Ziev, Tracey

From: Turilin, Andrey
Sent: Thursday, April 22, 2010 11:58 AM
To: Burritt, Arthur; Schroeder, Daniel; Balian, Harry; Cline, Leonard; OHara, Timothy
Subject: Risk Assessemnt of Missed Surveillance -Salem AFW Discharge Line Underground Piping
Attachments: Scan File.pdf

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RM DOCUMENTATION NO. SA-SURV-001	REV: 0	PAGE NO. 1/3

STATION: Salem Nuclear Generating Station

UNIT(S) AFFECTED: 2

TITLE: Risk Assessment of Missed Surveillance – Auxiliary Feedwater discharge line underground piping

SUMMARY (Include UREs incorporated): On 04/21/2010 it was discovered that required ASME Section XI surveillance tests (pressure testing) had not been performed for buried Auxiliary Feedwater piping as required by ER-AA-330-001 and OU-AA-335-015. This condition is documented in Notification 20459689.

A risk assessment of the condition was performed in accordance with procedure ER-AA-600-1045, "Risk Assessments of Missed or Deficient Surveillances." A surveillance deferral time of up to 7 days was evaluated and found to be acceptable. The following are recommended actions. Perform the surveillance as soon as practicable and limit removal of other-risk significant equipment from service consistent with OP-AA-101-112-1002, Rev. 4.

[ ] Review required after periodic Update

[X] **Internal RM Documentation** [ ] **External RM Documentation**

Electronic Calculation Data Files:
(Q:\System Engineering\Salem\PRA\Applications\Missed Surveillance\ SA-SURV-001)

Salem PRA, Revision 4.3; Equipment Out of Service (EOOS), version 3.3a from EPRI Risk and Reliability Workstation.

Method of Review: [ ] Detailed [ ] Alternate [ ] Review of External Document

This RM documentation supersedes: _____ **in its entirety.**

	Print	Sign	Date
Prepared by:	Brad Dolan	Brad Dolan	04/22/2010
Reviewed by:	Chris Pupek		04/22/2010
Approved by:	N/A		

Introduction

On 04/21/2010 it was discovered that buried segments of the AFW discharge lines supplying #22 and #24 Steam generators had not been subjected to surveillance testing as required.

When a required surveillance test is discovered not to have been performed as required, Salem's technical specifications permit either the test to be performed within 24 hours or performed at a later time if an assessment of the associated risk is performed within 24 hours and the risk is acceptable for the deferral period. This evaluation is provided to support that requirement.

This evaluation was prepared in accordance with Risk Management procedure ER-AA-600-1045, R0, "Risk Assessments of Missed or Deficient Surveillances."

That procedure indicates that if results are acceptable, a risk assessment may be performed which assumes that affected components and systems are unavailable for the period of time from discovery until the surveillance test is performed. That approach was employed here.

There are two potential failure modes which could occur with the buried AFW discharge piping to the #22 and #24 steam generators. The piping could collapse or otherwise obstruct, preventing flow from being delivered to the affected steam generators. It is also possible that the piping could leak or rupture, resulting in a diversion of inventory from the stored supplies maintained for the AFW system.

The function of the AFW discharge lines is to direct auxiliary feedwater to the secondary side of the steam generators. Piping integrity also acts to prevent loss of necessary inventory of auxiliary feedwater supply.

This condition was modeled as follows, using the online (a)(4) EOOS risk assessment model, based on the Salem model of record (v. 4.3).

The paths to the #22 and #24 SGs were failed by setting events AFS-CKV-CC-2AF23 and AFS-CKV-CC04AF23 to failed, using the "BE" feature in the EOOS operators screen.

The potential for loss of inventory was conservatively bounded in this way. Salem's procedures encourage identification and resolution of events which could cause a loss of inventory. Substantial time exists, on the order of hours, to identify and resolve a problem involving a loss of inventory. So long as ample "infinite" supplies exist, such as from the service water system, a loss of some inventory should not prevent the AFW system from successfully performing its required functions..

The one circumstance in which it could be more difficult to provide AFW suction supply from an infinite source would be during a station blackout. This was modeled by adding a new OR gate below gate GAN1712 that has inputs %TES, %TE2 and %TEG. This has the effect of failing the TDAFWP for all losses of offsite power. If onsite AC power supplies sufficient to power an MDAFWP are available, then power should also be available to sufficient service water pumps to provide AFW makeup. If onsite AC power sources are failed, then there is no AFW supply, given this model change. In addition gate TES03 (LOOP and failure of onsite AC power systems) was added below gate GASB110 to ensure that failure of offsite and onsite AC power would fail all AFW.

This case was quantified using both the A(4) zero-maintenance unavailability and average annual unavailability models. With the A(4) model the CDF increased from 2.21E-5 to 6.19E-5 and an AOT (to result in an ICCDP of 1E-6) of 9.2 days resulted. With the average annual unavailability model the CDF increased from 2.25E-5 to 7.16E-5 and an AOT (to result in an ICCDP of 1E-6) of 7.4 days resulted.

A similar set of modifications were made to the average annual unavailability model of record for LERF and it was quantified to confirm that ICCDP was the limiting parameter. LERF increased from a baseline value of 1.18E-6 to 1.57E-6, thus confirming that the CDF calculation is limiting.

Conclusion

Deferral of the missed surveillance for a period of up to 7 days is acceptable and results in a negligible increase in risk. All routine or emergent risk assessments should be performed as if the TDAFWP and 22AF23 and 24 AFW valves are unavailable until the surveillance is performed.