Ziev, Tracey

From: Cline, Leonard
Sent: Thursday, April 29, 2010 4:00 PM
To: Cahill, Christopher
Cc: Burritt, Arthur
Subject: MC 0309 for Salem AFW
Attachments: IMC0309 - Salem U1 buried AFW piping degradation_RFO.doc

Made changes please review and comment in particular on the risk write-up.

C/122

Enclosure 1

Decision Documentation for Reactive Inspection

(Deterministic and Risk Criteria Analyzed)

PLANT: Salem U1	EVENT DATE: 04/6/10	EVALUATION DATE: 04/30/10

Brief Description of the Significant Operational Event or Degraded Condition:

PSEG identified significant piping degradation for the buried AFW supply piping for 2 of the 4 steam generators on Unit 1. The pipe was schedule 80, 4" inside diameter, carbon steel piping. Design documents indicated the piping had an external protective coating applied; however, field observations indicated that the coating was never applied. Based on preliminary UT measurements of the piping, engineering determined AFW system operability could not be assured through next operating cycle. Additional UT examinations were performed to evaluate the structural integrity of the pipe and to identify the sections of pipe that needed replacement. Based on these measurements, PSEG replaced all of the buried pipe on Unit 1. To fully evaluate the impact of the identified pipe degradation on the AFW system PSEG hired a contractor to complete a finite element analysis. The results of the finite element analysis determined that although the pipe would have experienced plastic deformation in the more significantly degraded areas, the system would have maintained structural integrity. PSEG also completed excavation on portions of the Unit 2 AFW buried piping in locations similar to the areas where pipe degradation was identified on Unit 1. Visual inspections of the coating and UT inspections of the piping on Unit 2 determined that conditions on Unit 2 were better than they were on Unit 1.

In response to NRC inspection activities for the Unit 1 AFW pipe degradation, PSEG determined that they had not completed required ASME code testing for the buried section of the AFW piping on either Unit 1 or 2. Specifically, the ASME code required a pressure drop test for buried piping sections that can be isolated. PSEG determined the subject section of buried AFW piping could be isolated and therefore the pressure drop test could have and should have been performed. Available ISI program documentation did not identify that there was buried piping in the AFW system and as a result the testing was not performed on either Unit.

Y/N	DETERMINISTIC CRITERIA
N	a. Involved operations that exceeded, or were not included in, the design bases of the facility
	Remarks: The issue was associated with inadequate inspection and testing requirements for buried piping. Therefore the issue did not involve operations that exceeded or were not included in the facility design bases.
Y	b. Involved a major deficiency in design, construction, or operation having potential generic safety implications
	Remarks: Involved significant degradation of safety related buried piping that the licensee was not monitoring in accordance with the current ASME code requirements for inspection and testing. The cause of the degradation appears to be that the Unit 1 piping was not coated in accordance with its design requirements. The licensee identified the degradation while performing inspections of buried piping on Unit 1 in accordance with their buried piping program. To date, for the industry, this is the first significant degradation identified on high pressure safety related buried piping.

N	c. Led to a significant loss of integrity of the fuel, primary coolant pressure boundary, or primary containment boundary of a nuclear reactor
	Remarks: No impact on the integrity of the fuel, primary coolant pressure boundary, or primary containment boundary.
N	d. Led to the loss of a safety function or multiple failures in systems used to mitigate an actual event
	Remarks: Did not involve the loss of safety function or multiple failure in systems used to mitigate an actual event.
Y	e. Involved possible adverse generic implications
	Remarks: See remarks for b..
N	f. Involved significant unexpected system interactions
	Remarks: The event did not involve any unexpected system interactions.
N	g. Involved repetitive failures or events involving safety-related equipment or deficiencies in operations
	Remarks: Did not involve repetitive failures or events involving safety related equipment or deficiencies in operations.
N	h. Involved questions or concerns pertaining to licensee operational performance
	Remarks: There were no operational performance concerns relative to this event.

CONDITIONAL RISK ASSESSMENT

RISK ANALYSIS BY:	DATE:

Brief Description of the Basis for the Assessment (may include assumptions, calculations, references, peer review, or comparison with licensee's results):

As stated above although the pipe experienced significant degradation due to inadequate coating, the results of the finite element analysis determined that the pipe would have experienced plastic deformation in the more significantly degraded areas, but the system would have maintained structural integrity. Based on these results there was no impact of the estimated conditional core damage probability for the plant.

The estimated conditional core damage probability (CCDP) is _____N/A____ and places the risk in the range of no additional inspection, resident follow up.

RESPONSE DECISION

USING THE ABOVE INFORMATION AND OTHER KEY ELEMENTS OF CONSIDERATION AS APPROPRIATE, DOCUMENT THE RESPONSE DECISION TO THE EVENT OR CONDITION, AND THE BASIS FOR THAT DECISION

DECISION AND DETAILS OF THE BASIS FOR THE DECISION: The identified piping degradation did not impact the functionality of the AFW system; therefore, there was no impact on the estimated conditional core damage probability for the plant. This places the risk of this issue in the range of no additional inspection, resident follow-up. e	
BRANCH CHIEF REVIEW: Arthur L. Burritt **/RA/**	DATE: 04/30/10
DIVISION DIRECTOR REVIEW: David C. Lew **/RA/**	DATE: 04/30/10

Enclosure 2

Decision Documentation for Reactive Inspection

(Deterministic-only Criteria Analyzed)

PLANT: Salem U1	**EVENT DATE:** 04/6/10	**EVALUATION DATE:** 04/30/10

Description:

PSEG identified significant piping degradation for the buried AFW supply piping for 2 of the 4 steam generators on Unit 1. The pipe was schedule 80, 4" inside diameter, carbon steel piping. Design documents indicated the piping had an external protective coating applied; however, field observations indicated that the coating was never applied. Based on preliminary UT measurements of the piping, engineering determined AFW system operability could not be assured through next operating cycle. Additional UT examinations were performed to evaluate the structural integrity of the pipe and to identify the sections of pipe that needed replacement. Based on these measurements, PSEG replaced all of the buried pipe on Unit 1. To fully evaluate the impact of the identified pipe degradation on the AFW system PSEG hired a contractor to complete a finite element analysis. The results of the finite element analysis determined that although the pipe would have experienced plastic deformation in the more significantly degraded areas, the system would have maintained structural integrity. PSEG also completed excavation on portions of the Unit 2 AFW buried piping in locations similar to the areas where pipe degradation was identified on Unit 1. Visual inspections of the coating and UT inspections of the piping on Unit 2 determined that conditions on Unit 2 were better than they were on Unit 1.

In response to NRC inspection activities for the Unit 1 AFW pipe degradation, PSEG determined that they had not completed required ASME code testing for the buried section of the AFW piping on either Unit 1 or 2. Specifically, the ASME code required a pressure drop test for buried piping sections that can be isolated. PSEG determined the subject section of buried AFW piping could be isolated and therefore the pressure drop test could have and should have been performed. Available ISI program documentation did not identify that there was buried piping in the AFW system and as a result the testing was not performed on either Unit..

REACTOR SAFETY

Y/N	IIT Deterministic Criteria
N	Led to a Site Area Emergency
	Remarks: No EAL criteria were met.
N	Exceeded a safety limit of the licensee's technical specifications
	Remarks: No safety limits were exceeded.
N	Involved circumstances sufficiently complex, unique, or not well enough understood, or involved safeguards concerns, or involved characteristics the investigation of which would best serve the needs and interests of the Commission
	Remarks: All circumstances were well understood and the issue did not involve characteristics for which an investigation would serve the needs of the Commission.
Y/N	**SI Deterministic Criteria**

N	Significant failure to implement the emergency preparedness program during an actual event, including the failure to classify, notify, or augment onsite personnel
	Remarks: There were no actual events or EAL criteria that were met.

RADIATION SAFETY

Y/N	IIT Deterministic Criteria
N	Led to a significant radiological release (levels of radiation or concentrations of radioactive material in excess of 10 times any applicable limit in the license or 10 times the concentrations specified in 10 CFR Part 20, Appendix B, Table 2, when averaged over a year) of byproduct, source, or special nuclear material to unrestricted areas
	Remarks: There were no radiological releases associated with the event.
N	Led to a significant occupational exposure or significant exposure to a member of the public. In both cases, "significant" is defined as five times the applicable regulatory limit (except for shallow-dose equivalent to the skin or extremities from discrete radioactive particles)
	Remarks: There were no radiological consequences associated with this event.
N	Involved the deliberate misuse of byproduct, source, or special nuclear material from its intended or authorized use, which resulted in the exposure of a significant number of individuals
	Remarks: Did not involve the deliberate misuse of byproduct, source, or special nuclear material from its intended or authorized use.
N	Involved byproduct, source, or special nuclear material, which may have resulted in a fatality
	Remarks: Did not involve byproduct, source, or special nuclear material and did not result in fatality.
N	Involved circumstances sufficiently complex, unique, or not well enough understood, or involved safeguards concerns, or involved characteristics the investigation of which would best serve the needs and interests of the Commission
	Remarks: All circumstances were well understood and the issue did not involve characteristics for which an investigation would serve the needs of the Commission. There were no radiological consequences associated with this event.
Y/N	**AIT Deterministic Criteria**
N	Led to a radiological release of byproduct, source, or special nuclear material to unrestricted areas that resulted in occupational exposure or exposure to a member of the public in excess of the applicable regulatory limit (except for shallow-dose equivalent to the skin or extremities from discrete radioactive particles)
	Remarks: There were no radiological consequences associated with this event.
N	Involved the deliberate misuse of byproduct, source, or special nuclear material from its intended or authorized use and had the potential to cause an exposure of greater than 5 rem to an individual or 500 mrem to an embryo or fetus
	Remarks: Did not involve the deliberate misuse of byproduct, source, or special nuclear material.

N	Involved the failure of radioactive material packaging that resulted in external radiation levels exceeding 10 rads/hr or contamination of the packaging exceeding 1000 times the applicable limits specified in 10 CFR 71.87
	Remarks: Did not involve the failure of radioactive material packaging.
	Involved the failure of the dam for mill tailings with substantial release of tailings material and solution off site.
	Remarks: Did not involve the failure of the dam for mill tailings.
Y/N	**SI Deterministic Criteria**
N	May have led to an exposure in excess of the applicable regulatory limits, other than via the radiological release of byproduct, source, or special nuclear material to the unrestricted area; *specifically* •occupational exposure in excess of the regulatory limits in 10 CFR 20.1201 •exposure to an embryo/fetus in excess of the regulatory limits in 10 CFR 20.1208 •exposure to a member of the public in excess of the regulatory limits in 10 CFR 20.1301
	Remarks: There were no radiological consequences associated with this event.
N	May have led to an unplanned occupational exposure in excess of 40 percent of the applicable regulatory limit (excluding shallow-dose equivalent to the skin or extremities from discrete radioactive particles)
	Remarks: There were no radiological consequences associated with this event.
N	Led to unplanned changes in restricted area dose rates in excess of 20 rem per hour in an area where personnel were present or which is accessible to personnel
	Remarks: There were no radiological consequences associated with this event.
N	Led to unplanned changes in restricted area airborne radioactivity levels in excess of 500 DAC in an area where personnel were present or which is accessible to personnel and where the airborne radioactivity level was not promptly recognized and/or appropriate actions were not taken in a timely manner
	Remarks: There were no radiological consequences associated with this event.
N	Led to an uncontrolled, unplanned, or abnormal release of radioactive material to the unrestricted area •for which the extent of the offsite contamination is unknown; or, •that may have resulted in a dose to a member of the public from loss of radioactive material control in excess of 25 mrem (10 CFR 20.1301(e)); or, •that may have resulted in an exposure to a member of the public from effluents in excess of the ALARA guidelines contained in Appendix I to 10 CFR Part 50
	Remarks: There were no radiological consequences associated with this event.
N	Led to a large (typically greater than 100,000 gallons), unplanned release of radioactive liquid inside the restricted area that has the potential for ground-water, or offsite, contamination
	Remarks: There were no radiological consequences associated with this event.
N	Involved the failure of radioactive material packaging that resulted in external radiation levels exceeding 5 times the accessible area dose rate limits specified in 10 CFR Part 71, or 50 times the contamination limits specified in 49 CFR Part 173
	Remarks: Did not involve the failure of radioactive material packaging.

N	Involved an emergency or non-emergency event or situation, related to the health and safety of the public or on-site personnel or protection of the environment, for which a 10 CFR 50.72 report has been submitted that is expected to cause significant, heightened public or government concern
	Remarks: No 10 CFR 50.72 report was submitted.

SAFEGUARDS/SECURITY

Y/N	IIT Deterministic Criteria
N	Involved circumstances sufficiently complex, unique, or not well enough understood, or involved safeguards concerns, or involved characteristics the investigation of which would best serve the needs and interests of the Commission
	Remarks: All circumstances were well understood and the issue did not involve characteristics for which an investigation would serve the needs of the Commission. This event was a non-security related.
N	Failure of licensee safety-related equipment or adverse impact on licensee operations as a result of a safeguards initiated event (e.g., tampering).
	Remarks: There were no safety-related equipment failures associated with this event.
N	Actual intrusion into the protected area.
	Remarks: Did not involve intrusion into the protected area.
Y/N	**AIT Deterministic Criteria**
N	Involved a significant infraction or repeated instances of safeguards infractions that demonstrate the ineffectiveness of facility security provisions
	Remarks: Did not involve safeguards infractions.
N	Involved repeated instances of inadequate nuclear material control and accounting provisions to protect against theft or diversions of nuclear material
	Remarks: Did not involve inadequate nuclear material control and accounting provisions.
N	Confirmed tampering event involving safety-related or security-related equipment
	Remarks: Did not involve tampering.
N	Substantial failure in the licensee's intrusion detection or package/personnel search procedures which results in a significant vulnerability or compromise of plant safety or security
	Remarks: Did not involve a failure of the licensee's intrusion detection or package/personnel search procedures.
Y/N	**SI Deterministic Criteria**
N	Involved inadequate nuclear material control and accounting provisions to protect against theft or diversion, as evidenced by inability to locate an item containing special nuclear material (such as an irradiated rod, rod piece, pellet, or instrument)
	Remarks: Did not involve inadequate nuclear material control and accounting provisions

N	Involved a significant safeguards infraction that demonstrates the ineffectiveness of facility security provisions
	Remarks: Did not involve safeguards infractions.
N	Confirmation of lost or stolen weapon
	Remarks: Did not involve a lost or stolen weapon.
N	Unauthorized, actual non-accidental discharge of a weapon within the protected area
	Remarks: Did not involve discharge of a weapon in the protected area.
N	Substantial failure of the intrusion detection system (not weather related)
	Remarks: Did not involve a failure of the licensee's intrusion detection system.
N	Failure to implement the licensee's package/personnel search procedures that results in contraband or an unauthorized individual being introduced into the protected area
	Remarks: Did not involve a failure of the licensee's package and personnel search procedures.

RESPONSE DECISION

USING THE ABOVE INFORMATION AND OTHER KEY ELEMENTS OF CONSIDERATION AS APPROPRIATE, DOCUMENT THE RESPONSE DECISION TO THE EVENT OR CONDITION, AND THE BASIS FOR THAT DECISION

DECISION AND DETAILS OF THE BASIS FOR THE DECISION: See enclosure 1 for basis.

BRANCH CHIEF REVIEW:	Arthur L. Burritt **/RA/**	DATE:	04/30/10
DIVISION DIRECTOR REVIEW:	David C. Lew **/RA/**	DATE:	04/30/10