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Nuclear L.L.C.

10 CFR 50.90

LR-N10-0055
February 24, 2010

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Salem Generating Station - Unit 1
Facility Operating License No. DPR-70
NRC Docket No. 50-272

Subject: Response to Request for Additional Information Regarding License Amendment Request for One-Time Extension of the Type A Test Interval

References:
1) Letter from Robert C. Braun (PSEG Nuclear LLC) to USNRC, September 21, 2009
2) U.S. Nuclear Regulatory Commission e-mail dated January 21, 2010, Salem Nuclear Generating Station, Unit No. 1, Draft Request for Additional Information (TAC No. ME2258), ADAMS Accession No. ML090120593

In Reference 1, PSEG Nuclear LLC (PSEG) submitted a license amendment request for Salem Generating Station - Unit 1. The proposed license amendment would revise Technical Specification 6.8.4.f, "Primary Containment Leakage Rate Testing Program," to allow a one-time extension of the Type A Integrated Leakage Rate Test (ILRT) interval for no more than five (5) years.

In Reference 2, the NRC transmitted a draft request for additional information concerning the license amendment request. Attachment 1 to this letter provides PSEG's responses.

PSEG has determined that the information provided in response to this request for additional information does not alter the conclusions reached in the 10 CFR 50.92 no significant hazards determination previously submitted.

There are no regulatory commitments contained in this letter.

A001
NRR

Should you have any questions regarding this submittal, please contact Mr. Paul Duke at 856-339-1466.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 24, 2010
(date)

Sincerely,

Carl J. Fricker
Site Vice President - Salem

Attachment
1. Response to Request for Additional Information

cc: S. Collins, Regional Administrator – NRC Region I
R. Ennis, Project Manager - USNRC
NRC Senior Resident Inspector - Salem
P. Mulligan, Manager IV, NJBNE
L. Marabella - Corporate Commitment Tracking Coordinator
H. Berrick - Salem Commitment Tracking Coordinator

ATTACHMENT 1

Salem Generating Station - Unit 1
Facility Operating License No. DPR-70
NRC Docket No. 50-272

Response to Request for Additional Information

In Reference 1, PSEG Nuclear LLC (PSEG) submitted an amendment request for Salem Nuclear Generating Station (Salem), Unit No. 1. The proposed amendment would revise Technical Specification (TS) 6.8.4.f, "Primary Containment Leakage Rate Testing Program," to allow a one-time extension of the containment Type A integrated leakage rate test (ILRT) interval from 10 to 15 years.

In Reference 2, the NRC transmitted a draft request for additional information concerning the license amendment request. PSEG's responses are provided below.

Containment and Ventilation Branch (SCVB) Request for Additional Information (RAI) Questions

1. The second and third paragraphs on page 11 of Attachment 1 to the application dated September 21, 2009, discusses notifications processed during the first and second IWE examination campaigns for Salem Unit No. 1 related to coating degradation on containment penetrations and on the metal containment liner. Both paragraphs state that "[e]ngineering evaluations were performed on noted areas of degradation and all areas were found acceptable." Please describe the engineering evaluations performed and the acceptance criteria used for accepting the degraded coatings.

   PSEG Response
   Notifications processed during the first and second IWE examination campaigns for Salem Unit No. 1 related to coating degradation on containment penetrations and on the metal containment liner were of two categories, inspection indications that exceeded the acceptance criteria in site procedure SH.RA-IS.ZZ-0004(Q) "Containment Visual Inspection", and indications that did not exceed the acceptance criteria but were recordable. The indications that were acceptable but recordable were documented in a notification and planned for coating repairs to prevent further degradation. The indications that exceeded the acceptance criteria in procedure SH.RA-IS.ZZ-0004(Q), required engineering evaluation.

   The engineering evaluations were performed in accordance with the requirements of IWE-3122.3 of the 1998 Addenda of the ASME Boiler and Pressure Vessel Code, Section XI. The evaluations addressed the structural integrity of the containment, including the condition of the base metal beneath the degraded coating areas. A detailed visual examination of the base metal in these local areas was performed, with the conclusion that any material loss was less than 10% of the nominal plate thickness criterion, supporting the conclusion that the components were acceptable by engineering evaluation.

2. Please identify any bellows used on penetrations through containment pressure-retaining boundaries. Provide information on their location; and inspection, testing and operating experience with regard to detection of leakage through the penetration bellows.

   PSEG Response
   Salem does not utilize expansion bellows on any of the piping penetrations inside containment. As stated within the Salem UFSAR Section 3.8.1.6.8.10, "Piping Penetrations":

   > Containment piping penetrations designed for Salem are not required to be type "B" tested for 10CFR50 Appendix J (Ref. Safety Evaluation S-C-R700-MSE-0253 Rev. 0). The type "B" test is applicable to piping penetrations that utilize expansion bellows as the leakage limiting boundary. The piping penetrations at Salem rely on partial/full penetration seal welds inside containment as the leakage limiting boundary, which are leak rate tested as part of the Appendix J type "A" containment Integrated Leak Rate Test (ILRT).

3. Please provide information of instances, if any, during implementation of the IWE/IWL containment inservice inspection (CISI) program, for Salem Unit No. 1, where existence of, or potential for, degradation conditions in inaccessible areas of the containment structure and metallic liner were identified and evaluated based on conditions found in accessible areas as required by 10 CFR 50.55a(b)(2)(viii)(E) and 10 CFR 50.55a(b)(2)(ix)(A). If there were any instances of such conditions, please discuss the findings and actions taken.

   PSEG Response
   During implementation of the 1st 10 year Interval IWE/IWL containment in-service inspection (CISI) program, for Salem Unit No. 1, there were no instances where the existence of, or potential for, degraded conditions in inaccessible areas of the containment structure and metallic liner were identified or evaluated based on conditions found in accessible areas as required by 10 CFR 50.55a(b)(2)(viii)(E) and 10 CFR 50.55a(b)(2)(ix)(A).

   PSEG plans to perform additional examinations of inaccessible areas during refueling outage 1R20 (Spring 2010).

4. Page 12 of Attachment 1 to the application dated September 21, 2009, under the heading "Schedule and Method for Appendix J Visual Examination (RG 1.163, Regulatory Position C.3)," describes the requirements of Appendix J to 10 CFR Part 50 and the guidance in Regulatory Guide (RG) 1.163 for visual examination. It is not explicitly stated that these requirements and guidance were met for the most recent (Spring 2007) examination. Please discuss whether the station procedure used for the recent examination (SH.RA-ST.ZZ-0106), and also to be used for the scheduled examinations, is in accordance with the requirements in Appendix J to 10 CFR Part 50 and the guidance in RG 1.163.

   PSEG Response
   PSEG procedure SH.RA-ST.ZZ-0106 is in accordance with the requirements in Appendix J to 10 CFR Part 50 and the guidance in RG 1.163 regarding general visual

inspection of the accessible interior and exterior surfaces of the containment system for structural deterioration which may affect the containment leak-tight integrity

In accordance with the guidance in RG 1.163 and NEI Section 9.2.1, Salem and Hope Creek developed common procedure SH.RA-ST.ZZ-0106(Q) to perform and document these examinations. The procedure delineates that these examinations are to look for areas of deterioration that may affect containment structural integrity or leak tightness. Attachment 1 of the procedure identifies the specific interior and exterior areas to be inspected with sign-offs by the inspector. Attachment 3 records any notifications generated as a result of these inspections that require further review or evaluation. Performance of these exams is tracked under a recurring Technical Specification task such that the exams are performed at approximately equal intervals over the 10 year period. This procedure allows credit to be taken for those IWE/IWL exams performed under procedure OU-AA-335-018, "Detailed and General, VT-1 and VT-3 Visual Examination of ASME Class MC and CC Containment Surfaces and Components," if performed during the same refueling outage. In addition, in accordance with the requirements of 10 CFR 50 Appendix J, the Unit 1 Type A test procedure S1.RA-IS.ZZ-0013(Q) contains a test prerequisite to perform a containment examination in accordance with SH.RA-ST.ZZ-0106(Q).

5. Please discuss whether the periodic inspections of Service Level 1 coatings inside containment is consistent with the guidance in RG 1.54, "Service Level I, II, and III Protective Coatings Applied to Nuclear Power Plants," Revision 1, dated July 2000.

PSEG Response
The program for periodic inspection of Service Level I Coatings inside the Containments at Salem is consistent with the guidance in RG 1.54, Rev. 1.

Background:
Regulatory Guide (RG) 1.54 was first published in June, 1973 (Reference 3) to provide the Regulatory Position for compliance with Appendix B to 10CFR Part 50 regarding the Quality Assurance (QA) requirements for protective coatings at a nuclear power plant. This Regulatory Guide accepted ANSI N101.4-1972 (Reference 4). The quality assurance program for safety-related coatings inside the Salem containment was based on ANSI N101.4-1972.

ANSI 101.4-1972 and other standards related to protective coatings applied in nuclear power facilities were formally withdrawn in 1988 and were later replaced by several ASTM standards. RG 1.54 was revised to Revision 1 in July, 2000 (Reference 5) to endorse ASTM D5144-00 and other ASTM standards to provide guidance for Service Level I, II, and III protective coatings applied to nuclear power plants.

RG 1.54, Rev. 1 states that ASTM D5163-96 provides guidelines that are acceptable to the NRC staff for monitoring the performance of Level I protective coatings inside the containment.

Salem Level I Coating Monitoring Program Compliance:
At Salem, Level I coating performance monitoring program CC-SA-6006 is based on the guidelines presented in ASTM D5163-05a and its references. ASTM 5163-05a and ASTM 5163-96 are essentially the same. Therefore, the PSEG monitoring program for

Level I coating inside the containment is in consistent with the guidance in RG 1.54, Rev. 1.

PRA Licensing Branch (APLA) RAI Questions

1. The assessment of corrosion-induced leakage of the steel liner in Section 4.4 of Attachment 3 to the application dated September 21, 2009, was based on two observed corrosion events (at North Anna 2 and Brunswick Unit 2) considered in the Calvert Cliffs corrosion analysis. There have been additional instances of liner corrosion that are relevant to this assessment, including a recent finding at Beaver Valley Unit 1 (LER 2009-003-00, ADAMS Accession No. ML091740056). Provide a more complete accounting of all observed corrosion events relevant to the Salem Unit No. 1 containment, and an evaluation of the impact on risk results when all relevant corrosion events are included in the risk assessment.

   PSEG Response
   Based on a data search within the INPO operating experience database, the following instances of degraded containment liners were found:

   1. Braidwood Unit 2 (October 2000) - While performing visual inspection of the containment surfaces, it was discovered that the containment liner did not meet the acceptance criteria of "maximum 10% metal thickness loss" in some normally inaccessible areas below the moisture barrier. [This was a degraded condition not a failed condition and therefore would not impact the risk assessment.]

   2. Brunswick Unit 1 (March 2004) - inspection of the drywell personnel access penetration sleeve identified paint blisters on the 3/8" nominal thickness of the penetration sleeve. Ultrasonic testing (UT) of the penetration sleeve identified multiple areas of corrosion. Weld repairs were required to restore areas of the sleeve to required design wall thickness. [This was a degraded condition not a failed condition and therefore would not impact the risk assessment.]

   3. Beaver Valley Unit 1 (February 2006) - Upon completion of the hydro demolition of the concrete and removal of rebar from this temporary Steam Generator Replacement Project (SGRP) equipment opening, three areas of corrosion and pitting were identified on the concrete side of the steel containment liner. No through wall perforations were found. [This was a degraded condition not a failed condition and therefore would not impact the risk assessment.]

   4. Turkey Point Unit 4 (November 2006) - During preparations for inspection and coatings of the Unit 4 reactor cavity sump at elevation -15'-8", a hole developed in the Containment building liner when a sump pump support plate was moved. [This event is applicable to the risk assessment.]

   5. North Anna Unit 1 (March 2009) - Seven corroded carbon steel leak test connections with missing 1/8" diameter pipe plugs were identified during Engineering inspection in the Recirculation Spray (RS) and Containment Sump areas. [This event was a degraded condition with potential for

corrosion and not a failed condition and therefore would not impact the risk assessment.]

6. Beaver Valley Unit 1 (May 2009) - During the IWE examination of containment liner, a paint blister was identified. The blister was investigated and a through wall hole was identified. The hole was approximately 3/8" by 1" in size. [This event is applicable to the risk assessment.]

In addition to the instances of degraded containment liners listed above, degradation was observed in the Salem Unit 2 containment liner and pressure test channels during inspections performed during refueling outage 2R17 (Fall 2009). The liner wall corrosion reduced the wall thickness below design nominal; however the thickness was above the minimum wall and is not expected to corrode below minimum wall before the next refueling outage. [This event was also not a failed condition and therefore would not impact the risk assessment.]

The operating experience review indicated that two relevant additional failures have occurred since the methodology to estimate the impact of corrosion-induced leakage was established in the Calvert Cliffs analysis (Reference 6) that has since been utilized in several other ILRT extension requests. The Calvert Cliffs analysis utilized the information available at that time to establish a historical baseline estimate of corrosion induced liner flaws. The analysis then proceeded to estimate that corrosion induced flaw likelihood will increase due to the change in the ILRT interval to 15 years. The base case assumption was that the historical flaw rate would double every five years. Since these two additional failures occurred over a longer time period than was used in the original assessment (which accounted for two failures in 5.5 years to establish the historical liner flaw likelihood), accounting for the two failures indicated above would fall below the base case analysis for corrosion induced flaw likelihood at 15 years that was already performed by Calvert Cliffs and was duplicated for the Salem ILRT extension request in Section 4.4 of Attachment 3 of Reference 1. Additionally, to address the uncertainty associated with such probability estimation, the sensitivity analysis that was performed in Section 6.1 of the risk assessment for Salem varied the doubling time for flaw likelihood rate from once every five years to once every two years and once every ten years. The sensitivity case for doubling every two years would be indicative of industry operating experience with several noted liner failures due to corrosion (not just two that have been identified). This case resulted in an increase in LERF due to corrosion of just 3.64E-08/yr (refer to Table 6.1-1 of Attachment 3 of Reference 1). This sensitivity case is bounding for the incorporation of all relevant events identified above and as such would not change the conclusions of the analysis.

2. Section A.2.3 of Appendix A to Attachment 3 to the application dated September 21, 2009, states that results of a March 2008, formal peer review of the Salem probabilistic risk assessment (PRA) indicated that a number of supporting requirements were "Not Met" or only met "Category I." Table A.2-1 in Attachment 3 describes only the eight "key" findings from the March 2008 PRA peer review and an assessment of each finding's impact on the application. Provide a description and evaluation of the impact on the ILRT extension request of all the 2008 peer review items that are "Not Met."

   PSEG Response
   Table B following provides a listing of supporting requirements judged as "not met" and provides evaluations of the impact on the ILRT extension request.

Table B-1
Assessment of Supporting Requirement Capability Categories for Initiating Events Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
IE-A1	SR Not Met	IE-A1-01	The plant-specific search only addresses supporting systems. The listing is not encompassing of possible plant-specific initiators found at other plants such as a loss of charging (impact on RCP seal cooling). Loss of charging would lead to a reactor trip and would decrease redundancy for RCP seal cooling. *Discussion: As discussed in the Salem Initiating Events notebook, a structured approach was followed to identify plant-specific initiators, identifying that an initiator is considered for treatment as a special transient if both an automatic or manual trip occurs and frontline systems are significantly affected. Unlike many other plants, Salem has both charging/safety injection pumps and traditional safety injection pumps. Since frontline safety injection capability is not significantly compromised by a loss of charging, and since component cooling water provides support for reactor coolant pump seals, the loss of charging event was binned with ordinary transients. This classification has no significant impact on the assessment performed for the ILRT extension request.*
IE-A3	SR Not Met	IE-A3-001, IE-A3-002	The plant-specific history indicates that on 12/31/01 an event occurred resulting in SI. The categorization of initiating events does not account for this or the case of ESFAS actuation. *Discussion: Table 3-2 in the initiating events notebook indicates this was binned as a trip with loss of feedwater, consistent with the classification scheme employed for Salem (spurious SI = Tp). This classification does not result in any significant impact to the assessment performed for the ILRT extension request.*
IE-A3a	SR Not Met	IE-A3-001	The available documentation lists that past PRAs are examined. However, there appears to be no documentation of this evaluation with consideration of plants of similar design. *Discussion: Section 2.1 of the initiating events notebook indicates that comparisons were made to industry data and to other plants. This is a documentation issue and does not impact the ILRT extension request.*

Table B-1
Assessment of Supporting Requirement Capability Categories for Initiating Events Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
IE-A4a	SR Not Met	IE-A4-001	See supporting requirement IE-A4. Not all potential systems were addressed. *Discussion: The observation associated with IE-A4 says, "The analysis only addresses support systems and does not address the impact of other operating systems (such as charging) with regard to events resulting in a plant upset and subsequent trip signal." IE-A4 asks for a systematic review of plant systems to identify potential initiating events. A systematic review was performed. Loss of charging was not included as a separate initiator based on screening criterion identified in the initiating events notebook. No significant impact on the assessment performed for the ILRT extension request.*
IE-A5	SR Not Met	IE-A5-01	SA PRA Initiating Events Notebook, SA-PRA-001, Revision 0, Section 2.1.2 describes the review of Salem Generating Station Experience and Trip Review. No mention is made of consideration of events that occurred at conditions other than at-power operation. *Discussion: Other-than-at-power events were evaluated. Documentation issue. No impact to ILRT extension request.*
IE-B3	SR Not Met	IE-B3-001	The potential for SI actuation is placed in the general transient category with events such as reactor trip and considered to be no worse than the reactor trip. However, unmitigated SI events can challenge a PORV resulting in a consequential LOCA. These two events should not be grouped. Discussion: *Initiating events may be grouped reasonably. Spurious SI will generally be recovered (by resetting SI) and the events will be transients and they are so classified in the Salem PRA. If SI is not reset prior to PORV operation, what results is a transient with improved reliability of feed-and-bleed cooling (already initiated). If SI is not reset, and PORV operation results, and if the PORV were to subsequently leak, the associated block valve could be closed. The risk contribution of spurious SI, failure to terminate, PORV failure to reseat, failure of block valve to close, and failure to mitigate SLOCA given that high head injection is available is very small. No significant impact on the assessment performed for ILRT extension request.*

Table B-1
Assessment of Supporting Requirement Capability Categories for Initiating Events Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
IE-C3	SR Not Met	IE-C3-01	The initiators that are fault trees, loss of SW, loss of Capability Category, loss of control area ventilation, and others, do not appear to be based on reactor year. For example, under gate IE-TSW, basic event SWS-PIP-RP-TBHDR has a mission time of 8760 hours. *Discussion: The consequence of the current approach is a very mild conservatism, on the order of a few percent. No significant impact on the assessment performed for the ILRT extension request.*
IE-C4	SR Not Met	IE-A1-01	Quantitative screening does not appear to be performed, based on a review of the Salem SA-PRA-001, Revision 0 notebook. Therefore, subsection a) and b) of this SR are considered met. However, subsection c) of this SR does not appear to be met as noted in the e review for SR IE-A1, some events that require the plant to be shut down due to technical specifications were screen (e.g., loss of a 4KV bus). *Discussion: Loss of AC bus events at Salem are included with reactor trip events. Generally it is not expected that loss of an AC bus will result in a reactor trip. If a shutdown were undertaken manually after loss of a bus, the associated risk should be relatively small. If an AC bus were lost and if it appeared that a TS-required shutdown could contribute materially to risk, online repairs could be considered. No significant impact on the assessment performed for the ILRT extension request.*
IE-D3	SR Not Met	SC-C3-01, SC-C3-02	While assumptions are documented to some degree in the Salem SA-PRA-001, Revision 0 notebook, a systematic review/listing of assumptions and sources of uncertainty as defined by the Standard is not documented or referenced in the initiating events notebooks. *Discussion: This is a documentation (location) issue. Location of information about assumptions and sources of uncertainty does not impact ILRT extension request.*

Table B-2
Assessment of Supporting Requirement Capability Categories for Accident Sequence Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
AS-B6	SR Not Met	AS-A8-01	The SBO/LOOP, battery depletion, and room cooling are all addressed in the Accident Sequence notebook. However, the lumped treatment of offsite power recovery into both the diesel mission time calculation and the RBU recovery factor could overestimate the potential for recovery. *Discussion: "Lumped parameter" methods of accounting for DG run failure and offsite power nonrecovery have been studied, for example in connection with NUREG/CR-4550 and NUREG-1150, and these approaches have been found to provide acceptable results. No significant impact on the assessment performed for the ILRT extension request.*
AS-C2	SR Not Met	AS-C2-01	The operator actions are not part of the event tree as required by this Supporting Requirement. The requirements of c, d and e are not met. *Discussion: Inclusion of operator actions in the fault tree rather than the event tree is a generally accepted approach which allows modeling of the appropriate context. No significant impact on the assessment performed for the ILRT extension request.*

Table B-2
Assessment of Supporting Requirement Capability Categories for Accident Sequence Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
AS-C3	SR Not Met	SC-C3-02	In Notice of Clarification to Revision 1 of Regulatory Guide 1.200, FRN July 27, 2007, Accession number: ML071170054, the NRC provided their clarification related to assumptions and sources of uncertainty. The NRC stated that "Key" assumptions and sources have meaning only within the scope of an application. For a base PRA, the plant needs to identify and "characterize' assumptions and sources of uncertainty. Characterization" can be qualitative. ANO2 has documented the assumptions that they used for the accident sequence analyses. The uncertainty notebook is in draft form and therefore is not reviewable. The uncertainty portion of this requirement is not met. The assumption[s] were in the notebook so this part of the requirement is met. A suggestion is that an assumption section be added to the notebook. *Discussion: Industry consensus supports a peer review approach that considers all available documentation and information, so sufficient information about uncertainty was available to the peer review team, and sources of uncertainty have been characterized. No impact on ILRT extension.*

Table B-3
Assessment of Supporting Requirement Capability Categories for Success Criteria

SR	Capability Category	Associated F&Os	Summary of Assessment
SC-A1	SR Not Met	SC-A1-01	The ASME standard defines core damage as "uncovery and heatup of the reactor core to the point at which prolonged oxidation and severe fuel damage involving a large section of the core is anticipated." In the Salem PRA Success Criteria Notebook, SA-PRA-003, a "big picture" definition as described in the ASME PRA standard appears to missing. In the Salem PRA, core damage is defined as [not] maintaining core temperature below 1200 degrees F which deals with heatup but not uncovery. *Discussion: This is a documentation issue with respect to the success criteria used in the supporting analyses. No impact on the ILRT extension request.*
SC-A2	SR Not Met	SC-A2-01	In the Salem PRA, core cooling was defined as successful if core exit temperatures do not exceed 1200 degrees F. This represents the temperature below which no core damage is expected to occur and the core exit thermocouple temperature at which the operators transfer to severe accident guidelines. The 1200 degrees F core temperature success criteria were interpreted to be the core hottest node temperature (TCRHOT) in MAAP. However, in the TH notebook a peak cladding temperature of 1800 degrees F was referenced. The MAAP code used 1800 degrees as TCRHOT. Also, there is no mention of core collapsed liquid level. *Discussion: This is a documentation issue with respect to the success criteria used in the supporting analyses. No impact on the ILRT extension request.*
SC-B4	SR Not Met	SC-B4-01	The MAAP Thermal-Hydraulic Calculations Notebook (SA-PRA-007, Revision 1), Sections 1.2 and 1.3 provide a discussion of the codes available and the advantages associated with using MAAP, respectively. However, MAAP is used in establishing large LOCA success criteria, although the code is not suitable for analysis of this plant upset. A discussion of code limitations is not provided. *Discussion: Documentation only. MAAP analyses were only one input. Large LOCA success criteria used were consistent with design basis criteria and not based on MAAP. No impact to ILRT extension request.*

Table B-3
Assessment of Supporting Requirement Capability Categories for Success Criteria

SR	Capability Category	Associated F&Os	Summary of Assessment
SC-B5	SR Not Met	SC-B5-01	A check of the reasonableness and acceptability of the success criteria results is not documented. *Discussion: This check was performed by virtue of the fact that the team that performed the Salem model update is experienced with PWR success criteria and is cognizant of what is typical and reasonable and acceptable, so this is a documentation issue. No impact to ILRT extension request.*
SC-C3	SR Not Met	SC-C3-01, SC-C3-02	Assumptions are embedded in the documentation rather than captured in a specific section. Sources of uncertainty are addressed in a draft evaluation using guidance from draft EPRI report, "Treatment of Parameter and Model Uncertainty for Probabilistic Risk Assessments." *Discussion: Location of assumption information and draft status of the evaluation of uncertainty do not impact the ILRT extension request.*

Table B-4
Assessment of Supporting Requirement Capability Categories for Systems Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
SY-A4	SR Not Met	SY-A4-01	The system notebooks do not provide any walkdown information. A walkdown document was made available to the peer review but has not been reviewed and formally released. *Discussion: As noted, walkdowns were performed and documented. Review and formal release status of the walkdown information are documentation issues only and do not impact ILRT extension request.*
SY-A6	SR Not Met	SY-A6-01	The system notebooks do not provide definitive explanation of boundary information and do not provide illustration of modeled components. *Discussion: Boundary information is provided; the suggested improvements constitute a documentation issue. No impact to the ILRT extension request.*
SY-A8	SR Not Met	SY-A8-01	Boundaries not defined. *Discussion: Boundary information is provided; documentation issue. No impact to the ILRT extension request.*
SY-A10	SR Not Met	SY-A10-01	Diesel generator modeling. *Discussion: Other text in peer review report describes the underlying question concerning inclusion of DG day tank and level switches in boundary with EDG. This should be an acceptable boundary definition. Note that failure of a level switch on an individual EDG day tank at Salem will not prevent successful replenishment of all EDG day tanks. No impact to the ILRT extension request.*

Table B-4
Assessment of Supporting Requirement Capability Categories for Systems Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
SY-A12	SR Not Met	SY-A12-01	Some components listed in the standard supporting requirement are absent from some system models. *Discussion: Elsewhere in the peer review report, the specifics cited are DG fuel oil day tank and associated components; and some dampers which might need to reposition under some circumstance in the CAV system. DG components in question are within the supercomponent boundary for the EDG at Salem. CAV dampers which are checked/ repositioned as part of the alignment for off-normal operation are not modeled for failing to reposition; however other dampers are modeled. No impact to the ILRT extension request.*
SY-A13	SR Not Met	SY-A13-01	Review of models identified several exclusions of failure modes on a global basis without justification. *Discussion: The specific failure modes identified elsewhere in the report pertained to transfer closed/plugging failure modes for manual valves. These failure modes are included under special circumstances but are not generally modeled throughout. Justification is a documentation issue. No impact to the ILRT extension request.*
SY-A19	SR Not Met	SY-A19-01	No documentation of assessment. *Discussion: Elsewhere in the peer review report documentation it is clarified that this relates to documentation in system notebooks of potential adverse operating conditions that could impact operation. Equipment is only credited for sequences where it should be capable of operation. Documentation issue. No impact to ILRT extension request.*
SY-A21	SR Not Met	SY-A21-01	Multiple type code descriptions are used for the same data such that the second part of the SR is not met. *Discussion: Based on discussions held during the review, this observation is believed to relate to special instances where data are lacking for certain components/failure modes (e.g. diesel-driven air compressor fails to start/run). In these cases data from other similar components (other diesel-driven components) were used to develop the failure rates. This is an appropriate approximation. No significant impact on the assessment performed for the ILRT extension request.*

Table B-4
Assessment of Supporting Requirement Capability Categories for Systems Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
SY-B3	SR Not Met	SY-B3-01	For some cases the selection of CCF combinations are not complete and those selected are not the most limiting. *Discussion: This relates to a question concerning whether all possible n of 6 CCF combinations were applied for battery chargers. The significant CCF combinations are included in the model. No significant impact on the assessment performed for the ILRT extension request.*
SY-B4	SR Not Met	SY-B3-01	Some combinations are absent which when using MGL can underestimate the CCF contribution. *Discussion: The Salem PRA did not use the MGL method. No impact to ILRT extension request.*
SY-B5	SR Not Met	SY-B5-01	Documentation for several system notebooks (AFW, CVCS and RWST) indicated that the heated water circulating system was required to prevent freezing, but was not modeled. *Discussion: Documentation discrepancy, inaccuracy in system notebooks. No impact to ILRT extension request.*
SY-B6	SR Not Met	SY-B6-01	No analysis documented *Discussion: Support system requirements are analyzed, modeled, documented. No impact to ILRT extension request.*
SY-B10	SR Not Met	SY-B5-01	The need for heating of the RWST is not modeled although the system notebook indicates the need for heating. *Discussion: Documentation discrepancy, no impact to ILRT extension request.*
SY-B11	SR Not Met	SY-B11-01	Some AFW signals (SI, LOSP) are not defined and no justification for exclusion is provided. *Discussion: Justification is documentation issue, no impact to ILRT extension request.*

Table B-4
Assessment of Supporting Requirement Capability Categories for Systems Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
SY-B12	SR Not Met	SY-B12-01	Some identified mission times are less than required. *Discussion: Specific comments in report identified issue with "lumped parameter" EDG run time / offsite power recovery time. Studies (NUREG/CR-4550, NUREG-1150) have shown this method to be an acceptable alternative. Also mentioned was a run time less than 24 hours for the TDAFWP. No significant impact on the assessment performed for the ILRT extension request.*
SY-B15	SR Not Met	N/A	No documentation of an evaluation for potential adverse environments. *Discussion: No fact and observation was provided relating to this SR. System notebooks do address what support system behavior is required for successful operation. No impact to ILRT extension request.*
SY-B16	SR Not Met	HR-C3-01	Operator starts for standby equipment not defined. No miscalibration of under voltage relays. *Discussion: There are a limited number of operator starts for standby equipment in the model and the actions are defined in the HRA analysis. There is not an event for miscalibration of undervoltage relays. This failure mode may be considered to be represented by random and common-cause equipment failures. No significant impact on the assessment performed for the ILRT extension request.*
SY-C2	SR Not Met	SY-C2-01	System documentation does not provide some required documentation. *Discussion: F&O SY-C2-01 does not occur in peer review report. No impact to ILRT extension request.*
SY-C3	SR Not Met	SC-C3-02	Assumptions are not present *Discussion: Underlying discussion notes that the information is present, just not in location preferred by reviewer. No impact to ILRT extension request.*

Table B-5
Assessment of Supporting Requirement Capability Categories for Human Reliability Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
HR-B2	SR Not Met	HR-B2-01	This requirement is directly in violation of the first sentence of Section 4.3.3.1 which allows screening of actions that could simultaneously have an impact on multiple trains of a redundant system or diverse systems. *Discussion: This statement resulted from an apparent misunderstanding of the HRA notebook text. The text in question was not intended to suggest the screening of valid pre-initiator events that could impact multiple trains of a system or multiple redundant systems. Nothing was screened except for non-invasive surveillances and activities not relevant to PRA equipment. No impact to ILRT extension request.*
HR-C3	SR Not Met	HR-C3-01	There is no documentation showing that miscalibration as a mode of failure of initiation of standby systems was considered. An example of this is that there is no HFE for miscalibration of bus under voltage bus, RPS relays, etc. *Discussion: This failure mode is subsumed by common-cause failure to start events. No significant impact on the assessment performed for the ILRT extension request.*
HR-D6	SR Not Met	SC-C3-02	The uncertainty analysis has not been done. The mean values were used since the HRA Calculator was used for this analysis. *Discussion: A draft evaluation of uncertainty was available but not reviewed. No impact to the ILRT extension request.*
HR-F2	SR Not Met	HR-F2-01, HR-F2-02	The accident sequence specific timing of time window for successful completion for CCS-XHE-FO-ISOLT is based on a calculation that does not address leakage. The calculation S-CC-MDC-2111 is for loss of Service Water and does not address leakage of the Component Cooling Water System. The time window should account for leakage that would drain the CCW system and make it inoperable. This is the limiting time since the CCW system will continue to cool with the leak until the surge tank is drained. Other examples of problems with timing are the lack of documentation for the timing used. This is noted in HRAs: CIS-XHE-FC-XLCNT, AND MSS-XHE-FO-MS10. It should be noted that only a sampling was performed and that this may involve many more HRA analysis.

Table B-5
Assessment of Supporting Requirement Capability Categories for Human Reliability Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
			Discussion: The HEP analyses are based on appropriate time windows. The specific examples cited result from apparent misunderstandings. *The HRA evaluation for CCS-XHE-FO-ISOLT is reasonable and the reference to S-CC-MDC-2111 is appropriate. S-CC-MDC-2111 provides information about how much time is available to take actions necessary to respond to loss of cooling by the CCW system.* *Regarding CIS-XHE-FC-XLCNT: "Operator fails to terminate {Excess} LD LOCA through Containment." A conservative limit of 4 hours was assumed in which time the operators would have to understand that a CVCS relief valve had lifted and respond appropriately. This is described in the notes for the analysis of the action and is appropriate.* *Regarding MSS-XHE-FO-MS10: This is an action to depressurize the RCS using the secondary side of the plant, which may be required within 2 hours in some circumstances. As the discussion for MSS-XHE-FO-MS10 indicates, this is the basis for the timing. A 90 minute time to take the action is assumed, which allows an ample 30 minutes for the actual depressurization. No impact to ILRT extension request.* *None of the examples cited identified valid issues with the timing assumed for the HEP analyses and there is no impact to the ILRT extension request.*

Table B-5
Assessment of Supporting Requirement Capability Categories for Human Reliability Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
HR-G4	SR Not Met	HR-F2-01, HR-F2-02	The accident sequence specific timing of time window for successful completion for CCS-XHE-FO-ISOLT is based on a calculation that does not address leakage. The calculation S-CC-MDC-2111 is for loss of Service Water and does not address leakage of the Component Cooling Water System. The time window should account for leakage that would drain the CCW system and make it inoperable. This is the limiting time since the CCW system will continue to cool with the leak until the surge tank is drained. Other examples of problems with timing are the lack of documentation for the timing used. This is noted in HRAs: CIS-XHE-FC-XLCNT, and MSS-XHE-FO-MS10. It should be noted that only a sampling was performed and that this may involve many more HRA analysis. *Discussion: See discussion provided with respect to HR-F2. No impact to ILRT extension request.*
HR-G9	SR Not Met	SC-C3-02	This requirement is not met. *Discussion: Pertains to location of discussion of assumptions; current location is acceptable. Also pertains to discussion of uncertainty. Draft uncertainty information was provided but not reviewed. No impact to ILRT extension request.*
HR-I3	SR Not Met	SC-C3-02	This requirement not met. *Discussion: See HR-G9. No impact to ILRT extension request.*

Table B-6
Assessment of Supporting Requirement Capability Categories for Data Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
DA-A1a	SR Not Met	DA-A1a-01	No discussion of component boundary definition is provided in either the data or systems analysis. Boundaries for unavailability events are not established. Boundary definitions help assure that failures are attributed to the correct component and that calculated failure rates and unavailability values are appropriate. Some component boundaries are discussed in the notes to Appendix A, "Generic (Industry) Failure Data" of the Data Notebook. Note 32 states to "Assume that CCW/RHR HX failure rates apply to TDAFW Pump Bearing and governor jacket coolers", however unless the Salem TDAFW pump has unique features that require this to be modeled separately, cooling to the TDAFW pump is included in the component boundary to the pump in NUREG-6928. *Discussion: As noted previously, information is provided about boundaries in the systems analysis. In the AFW systems notebook this is in the form of listing the major components and interfaces to other systems. This is a documentation issue and will have no impact on the ILRT extension request. The current evaluation may be very slightly conservative. Again, no significant impact on the assessment performed for the ILRT extension request.*
DA-A2	SR Not Met	DA-A2-01	Mean values for failure rates appear in the model, however no uncertainty distributions could be found in the basic events checked. *Discussion: Uncertainty distribution information has been incorporated. No significant impact on the assessment performed for the ILRT extension request.*

Table B-6
Assessment of Supporting Requirement Capability Categories for Data Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
DA-C1	SR Not Met	DA-A1a-01, DA-C1-01	Generic parameter estimates are obtained from recognized sources (principally NUREG/CR-6928). However, no discussion of component boundary definition is provided other than a draft document. In addition, generic unavailability data is used for some SSCs without demonstrating that the data is consistent with the test and maintenance philosophies for the subject plant. *Discussion: Component boundary definitions in the PRA model are consistent with those in the generic data sources (where available – e.g. 6928). Regarding generic unavailability data: Unavailability data is collected for important plant systems (e.g. AFW, HHSI, etc.), but not for unimportant systems (e.g. floor drains). It is appropriate to use collected data for important systems and generic data for less important systems where no plant-specific data is gathered. Documentation issue. No significant impact on the assessment performed for the ILRT extension request.*
DA-C2	SR Not Met	DA-C2-01	Plant-specific data is only collected for MSPI components. The draft data procedure provided requires that plant specific data be supplied for SSCs with RAWs > 2 and F-V's > 0.005. *Discussion: Plant specific data is collected for important plant systems (e.g. AFW, HHSI, etc.), but not for unimportant systems (e.g. floor drains). It is appropriate to use collected data for important systems and generic data for less important systems where no plant-specific data is gathered. No impact to ILRT extension request.*

Table B-6
Assessment of Supporting Requirement Capability Categories for Data Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
DA-C4	SR Not Met	DA-C4-01	Documentation describing the process of evaluating maintenance records was identified in a draft procedure. All failures must be reviewed for applicability to the PRA model and this process should be documented. All plant specific data came from MSPI or the Maintenance Rule, however there was no documentation provided that these failures were reviewed as PRA failures. *Discussion: Plant data were developed from existing plant programs (e.g. MSPI, maintenance rule, etc.) which is also an acceptable approach. Failures from those programs were reviewed to ensure they were also PRA failures. MSPI data are generally appropriate for use in the PRA. Maintenance rule data can overestimate PRA failures. Documentation issue. No significant impact on the assessment performed for the ILRT extension request.*
DA-C5	SR Not Met	DA-C5-01	Documentation describing the process of evaluating failure records other than applying MSPI data directly could not be identified. All failures must be reviewed for applicability to the PRA model. *Discuss: Process details are available in the relevant plant documentation, see response to DA-C4. No impact to ILRT extension request.*
DA-C6	SR Not Met	DA-C6-01	Documentation describing the process of evaluating the number of plant specific demands for standby components could not be identified. Standby components were identified in Table 1 of the Data Analysis Notebook and plant specific demands for some of these components were listed in Appendix B, however the basis for this number of demands was not provided. The draft data procedure states that plant specific data should be estimated by actual counts of hours or demands from logs or counters, use of surveillance procedures to estimate the frequency of demands and run times, or estimates based upon input from the System Engineer. *Discussion: Plant data from existing plant monitoring programs were used wherever possible. In limited instances other sources such as system engineer estimates were used, when precise data were not readily available. This is believed to be reasonable and appropriate. No impact to ILRT extension request.*

Table B-6
Assessment of Supporting Requirement Capability Categories for Data Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
DA-C7	SR Not Met	DA-C7-01	Documentation describing the process of collecting the number of surveillance tests and planned maintenance activities on plant requirements could not be identified. In Appendix C for example CCS MOVs in test and Maintenance were described. The source of the data was listed as Salem 3.2 PRA, however no specific breakdown of the surveillance tests included was provided. The draft data procedure identifies surveillance tests as a source of data. *Discussion: Plant data were developed from existing plant programs (e.g. MSPI, maintenance rule, etc.) which is an acceptable approach. No significant impact on the assessment performed for the ILRT extension request.*
DA-C9	SR Not Met	DA-C9-01	Documentation describing the process of estimating the operational time of standby components from testing was identified in draft procedure. Standby components were identified in Table 1 of the Data Analysis Notebook and operational times for some of these components were listed in the Data Analysis Notebook, however the source of the data was not provided. *Plant data were developed from existing plant programs (e.g. MSPI, maintenance rule, etc.) which is an acceptable approach. No significant impact on the assessment performed for the ILRT extension request.*
DA-C10	SR Not Met	DA-C10-01	Documentation describing the process of reviewing test procedures to determine surveillance test data could not be identified. No specific surveillance tests were discussed in the Data Analysis Notebook. The Systems Analysis Notebooks for specific systems described various surveillance testing, but did not reference surveillance tests by name. *Discussion: Plant data were developed from existing plant programs. Note that the PRA model does not generally differentiate between test unavailability and maintenance unavailability, rather an overall term calculated based on total unavailability is used. No impact to ILRT extension request.*

Table B-6
Assessment of Supporting Requirement Capability Categories for Data Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
DA-C11	SR Not Met	DA-C11-01	Documentation describing the process of using maintenance and testing durations to determine plant specific durations was identified in a draft document. No specific surveillance tests were discussed in the Data Analysis Notebook but MSPI/Maintenance Rule sources were identified. *Discussion: Plant data were developed from existing plant programs (e.g. MSPI, maintenance rule, etc.) which is an acceptable approach. Note that the PRA model does not generally differentiate between test unavailability and maintenance unavailability, rather an overall term calculated based on total unavailability is used. No significant impact on the assessment performed for the ILRT extension request.*
DA-C11a	SR Not Met	DA-C11a-01	Documentation describing the process of how to count maintenance unavailability was not identified. Plant Specific unavailability was only documented for MSPI components which identifies the unavailability for support and frontline systems separately, however it could not be determined that this was the case throughout the model without a specific guidance document. *Plant data were developed from existing plant programs (e.g. MSPI, maintenance rule, etc.) which is an acceptable approach. Documentation issue. Note that the PRA model does not generally differentiate between test unavailability and maintenance unavailability, rather an overall term calculated based on total unavailability is used. No significant impact on the assessment performed for the ILRT extension request.*
DA-C12	SR Not Met	DA-C12-01	While a table of critical hours was provided and the Maintenance Unavailability Table provided in Appendix C appears to address these hours there was no specific documentation or guidance document provided that discusses how maintenance was treated for shared systems. *Discussion: Section 3.1.1 of the data notebook describes explicitly how critical hours were treated for shared systems. Both Tables 2 and 3 show shared system critical hours (labeled as 'C hrs' as discussed in Section 3.1.1). The Gas Turbine Generator and SBO Air Compressor are the only shared systems. As can be seen in the Table in Appendix 3, these are listed as 'C' (common) components, and the 'C' hours are used to calculate the unavailability probability. No impact to ILRT extension request.*

Table B-6
Assessment of Supporting Requirement Capability Categories for Data Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
DA-C13	SR Not Met	DA-C13-01	Coincident unavailability for service water pumps was modeled as shown in Appendix C of the Data Analysis Notebook, however, no overall guidance document could be found to ensure all systems were reviewed for coincident unavailability. *Discussion: Service water is the only potentially important system identified where concurrent unavailability of multiple components might occur and not require a prompt shutdown. Documentation issue. No significant impact on the assessment performed for the ILRT extension request.*
DA-E2	SR Not Met	DA-E2-01	A draft document was provided that documented how to establish component boundaries, how to establish failure probabilities, sources of generic data, etc. This procedure needs to be formalized. *Discussion: Documentation issue. No significant impact on the assessment performed for the ILRT extension request.*
DA-E3	SR Not Met	SC-C3-02	Assumptions were noted in various sections of the Data Analysis Notebook. These need to be gathered into an assumptions section in the notebook. Sources of uncertainty were not discussed in the analysis. *Discussion: See prior discussions of this topic. A draft evaluation of uncertainty was available but not reviewed. No significant impact on the assessment performed for the ILRT extension request.*

Table B-7
Assessment of Supporting Requirement Capability Categories for Internal Flooding Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
IF-A4	SR Not Met	IF-A4-01	Salem internal flooding notebook SA-PRA-012, Revision 0 Appendix A contains a summary of the walkdowns that were performed. The summary includes some of the important flood features. But walkdown sheets containing the details of the walkdowns (spatial information, mitigating equipment such as drains, sumps, doors, wall penetrations, etc.) were not available. *Discussion: Example walkdown sheets were provided but they were not maintained in a separate, reviewed, notebook. This information was and is available. No impact to ILRT extension request.*
IF-B1a	SR Not Met	IF-B1a-01, IF-C4a-01	The buildings and areas that share equipment (e.g., Auxiliary and Turbine buildings) are included in the flood area identifications. However, there was no indication in the documentation that flood sources from Unit 2 can impact Unit 1 and vice versa. *Discussion: This was done. AB-084B scenario is an example. No impact to ILRT extension request.*
IF-B3a	SR Not Met	IF-A4-01	Salem internal flooding notebook SA-PRA-012, Revision 0 Appendix A contains a summary of the walkdowns that were performed. The summary includes some of the important flood features. But walkdown sheets containing the details of the walkdowns were not available. *Discussion: See IF-A4. This information was and is available. No impact to ILRT extension request.*
IF-C1	SR Not Met	IF-C1-01	Propagation paths for areas are defined for highly risk-significant cases only. *Discussion: See response to PRA question #4. Relatively low risk areas were not addressed using the same level of detail as for higher risk areas, which is appropriate. No impact to ILRT extension request.*

Table B-7
Assessment of Supporting Requirement Capability Categories for Internal Flooding Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
IF-C2	SR Not Met	IF-C2-01	Plant design features that have the ability to terminate or contain the flood propagation are not documented for all defined flood areas. *Discussion: Plant design feature information is provided for those areas which could not be shown to be unimportant. Information was not gathered if no possible flood could have any effect. No impact to ILRT extension request.*
IF-C2a	SR Not Met	IF-C2a-01	This is only addressed for the most risk-significant areas. *Discussion: Elsewhere in the report it is indicated that the issue concerns development of automatic and operator actions which could be mitigative for identified flood areas. This was not done for some areas that could be bounded as low risk. See response to PRA question #4. Relatively low risk areas were not addressed using the same level of detail as for higher risk areas. No impact to ILRT extension request.*
IF-C2b	SR Not Met	IF-C2b-01	No discussion of required information is provided for the majority of areas. *Discussion: Concerns development of detailed spatial information for areas which could be bounded as low risk. See discussion for PRA question #4. Relatively low risk areas were not addressed using the same level of detail as for higher risk areas. No impact to ILRT extension request.*
IF-C2c	SR Not Met	IF-C2c-01	The documentation does not discuss spatial orientation for components in those areas not screened. *Discussion: See discussion provided for PRA question #4. Relatively low risk areas were not addressed using the same level of detail as for higher risk areas. No impact to ILRT extension request.*

Table B-7
Assessment of Supporting Requirement Capability Categories for Internal Flooding Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
IF-C3a	SR Not Met	IF-C3a-01	Appendix D of the PRA Internal Flood Evaluation states that "For spray scenarios, however, walkdown observations revealed that Air-Operated Valves (AOVs) and Motor-Operated Valves (MOVs) were of a robust design that would exclude them from being susceptible to water damage. Hence, these components were not automatically failed (PRA event equal to TRUE) for quantification of the CCDP." This is not an adequate basis for determining the susceptibility of these components to flood-induced failure mechanisms per this SR. *Discussion: This was an informed judgment based on empirical observation. This judgment is supported by a paper presented by Lin at the ANS PSA'08 conference ("Insights From the Updates of Internal Flooding PRAs," James C. Lin, ANS PSA 2008 Topical Meeting, Knoxville, TN). Water spray does not generally prevent AOVs and MOVs from operating. It can, but the most probable result is that it will not. Therefore the assumption is appropriate for best-estimate PRA work. No significant impact on the assessment performed for the ILRT extension request.*
IF-C4	SR Not Met	IF-C4-01	The defined flooding scenarios were screened without development of flood rate, source, operator actions. Detailed assessments were only provided for selected high frequency floods. *Discussion: Detailed assessments were provided for those floods which could not be shown by screening to be negligible risk contributors. See discussion provided for PRA question #4. No impact to ILRT extension request.*
IF-C4a	SR Not Met	IF-C4a-01, IF-B1a-01	Documentation of multi-unit scenarios could not be identified. *Discussion: This was considered, see for example flood AB084B. No impact to ILRT extension request.*

Table B-7
Assessment of Supporting Requirement Capability Categories for Internal Flooding Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
IF-D3	SR Not Met	IF-C4-01	This is an extension of F&O IF-C4-01. *Discussion: See response to IF-C4-01. Detailed assessments were provided for those floods which could not be shown by screening to be negligible risk contributors. Available guidance does not indicate that detailed information must be gathered for locations once they are shown not to contribute to flood risk. No impact to ILRT extension request.*
IF-D4	SR Not Met	IF-C4a-01	There is no evidence that flooding in Unit 2 was considered for it affects on Unit 1. *Discussion: This was done. AB-084B scenario is an example. No impact to ILRT extension request.*
IF-E8	SR Not Met	IF-A4-01	Walkdown documentation does not capture this information for all flood areas. *Discussion: Detailed assessments were provided for those floods which could not be shown by screening to be negligible risk contributors. Available guidance does not indicate that detailed information must be gathered for locations once they are shown not to contribute to flood risk. No impact to ILRT extension request.*
IF-F2	SR Not Met	See all IF F&Os	Some documentation elements are missing, as noted in the Internal Flood F&Os. *Discussion: See responses above. No impact to ILRT extension.*
IF-F3	SR Not Met	IF-F3-01	Assumptions are documented in the Flooding Notebook. Parametric uncertainty analysis was done but systemic uncertainty is not addressed. *Discussion: A draft evaluation of uncertainty was available but not reviewed. That and additional uncertainty evaluations performed since now exist. No impact to the ILRT extension request has been identified.*

Table B-8
Assessment of Supporting Requirement Capability Categories for Quantification

SR	Capability Category	Associated F&Os	Summary of Assessment
QU-B5	SR Not Met	QU-B5-01	Creation of different fault tree tops to break circular logic is discussed in the system notebooks, however the documentation is not sufficient to determine whether the logic was broken at the appropriate level to ensure unnecessary conservatisms or non-conservatisms. *Discussion: This is a documentation issue. No impact to ILRT extension request.*
QU-B9	SR Not Met	QU-B9-01	Split fractions and undeveloped events are included in the model. Examples include main Feedwater availability for ATWS (MFI-UNAVAILABLE) and some Unit 2 systems credited for recovery of Unit 1 CAV failure (G2SW22). The derivation of the values for these events is not documented to allow determination that consideration has been given to the impact of shared events. *Discussion: This is a documentation issue. No impact to ILRT extension request.*
QU-D1b	SR Not Met	QU-D1b-01	There is no discussion in the quantification notebook that indicates a review of the results was performed for the purpose of assessing modeling and operational consistency. Also, since the sequences were not quantified, it is difficult to perform this verification. *Discussion: Results reviews and sequence evaluation information is present in the summary notebook and associated documents. Documentation issue, no impact to ILRT extension request.*
QU-D1c	SR Not Met	QU-A4-01	There is no discussion in the quantification notebook SA-PRA-2008-01, Revision 4.1 that indicates this review was completed. *Discussion: Refers to a review of use of recovery events, provision of listing and information about intended application in Quantification Notebook. No significant impact on the assessment performed for the ILRT extension request.*

Table B-8
Assessment of Supporting Requirement Capability Categories for Quantification

SR	Capability Category	Associated F&Os	Summary of Assessment
QU-D4	SR Not Met	QU-D4-01	There is no documentation indicating that a sampling of non-significant accident cutsets or sequences were reviewed to determine they are reasonable and have physical meaning. *Discussion: Documentation issue. No impact to ILRT extension request.*
QU-D5a	SR Not Met	QU-F2-01	This requirement was not met because the importance of components and basic events was not performed. There is no definition of significant contributors to CDF. No documentation of an analysis for significant contributors to CDF. *Discussion: Much of this information is present in the summary notebook and associated documents. Documentation issue, no impact to ILRT extension request.*
QU-D5b	SR Not Met	QU-F2-01	This requirement was not met because the importance of components and basic events was not performed. *Discussion: Much of this information is present in the summary notebook and associated documents. Documentation issue, no impact to ILRT extension request.*
QU-E1	SR Not Met	SC-C3-02	The uncertainty notebook was produced but is not finalized. *Discussion: A draft evaluation of uncertainty was available but not reviewed. No significant impact on the assessment performed for the ILRT extension request.*
QU-E3	SR Not Met	SC-C3-02	The uncertainty notebook was produced but is not finalized. *Discussion: A draft evaluation of uncertainty was available but not reviewed. No significant impact on the assessment performed for the ILRT extension request.*
QU-E4	SR Not Met	SC-C3-02	The uncertainty notebook was produced but is not finalized. *Discussion: A draft evaluation of uncertainty was available but not reviewed. No significant impact on the assessment performed for the ILRT extension request.*

Table B-8
Assessment of Supporting Requirement Capability Categories for Quantification

SR	Capability Category	Associated F&Os	Summary of Assessment
QU-F2	SR Not Met	QU-B3-01, QU-F2-01	This requirement was only partially met as described below: (a) This requirement is met by the system and HRA notebooks. (b) There is a cutset review process description (c) There is no description of how the success systems are accounted for. Since a one top tree is used the software already accounts for this. A statement stating would be satisfactory. The truncation values and how they were determined were documented. The method for applying recovery and how post initiator HFEs are applied was not described. (d) This requirement was met. (e) This requirement was met (f) This requirement was not met since the cutsets per accident sequence were not discussed. (g) This requirement was not met since equipment or human actions that are the key factors in causing the accidents sequences to be non-dominant are not discussed. (h) This requirement was not met since sensitivities were not documented. (i) This requirement was not met since the uncertainty notebook was not finalized. (j) This requirement is not met since there is no discussion of importance. (k) This requirement is not met because there is not list of mutually exclusive events and [their] justification. (l) This requirement is not met because there is no discussion of asymmetries in quantitative modeling to provide application users the necessary understanding regarding why such asymmetries are present in the model. (m) This requirement is met since CAFTA and Forte are being used. Both of these pieces of software are industry standards and therefore no further testing is required. *Discussion: Much of this information is present in the summary notebook and associated documents. Documentation issue, no impact to ILRT extension request.*
QU-F4	SR Not Met	SC-C3-02	The uncertainty notebook has not been approved. *Discussion: A draft evaluation of uncertainty was available but not reviewed. Documentation issue, not impact to the ILRT extension request.*

Table B-8
Assessment of Supporting Requirement Capability Categories for Quantification

SR	Capability Category	Associated F&Os	Summary of Assessment
QU-F6	SR Not Met	QU-F2-01	This requirement was not met since there is no definition for significant basic event, significant cutset, significant accident sequence. *Discussion: Documentation issue, no impact to ILRT extension request.*

Table B-9
Assessment of Supporting Requirement Capability Categories for LERF Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
LE-C8a	SR Not Met	LE-C8a-01	No discussion provided in the documentation related to environment. *Discussion: No credit is taken for equipment operability or operator actions in adverse environments or after containment failure, but none is needed or justifiable. System notebooks (including ABV notebook) provide discussion of equipment operability limits. No impact to ILRT extension request.*
LE-D1b	SR Not Met	LE-D1b-01	No analysis for penetrations, hatches, seals *Discussion: The penetrations, hatches and seals were evaluated. This is a documentation issue only No impact to ILRT extension request.*
LE-D6	SR Not Met	LE-D6-01	The CI model (SA-PRA-005.07) does not provide sufficient information and does not address potential failures due to air locks or other locations. *Discussion: Air locks and other locations were evaluated. This is a documentation issue only. No impact to ILRT extension request.*
LE-F1b	SR Not Met	LE-F1b-01	Other than verifying that the sum of the three end states (INTACT, LATE and LERF) is approximately equal to the core damage frequency, no checks on the reasonableness of the LERF contributors is documented. *Documentation issue, no impact to ILRT extension request.*
LE-F3	SR Not Met	LE-F3-01	LERF uncertainties are not characterized consistent with the requirements in Tables 4.5.8-2(d) and 4.5.8-2(e). *Discussion: A draft evaluation of uncertainty was available but not reviewed. No impact to the ILRT extension request.*

Table B-9
Assessment of Supporting Requirement Capability Categories for LERF Analysis

SR	Capability Category	Associated F&Os	Summary of Assessment
LE-G4	SR Not Met	SC-C3-01, SC-C3-02	Assumptions are embedded in the documentation rather than captured in a specific section. Sources of uncertainty are addressed in a draft evaluation using guidance from draft EPRI report, "Treatment of Parameter and Model Uncertainty for Probabilistic Risk Assessments." No documentation of sensitivity studies was found. *Discussion: Documentation / location of information issue, no impact on ILRT extension request.*
LE-G5	SR Not Met	LE-G5-01	Limitations in the LERF analysis that would impact applications are not documented. *Discussion: Documentation issue, no impact on ILRT extension request.*
LE-G6	SR Not Met	LE-G6-01	A definition for significant accident progression sequence is not documented. *Discussion: Documentation issue, no impact on ILRT extension request.*

Table B-10
Assessment of Supporting Requirement Capability Categories for Configuration Control

SR	Capability Category	Associated F&Os	Summary of Assessment
MU-B4	SR Not Met	MU-B4-01	There is no reference to the requirement for a PRA peer review for upgrades. *Discussion: Documentation issue, no impact to ILRT extension request.*
MU-C1	SR Not Met	MU-C1-01	There is no reference to a review of the cumulative impact of pending changes. *Discussion: Documentation issue, reviews are performed. No impact to ILRT extension request.*

The remaining questions refer to entries in Table A.2-1 in Attachment 3 on key findings from the Salem PRA 2008 peer review:

3. The fourth issue is that the Initiating Events Notebook indicates that in the Salem Generating Station Experience and Trip Review, there was potentially inadequate consideration of (1) events other than at-power operation, and (2) events during controlled shutdown, which could result in the exclusion of valid initiating events. The impact of this issue is assessed as "non-significant" because a review of non-power events was included. Clarify whether this review of non-power events was completed (but not documented) for the PRA, or whether this review was completed for the current application of extending the Type A ILRT interval.

   PSEG Response
   This issue relates to SR IE-A5. See Table B-1 above.

   This resulted from unclear wording in the initiating events notebook. Other-than-at-power events and events involving controlled shutdown were evaluated for applicability to at-power initiating events. Therefore there should be no impact to the ILRT extension request.

4. The fifth issue involves the screening of internal flood scenarios (non-high frequency) without development of flood rate, source, and operator actions. The impact of this issue is assessed as "no impact." In PSEG's severe accident mitigation alternative (SAMA) analysis supporting its August 18, 2009, license renewal application for Salem, floods are shown to be the fourth leading initiator contributing to core damage frequency (CDF) and large early release frequency (LERF). Describe the approach used, and basis for, screening internal flood scenarios.

   PSEG Response
   The internal flood analysis did quantify all postulated scenarios that were not screened on the basis of Supporting Requirement IFSN-A12 within the ASME PRA Standard (ASME/ANS RA-Sa–2009a). This is equivalent to SR IF-C5 in ASME-RA-SC-2007. For those quantified scenarios, a conservative approach was initially used that considered all PRA-modeled SSCs to be damaged due to a flood originating or propagating into a particular flood area and a conditional core damage probability (CCDP) computed. This CCDP was then multiplied by the flood initiating frequency to estimate the core damage frequency (CDF). If the CDF for a given flood scenario was sufficiently low, e.g., less than about 0.1% of the nominal internal events CDF, then no further refinement was deemed necessary. However, if first estimates of the core damage frequencies for that compartment proved too pessimistic, the affected area of the plant was analyzed in greater detail to take into account spatial effects, specific flooding flow rates, operator actions, drainage pathways, etc. Hence, the justification for more detailed modeling of certain flooding scenarios was aimed at removing some of the conservatism of the methodology, while at the same time providing a realistic basis for not assuming complete failure of all scenario-specific equipment due to a credible flooding event.

   In reviewing the CDF results for the flood scenarios reported in the Internal Flood Analysis documentation, many of the scenarios were less than about a tenth of a percent of the nominal CDF value. Collectively, these scenarios contributed a sum total of about 0.6% of the nominal CDF and were excluded from any further detailed analysis. Hence, although there were internal flood scenarios where detailed modeling was not

performed, they were not "screened" from quantification. These scenarios were merely excluded from any further detailed analysis that would involve hydraulic modeling of flood areas, which would involve development of specific flooding flow rates and height of water as a function of time for various flood areas. That is, there was little benefit to be gained from performing time-intensive detailed evaluations of scenarios that proved to be relatively insignificant in comparison to other internal flood scenarios. Had more detailed evaluations been performed, the effect would have been a reduction in the overall contribution to CDF.

5. The impact of the sixth issue involving station blackout (SBO) accident sequence success paths is assessed as "non-significant," due to the "very small" likelihood of relevant sequences. In PSEG's SAMA analysis supporting its August 18, 2009, license renewal application for Salem, Loss of Offsite Power is shown as a dominant initiator contributing to CDF and LERF. Provide an order of magnitude estimate of the frequency of SBO sequences, with and without successful offsite power recovery.

   PSEG Response
   Allowing for potential recovery of offsite power, SBO sequences contribute approximately 8E-6/yr to CDF. If the potential for recovery of offsite power was not credited, SBO sequences would contribute approximately 4E-5/yr to CDF.

6. The description of the eighth issue related to data included sources of uncertainty not being discussed in the analysis. The impact of this issue is assessed as "no impact" due to the issues being related to documentation only, but it is not clear whether sources of uncertainty were considered. Clarify whether and how sources of uncertainty were considered.

   PSEG Response
   Sources of uncertainty were considered prior to the peer review using a draft form of the guidance in EPRI-TR1016737, "Treatment of Parameter and Modeling Uncertainty for Probabilistic Risk Assesment." The notebook documenting the review was in draft form at the time of the peer review and the peer review team declined to examine or credit it. Potential significance of uncertainties was considered in the analysis which supports the ILRT extension, which noted that there were no sources of uncertainty which would change the conclusions of the risk assessment.

References

1. Letter from Robert C. Braun (PSEG Nuclear LLC) to USNRC, September 21, 2009 (ADAMS Accession No. ML092730362)

2. U.S. Nuclear Regulatory Commission e-mail dated January 21, 2010, Salem Nuclear Generating Station, Unit No. 1, Draft Request for Additional Information (TAC No. ME2258), ADAMS Accession No. ML090120593

3. Regulatory Guide 1.54, dated June 1973, "Quality Assurance Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants."

4. ANSI N101.4-1972, "Quality Assurance for Protective Coatings Applied to Nuclear Facilities."

5. Regulatory Guide 1.54, Revision 1 dated July 2000, "Service Level I, II, and III Protective Coatings Applied to Nuclear Power Plants."

6. Response to Request for Additional Information Concerning the License Amendment Request for a One-Time Integrated Leakage Rate Test Extension, Letter from Mr. C. H. Cruse (Calvert Cliffs Nuclear Power Plant) to NRC Document Control Desk, Docket No. 50-317, March 27, 2002.