 buried AFW piping. This failure to comply with the above noted ASME code requirements for Unit 2 constitutes a violation of minor significance that is not subject to enforcement action in accordance with the NRC's enforcement policy.

For Unit 1, the inspector screened this performance deficiency using IMC 0609, Attachment 0609.04, "Phase 1 Initial Screening and Characterization of Findings." This finding impacts the mitigating systems cornerstone by adversely affecting the secondary, short term decay heat removal capability. Because the finding did not result in loss of operability or functionality, the inspector determined that the finding screened to Green, very low safety significance. No Cross Cutting Aspect is assigned to this violation because this condition began in 1988, more than 3 years ago, and is not indicative of current performance. This finding is described in Section 1R08.

Also, one violation of very low safety significance, which was identified by PSEG, was reviewed by the inspector. Corrective actions taken or planned by PSEG were entered into the corrective action program. The violation and corrective action (notification) tracking number is described in Section 4OA7 of this report.

## REPORT DETAILS

### 1R08 Inservice Inspection (ISI) (7111108 - 1 Sample)

#### a. Inspection Scope

The inspector observed a selected sample of nondestructive examination (NDE) activities in process. Also, the inspector reviewed the records of selected additional samples of completed NDE and repair/replacement activities. The sample selection was based on the inspection procedure objectives and risk priority of those components and systems where degradation would result in a significant increase in risk of core damage. The observations and documentation reviews were performed to verify that the activities inspected were performed in accordance with the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code requirements.

The inspector reviewed the licensee's performance of a visual inspection (VT) of the Unit 1 reactor vessel closure head (RVCH) and the installed upper head penetrations. The inspector reviewed the visual procedure, the qualifications of the personnel and reviewed the inspection report documenting the inspection results. The inspector also reviewed the data sheets for the penetrant tests completed on three of the penetration welds of the RVCH.

The inspector reviewed records for ultrasonic testing (UT), visual testing (VT), penetrant testing (PT) and magnetic particle testing (MT) NDE processes. PSEG did not perform any radiographic testing (RT) during this outage. The inspector reviewed inspection data sheets and documentation for these activities to verify the effectiveness of the examiner, process, and equipment in identifying degradation of risk significant systems, structures and components and to evaluate the activities for compliance with the requirements of ASME Code, Section XI.

#### Steam Generator Inspection Activities

The inspectors reviewed a sample of the Unit 1 steam generator eddy current testing (ECT) tube examinations, and applicable procedures for monitoring degradation of steam generator tubes to verify that the steam generator examination activities were performed in accordance with the rules and regulations of the steam generator examination program, Salem Unit 1 steam generator examination guidelines, NRC Generic Letters, 10CFR50, technical specifications for Unit 1, Nuclear Energy Institute 97-06, EPRI PWR steam generator examination guidelines, and the ASME Boiler and Pressure Vessel Code Sections V and XI. The review also included the Salem Unit 1 steam generator degradation assessment and steam generator Cycle 21 and 22 operational assessment. The inspector also verified the individual certifications for personnel participating in the SG ECT inspections during the 1R20 refueling outage.

The inspector reviewed PSEG's efforts in identifying wear degradation to the tubing in the four SGs at Unit 1. The majority of the identified wear indications were attributed to anti vibration bar (AVB) wear in the u bend regions of the four SGs. The inspector reviewed the analyses and evaluations that determined that a total of 14 SG tubes would be removed from service by plugging.

#### Boric Acid Corrosion Control Program Activities

The inspector reviewed the PSEG boric acid corrosion control program. The resident inspectors observed PSEG personnel performing boric acid walkdown inspections, inside containment, and in other affected areas outside of containment, at the beginning of the Unit 1 refueling outage. The inspectors reviewed the notifications generated by the walkdowns and the evaluations conducted by Engineering to disposition the notifications. Additionally, the inspector reviewed a sample of notifications and corrective actions completed to repair the reported conditions.

#### Section XI Repair/Replacement Samples:

AFW System Piping, Control Air & Station Air: The inspectors reviewed PSEG's discovery, reporting, evaluation and the repair/replacement of Unit 1 AFW piping that was excavated for inspection during the April 2010 Unit 1 refueling outage (1R20). PSEG conducted this inspection in accordance with PSEG's Buried Piping Inspection Program. Additionally, the inspectors reviewed the UT testing results (approximately 20,000) performed to characterize the condition of the degraded Unit 1 buried AFW piping.

The inspector also reviewed the repair/replacement work orders and the 50.59 screening and evaluation for the AFW, CA and SA piping. The inspectors reviewed the fabrication of the replacement piping, reviewed the documentation of the welding and NDE of the replacement piping and reviewed the pressure tests used to certify the replacement piping. Additionally, the inspector reviewed the specified replacement coating, the application of the replacement coating and the backfill of the excavated area after the piping had been tested.

The inspector reviewed the finite element analysis (FEA) results from PSEG's past operability analysis on the affected Unit 1 buried AFW piping completed by the licensee in order to demonstrate past operability at a reduced system pressure of 1275 psig. The design pressure of the AFW system is 1950 psig.

The inspector also reviewed the UT testing results (approximately 400) performed on portions of the Unit 2 AFW buried piping, in response to the conditions observed on Unit 1 AFW buried piping to determine if degradation existed on the Unit 2 buried AFW piping.

#### Rejectable Indication Accepted For Service After Analysis:

The inspector reviewed the Notification and the UT data report of a rejectable wall thickness measurement on the #11 SG Feedwater elbow during 1R20. The inspector reviewed the additional wall thickness data taken to further define the condition and

reviewed the finite element analysis (FEA) which verified that sufficient wall thickness remained to operate the component until the next refueling outage when it will be replaced.

b. Finding

The inspector identified the following violation related to ASME, Section XI testing of buried Unit 1 buried AFW piping.

Introduction. The inspector identified a GREEN non-cited violation (NCV) of 10 CFR 50.55a(g)(4) and the referenced American Society of Mechanical Engineers (ASME) Code, Section XI, paragraph IWA-5244 for PSEG's failure to perform required pressure tests of buried components for Salem Unit 1. This piping is safety related, 4.0" ID, ASME Class 3, Seismic Class 1 piping.

Description. Portions of the Unit 1 and Unit 2 Auxiliary Feedwater (AFW) System piping is buried piping and has not been visually inspected since the plant began operation in 1977 for Unit 1 and since 1979 for Salem Unit 2. In April 2010, approximately 680 ft. (340 ft. of the #12 SG AFW supply and 340 ft. of the #14 SG AFW supply) of piping between the pump discharge manifold and the connection to the Main Feedwater piping to the affected SGs was discovered to be corroded to below minimum wall thickness (0.278") for the 1950 psi design pressure of the AFW System. The discovery was noted by PSEG during a planned excavation implementing their buried pipe inspection program. The lowest wall thickness measured in the affected piping was 0.077". PSEG plans on excavating the Unit 2 buried piping to inspect the condition during the next Unit 2 outage scheduled for the spring of 2011. The affected Unit 1 piping was replaced. Although no leakage was evident as a result of the corrosion, the inspector questioned PSEG about whether the IWA-5244 periodic pressure tests had been conducted on this underground piping.

10 CFR 50.55(a)(g)(4)(ii) requires licensees to follow the in-service requirements of the ASME Code, Section XI. Paragraph IWA-5244 of Section XI requires licensees to perform system pressure tests on buried components to demonstrate the structural integrity of the tested piping. The system pressure test required by IWA-5244 is considered to be an inservice inspection and is part of Section XI. Section XI and IWA-5244 do not specify other non-destructive examinations (NDE) on buried components to demonstrate structural integrity other than a flow test if the system pressure test cannot be performed. PSEG had not performed the required tests for Unit 1 since 1988. Also PSEG had not performed the required tests for Unit 2 since 2001. Thus, PSEG did not perform the inservice inspection provided by the ASME Code, Section XI, intended to demonstrate the structural integrity of this safety related buried piping.

PSEG was aware of the need to perform these required tests because PSEG sought relief, from the NRC, from the previous Code required pressure testing in 1988 for Unit 1 only. Relief was granted to PSEG, by the NRC, to perform an alternate flow test in 1991 for Unit 1. However, PSEG did not perform the proposed alternate flow tests for Unit 1 since 1988. Also, PSEG did not request relief from the required tests or perform the proposed alternate tests on the Unit 2 buried piping from 2001 to the present. Thus, PSEG had had chance to foresee and correct this performance deficiency for both units but missed the opportunity at the time of processing this final results of the relief request.

PSEG replaced the affected Unit 1 buried piping during the refueling outage in April/May 2010. The required pressure tests were successfully completed after the replacement of the Unit 1 buried piping. Because the AFW system functioned as required during the plant shutdown prior to the start of 1R20 (April 2010), the system did not lose operability.

For Unit 2, PSEG completed an Operability Determination and a Risk Assessment for continued operation until the next scheduled refueling outage, scheduled for spring 2011. These evaluations determined that the condition was acceptable for continued operation until spring 2011. At present, it was not feasible to conduct the system pressure test or alternate flow test for operating conditions and no degradation has been discovered on the Unit 2, buried AFW piping.

Analysis. Because buried piping is not accessible for visual or volumetric non-destructive examination, the ASME Code, Section XI, paragraph IWA-5244 specifies a periodic pressure test as a method of demonstrating that structural integrity exists in buried components including piping. PSEG's failure to perform the pressure test on this safety related buried piping is a performance deficiency for each Salem Unit. For each unit, this performance deficiency was reasonably within the licensee's ability to foresee because PSEG sought Code relief from the pressure test in 1988 for Unit 1, and the deficiency could have been corrected and should have been prevented for both units. PSEG did not perform the inservice inspection (IWA-5244, pressure test), intended to demonstrate the structural integrity of this safety related buried piping.

This performance deficiency is a violation of regulatory requirements of 10 CFR 50.55a(g)(4) and the ASME Code, Section XI, paragraph IWA-5244 for Salem Unit 1. The inspector determined that the performance deficiency (failure to perform the pressure testing) was more than minor, for the Unit 1 conditions, because, if left uncorrected, it would have resulted in a more significant condition. That is, in light of the as-found degraded conditions of the coating and the piping discovered during excavation in Unit 1, an undetected failure of the piping would have resulted due to further continued, undetected corrosion, and continued pipe wall degradation eventually resulting in the loss of structural integrity without system pressure testing.

For Unit 2, the performance deficiency is minor because PSEG has not identified corrosion on the Unit 2 buried AFW piping. PSEG did not perform the required pressure tests of the buried piping to the #22 SG and #24 SG for Unit 2 for the 1st period (5/19/01 to 6/3/04) and 2<sup>nd</sup> period (6/24/04 to 5/20/08) of the 3<sup>rd</sup> In Service Inspection Interval. Accordingly and in accordance with IMC 0612 section 0612-11, this failure to comply with the above noted ASME code requirements for Unit 2 constitutes a violation of minor significance that is not subject to enforcement action in accordance with the NRC's enforcement policy.

For Unit 1, the inspector screened this performance deficiency using IMC 0609, Attachment 0609.04, "Phase 1 Initial Screening and Characterization of Findings." This finding impacts the mitigating systems cornerstone by adversely affecting the secondary, short term decay heat removal capability. Because the finding was not a design or qualification deficiency, did not result in an actual loss of safety function, and was not potentially risk significant for external events, the inspector determined that the finding screened to Green, very low safety significance for Unit 1.

The inspector determined that a Cross Cutting Aspect did not exist because the issue was not indicative of current performance because the condition existed since 1991, more than 3 years ago. Specifically, the failure to perform these pressure tests began in 1988 when PSEG requested relief from the requirement and neglected to incorporate the actions of the relief into the plant inservice inspection program when it was granted in 1991.

Enforcement. 10 CFR 50.55a(g)(4) states, in part: "Throughout the service life of a boiling or pressurized water-cooled nuclear power facility, components ... which are classified as ASME Code Class 1, Class 2 and Class 3 must meet the requirements, set forth in Section XI of editions of the ASME Boiler and Pressure Vessel Code". Paragraph IWA-5244, Buried Components, of Section XI says, in part,

"(b) For buried components where a VT-2 visual examination cannot be performed, the examination requirement is satisfied by the following: (1) The system pressure test for buried components that are isolable by means of valves shall consist of a test that determines the rate of pressure loss. Alternatively, the test may determine the change in flow between the ends of the buried components."

Contrary to these requirements, PSEG did not perform the required pressure tests of the buried AFW piping to the #12 SG and #14 SG at Salem Unit 1 during the 2<sup>nd</sup> In Service Inspection Interval (2/27/88 to 5/19/01) and during the 1<sup>st</sup> (5/19/01 to 6/3/04) and 2<sup>nd</sup> (6/24/04 to 5/20/08) periods of the 3<sup>rd</sup> In Service Inspection Interval (5/19/01 to 5/19/11). Consequently, from 2/27/88 to April 2010 the required pressure tests were not performed to demonstrate structural integrity on the affected buried Unit 1 AFW piping.

Because PSEG entered this condition for Salem Unit 1 into the corrective action process (Notification 20459686) and because it is of very low safety significance (Green), it is being treated as a non-cited violation consistent with Section VI.A.1 of the NRC Enforcement Policy. **NCV 50-272/2010003-??**

#### 4OA2 Identification and Resolution of Problems (71152)

##### a. Inspection Scope

The inspectors reviewed a sample of corrective action reports (notifications), listed in Attachment 2 which involved in-service inspection related issues, to ensure that issues are being promptly identified, reported and resolved.

##### b. Findings

No findings of significance were identified.

#### 4OA5 Temporary Instruction (TI) 2515/172

##### a. Inspection Scope

The Temporary Instruction (TI), 2515/172 provides for confirmation that owners of pressurized-water reactors (PWRs) have implemented the industry guidelines of the Materials Reliability Program (MRP) -139 regarding nondestructive examination and evaluation of certain dissimilar metal welds in the RCS containing nickel based Alloys 600/82/182.

During 1R20 PSEG inspected the dissimilar metal weld on the 1" reactor vessel drain piping with no detected indications. Salem Unit 1 has dissimilar metal welds in the eight reactor coolant system piping to reactor vessel nozzle safe end welds. No additional inspections or MSIP applications were performed during 1R20.

This TI requires documentation of specific questions in an inspection report. The questions and responses for the IR 05000272/2010003 section 4OA5 are included in this report as Attachment "B-1".

##### b. Findings

No findings of significance were identified.

#### 4OA6 Meetings, including Exit

The inspectors presented the ISI inspection and TI 2515/172 inspection results to Mr. Ed Eilola, Salem Plant Manager, and other members of the PSEG staff at the conclusion of the inspection at an exit meeting on June 28, 2010 for Salem Unit 1. The licensee acknowledged the conclusions and observations presented. Some proprietary information was reviewed during this inspection and was properly destroyed. No proprietary information is contained in this report.

#### 4OA7 Licensee Identified Violations

The following finding of very low safety significance was identified by PSEG. The finding is a violation of 10 CFR 50, Appendix B, Criterion III, Design Control that requires, in part, that measures shall be established to assure that applicable regulatory requirements and design bases are correctly translated into specifications, drawings, and instructions and that these measures shall include provisions to assure the proper selection and review for suitability of application of materials, parts, equipment, and processes. PSEG did not provide an effective protective coating for the buried AFW piping on Unit 1.

PSEG identified general corrosion that reduced the wall thickness of the safety related piping to less than the design minimum wall thickness of 0.278" for the system design pressure of 1950 psig. The lowest measured wall thickness was 0.077". A Finite Element Analysis (FEA) for the degraded piping was able to demonstrate past operability at a reduced operating pressure of 1275 psig. However, the required design pressure for the AFW system is 1950 psig and could not have been supported by the "as found" corroded piping.

This finding was associated with the mitigating systems cornerstone, specifically the short term decay heat removal capability. The finding was determined to be Green because it did not result in loss of operability or functionality of the AFW system.

Because PSEG entered this condition into the corrective action process (Notification 20456999) and because the issue is of very low safety significance (Green), this issue is being treated as a non-cited violation consistent with Section VI.A.1 of the NRC Enforcement Policy.

**ATTACHMENT**  
**SUPPLEMENTAL INFORMATION**  
**KEY CONTACTS**

Licensee Personnel:

Howard Berrick, PSEG  
Pat Fabian, PSEG  
Mohammad Ahmed, PSEG  
Tony Oliveri, PSEG  
Tom Roberts, PSEG  
Ali Fakhra, PSEG  
Len Rajkowski, PSEG  
Dave Mora, PSEG  
Edley Giles, PSEG  
Walter Sheets, PSEG  
Bob Montgomery, PSEG  
Jim Mellchiona, PSEG  
Bill Mattingly, PSEG  
Pat Van Horn, PSEG  
Jim Barnes, PSEG  
Justin Werne, PSEG  
Rick Villar, PSEG  
Matthew Murray, PSEG

**LIST OF DOCUMENTS REVIEWED**

Notifications:

20457869, Control Air Piping Leak\*  
20462034, Basis AFW Discharge Line Design Pressure\*  
20461785, Untimely retrieval of Design Documents\*  
20461255, U2 Containment Liner Blisters\*  
20459259, U2 Containment Liner Blisters\*  
20459689, failure to do IWA-5244 pressure tests\*  
20456999, Guided Wave (GW) pipe wall loss 20% to 44%\*, in Equipment Apparent Cause Evaluation (EQ;ACE) Charter  
20457854, see Equipment Apparent Cause Evaluation (EQ: ACE) Charter  
20457869, Air Line Leak, in Equipment Apparent Cause Evaluation EQ: ACE Charter  
20458147, see Equipment Apparent Cause Evaluation (EQ: ACE) Charter  
20458148, see Equipment Apparent Cause Evaluation (EQ: ACE) Charter  
20458568, see Equipment Apparent Cause Evaluation (EQ: ACE) Charter  
20458554, 11 CA HDR Line In Fuel Xfer Area Degraded\*  
20458761, 1R20 CA Buried Pipe Coating Repair\*  
20458925, 1R20 SA Buried Pipe Coating Repair\*  
20457262, (88) 1R20 AF Buried Pipe Inspection Results\*  
20460624, Need Heat Trace on AF lines in FFT Area  
20457877, U1 Containment Liner Corrosion at 78' El.\*

20459259, U1 Corrosion on Containment Liner\*  
20459303, #14 AF pipe damaged penetration seal\*  
20459304, #12 AF pipe damaged penetration seal\*  
20459454, Request for Additional UT Data, 4/18/10 (due to 0.077" reading)\*  
20344017, Inspect steel liner in 1R19  
20235636, NRC noted water running down containment wall  
20459189, Question on location of RFO-14 location of a PZR shell weld  
20290560, Replace section of 15B FWH shell-S1-R18  
20457879, (184) 1R20 FAC(N18) 14# elbow below Tmin  
20456828, (66) valve has visible boron buildup 1R20  
20459232, Heavy Dry White Boron Vlv Packing (1R20)  
20456834, Heavy Dry White Boron Vlv Packing (1R20)  
20456840, Medium Dry White Boron Vlv Packing (1R20)  
20456839, Medium Dry White Boron Vlv Packing (1R20)  
20389147, Recordable ISI Indications on CVC Tank  
20344017, Inspect Steel Liner in 1R19 @ Containment Sump  
20235636, NRC Noted Water Running Down Containment Wall  
20392631, ARMA From ISI Program Audit 2008  
20460624, Need Heat Trace on AF lines in FTT Area  
20333050, Response to NRC NOV EA-07-149  
20322039, 2<sup>nd</sup> Interval ISI NRC Violation  
20397518, A1CVC-1CV180 Chk Vlv Stuck Open - PI&R review  
20444514, Boric Acid Leak from Drain Line - PI&R review  
20445314, boron leak - PI&R review  
20448241, Minor Packing Leak – BAC - PI&R review  
20435861, 21SJ313 Has Boric Acid Leakage - PI&R review  
20417331, Boric Acid Leak at 11 CV156 - PI&R review  
20411151, Tubing leak on 1SS653 - PI&R review  
20414343, 12 Charging Pump seal inj. Line - PI&R review  
20395346, 12 Bat PP Seal Leak - PI&R review  
20450330, Containment Liner Corrosion - PI&R review  
20385733, Severe Corrosion on FP Valve - PI&R review  
20438320, (217) Op Eval. Of Containment Corrosion - PI&R review  
20387897, Significant outlet pipe corrosion - PI&R review  
20397225, MIC Corrosion Causing Through Wall Leak - PI&R review  
20436836, Repair Cracks in Battery Cells - PI&R review  
20392145, Update U1 ISI Relief Request Book - PI&R review  
20449447, Update Salem Unit 1 ISI 10 Yr Plan - PI&R review  
20449744, Update Salem Unit 1 Containment ISI 10 Yr Plan - PI&R review  
20449442, Update Salem Unit 2 Containment ISI 10 Yr Plan - PI&R review  
20449554, Salem U2 RFO18 ISI Scope - PI&R review  
20416605, INPO PSIRV Alloy 600 Program - PI&R review  
20404057, Unit 2 ISI (MSIP) - PI&R review  
20392631, ARMA FROM ISI PROGRAM AUDIT 2008 - PI&R review  
20388065, Water leaking in decon room - PI&R review  
20439023, 23 CFCU Head Leakage - PI&R review  
20439022, SW Header Leakage 23 CFCU - PI&R review  
20389148, 1R19 ISI Weld Exam Limitations - PI&R review  
20416605, INPO PSIRV Alloy 600 Program - PI&R review  
20449442, Update Salem 2 Containment ISI 10 yr. Plan - PI&R review  
20449554, Salem Unit 2 RFO18 ISI Scope - PI&R review

20449747, Update Salem 2 ISI 10 Yr. Plan - PI&R review  
20401542, Perform ISI BMV Exam on RPV Upper Head - PI&R review  
20449063, SA U1 Service Inspec – ISI & U1 TI 2515 - PI&R review  
20389147, Recordable ISI Indications on CVC Tank - PI&R review  
20392145, Update U1 ISI Relief Request Book - PI&R review  
20449744, Update Salem U1 Containment ISI 10 Yr. Plan - PI&R review  
20409943, NRC RIS 2009-04 SG Tube Insp Rqmts – PI&R review  
20459851, Section XI Exams Limited to 90% or Less – PI&R review  
20450520, Recoat Affected Areas of Liner 2R18 – PI&R review  
20457388, Excavation Issues – PI&R review

\*Denotes this Notification was generated as a result of this inspection

Section XI Repair/Replacement Samples:

W.O. 60079414, 14" Carbon Steel Elbow FAC indication below minimum wall  
W.O. 60084266, Salem U1 AF Buried Piping Inspection  
W.O. 60089561, 80101381: Replace Aux FW U/G Piping  
W.O. 60064104, Repair 15B FWH Area  
W.O. 60084375, BACC Program repair to 1PS1  
W.O. 60089612, BACC Program repair to S1CVC-14CV392  
W.O. 60089615, BACC Program repair to S1SJ-13SJ25  
W.O. 60089848, 80101382 Advanced Work Authorization #2 FTTA Replace Aux. Feedwater Pipe  
W.O. 60089561, 80101381 Advanced Work Authorization – Replace Aux. FW U/G Piping, 4/9/10

Non-Code Repair

W.O. 60089848, Repair Non-nuclear, safety related CA Pipe, Unit 1 FTTA  
W.O. 60089757, Test Non-nuclear, safety related CA Pipe Repair, Unit 1 FTTA

Miscellaneous Work Orders:

W.O. 60089917, Penetrations for CA & SA Lines, 4/23/10  
W.O. 941017262, Activity 04, Excavate and Examine Auxiliary Feedwater Piping, Unit 2, 12/94  
W.O. 941017262, Activity 03, Excavate and Examine Auxiliary Feedwater Piping, Unit 2, 12/94  
W.O. 941017262, Activity 02, Excavate and Examine Auxiliary Feedwater Piping, Unit 2, 12/94  
W.O. 941017262, Activity 01, Excavate and Examine Auxiliary Feedwater Piping, Unit 2, 12/94  
W.O. 60089561, Flush New AFW piping 12 and 14

Drawings & Sketches:

205236A8761-54, Salem Nuclear Generating Station, Unit No. 1, Auxiliary Feedwater Salem Unit 1 Aux Feed Piping, Allan Johnson, 4/10/10  
80101381RO, Buried Pipe, Replaced AFW Piping Arrangement  
207483A8923-11, Salem Nuclear Generating Station, Unit No. 1 – Reactor Containment Auxiliary Feedwater, Plans & Sections – Elev. 78' 10" & 100' 0", Mechanical Arrangement, Revision 8, 9/31/86

- 207483A8923-28, Sheet 1 of 4, Salem Nuclear Generating Station, Unit No. 1 – Reactor Containment Auxiliary Feedwater, Plans & Sections – Elev. 84', Mechanical Arrangement, Revision 8, 9/31/86
- 207483A8923-31, Sheet 2 of 4, Salem Nuclear Generating Station, Unit No. 1 – Reactor Containment Auxiliary Feedwater, Plans & Sections – Elev. 84', Mechanical Arrangement, Revision 8, 9/31/86
- 207483A8923-28, Sheet 3 of 4, Salem Nuclear Generating Station, Unit No. 1 – Reactor Containment Auxiliary Feedwater, Plans & Sections – Elev. 84', Mechanical Arrangement, Revision 8, 9/31/86
- 207483A8923-30, Salem Nuclear Generating Station, Unit No. 1 – Reactor Containment Auxiliary Feedwater, Plans & Sections – Elev. 84', Mechanical Arrangement, Revision 8, 9/31/86
- 207610A8896-12, Salem Nuclear Generating Station, Unit No. 1 – Auxiliary Building & Reactor Containment Compressed Air Piping, Aux. Building El. 84 East & React. Contain. El. 78, Mechanical Arrangement, Revision 8, 9/31/86

Design Change Packages/Equivalent Change Packages

- 80101382, Revision 2, Replace Salem Unit 1 AFW Piping from the Unit Mechanical Penetration Area El. 78'-0" to the Unit 1 Fuel Transfer Tube Area El. 100'-0"
- 80101381, Revision 1, Replace in-kind the Salem Unit 1 AF Piping that runs underground from the Unit 1 Fuel Transfer Tube Area to the Unit 1 Main Steam Outer Penetration Area

50.59 Applicability Reviews, Screenings & Evaluations

- 80101382; Salem Unit 1 12/14 AF Piping Reroute; 4/24/10

System & Program Health Reports & Self-Assessments:

- Salem Boric Acid Corrosion Control Program Focused Area Self-Assessment, 1/2010
- 70106830, Salem S1R20 NRC ISI Inspection Check-In Self Assessment
- 70095327, Salem Boric Acid Corrosion Control Program Focused Area Self-Assessment, 4/29/09

Program Documents

- PSEG Nuclear Salem Units 1 & 2, Alloy 600 Management Plan, Long Term Plan (LTP), Revision 2, Integrated Strategic Plan For Long Term Protection from Primary Water Stress Corrosion Cracking (PWSCC), 10/15/09
- ASME, Section XI, 1998 Edition, 2000 Addenda, IWA-5244 Buried Components
- OAR-1, Owner's Activity Report, #S1RFO19, 1/15/09

ProceduresDETAILED AND GENERAL, VT-1 AND VT-3 VISUAL EXAMINATION OF ASME CLASS MC AND CC CONTAINMENT SURFACES AND COMPONENTS

SH.RA - AP.ZZ - 8805(Q) - Revision 4, 8/31/06; Boric Acid Corrosion Management Program  
 ER - AP - 331, Revision 4, Boric Acid Corrosion Control (BACC) Program  
 ER - AP - 331 - 1001, Revision 2, Boric Acid Corrosion Control (BACC) Inspection Locations, Implementation And inspection Guidelines  
 ER - AP - 331 - 1002, Revision 3, Boric Acid Corrosion Control (BACC) Program Identification, Screening, and Evaluation  
 ER - AP - 331 - 1003, Revision 1, RCS Leakage Monitoring And Action Plan  
 ER - AP - 331 - 1004, Revision 2, Boric Acid Corrosion Control (BACC) Program Training and Qualification

ER - AA - 330 - 001, Revision 7, SECTION XI PRESSURE TESTING

LS - AA - 125, Revision 13; Corrective Action Program (CAP) Procedure

LS - AA - 120, Revision 8; Issue Identification And Screening Process

SH.RA-IS.ZZ-0005(Q)-Revision 6; VT-2 Visual Examination Of Nuclear Class 1, 2 and 3 Systems

SH.RA-IS.ZZ-0150(Q) – Revision 8, 10/19/04; Nuclear Class 1, 2, 3 and MC Component Support Visual Examination

OU-AP-335-043, Revision 0; BARE METAL VISUAL EXAMINATION (VE) OF CLASS 1 PWR COMPONENTS CONTAINING ALLOY 600/82/182 AND CLASS 1 PWR REACTOR VESSEL UPPER HEADS

OU-AA-335-015, Revision 0; VT 2 - VISUAL EXAMINATION

Areva NP, Inc., Engineering Information Record 51-9118973-000; Qualified Eddy Current Examination Techniques for Salem Unit 1 Areva Steam Generators, 10/15/09

AREVA NP 03-9123233, Revision 000, 10/13/09; Salem Unit 2 RVCH Flange Repair

SC.MD-GP.ZZ-0035(Q) – Revision 9, PRESSURE TESTING OF NUCLEAR CLASS 2 AND 3 COMPONENTS AND SYSTEMS; 02/02/10

SH.MD-GP.ZZ-0240(Q) – Revision 10, SYSTEM PRESSURE TEST AT NORMAL OPERATING PRESSURE AND TEMPERATURE, 7/29/09

S2.OP-AF-0007(Q)-Revision 20, 12/23/09; INSERVICE TESTING AUXILIARY FEEDWATER VALVES, MODE 3

ER-AA-5400-1002, Revision 1, BURIED PIPING EXAMINATION GUIDE

Specification No. S-C-MPOO-MGS-0001; Piping Schedule SPS54, Auxiliary Feedwater, Revision 6

PSEG Test Procedure 10-H-8-R1, Unit 2 Auxiliary Feedwater 2100/2150 Hydro; 9/21/78

NDE Examination Reports & Data Sheets

003753, VT-10-113, PRV nozzle sliding support

003754, VT-10-114, RPV nozzle sliding support

006325, UT-10-041, PZR longitudinal shell weld J (100%)

007500, UT-10-132, PZR surge line nozzle (100%)

007901, UT-10-028, 13 SG lower head to tubesheet weld (67%)

006073, VE-10-026, CRDM TO VESSEL PENETRATION WELD, 4/12/10

008001, VE-10-027, 31-RCN-1130-IRS

008026, VE-10-028, 29-RCN-1130-IRS

009070, VE-10-030, 12-STG Channel Head Drain (100%)

033300, UT-10-027, 4-PS-1131-27 (100%)

033200, UT-10-029, 4-PS-1131-26 (100%)

033100, UT-10-032, 4-PS-1131-25 (100%)  
 032300, UT-10-033, 4-PS-1131-17 (100%)  
 031700, UT-10-040, 4-PS-1131-12 (100%)  
 032600, UT-10-034, 4-PS-1131-20 (100%)  
 047600, UT-10-045, 29-RC-1140-3 (100%)  
 051200, UT-10-048, 29-RC-1120-3 (100%)  
 203901, UT-10-047, 32-MSN-2111-1 (100%)  
 204001, UT-10-046, 16-BFN-2111-1 (70.64%)  
 210586, UT-10-025, 14-BF-2141-19 (100%)  
 210588, UT-10-024, 14-BF-2141-20 (100%)  
 836300, IWE: VT-10-338, PNL-S1-343-1  
 836400, IWE: VT-10-333, ALK-S1-100-tubing  
 840000, IWE: Vert Leak Channels 1 – 14  
 006073, VE-10-026, RPV Upper Head Inspection  
 006051, PT-10-004, CRDM Housing Weld Exams, penetrations #66, 67, and 72  
 Salem Unit 1, VT-2, Visual Examination Record, 12/14 AF FTTA, W.O. 60089848, 4/26/10 (VT)  
 Salem Unit 1, VT-2, CA Repair Snoop Test, W.O. 60089575, 4/27/10  
 Salem Unit 1, UT, W.O. 60084266, Yard AF, 4/18/10  
 Salem Unit 2, UT, W.O. 60089851, Exam of containment liner  
 Salem Unit 1, UT 1-SGF-31-L2 FW elbow below min. wall  
 Salem Unit 1, UT, W.O. 30176541, 1-SGF-31-L2 FW elbow below min. wall  
 Salem Unit 1, UT, W.O. 60084266, AFW  
 Order 50113214, ST 550D, Surveillance: ISI Perform PORV Check  
 Order 50118090, ST 550D, Surveillance: OPS Perform PORV Check  
 W.O. 60089848, VT-2 Visual Examination Record, 12/14 AFW in FTTA, 4/26/10  
 W.O. 941017262, Activity 02; Salem Unit 2, Excavate and Examine Auxiliary Feedwater Piping,  
 12/2/94  
 W.O. 60084266, UT Unit 1 AFW (thinnest area), 4/20/10  
 UT Analysis, Component 1-SGF-31-L2 (14" FW Elbow below Minimum wall), 4/10/10  
 W.O. 60089851, Unit 2 Containment Liner blister UT measurements, 4/21/10  
 W.O. 60086175, Unit 1 Containment corrosion 78' elevation  
 W.O. 60084266, Unit 1 AFW piping UT measurements, 4/12/10  
 W.O. 30176541, Unit 1 AFW piping UT measurements, 4/12/10  
 W.O. 60084266, Unit 1 AFW piping UT measurements, 4/7/10  
 W.O. 60084266, Unit 1 AFW piping UT measurements, 4/5/10  
 W.O. 60084266, Unit 1 AFW pipe UT measurements at supports, 4/18/10  
 W.O. 30176541, Unit 1 CA piping UT measurements in FTTA  
 401600, VE-04-198; Hope Creek system pressure test CST to HPCI/RCIC and Core Spray,  
 11/5/04  
 VT-2, Salem Unit 1 AF 12 & 14 Pressure Test, 4/25/10  
 W.O. 60089661, UT measurements, Unit 2 AFW Piping #24 in FTTA, 4/25/10  
 W.O. 60089661, UT measurements, Unit 2 AFW Piping #22 in FTTA, 4/26/10

Eddy Current Testing Personnel Qualification Records

A2421	C2028	R6452	T5616
B8731	C4596	R8002	R9311
B0500	C3340	S7752	G4943
B5127	D3858	T8251	C5542
B5128	H6267	V3197	F0075
B2576	H0282	R4142	F6623
F3961	I4048	R6279	F3453
C1560	J1978	G3380	G4943
D7895	2010983302133	B3720	G1311
D9573	P6459	R6900	H7791
D6502	R0830	A9608	J9141
H2039	R1164	N2574	M0950
K5380	S0608	I3805	M2665
M9460	2509981330193	T2170	M7006
E0427	K5858	N4815	M9459
M6664	1007951330114	M0945	M7007
B4260	L9168	P2963	M9082
A3502	L4332	M9715	N7035
J9815	F7460	K1903	N9952
P5436	F0037	D5318	R9311
M6042	3107943330158	W6070	S9098
B8589	6206070744	M5096	T5616
B4014	6507061922	J1945	T5565
G2573	1803983330125	L4588	W2639
V8530	2709977301226	C8042	W7912
W3368	P5304	N5330	
M4305	P4006	L8267	
B4052	R4201	F3453	
K6975			
G3910			
H0268			
L3025			
P1465			
B8079			
G1756			
C8071			
6410058746			
B5371			
H2131			
2909965330076			

Engineering Analyses & Calculations & Standards

Calculation 6SO-1882, Revision 1, 8/30/96; Qualification of Safety-Related Buried Commodities For Tornado Missile and Seismic Evaluation.

Calculation No. S-C-AF-MDC-1789; Salem Auxiliary Feedwater Thermal Hydraulic Flow Model, 10/4/00

70087436, Steam Generator Degradation & Operational Assessment Validation, Salem Unit 1 Refueling Outage 18 (1R18) & Cycles 19/20, 9/2008

51-9052270-000, Update – Salem Unit 1 SG Operational Assessment At 1R18 For Cycles 19 and 20, 10/1/08

51-9048311-002, Salem Unit 1 SG Condition Monitoring For 1R18 And Preliminary Operational Assessment For Cycles 19 and 20, 10/30/07

701086998-0050, Maximum Pressure in Underground Auxiliary Feedwater Piping

60089575-130, Past Operability Determination for the leak in the one inch air line to air operated valves in Unit 1 South Penetration Area

70109233/20459231; Boric Acid evaluation of leakage from S1CVC-1CV277

70109232/20459230; Boric Acid evaluation of leakage from S1CVC-1CV2

70109230/20459228; Boric Acid evaluation of leakage from S2RC-1PS1

70109234/20459232; Boric Acid evaluation of leakage from S1SJ-13SJ25

70108698/30, Operating Experience Report for degraded Unit 1 AFW piping

51-9135923-000, AREVA; Salem unit 1 SG Condition Monitoring For 1R20 and Preliminary Operational Assessment For Cycles 21 And 22, 4/20/10

SA-SURV-2010-001, Revision 1; Risk Assessment of Missed Surveillance – Auxiliary Feedwater discharge line underground piping pressure testing, 4/23/10

CQ9503151526; SCI-94-0877, EXCAVATED AUXILIARY PIPING WALKDOWN/DISPOSITION OF COATING REQUIREMENTS; 12/16/94

Specification No. S-C-M600-NDS-019, COATINGS INTERIOR/EXTERIOR SURFACES CARBON STEEL SERVICE WATER PIPING, NO. 12 COMPONENT COOLING HEAT EXCHANGER ROOM AUXILIARY BUILDING (ELEVATION 84)

Structural Integrity Associates, Inc. Calculation File No. 1000494.301, Evaluation of Degraded Underground Auxiliary Feedwater Piping (Between Unit 1 FTTA and OPA), 4/23/10

Technical Evaluation 60089575-0140, Acceptability of CA Piping in the Fuel Transfer Area, 4/29/10

Technical Evaluation 60089848-0960, Auxiliary Feedwater Piping Missle Barrier Exclusion, 4/29/10

Structural Integrity Associates, Inc. Calculation File No. 1000498.301, Evaluation of Thinned Feedwater Elbow, 4/22/10

Technical Evaluation 70108698-0050, Maximum Pressure in Underground Auxiliary Feedwater Piping, 4/29/10

SPECIFICATION NO. S-C-MPOO-MGS-0001, Piping Schedule SPS54 AUXILIARY FEEDWATER, Revision 6

OpEval. #10-005, Salem Unit 2 Operability Evaluation, Received 5/18/10

Technical Evaluation 60084266-105-20, Alternative Exterior Coatings for Buried Piping, AF, CA, SA and Pipe Supports Under W.O. 60084266, 4/2/10

Technical Evaluation H-1-EA-PEE-1871, Hope Creek Service Piping Coatings Alternatives, 80075587, Revision 0, 10/15/04

PSEG Nuclear, LLC, Technical Standard, Coating Systems and Color Schedules, Revision 5, 4/3/06

Weld Records – AFW Piping Repair (W.O. #'s 60084266, 60089561, 60089798, 60089848)

Multiple Weld History Record: 74626  
Multiple Weld History Record: 74556  
Multiple Weld History Record: 74557  
Multiple Weld History Record: 74558  
Multiple Weld History Record: 74559  
Multiple Weld History Record: 74560  
Multiple Weld History Record: 74561  
Multiple Weld History Record: 74562  
Multiple Weld History Record: 74563  
Multiple Weld History Record: 74564  
Multiple Weld History Record: 74565  
Multiple Weld History Record: 74566  
Multiple Weld History Record: 74567  
Multiple Weld History Record: 74627  
Multiple Weld History Record: 74569  
Multiple Weld History Record: 74599  
Multiple Weld History Record: 74623  
Multiple Weld History Record: 74600  
Multiple Weld History Record: 74630  
Multiple Weld History Record: 74622  
Multiple Weld History Record: 74578  
Multiple Weld History Record: 74596  
Multiple Weld History Record: 74601  
Multiple Weld History Record: 74602  
Multiple Weld History Record: 74603  
Multiple Weld History Record: 74604  
Multiple Weld History Record: 74605  
Multiple Weld History Record: 74598  
Multiple Weld History Record: 74606  
Multiple Weld History Record: 74607  
Multiple Weld History Record: 74608  
Multiple Weld History Record: 74609  
Multiple Weld History Record: 74610  
Multiple Weld History Record: 74611  
Multiple Weld History Record: 74612  
Multiple Weld History Record: 74613  
Multiple Weld History Record: 74614  
Multiple Weld History Record: 74615  
Multiple Weld History Record: 74597  
Multiple Weld History Record: 74616  
Multiple Weld History Record: 74579  
Multiple Weld History Record: 74580  
Multiple Weld History Record: 74581  
Multiple Weld History Record: 74582  
Multiple Weld History Record: 74583  
Multiple Weld History Record: 74595  
Multiple Weld History Record: 74584  
Multiple Weld History Record: 74585  
Multiple Weld History Record: 74586

Multiple Weld History Record: 74587  
Multiple Weld History Record: 74588  
Multiple Weld History Record: 74589  
Multiple Weld History Record: 74590  
Multiple Weld History Record: 74591  
Multiple Weld History Record: 74592  
Multiple Weld History Record: 74593  
Multiple Weld History Record: 74577  
Multiple Weld History Record: 74625  
Multiple Weld History Record: 74574  
Multiple Weld History Record: 74624  
Multiple Weld History Record: 74573  
Multiple Weld History Record: 74572  
Multiple Weld History Record: 74570  
Multiple Weld History Record: 74571  
Multiple Weld History Record: 74623  
Multiple Weld History Record: 74622  
Multiple Weld History Record: 74621  
Multiple Weld History Record: 74537  
Multiple Weld History Record: 74538  
Multiple Weld History Record: 74537  
Welder Stamp Number: P-664  
Welder Stamp Number: P-65  
Welder Stamp Number: P-466  
Welder Stamp Number: P-57  
Welder Stamp Number: E-64  
Welder Stamp Number: P-710  
Welder Stamp Number: P-207  
Welder Stamp Number: P-666  
Welder Stamp Number: P-708  
Welder Stamp Number: E-89  
Welder Stamp Number: P-84  
Welder Stamp Number: P-228  
Surface Exam Record: 60089561-0041  
Surface Exam Record: 60089848-0001  
Surface Exam Record: 60089848-0001  
Surface Exam Record: 60089561-0041  
Surface Exam Record: 60089561-0860

Miscellaneous Documents

Salem Unit 1 & Salem Unit 2 Technical Specification, 3.4.11 STRUCTURAL INTEGRITY, ASME  
CODE CLASS 1, 2 AND 3 COMPONENTS  
Electric Power Research Institute (EPRI), Steam Generator Integrity Assessment Guidelines,  
Technical Report 1012987, Revision 2, July 2006  
NRC Letter dated 3/11/91; FIRST TEN-YEAR INSPECTION INTERVAL, INSERVICE  
INSPECTION PROGRAM RELIEF REQUEST, SALEM NUCLEAR GENERATING  
STATION, UNIT 1 (TAC NOS. 66013 AND 71101)  
PSEG Nuclear, Salem Unit 1 & 2 Alloy 600 Management Plan, Long Term Plan (LTP), Revision  
2, 10/15/09  
Salem Unit 1 – Buried Piping Risk Ranking

MPR Associates Report, Technical Input To Operability of Potential Containment Liner  
 Corrosion, Revision 0, 10/30/09  
 Transmittal of Design Information #S-TODI-2010-0005, 4/20/2010  
 Transmittal of Design Information #S-TODI-2010-0004, 4/16/2010  
 OQ950315126, PSEG ltr. Dated 12/16/94; Excavated Auxiliary Feedwater Piping  
 Walkdown/Disposition of Coating Requirements  
 PSEG letter LR-N07-0224 dated 9/13/2007; REPLY TO NOTICE OF VIOLATION EA-07-149  
 UNTAGGING WORKLIST 4274446, 14 AF Underground Piping 1R20, 4/30/10  
 UNTAGGING WORKLIST 4274351, 12 AF Underground Piping 1R20, 4/30/10

**LIST OF ACRONYMS**

ASME	American Society of Mechanical Engineers
BAST	Boric Acid Storage Tank
CEA	Control Element Assembly
CEDM	Control Element Drive Mechanism
CFR	Code of Federal Regulations
EDG	Emergency Diesel Generator
EPRI	Electric Power Research institute
EQ;ACE	Equipment Apparent Cause Evaluation
EQ	Environmental Qualification
ER	Engineering Request
FEA	Finite Element Analysis
FTTA	Fuel Transfer Tube Area
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	NRC Inspection Report
LER	Licensee Event Report
LOCA	Loss of Coolant Accident
MT	Magnetic Particle Testing
MSIP	Mechanical Stress Improvement Process
NCV	Non-cited Violation
Notification	Corrective Action Notification
NRC	Nuclear Regulatory Commission
NDE	Nondestructive Examination
OE	Operating Experience
PDI	Performance Demonstration Initiative
PI&R	Problem Identification and Resolution
PSEG	Public Service Electric & Gas, LLC
PWSCC	Primary Water Stress Corrosion Cracking
PQR	Procedure Qualification Record (Welding Procedures)
RCS	Reactor Coolant System
RT	Radiographic Test (Radiography)
PT	Dye Penetrant Testing
SDP	Significance Determination Process
SE	Safety Evaluation

SG	Steam Generator
SI	Stress Improvement
SSC	Structure, System, and Component
TS	Technical Specifications
UT	Ultrasonic Test
UFSAR	Updated Final Safety Analysis Report
VT	Visual Examination
WPS	Weld Procedure Specification

**INSPECTION SAMPLE COMPLETION STATUS**

<b>PROCEDURE or TI</b>	<b>MINIMUM REQUIRED SAMPLES</b> Annual (A) Biennial (B)	<b>CURRENT INSPECTION SAMPLES</b>	<b>RPS TOTAL SAMPLES TO DATE</b>	<b>PROCEDURE STATUS OPEN (O) CLOSED (C)</b>	<b>RPS UPDATED (Y) (N)</b>
7111108 (G)	1				Y
2515/172	1				YES

**Attachment B-1**

**TI 172 MSIP Documentation Questions Salem Unit 1**

Introduction:

The Temporary Instruction (TI), 2515/172 provides for confirmation that owners of pressurized-water reactors (PWRs) have implemented the industry guidelines of the Materials Reliability Program (MRP) -139 regarding nondestructive examination and evaluation of certain dissimilar metal welds in the RCS containing nickel based Alloys 600/82/182. This TI requires documentation of specific questions in an inspection report. The questions and responses for MSIP for the IR 05000311/2009005 section 4OA5 are included in this Attachment "B-1".

In summary the Salem Units 1 and 2 have MRP-139 applicable Alloy 600/82/182 RCS welds in the four hot and four cold leg piping to reactor pressure vessel nozzle connections for each plant.

For Unit 1 during the 1R20 refueling outage in April 2010 PSEG inspected one dissimilar metal weld, a SG channel head drain line weld. No indications were reported from this inspection. PSEG plans on replacing this valve, and the dissimilar metal weld, during refueling outage 1R22.

TI 2515/172 requires the following questions to be answered for MRP-139 MSIP inspections:

Question 1: For each mechanical stress improvement used by the licensee during the Salem U1 1R20 outage, was the activity performed in accordance with a documented qualification report for stress improvement processes and in accordance with demonstrated procedures?

Response Question 1: No MSIP activities were conducted on U1 during 1R20.

Question d.1: Are the nozzle, weld, safe end, and pipe configurations, as applicable, consistent with the configuration addressed in the stress improvement (SI) qualification report?

Response – Question d.1: No MSIP activities were conducted on U1 during 1R20.

Question d.2.: Does the SI qualification report address the location radial loading is applied, the applied load, and the effect that plastic deformation of the pipe configuration may have on the ability to conduct volumetric examinations?

Response Question d.2: No MSIP activities were conducted on U1 during 1R20.

Question d.3.: Do the licensee's inspection procedure records document that a volumetric examination per the ASME Code, Section XI, Appendix VIII was performed prior to and after the application of the MSIP?

Response: Question d.3.: No MSIP activities were conducted on U1 during 1 R20.

Question d.4.: Does the SI qualification report address limiting flaw sizes that may be found during pre-SI and post-SI inspections and that any flaws identified during the volumetric examination are to be within the limiting flaw sizes established by the SI qualification report?

Response: Question d.4.: No MSIP activities were conducted on U1 during 1 R20.

Question d.5.: Was the MSIP performed such that deficiencies were identified, dispositioned, and resolved?

Response Question d.5.: No MSIP activities were conducted on U1 during 1 R20.