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LR-N05-0310

JUL 0 5 2005

PSEG Nuclear LLC

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

LER 272/05 – 003 – 00
Salem Generating Station Unit 1
Facility Operating License DPR- 70
Docket No. 50-272

This Licensee Event Report (LER) entitled "ECCS Leakage Outside Containment Exceeds Dose Analysis Limits (Seal Injection Filter Replacement)," is being submitted pursuant to the requirements of 10CFR 50.73(a)(2)(v).

The attached LER contains no commitments.

Should there be any questions regarding this matter please contact Enrique Villar at 856-339-5456.

Sincerely,

Thomas P. Joyce
Site Vice President - Salem

Attachment

EHV

C Distribution
LER File 3.7

IE22

FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 06/30/2007

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

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4. TITLE

ECCS Leakage Outside Containment Exceeds Dose Analysis Limits (Seal Injection Filter Replacement)

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
05	03	2005	2005	- 003 -	00	07	05	2005	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE

1

10. POWER LEVEL

100%

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☐ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☐ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☐ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☒ 50.73(a)(2)(v)(C)
- ☒ 50.73(a)(2)(v)(D)
- ☐ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
E. H. Villar, Licensing Engineer	856-339-5456

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
X	CB	ISV		No					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On May 3, 2005, the 11 seal water injection filter was removed from service in preparation for filter replacement. A local leak rate was performed following the tag out and determined that the leakage was well within the acceptable administrative limit for Emergency Core Cooling System (ECCS) leakage outside the containment. Subsequent Reactor Coolant System (RCS) water inventory surveillances completed at 0900 and 2318 hours on May 3 indicated an unidentified RCS leakrate of 0.3 gallons per minute (gpm). On May 4 at approximately 0600 hours the seal water injection filter work was completed and the filter returned to standby mode. A third RCS water inventory was completed on May 4 showing an unidentified leak rate of 0.055 gpm. At this point it was determined that the increased leakage was associated with the seal replacement work. This leakage (approximately 68,000 cubic centimeters/hour (cc/hr)) exceeded the 3800 cc/hr limit stated in the Final Safety Analysis Report (FSAR) Section 6.3.2.11 for ECCS leakage outside the containment. The apparent cause for the excessive leakage was inadequate isolation of the seal injection filter. Some of the corrective actions taken are: The seal water injection filter isolation valves are scheduled to be repaired in the next refueling outage, the human performance deficiencies have been documented in the corrective action program, Operations procedures will be revised to provide enhanced guidance on anomalous RCS leakrate trends, and the ownership for the leakage monitoring and reduction program will be transferred from Engineering to Operations.

This event is reportable in accordance with 10CFR50.73(a)(2)(v), "any event or condition that could have prevented the fulfillment of the safety function of structures or system that are needed to: ...(C) control the release of radioactive material; or (D) mitigate the consequences of an accident."

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17. NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)*

PLANT AND SYSTEM IDENTIFICATION

Chemical and Volume Control System (CVCS) {CB}
Seal Injection Filter {FLT}

* Energy Industry Identification System {EIIS} codes and component function identifier codes appear as {SS/CCC}

IDENTIFICATION OF OCCURRENCE

Event Date: May 3, 2005

Discovery Date: May 4, 2005

CONDITIONS PRIOR TO OCCURRENCE

Salem Unit 1 was in Mode 1 (OPERATIONS) at 100% power at the time of the event. No structures, systems or components were inoperable at the time of the occurrence that contributed to the event.

DESCRIPTION OF OCCURRENCE

At 0453 hours on May 3, 2005, the 11 seal water injection filter {FLT} was removed from service in preparation for filter replacement. Following the removal from service of the filter, a local leak rate was performed. This local leak rate indicated that the isolations boundaries were leaking by an estimated two drops per second (approximately 360 cubic centimeters/hour (cc/hr)). This leakage was well within the acceptable limit for emergency core cooling system (ECCS) leakage outside the containment.

At 0900 hours on May 3, 2005, a Reactor Coolant System (RCS) water inventory surveillance was completed indicating an unidentified leakrate of 0.3 gallons per minute (gpm), which is below the Technical Specification limit. This leakage was greater than the previously obtained value of 0.05 gpm; however, radiation monitoring system instrumentation, containment and primary plant data showed no adverse trend. The higher leak rate value at the time was attributed to equipment other than the seal water injection filter that was in service at the time.

At 2318 hours on May 3, 2005, a second RCS water inventory surveillance was completed with the same results (0.3 gpm). At this point, the change in leak rate from 0.05 to 0.3 gpm was attributed to the work associated with the 11 seal water injection filter.

At approximately 0600 hours on May 4, 2005, the seal water injection filter work was completed and the filter was returned to standby mode.

At 0930 hours on May 4, 2005, a third RCS water inventory surveillance was completed indicating an unidentified leak rate of 0.055 gpm.

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DESCRIPTION OF OCCURRENCE (cont'd)

At that point, it was confirmed that the increased leakage from 0.05 gpm to 0.3 gpm was associated with the seal water filter replacement work. The leakage of 0.3 gpm calculated on the previous day (approximately 68,000 cc/hr) exceeded the 3800 cc/hr limit stated in the Updated Final Safety Analysis Report (UFSAR) Section 6.3.2.11 for ECCS leakage outside the containment.

This event is reportable in accordance with 10CFR50.73(a)(2)(v), "any event or condition that could have prevented the fulfillment of the safety function of structures or system that are needed to: ...(C) control the release of radioactive material; or (D) mitigate the consequences of an accident."

CAUSE OF OCCURRENCE

The apparent cause for the excessive leakage was determined to be inadequate isolation of the seal injection filter. The leakage was captured in the liquid radioactive waste system.

Other factors contributing to this event were related to human performance deficiencies that allowed the leakage from the seal water injection filter to go uncorrected for approximately 24 hours, (specifically, inadequate teamwork and job briefs). Additionally, the procedure related to ECCS leakage control (an engineering procedure) was less than adequate in that it lacked operational guidance on investigating anomalous leakage.

PREVIOUS OCCURRENCES

A review of reportable events for Salem since 2001 noted three LERs related to greater than UFSAR allowable ECCS leakage outside containment.

LER 311/01-006 was issued November 1, 2001. The cause of this event was attributed to having the wrong packing configuration and torque requirements specified on the packing data sheet for the affected component (valve 2CV49). LER 311/04-009 issued December 12, 2004, was due to excessive leakage due to the failure of the 2CV64 to provide full isolation of the charging pump during maintenance. LER 272/04-005 issued February 3, 2005, identified that the 11 Residual Heat Exchanger had developed a flange leak due to improper torquing of the flange bolts. The corrective actions taken were appropriate and specific for these events, but they would not have been expected to prevent this occurrence.

During the investigation of this event, it was discovered that on October 27, 2003, there was a similar event that was not recognized as being reportable. On October 26, 2003, the same seal injection filter was isolated for maintenance. The RCS leak rate prior to the filter being removed from service was 0.06 gpm. The RCS leak rate after the filter was removed from service increased to 0.17 gpm. The increase in leakage was not recognized as being from the seal water injection filter and, therefore, was not reported as exceeding the limits in the UFSAR for ECCS leakage outside containment.

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PREVIOUS OCCURRENCES (cont'd)

Accordingly, as provided in NUREG 1022, Section 5.2.5, the event of October 27, 2003 is included under this section since it took place within two years of this LER. Although a formal cause of occurrence was not performed, it is reasonable to conclude that leak by through the filter isolation valves was the cause of that event as well.

SAFETY CONSEQUENCES AND IMPLICATIONS

There was no safety consequences associated with this event.

This leakage (approximately 68,000 cc/hr) exceeded the 3800 cc/hr limit stated in the UFSAR Section 6.3.2.11 for ECCS leakage outside the containment. The additional leakage would not have exceeded the limits of 10CFR100 for offsite releases. However, the limits of GDC 19 for exposure of the Control Room Operators could have been exceeded had a LOCA occurred while this leakage existed as determined by a review of the LOCA dose analysis.

Because this leakage could not have been isolated from the recirculation flow path during the recirculation phase of the design basis LOCA, the assumptions made in the dose analysis calculations were violated. The dose analysis assumption for ECCS leakage outside containment ensures that following a LOCA the radioactive releases will remain within the requirements of 10CFR100 for offsite releases and 10CFR50 Appendix A General Design Criterion 19 (GDC 19) for exposure to Control Room Operators.

The LOCA dose analysis calculation is a conservative model used to determine the effect of the radioactive release to the control room operators. This model does not assume any compensatory measures are taken by the operators to reduce their exposure to the radioactive release beyond the control room emergency air conditioning system aligning to its post-accident configuration. However, during an emergency condition, LOCA, Emergency Preparedness procedures call for providing guidance to emergency response personnel for administration of potassium iodide (KI) during an emergency at Hope Creek or Salem Generating Station.

Appendix B of NEI 99-03, Control Room Habitability Assessment Guidance, Revision 1, indicates that a factor of 10 reduction in thyroid dose may be credited due to the administration of KI. Therefore, with administration of KI, the thyroid dose guideline for control room personnel and other plant personnel would not have been exceeded in the high leakage conditions.

Although the PSEG Alternative Source Term license amendment has yet to be fully processed by the NRC, the leakage identified in this LER would have been bounded by the new analysis.

Based on the above, there was no impact to the health and safety of the public.

A review of this event determined that a Safety System Functional Failure (SSFF) as defined in NEI 99-02, Regulatory Assessment Performance Indicator Guidelines, occurred.

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CORRECTIVE ACTIONS

1. The seal water injection filter isolation valves are scheduled to be repaired in the next refueling outage.
2. The human performance deficiencies have been documented in the corrective action program and corrective actions are being developed.
3. Operations procedures will be revised to provide enhanced guidance on investigating anomalous trends of RCS leak rates.
4. The ownership for the leakage monitoring and reduction program will be transferred from Engineering to Operations.
5. The events as described in this LER will be submitted to the PSEG Operations Training Review Group for incorporation into the formal training program for operations personnel.

COMMITMENTS

This LER contains no commitments.