COMMENTS ON REV I

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

July 22, 2010

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

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

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

SUBJECT: INSERVICE INSPECTION ACTIVITIES INSPECTION FEEDER FOR SALEM UNIT 1, INSPECTION REPORT 05000272/2010003, REVISION OF July 21, 2010

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.

C/180

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 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 as risk assessment for waiting to do the above noted inspection. This analysis resulted in a revised pipe design rating for Unit 2 down to 1275 psig.

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.

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, DRP, SRI - Salem Unit 1
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)(7-21-2010)wbr3edits.doc
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	07/21/2010		07/21/2010		07/22/2010					
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 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 and Salem Unit 2. The required tests are intended to ~~provide evidence of~~demonstrate the structural integrity of the buried piping portions of the system.

The affected piping is safety related, ASME Class 3, Seismic Class 1 piping. This performance deficiency is more than minor because the condition affected the Equipment Performance attribute (availability and reliability) of the mitigating systems cornerstone objective to ensure the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). ~~The only ASME-required inspection, used to demonstrate structural integrity, had not been performed between 1988 and 2010 for Unit 1 and Unit 2.~~ No Cross Cutting Aspect is assigned to this violation because this condition is not indicative of current performance. This finding is described in Section 1R08.

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.

Comment [L1]: MC 0612 requires the summary of findings to discuss the immediate corrective actions and to state that the issue was entered into the CAP.

Comment [L2]: This sentence appears to be out of place in accordance with MC 0612 the second paragraph should include the following:

Second paragraph – Summarize significance as discussed in Analysis, why greater than minor, effect on cornerstone, why not greater than green, cross-cutting area, component and aspect (alpha numeric identifier, if no cross-cutting aspect state). Reference section of report.
See MC 0612 pg 28 and 29

Comment [L3]: I believe in accordance with the applicable section of MC 0612 this paragraph is still missing information (see above). Specifically, why the finding screens to green.

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.

Boris 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 ~~limited~~ portions of the Unit 2 AFW piping in response to the conditions observed on Unit 1 piping in order to determine if significant degradation existed on the Unit 2 buried AFW piping.

Comment [L4]: I still believe that no matter where you move this to it is still purple

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 and Unit 2 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. 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 for these conditions, the inspector questioned if 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 pressure tests on buried components to demonstrate the structural integrity of the tested piping. The 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 the existence of structural integrity. PSEG did not perform the required tests for Unit 1 during the 1st period (5/19/01 to 6/3/04) and 2nd period (6/24/04 to 5/20/08) periods of the 3rd In Service Inspection Interval and for Unit 2 for the 1st period (5/19/01 to 6/3/04) and 2nd period (6/24/04 to 5/20/08) of the 3rd In Service Inspection Interval. Thus, PSEG ~~neglected~~ did not to perform the only inservice inspection, intended to ~~provide evidence of~~demonstrate the structural integrity of this safety related buried piping.

Comment [L5]: According to the code it appears to require a "rate of pressure loss" test. I understand that there are some differences in what the code said then and now but we probably need to make all the write-up sections consistent. If the Enforcement section says "rate of pressure loss" maybe the whole write-up should sy raite of pressure loss.

Comment [L6]: Should delete as long as included in the Enforcement section.

Comment [L7]: Purple

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 tests during the 2nd inservice interval and during the 1st (5/19/01 to 6/3/04) and 2nd (6/24/04 to 5/20/08) periods of the 3rd In Service Inspection Interval for Unit 1. Also PSEG did not request relief from the required tests or perform perform the proposed alternate tests on the Unit 2 buried piping during the 1st period (5/19/01 to 6/3/04) and 2nd period (6/24/04 to 5/20/08) of the 3rd In Service Inspection Intervals. Thus, PSEG

Comment [L8]: Should delete as long as included in the Enforcement section.

missed an opportunity to identify and correct this performance deficiency which affects Unit 1 and Unit 2.

A second opportunity to identify and correct this performance deficiency was missed in 2002 when a similar condition (failure to perform buried piping pressure tests) was documented in NRC Inspection Report 05000286-01-011 for Indian Point Unit 3 as NCV 50-286/2001-011-02. PSEG's review of NRC inspection reports did not identify that the same condition existed at Unit 1 and Unit 2.

PSEG replaced the affected buried Unit 1 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 loose 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 for this issue. These evaluations determined that the condition was acceptable for continued operation until spring 2011.

Analysis. PSEG's failure to perform the required pressure test on this safety related buried piping is a performance deficiency for each Salem Unit. This condition was the result of the licensee's failure to meet the regulatory requirements of 10 CFR 50.55a(g)(4) and the ASME Code, Section XI, paragraph IWA-5244. This performance deficiency was reasonably within the licensee's ability to foresee and correct and should have been prevented, based on the above noted missed opportunities. PSEG did not perform the only inservice inspection (IWA-5244), intended to ~~provide evidence of~~ demonstrate the structural integrity of this safety related buried piping.

The inspector determined that the performance deficiency was more than minor because this condition affected the Equipment Performance attribute (availability and reliability) of the mitigating systems cornerstone objective to ensure the availability reliability and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). ~~Further, if left uncorrected, this condition could have resulted in a more significant condition due to continued, undetected corrosion without pressure testing for leakage.~~

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, a very low safety significance.

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 when it was granted in 1991.

Comment [L9]: Not sure I understand this the way you have it written here. Wouldn't a better argument be that it was within their ability to forsee and correct because it was a requirement that we know that they were aware of because they sought relief from the requirement for Unit 1 in 1991.

Comment [L10]: We do not require licensee's to review and take action on inspection reports written to document issues at other sites. So unless their procedure requires this we should probably back away. Again I believe that we can say that it was within their ability to forsee and correct because it was a requirement that we know that they were aware of because they sought relief from the requirement for Unit 1 in 1991.

Comment [L11]: Use this statement to support a *not* more than minor violation for Unit 2 based on the information currently provided to us by PSEG in the OD and RA. This may change during the next Unit 2 outage depending on what they find with the piping on Unit 2, but we can deal with that during the U2 outage.

Comment [L12]: I think that we missed the point here. As defined in MC 0612 a performance deficiency is an issue that ***is the result*** of a licensee not meeting a requirement or standard where the cause was reasonably within the licensee's ability to forsee and correct and therefore should have been prevented. PSEG did not meet the CFR because they did not perform the testing not the other way around. What was the result/the impact on the safety of the public by not performing the required testing? It is necessary to define thise result in order to evaluate the significance – that is why the ... [1]

Comment [L13]: As stated above the issue was within their ability to forsee and correct because it was a requirement that we know that they were aware of because they sought relief from the requirement for Unit 1.

Comment [L14]: Since, as of today, there was no consequence for the lack of testing, the easier approach for "more than minor" is the left uncorrected approach. So, in accordance with MC 0612, we need to state the cornerstone affected and then define why if left uncorrected this PD would result in a more significant safety concern.

Comment [L15]: This does not meet the MC 0612 documentation requirements. Needs to address all the screening criteria. A more appropriate statement would be something like this: The inspectors determined the issue was of very low safety significance (Green) because the finding was not a design or qualification deficiency. ... [2]

Comment [L16]: Would like more information here if possible but understand that MC 0612 defines present performance as occurred within the last three years.

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) that ~~For~~ 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."

Comment [L17]: Originally, without the deletion that you recommended TIM, the way this was cited was not clear. However, recommended deletion would address my earlier comment.

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 2nd In Service Inspection Interval (2/27/88 to 5/19/01) and during the 1st (5/19/01 to 6/3/04) and 2nd (6/24/04 to 5/20/08) periods of the 3rd In Service Inspection Interval (5/19/01 to 5/19/11). Also, contrary to these requirements, 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 2nd period (6/24/04 to 5/20/08) of the 3rd In Service Inspection Interval. Consequently, from 2/27/88 to 4/20/07) the required pressure tests were not performed to demonstrate structural integrity on the affected buried Unit 1 AFW piping.

Because PSEG entered this condition into the corrective action process (Notification 20459686) and because it is 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 50-272/2010-?? and NCV 50-311/2010-??**

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 violation of NRC requirements was identified by PSEG. It was determined to have very low significance (Green) and to meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as a non-cited violation.

~~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. During pipe excavation and inspections conducted as part of PSEGs buried piping program PSEG identified that it did not provide an effective protective coating for the buried section of 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". An 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 was a design or qualification deficiency that was confirmed not to result in loss of operability ~~it did not result in loss of operability or functionality~~ of the AFW system.

Comment [L18]: Not necessary and I believe confuses the write-up.

Comment [L19]: This discussion should clearly include: cornerstone affected; justification for more than minor; and justification for screen to green based on Phase 1 questions in MC 0609. Probably need a little more detail here on how the phase 1 questions were answered. See MC 0612 requirements for LIV documentation:

Include the requirement(s) violated; describe how it was violated; identify the licensee's corrective action tracking number(s); and provide a very brief justification why the violation is not greater than Green. A complete reconstruction of the SDP logic is not required. However, Section 4OA7 must include the following introductory paragraph:

The following violations of very low safety significance (Green) or Severity Level IV were identified by the licensee and are violations of NRC requirements which meet the criteria of the NRC Enforcement Policy for being dispositioned as a Non-Cited Violation.

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. **NCV 50-272/2010003-??**

ATTACHMENT

SUPPLEMENTAL INFORMATION

KEY CONTACTS

Licensee Personnel:

Howard Berrick, PSEG
Pat Fabian, PSEG
Mohammad Ahmed, PSEG
Tony Oliveri, PSEG
Tom Roberts, PSEG
Ali Fakhar, 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, 2nd 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 Containmnet 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

Procedures

DETAILED 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 Missle 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-YEARINSPECTION 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

A-13

INSPECTION SAMPLE COMPLETION STATUS

PROCEDURE or TI	**MINIMUM REQUIRED SAMPLES** Annual (A) Biennial (B)	**CURRENT INSPECTION SAMPLES**	**RPS TOTAL SAMPLES TO DATE**	**PROCEDURE STATUS OPEN (O) CLOSED (C)**	**RPS UPDATED** (Y) (N)
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.

Page 4: [1] Comment [L12] LMC1 7/28/2010 8:06:00 AM

I think that we missed the point here. As defined in MC 0612 a performance deficiency is an issue that ***is the result*** of a licensee not meeting a requirement or standard where the cause was reasonably within the licensee's ability to forsee and correct, and therefore should have been prevented. PSEG did not meet the CFR because they did not perform the testing, not the other way around. What was the result/the impact on the safety of the public by not performing the required testing? It is necessary to define thise result in order to evaluate the significance – that is why the definition is written that way. Not using the following words exactly one suggestion for defining the result would be - due to the condition of the pipe and coating identified during the excavation, it is clear that the failure to perform required testing would have ultimately resulted a loss of structural integrity for the pipe impacting the operability of the affected AFW trains.

Page 4: [2] Comment [L15] LMC1 7/27/2010 4:41:00 PM

This does not meet the MC 0612 documentation requirements. Needs to address all the screening criteria. A more appropriate statement would be something like this. The inspectors determined the issue was of very low safety significance (Green) 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.