TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
5N 157B Lookout Place

JUL 02 1987

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

In the Matter of	)	Docket Nos. 50-327
Tennessee Valley Authority	)	50-328

SEQUOYAH NUCLEAR PLANT (SQN) - MODERATE ENERGY LINE BREAK EVALUATION

TVA identified the restart corrective actions for the moderate energy line break flooding studies in section III.15.2 of Volume 2 of the Sequoyah Nuclear Performance Plan. Two significant condition reports, SQN NEB 8520 and SQN NEB 8617, were referenced in the discussion of this problem. NRC requested by telephone that copies of these significant condition reports be provided in order to complete their review of this issue. Copies of the significant condition reports and the associated calculation are enclosed. These documents outline the problem, the methodology for resolution, and the proposed corrective actions.

If you have any questions concerning this matter, please telephone M. J. Burzynski at (615) 870-6172.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

R. Gridley

R. Gridley, Director
Nuclear Safety and Licensing

Enclosures
cc: see page 2

A030
1/1

U.S. Nuclear Regulatory Commission JUL 02 1987

cc (Enclosures):
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ENCLOSURE

SEQUOYAH NUCLEAR PLANT

MODERATE ENERGY LINE BREAK DOCUMENTS

1. SCR SQN NEB 8520 - Significant condition report for pipe break flooding outside containment

2. SCR SQN NEB 8617 R1 - Significant condition report for pipe break flooding outside containment

3. SQN-SQS4-126 - Moderate Energy Line Break Flooding Evaluation Report, SL-4424

QA Record

SIGNIFICANT CONDITION REPORT

RIMS Accession Number → B45 [illegible] 952

A Identification and Documentation (Must complete within 8 days)

1 Project/Plant and Unit: Sequoyah Nuclear Plant Units 1 and 2

2 Date: 12/11/85

3 SCR Number and Rev: SCRSONNEB8520

4a Preparer and Organization: Edward Sheehy/OE-NEB-OSG7

4b QC NCR No./Deficiency Report (For QC Use Only)

5a Contract Number: N/A

5b Vendor: N/A

5c Requirement Violated: Evaluation not performed of pipe break flooding efforts outside of containment

5d Source of Requirement: SQN-DC-V.1.1.11 (Section 6.3.B.2)

5e Description of Condition: There is inadequate documentation to conclude that the efforts of flooding after a pipe break in category I structures outside of containment is acceptable.

(3)

5f System: N/A

5g UN(D)/Component Code (For OE Use Only): N/A

6 Date of Occurrence: Oct. 1973 [X] Estimated [ ] Actual

7 Method of Discovery: Gen Implication Eval of SCR SCRWBNNEB8523

8 Significant Condition Adverse to Quality → [X] Yes [ ] No

9 Organization to Determine Corrective Action: NUC PR

10a If significant, NEB-NLS Contact: R. T. Holliday

10b Date: 12/11/85

10c Contacted by: D. Y. Justice

11 Is a Potential Generic Condition Evaluation Required? [ ] Yes [X] No

If yes, initiate Attachment 5 of OEP 17 and list Attachment 5 RIMS Accession No.: See B45851129278

12 Branch Chief or QC Quality Manager (Distribute as required—see block 30.): RCWain for J.A. Raulston 12-12-85

B Determination of Corrective Action (Must complete within 60 days)

13 Root Cause: This deficiency is due to a failure to properly assign and track this task within the responsible engineering organization. Although several engineers were cognizant of the requirement, the failure to enter the task into the task assignment logs resulted in the failure to assign the task and schedule a date for completion. This occurrence is considered to be an isolated design oversight.

14a Corrective Action: This item is being tracked by ONP as SCRSONNEB8520.

14b Coordination Review of OE Work (Provide initials)

14c Scheduled Date of Completion

14d Action Required to Prevent Recurrence (ARPR): NEB will reiterate to their supervisors the need to ensure that all identified tasks are properly assigned and tracked by existing mechanisms. The existing assignment and tracking mechanisms are considered to be adequate to ensure that identified tasks are not overlooked. No further actions to prevent recurrence are considered necessary.

(cont'd p. 2)

TVA 10700 (OE 8-85)

E15345.04

8703310061

SCR Number and Revision [illegible]

[illegible]

[17] Scheduled Completion Date of OE Action → 3/14/86

[35] Does the corrective action deviate from a design/accidence requirement? ☐ Yes ☒ No

[17] Design Criteria Document Number: N/A

[18] Exception Request Number: N/A

[19] Is an ECN required?
☐ Yes
☒ No
If yes, ECN number

[20] Impact on Schedule?
☐ Affects project completion schedule
☐ Affects schedule of related activities
☒ No impact

[21] Review
☐ Design Verification
☒ Concurrence with ARPR as Stated Above
☐ Other

Review Signature and Date: DRW CHRalston 2/10/86

[10] Approval Signature and Date (Distribute as required. See Block 30.)
John J Conway for JAR 2/11/86

RIMS Accession Number: B45 851

B. Determination of Corrective Action (Continued)

FOR OE USE

FOR QC USE

[22] Is it a generic condition? ☐ Yes ☐ No

If yes, describe.

[23] Prepared and Date

[24] Supervisor and Date

[25] ARPR Recommended By and Date

[26] ARPR Approved By and Date

[27] Concurrence of Designated Quality Reviewer for ARPR and Date (Distribute as appropriate. See block 30.)

RIMS Accession Number

[28] Remarks

John A. Raulston's memorandum to Those listed dated March 10, 1986 (B45 860410 255), was written to stress the importance to all NEB managers that they properly identify, assign, and track all significant tasks.

☐ See Continuation Sheet

C. Closure

[29] All OE/QC Action Complete →

Signature, Organization, and Date: [illegible] 3/11/86

[30] Indicate distribution with a check.

- ☐ RIMS, SL26 C-K
- ☐ QC Site Dedicated Data Base
- ☒ NEB-NLS
- ☒ NSRS
- ☒ OE Project Manager
- ☐ QC Project Manager
- ☐ Chief, QMS
- ☐ OE Manager
- ☐ NEB-CMS (for ASME Code Items)
- ☐ NRC Resident Inspector
- ☐ QC-QAB, Knoxville
- ☐ Records Storage Facility
- ☐ ANI (For Code Items Only)
- ☐ QC-QAB Site
- ☒ E. J. Shrushy, WBN A10 C-K

RIMS Accession Number: B45 860312 851

SIGNIFICANT CONDITION REPORT
COMPLETION VERIFICATION SHEET

Significant	
Yes	No
X	

Reportable	
Yes	No
X	

SCR Identifier: SQN NEB 8520

A. Have any analyses, contracts, memos, etc., requiring OE work been generated? [X] Yes [ ] No
If yes, list in C below.

B. Have all ECNs related to the SCR been issued? [ ] Yes [ ] No [X] N/A
If yes, list in C below.

C. Documents related to the SCR (ECN, analyses, memos, contract number, etc.)

Document	Completion Date	Reference or Accession Number
Memo from GAR to all NEB Mgs for Action Required to Prevent Recurrence	3/10/86	B45 860310 254

D. Is action by an organization outside OE required? [X] Yes [ ] No
Organization Tracking Number SCR SQN NEB 8520

E. Has all necessary OE information been transmitted to an organization outside OE to enable the completion of work required? [ ] Yes [ ] No [X] N/A
If yes, list in C above

F. Is all OE action complete? [X] Yes [ ] No

G. Remarks
Refer to H. B. Rankin's memo to J. P. Vineyard (SQN 851218 889) dated December 19, 1985.

Prepared	Reviewed by and Date
Richard C. Jenkins	B. K. Williams

TVA 1070 A (OE 4-85)

SIGNIFICANT CONDITION REPORT

RIMS Accession Number ➡ B25 '87 0303 038

A. Identification and Documentation (Must complete within 8 days.)

1 Project/Plant and Unit: Sequoyah Nuclear Plant Units 1 & 2

2 Date: MAR 0 3 1987

3 SCR Number and Rev.: SCRSQNNEB8617(R1)

4a Preparer and Organization: E. J. Cheehy, DNE-NEB

4b NU CON NCR No./Deficiency Report (For NU CON Use Only):

4c ASME Code: ☐ Yes ☒ No

5a Contract Number: NA

5b Vendor: NA

5c Requirement Violated: Safe shutdown must not be prevented by flooding effects associated with pipe break event

5d Source of Requirement: SQN-DC-V-1.1.11 (Sections 4.1 and 6.4.3)

6a Description of Condition:

Based upon Sargent and Lundy and TVA studies (findings in attached report) moderate energy line breaks (MELBs) have been identified that prevent safe shutdown of the plant as required by SQN-DC-V-1.1.11.

7 System: NA

8a UNID/Component Code (For ONE Use Only): NA

8 Date of Occurrence: October 1973 ☒ Estimated ☐ Actual

8b Method of Discovery: Study undertaken as result of SCRSQNNEB8520

9 Significant Condition Adverse to Quality ➡ ☒ Yes ☐ No

10 Organization to Determine Corrective Action: DNE-NEB

10a If significant, NEB-NLS Contact: R. T. Holliday

10b Date: 8/15/86

10c Contacted by: D. Y. Justice

11 Is a Potential Generic Condition Evaluation Required? ☐ Yes ☒ No — If no, describe in block 28.

If yes, initiate Attachment 5 of NEP-9.1 and list Attachment 5 RIMS Accession No.:

12 Branch Chief/Project Engineer/DNQA Quality Site Manager (Distribute as required—see block 30.) (WLL)WNH

B. Determination of Corrective Action (Must complete within 60 days.)

13 Root Cause:

See Attachment 1.

14a Corrective Action:

See Attachment B

~~THIS IS A RESTART ITEM.~~ PMH 4/2/87

Corrective actions required for restart are identified in attachment B section 1.

Corrective actions delayed till after restart are identified in attachment B section 2.

14b Coordination Review of DNE Work (Provide initials): [illegible] ILK RCW

14c Scheduled Date of Completion:

15a Action Required to Prevent Recurrence (ARPR):

ARPR previously specified on SCRSQNNEB8520.

(cont on p. 2)

SCR Number and Revision

B. Determination of Corrective Action (Continued)

FOR DNE USE

[14a] ARPR (continued)

Note: Corrective Actions not required for restart are specifically identified

[14b] Scheduled Completion Date of DNE Work ⇒ Restart

[15] Does the corrective action deviate from a design criteria requirement? ☐ Yes ☒ No

[17] Design Criteria Document Number N/A

[18] Exception Request Number N/A

[19] Is an ECN required?
☒ Yes — If yes, ECN numb rs 6300 LATER FOR 7407 others will be issued later.
☐ No

[20] Impact on Schedule?
☒ Affects project completion schedule
☒ Affects schedule of related activities
☐ No impact

[21a] Verification of Adequacy and Accuracy of Blocks 13-20 Above ⇒ Signature and Date H.G. O'Brien/DMH 4/1/87

[21b] Approval Signature and Date (Distribute as required - See Block 30.) V.A. Bianco 4/2/87

RIMS Accession Number B25 '87 0403 042

FOR NU CON USE

[22] Is it a generic condition? ☐ Yes ☐ No QA Record

If yes, describe.

Adverse to

[23] Preparer and Date

[24] Supervisor and Date

[25] ARPR Recommended By and Date

[26] ARPR Approved By and Date

[27] Concurrence of Designated Quality Reviewer for ARPR and Date (Distribute as appropriate--See block 30.)

RIMS Accession Number

C. Closure

[28] Remarks

☐ See Continuation Sheet

[29] All DNE/NU CON Action Complete ⇒ (Attach Completion Verification Sheet)

Signature, Organization, and Date

[30] (If needed, attach a separate sheet for additional distribution.)

Indicate additional distribution with an "X".

- ☒ RIMS, SL 28 C-K
- ☐ NU CON Site Dedicated Data Base
- ☒ NMRG
- ☒ DNE Project Engineer
- ☐ NU CON Project Manager
- ☐ Manager, Engineering Assurance
- ☐ Director of DNE
- ☐ NEB-CMS (for ASME Code Items)
- ☐ Director of DNQA
- ☐ NRC Resident Inspector
- ☐ Director of NU CON
- ☐ Records Storage Facility
- ☐ ANI (For ASME Code Items Only)
- ☐ DNQA Site Quality Manager
- ☒ Preparer

RIMS Accession Number

A combination of inadequately specified interdivisional responsibilities and lack of visibility of the need to perform the analysis. More specifically the pipe break analysis report identified the need for the flooding study via a single sentence which read ". . . shall be evaluated for jet impact and environmental effects. . ." (see section 5.2, CEB-72-22). No specific mention was made of flooding. As a result, CEB, the lead organization for pipe break analysis, evaluated jet and temperature affects of MELBs. They did not evaluate flooding affects as NEB had via informal agreement accepted the responsibility for these. As issued CEB-72-22 appeared to be complete, however, the flooding evaluation either was not performed or insufficiently documented. The omission of MELB flooding was not recognized until a documentation upgrade to assure compliance with environmental qualification requirements discovered the oversight.

ATTACHMENT TO SCR SQN NEB8617 (R1)
CORRECTIVE ACTIONS FOR MELB FLOODING

Purpose

The purpose of this report is to provide an updated listing of all corrective action required to mitigate moderate energy line breaks (MELBs). It also identifies which of these corrective actions must be completed prior to restart and which may be delayed into the next fuel cycle (cycle 4). This report supersedes all previous memorandums on this subject (i.e., reference 2 and it's reference and reference 3).

Recommendations/Corrective Actions

The revised recommendations from the Sargent and Lundy Engineers (S&L) flooding evaluation for MELBs (reference 1) are given in Attachment A. Attachment B defines the complete set of corrective actions that remain to be implemented to address these recommendations. Corrective actions that have already been implemented are not listed in Attachment B. The corrective actions are divided into actions required for unit restart and post restart items. Justifications for decoupling the post restart items are given in Attachment C of the Engineering Report. The post restart items should be addressed as soon as practical. Corrective action (if any) needs to be completed prior to the startup for fuel cycle 5.

Additional corrective actions may be identified when S&L issues the revised power system analysis portion of the MELB flooding evaluation.

The results of the corrective action are to be documented in either (1) a QIR, if appropriate, or (2) a memorandum to H. L. Jones with copies to RIMS and H. G. O'Brien. This will then be referenced in a summary report which will document all corrective actions as indicated in Attachment A.

References

1. Sargent and Lundy Report SL-4424, Moderate Energy Line Break Flooding Evaluation revision dated August 29, 1986 (B45 861217 218)

2. D. W. Wilson's memorandum to Those listed dated October 3, 1986 (B25 861003 023)

3. D. W. Wilson's memorandum to H. L. Abercrombie dated September 10,1986 (B25 860910 006)

4. D. W. Wilson's memorandum to SQEP Files dated December 12, 1986 (B25 861212 008)

5. D. W. Wilson's memorandum to DNE Files dated October 14, 1986 (B25 861014 001).

DNE1 - 35
NEB 1/29/87

Section 7

CONCLUSIONS AND RECOMMENDATIONS

The ability to achieve safe shutdown was demonstrated for postulated MELB flooding events provided the following recommendations are implemented:

1. TVA Test Procedure, SL-129, "ECCS Injection Pump Operability," should be revised to include the requirement for both Division A and Division B safety injection pump cubicle doors to be open during functional testing of either pump. This is only required during surveillance testing of the safety injection pumps and not during plant-wide SI signal tests. This requirement ensures that design basis MELB flood loads in these cubicles are less than the allowable live loads provided by TVA.

2. The auxiliary building/turbine building and control building/turbine building wall should be flood protected to elevation 706 feet 0 inches.

3. HPFP lines in Zones 749.0-A6, 749.0-A7, 749.0-A10, and 749.0-A11 should be shown to be equivalent to Seismic Category I(L) Pressure Boundary Retention. This may require sprinkler head modifications.

4. Conduit containing cables required for MELB safe shutdown that are located below MELB flood levels should be sealed. Alternatively, the cables may be shown to be qualified for submergence.

5. Conduit containing cables connected to safe shutdown power supplies that are located below MELB flood levels in areas affected by borated water should be sealed. Alternatively, the cables may be shown to be qualified for submergence.

6. Revise the protective device settings for the following main circuit breakers in accordance with the recommendations contained in Sargent & Lundy Calculation No. SQN-EPS-001-1: R

Board	Breaker Location
C&A Building Vent Board 1A1-A	480-V Shutdown Board 1A1-A
C&A Building Vent Board 1B1-B	480-V Shutdown Board 1B1-B
C&A Building Vent Board 2A1-A	480-V Shutdown Board 2A1-A

7. Verify the structural adequacy of walls and floors in Zones 669.0-A13, 669.0-A16, 714.0-A7, and 714.0-A8 for the flood levels provided in NSLD Calculation 3C[illegible]-0686-001, Revision 3.

8. Flooding in the reactor building annulus must be limited to 2 inches by providing free flow in the drain system or modification to the detection and isolation system.

9. The test return header to the refueling water storage tank and certain component cooling system piping in Zones 714.0-A7 and 714.0-A8 are assumed to meet the crack exclusion criteria. R

10. Spurious operation of associated equipment that might prevent safe shutdown was not evaluated in this report.

PROGRAM FOLLOWUP

Sargent & Lundy recommends that TVA summarize implementation of the above recommendations through issuance of a TVA calculation "MELB Flooding-Summary of Corrective Actions."[7] This calculation will document corrective actions taken by TVA to ensure that the intent of the Sargent & Lundy recommendations is met.

ATTACHMENT B
SEQUOYAH NUCLEAR PLANT MELB FLOODING - ACTION ITEMS

The action items for the corrective actions have been revised and renumbered from those in reference 2. The recommendation numbers correspond to those in Attachment A.

This attachment reflects a decision to (1) stop work on the "active" approach for turbine building flooding and (2) implement the "passive" approach of sealing the control and auxiliary boundaries for turbine building flooding to elevation 706. These two alternative approaches are described in reference 2. After restart, EEB will determine which of the parallel efforts on conduit sealing/cable submergence in actions items 2.2.2 and 2.2.3 will be pursued.

The revision of the protective device settings per recommendation 6 is a generic issue that is broader than MELB events. This will be handled separately. The protective devices for C&A Building Vent Boards 1A1-A and 2A1-A are being addressed in SCR SQN EEB 86124 R0. The revision of the protective device settings for C&A Building Vent Board 1B1-B is an enhancement and does not involve an SCR or PIR.

1. ACTION ITEMS REQUIRED BEFORE UNIT 2 RESTART

1.1 Mechanical Discipline Action Items

1.1.1 Turbine Building Flooding - Barrier Integrity - (Recommendation 2) Close the drain path from the turbine building to the control building as defined in J. C. Key's memorandum to V. A. Bianco dated December 17, 1986 (B25 861217 005). Assure that the current sealing provisions of the doors potentially subjected to turbine building flooding meets the design.

1.2 Electrical Discipline Action Items

1.2.1 Turbine Building Flooding - Barrier Integrity - (Recommendation 2) - Seal conduit PL 3057 in accordance with existing drawing requirements as defined in C. R. Brimer's memorandum to H. G. O'Brien dated January 26, 1987 (B25 870126 001) (reference Work Request WR B218260).

1.2.2 Flooding Electrical Equipment on Elevations 734 and 749 - Expand the evaluation in QIR SQN EEB85003 (B25 850701 002) to verify that the electrical equipment in all of the electrical boards on elevations 734 and 749 are above the MELB flood levels defined in the flood level calculation SQN-SQS4-056 (B45 870106 478).

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NEB 1/3/87

1.3 Civil Discipline - Action Items

1.3.1 Turbine Building Flooding - Barrier Integrity - (Recommendation 2) - Assure that existing sealing of turbine building to control building hatch cover at El. 685 is restored to design condition (reference Work Request B208207).

Nuclear Discipline Action Items

Review of Unimplemented ECNs - Update the previous review of unimplemented ECNs to determine if subsequent ECNs impact the flooding evaluation.

Plant Manager's Office Action Items

Annulus Flooding - (Recommendation 8) - Develop an instruction to provide operating surveillance of the annulus drain sump alarm system (associated with LS-40-12A and LS-40-12B). Develop provisions for inspection of annulus for flooding if the alarm system is inoperable. Revise system operation instructions SOI-55-1-1M15 and SOI-55-2M15 to add an action to open valve 77-920 to drain the annulus sump to the auxiliary building passive sump. The time margins for inspection if the system is inoperable and to open valve 77-920 is about 4 hours. These provisions may be discontinued upon completion of action item 2.1.3.

2. POST RESTART ACTION ITEMS

2.1 Mechanical Discipline Action Items

2.1.1 Turbine Building Flooding - Barrier Integrity - (Recommendation 2) Implement improved sealing of mechanical penetrations in control and auxiliary building boundaries as defined in part of ECM L6790, and J. C. Key's memorandum to SQEP Files dated October 1, 1986 (B25 861001 064). Improve the discharge path and capabilities of the control building sump pumps for turbine building flooding conditions. Add a sump pump (if required) to the south mechanical equipment room, elevation 669 in the turbine building. Provide the information on the barrier leakage during turbine building flooding as requested in QIR NEB86244 (B45 861126 252). Obtain supporting information as needed.

2.1.2 HPFP Seismic 1(L) Capability - (Recommendation 3) - Document that the HPFP lines in zones 749.0 -A6, -A7, -A10, and -A11 will not have a loss-of-pressure boundary in an earthquake. The HPFP modifications related to these zones as defined in ECN L6770 and J. C. Key's memorandum to SQEP Files dated October 1, 1986 (B25 861001 064), are field completed.

2.1.3 Annulus Flooding - (Recommendation 8) - Develop methods of providing free flow in drain system similar to WBN. (A possible alternative if this approach is not practical is to upgrade the flood alarm system - see action item 2.2.5).

2.2 Electrical Discipline Action Items

2.2.1 Turbine Building Flooding - Barrier Integrity - (Recommendation 2) - Perform the electrical penetration sealant modification for the conduits entering the control/auxiliary building from the south mechanical equipment room elevation 669 in the turbine building as defined in ECN 6828. Document the adequacy of electrical penetrations for turbine building flooding to elevation 706 for the "passive" approach and quantify any estimated leakage. (Reference Wyle Test Reports No. 17333-01 and -02.)

2.2.2 Cable Submergence - (Recommendations 4 and 5) - Develop an engineering justification that cables will operate satisfactorily under MELB submergence conditions. See inputs from reference 5, S&L (B45 860905 218), SQN EQP, and WBN EQP. Document the justification. This is an alternative to action item 2.2.3.

2.2.3 Conduit Sealing - (Recommendations 4 and 5) - Seal the conduits for (1) cables required for MELB safe shutdown which are located below the MELB flood levels and (2) cables connected to safe shutdown power supplies that are located in areas affected by borated water. This should be combined to the degree practical with the conduit sealing for the flooding from high energy line breaks (HELB) to resolve SCR SQN EQP8621. EQP has conducted testing of conduit couplings for MELB conditions and the additional field inspections, or verifications, to identify the conduits below MELB flood levels. EEB has conducted more formal testing of the conduit coupling and condulet sealing (see Wyle Test Reports No. 17833-01 and -02). If there are large number of conduits involved, it may be cost effective for NEB to arrange for S&L assistance in reducing the set below the size of the (1) S&L safe shutdown set of August 12, 1986, and (2) set of cables connected to safe shutdown power supplies that are located in areas affected by borated water. If problem areas arise where the flood depth or duration exceeds the MELB conduit coupling test conditions, (such as in the UHI zone), NEB can assist in developing alternate approaches (such as curbs, door modifications, etc.). Document the adequacy of the conduit sealing. This is an alternative to action item 2.2.2 (see reference 5).

2.2.4 Conduits Acting as Water Pipes - Evaluate the TVA concern on the acceptability of water, which may leak through fittings on flooded conduits, being routed via the conduit to essential equipment at other locations. These conduits are being sealed or rerouted for the MELB effort. S&L did not consider this failure mechanism in their study. Seal the conduits if needed. Document the resolution of this concern.

2.2.5 Annulus Flooding - (Recommendation 8) - Upgrade the annulus drain sump alarm system if required. See action item 2.1.3.

2.3 Civil Discipline - Action Items

2.3.1 Turbine Building Flooding - Barrier Integrity - (Recommendation 2) - Provide the information on the barrier leakage during turbine building flooding as requested in QIR NEB86242 (B45 861126 253).

2.4 Nuclear Discipline Action Items

2.4.1 Turbine Building Flooding - (Recommendation 1) - Evaluate estimated inleakages through the control and auxiliary building boundaries to determine if these are within the design capability of the sump and sump pumps. Develop additional methods of handling the inleakage if needed.

2.4.2 Evaluate Unintended (Spurious) Operations - (Recommendation 10) - Evaluate unintended operation per section 5.5 of Project Instruction PI-SQ-5 in reference 1.

2.4.3 Isolation Valves with Power Removed - Develop methods of addressing the use of motor operated valves with power removed for isolation of pipe breaks in a timely manner. See punch list item 1 in the system isolation calculation, SQN-SQS4-055 (B45 870106 426).

2.4.4 Non-Seismic Piping Evaluation - The analysis in section 6.4 (page 25), and Appendix B of the safe shutdown analysis calculation, SQN-SQS4-057 (B45 870106 427), needs to be expanded from the MELB safe shutdown set of equipment to the full set of Seismic Category I equipment per section 7.1 of the project instruction PI-SQ-5 in reference 1.

2.4.5 Backflow Through Drains - The treatment of backflow from higher floors through drains into lower floors in Appendix H in the flood level calculation, SQN-SQS4-056 (845 870106 428) will be expanded per item 1 in the punch list for this calculation.

2.4.6 Revision of MELB Calculations - The calculations will be revised to address the punch list items and the unverified assumptions. The more significant items and assumptions are listed as separate action items in this listing. The use of any non-QA inputs such as telecons will be upgraded to QIRs if needed.

2.4.7 Addition of Flood Levels to Environmental Drawing - Add the MELB flood levels to environmental data drawing series 47E235.

2.4.8 Input to Operations - Provide input to ONP-SDO for their use for either (1) procedures, (2) training, and/or (3) background. This will be design output (or functional information output).

2.4.9 Summary of Corrective Actions - Document the final corrective actions in a calculation that is referenced in the summary report as indicated in Attachment A.

2.4.10 Licensing Documentation - Revise FSAR Section 3.6 to reference flooding study in next FSAR revision. It has been determined that a separate submittal to NRC is not needed.

2.5 Plant Manager's Office Action Items

2.5.1 Safety Injection Test Mode - (Recommendation 1) - Revise test procedure per recommendation 1 in Attachment A.

2.5.2 Surveilance on Flood Alarms - Develop a procedure for surveilance testing of the turbine, auxiliary and reactor building flood alarm (detection) system, turbine building station sump level alarm, etc. See TVA commitment in section 6.3.2.11 of the FSAR.

QA Record

TVA 10697 (DNE-OA--86) DNE CALCULATIONS

Title	Plant/Unit
MODERATE ENERGY LINE BREAK FLOODING EVALUATION REPORT, SL-4424	SQN/1 & 2

Preparing Organization	KEY NOUNS (Consult RIMS Descriptors List)
DNE/NEB/SQS4	MELB, Sargent & Lundy, Pipe Ruptures, Flooding
Branch/Project Identifiers	Each time these calculations are issued, preparers must ensure that the original (RO) RIMS accession number is filled in.
SQN-SQS4-126	Rev (for RIMS' use) RIMS ACCESSION NUMBER
	RO B45 '87 0521 426
Applicable Design Document(s)	R
N/A	R
SAR Section(s) / UNID System(s)	R
3.6 / N/A	

Revision 0	R1	R2	R3	Safety-related? Yes (x) No ( )
ECN No. (or indicate Not Applicable)				Statement of Problem
N/A				
Prepared Richard C. Carlson				Document an organized overview of work performed by Sargent & Lundy to evaluate moderate energy line break (MELB) events.
Checked C. R. Morgan				
Reviewed David G. Renfro				
Approved Henry B. O'Brien				
Date 5-20-87				
USE FORM TVA 10534 IF MORE SPACE REQUIRED — List all pages added by this revision				
List all pages deleted by this revision				
List all pages changed by this revision				

ABSTRACT [These calculations contain an unverified assumption(s) that must be verified later. Yes (X) No ( )]

Sargent and Lundy (S&L) has prepared a comprehensive safety evaluation of MELB flooding for SQN composed of evaluation criteria, data packages, calculations, and an evaluation report. This calculation documents the evaluation report, Moderate Energy Line-Break Flooding Evaluation Report, SL-4424, revision 2 dated March 6, 1987. The S&L report summarizes work performed by S&L to evaluate MELB flooding events for SQN and serves as a guide that shows the relationships among the supporting calculations produced in the evaluation. The design criteria for the evaluation are provided in Appendix A of SL-4424. Section 3 of SL-4424 summarizes the methodology, the major elements, and the individual calculations in the evaluation. Section 3 of SL-4424 indicates that the evaluation demonstrates the ability to achieve safe shutdown for postulated MELB flooding events provided that the recommendations listed are implemented. This calculation consists of this coversheet and Attachment A.

The TVA corrective actions to address the S&L recommendations (unverified assumptions) will be summarized in TVA calculation, MELB Flooding Summary of Corrective Actions, SQN-SQS4-59 (to be issued).

( ) Microfilm and store calculations in RIMS Service Center
(x) Microfilm and return calculations to: R. S. McKeehan

Microfilm and destroy. ( )
Address: W10 A52 C-K

cc: RIMS, SL 26 C-K
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DNE1-45110

MELB FLOODING EVALUATION REPORT

Sheet 1 of 1

Prepared by/Date [illegible] 4/22/87

SQN-SQS4-126

Checked by/Date CRH 4/22/87

ATTACHMENT A

Contents:

COORDINATION LOG

Document No.: SQN-SQS4-126

Title: MODERATE ENERGY LINE BREAK FLOODING EVALUATION REPORT SI-4424

Revision: R0

R--Denotes review

A--Denotes approval

DIVISION OF ENGINEERING AND TECHNICAL SERVICES (DETS)

CEB		EEB		MEB		NEB		QEB		ECB					
R	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A
REH	REH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	RSM	[illegible]								
CAK	CAK	RLC	RLC	[illegible]	[illegible]	HEO	HEO								
CPB	CPB	[illegible]	KCW	RED	[illegible]	VAB	VAB								
	WJK/B														

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STAFFS

BPS		DSN		DSP		IMS		PSS		QMS		TAS			
R	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A