



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

August 14, 2009

Mr. Preston D. Swafford
Chief Nuclear Officer and
Executive Vice President
Tennessee Valley Authority
3R Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2 – ISSUANCE OF AMENDMENTS
REGARDING REVISIONS TO THE ICE CONDENSER LICENSING BASIS
(TS 08-06) (TAC NOS. MD9973 AND MD9974)

Dear Mr. Swafford:

The Nuclear Regulatory Commission (NRC) has issued the enclosed Amendment No. 325 to Facility Operating License No. DPR-77 and Amendment No. 317 to Facility Operating License No. DPR-79 for the Sequoyah Nuclear Plant, Units 1 and 2 (SQN), respectively. These amendments are in response to your application dated October 21, 2008. The amendments modify the SQN Updated Final Safety Analysis Report by requiring an inspection of each ice condenser within 24 hours of experiencing a seismic event greater than or equal to an Operating Basis Earthquake within the 5-week period after ice basket replenishment has been completed to confirm that adverse ice fallout has not occurred, that could impede the ability of the ice condenser lower inlet doors to open. This action would be taken, in lieu of requiring a 5-week waiting period following ice basket replenishment, prior to beginning ascension to power operations following an outage.

A copy of the Safety Evaluation is also enclosed. Notice of Issuance will be included in NRC's biweekly *Federal Register* notice.

Sincerely,

A handwritten signature in cursive script that reads "Siva P. Lingam".

Siva P. Lingam, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-327 and 50-328

Enclosures: 1. Amendment No. 325 to
License No. DPR-77
2. Amendment No. 317 to
License No. DPR-79
3. Safety Evaluation

cc w/enclosures: Distribution via Listserv



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-327

SEQUOYAH NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 325
License No. DPR-77

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Tennessee Valley Authority (the licensee) dated October 21, 2008, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in Title 10 of the *Code of Federal Regulations*, Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

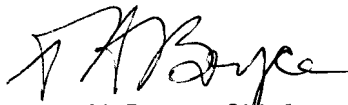
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-77 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 325 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. Further, Facility Operating License No. DPR-77 is hereby amended to authorize a change to the Updated Final Safety Analysis Report (UFSAR) requiring an inspection of each ice condenser within 24 hours of experiencing a seismic event greater than or equal to an operating-basis earthquake within the 5-week period after ice basket replenishment has been completed to confirm that adverse ice fallout has not occurred, that could impede the ability of the ice condenser lower inlet doors to open. This action would be taken, in lieu of requiring a 5-week waiting period following ice basket replenishment, prior to beginning ascension to power operations following an outage, as set forth in the license amendment application dated October 21, 2008, and evaluated in the safety evaluation dated August 14 , 2009. The licensee shall update the UFSAR by adding a description of this change, as authorized by this amendment, and in accordance with 10 CFR 50.71(e).
4. This license amendment is effective as of its date of issuance and shall be implemented within 90 days of issuance. The UFSAR changes shall be implemented in the next periodic update to the UFSAR in accordance with 10 CFR 50.71(e).

FOR THE NUCLEAR REGULATORY COMMISSION



Thomas H. Boyce, Chief
Plant Licensing Branch II-2
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to License No. DPR-77

Date of Issuance: August 14, 2009

ATTACHMENT TO LICENSE AMENDMENT NO. 325

FACILITY OPERATING LICENSE NO. DPR-77

DOCKET NO. 50-327

Replace Page 3 of Operating License DPR-77 with the attached page 3.

- (4) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required, any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis, instrument calibration or associated with radioactive apparatus or components; and
 - (5) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the Sequoyah and Watts Bar Unit 1 Nuclear Plants.
- C. This license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:
- (1) Maximum Power Level

The Tennessee Valley Authority is authorized to operate the facility at reactor core power levels not in excess of 3455 megawatts thermal.
 - (2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 325 are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications.
 - (3) Initial Test Program

The Tennessee Valley Authority shall conduct the post-fuel-loading initial test program (set forth in Section 14 of Tennessee Valley Authority's Final Safety Analysis Report, as amended), without making any major modifications of this program unless modifications have been identified and have received prior NRC approval. Major modifications are defined as:

 - a. Elimination of any test identified in Section 14 of TVA's Final Safety Analysis Report as amended as being essential;
 - b. Modification of test objectives, methods or acceptance criteria for any test identified in Section 14 of TVA's Final Safety Analysis Report as amended as being essential;
 - c. Performance of any test at power level different from there described; and



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TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-328

SEQUOYAH NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 317
License No. DPR-79

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Tennessee Valley Authority (the licensee) dated October 21, 2008, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in Title 10 of the *Code of Federal Regulations*, Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-79 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 317 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. Further, Facility Operating License No. DPR-79 is hereby amended to authorize a change to the Updated Final Safety Analysis Report (UFSAR) requiring an inspection of each ice condenser within 24 hours of experiencing a seismic event greater than or equal to an operating-basis earthquake within the 5-week period after ice basket replenishment has been completed to confirm that adverse ice fallout has not occurred, that could impede the ability of the ice condenser lower inlet doors to open. This action would be taken, in lieu of requiring a 5-week waiting period following ice basket replenishment, prior to beginning ascension to power operations following an outage, as set forth in the license amendment application dated October 21, 2008, and evaluated in the safety evaluation dated August 14 , 2009. The licensee shall update the UFSAR by adding a description of this change, as authorized by this amendment, and in accordance with 10 CFR 50.71(e).
4. This license amendment is effective as of its date of issuance and shall be implemented within 90 days of issuance. The UFSAR changes shall be implemented in the next periodic update to the UFSAR in accordance with 10 CFR 50.71(e).

FOR THE NUCLEAR REGULATORY COMMISSION



Thomas H. Boyce, Chief
Plant Licensing Branch II-2
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to License No. DPR-79

Date of Issuance: August 14, 2009

ATTACHMENT TO LICENSE AMENDMENT NO. 317

FACILITY OPERATING LICENSE NO. DPR-79

DOCKET NO. 50-328

Replace Page 3 of Operating License DPR-79 with the attached page 3.

- (4) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and
 - (5) Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the Sequoyah and Watts Bar Unit 1 Nuclear Plants.
- C. This license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

The Tennessee Valley Authority is authorized to operate the facility at reactor core power levels not in excess of 3455 megawatts thermal.

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 317 are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications.

(3) Initial Test Program

The Tennessee Valley Authority shall conduct the post-fuel-loading initial test program (set forth in Section 14 of Tennessee Valley Authority's Final Safety Analysis Report, as amended), without making any major modifications of this program unless modifications have been identified and have received prior NRC approval. Major modifications are defined as:

- a. Elimination of any test identified in Section 14 of TVA's Final Safety Analysis Report as amended as being essential;
- b. Modification of test objectives, methods or acceptance criteria for any test identified in Section 14 of TVA's Final Safety Analysis Report as amended as being essential;
- c. Performance of any test at power level different from there described; and



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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 325 TO FACILITY OPERATING LICENSE NO. DPR-77
AND AMENDMENT NO. 317 TO FACILITY OPERATING LICENSE NO. DPR-79
TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2
DOCKET NOS. 50-327 AND 50-328

1.0 INTRODUCTION

By letter dated October 21, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML083030432), Tennessee Valley Authority (the licensee), submitted a request for revisions to the ice condenser licensing basis for Sequoyah Nuclear Plant, Units 1 and 2 (SQN). The proposed revisions would authorize a change to the SQN Updated Final Safety Analysis Report (UFSAR) by requiring an inspection of the ice condenser within 24 hours of experiencing a seismic event greater than or equal to an Operating Basis Earthquake (OBE) within the 5-week period after ice basket replenishment has been completed to confirm that adverse ice spillage has not occurred, that could impede the ability of the ice condenser lower inlet doors to open. This action would be taken, in lieu of requiring a 5-week waiting period following ice basket replenishment, prior to beginning ascension to power operations following an outage.

The U.S. Nuclear Regulatory Commission (the Commission, NRC) published a proposed no significant hazards consideration determination in the *Federal Register* on January 13, 2009 (74 FR 1715).

2.0 REGULATORY EVALUATION

The SQN ice condenser consists of a completely enclosed annular compartment located approximately 300 degrees of the perimeter of the upper compartment of the containment, but penetrating the operating deck so that a portion extends into the containment lower compartment. Within the ice condenser, ice is held in baskets arranged to promote heat transfer to the ice. The ability to transfer the heat to the ice baskets reduces lower compartment pressure during design basis accidents (DBA) such as a loss-of-coolant accident (LOCA).

As part of the original ice condenser qualification program, testing of fused ice baskets was conducted by Westinghouse to determine the amount of ice spillage from ice baskets subjected to simulated plant time-history seismic disturbances. Test results were reported in WCAP-8110, Supplement 9 (now renamed WCAP-8110, Supplement 9-A), dated May 1974. Although the

testing observed the effects of ice fusion after 5 weeks, the test program did not officially establish a minimum time recommendation for ice fusion.

In a letter dated November 21, 1974, the Atomic Energy Commission (AEC, now NRC) issued a safety evaluation report (SER) on Supplement 9-A of WCAP-8110, stating that "... the data presented in WCAP-8110 Supplement 9 are adequate to conclude that land-based plants using ice condenser type containments should begin their initial ascent to power after a minimum of 5-weeks following ice loading." The testing also concluded that the impact of the ice not fusing properly could potentially block the ice condenser lower inlet doors, which would prohibit the ice condenser from carrying out its safety function of energy absorption and pressure mitigation in the event of a LOCA or HELB. Despite what the AEC staff stated in the SER, the Westinghouse ice condenser program did not determine a minimum time recommendation for ice fusion. The November 21, 1974, letter above accepts the document as a topical report that may be referenced in license applications. As a result, the licensee for SQN references WCAP-8110, Supplement 9-A as part of its licensing basis for the ice condenser at SQN.

SQN UFSAR currently includes a reference to the AEC's Safety Evaluation (SE) on the Westinghouse Electric Corporation (Westinghouse) Topical Report, WCAP-8110, Supplement 9-A, "Ice Fallout From Seismic Testing of Fused Ice Basket," dated November 21, 1974, that bounds SQN's design basis of power ascension after a minimum of 5 weeks following ice loading. Paragraph 50.59(c)(2) to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50 states that the licensee shall obtain a license amendment pursuant to 10 CFR 50.90 prior to implementing a proposed test or experiment which would: (ii) result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component important to safety previously evaluated in the UFSAR; or (viii) result in a departure from a method of evaluation described in the UFSAR used in establishing the design basis or in the safety analyses. The proposed amendment by the licensee to include an inspection of the ice condenser within 24 hours of a seismic event that is similar to an OBE or greater falls under the conditions for 10 CFR 50.59(c)(2). The licensee defines OBE for SQN as 1/2 of a Safe Shutdown Earthquake (SSE).

In December 29, 2000, the NRC completed Task Interface Agreement (TIA) 2000-08 (ADAMS Accession Number ML010380251), which indicated that licensees applicable to the conditions stated in the AEC's SE would be recommended in its design basis to follow the minimum fusion time of 5 weeks if those licensees have incorporated the AEC's SE into their respective nuclear plants UFSARs regarding ice condensers. The licensee for SQN seeks to revise the UFSAR to include the 24 hours inspection as an alternative method to meet the design basis for the ice condensers. Additionally, SQN will remain in compliance with the applicable General Design Criteria (GDC) as follows:

GDC 2, "Design Basis For Protection Against Natural Phenomena," which requires that SSCs important to safety be designed to withstand the effects of natural phenomena such as earthquakes;

GDC 16, "Containment Design," which requires that the reactor containment and associated systems provide an essentially leak-tight barrier against the uncontrolled release of radioactivity to the environment;

GDC 38, "Containment Heat Removal," which requires that a system be provided to remove heat from the reactor containment; and

GDC 50, "Containment Design Basis," which requires that the reactor containment structure be designed with conservatism to accommodate applicable design parameters (pressure, temperature, leakage rate).

Previous amendments approved by the NRC that made changes similar to what is being proposed by the licensee for SQN are McGuire on April 2, 2008 (ADAMS Accession Number ML080790238), D.C. Cook on April 18, 2008 (ADAMS Accession Number ML080701037), and Watts Bar, Unit 1 on January 6, 2009 (ADAMS Accession Number ML083030336).

3.0 TECHNICAL EVALUATION

3.1 Licensee's Description of Ice Fusion

In the October 21, 2008, application, the licensee provided a general description of ice condenser design and its operation during a LOCA or a high energy line break (HELB). Since the purpose of the proposed amendment is not to change the physical design of the ice condenser, the licensee's general description is not repeated here. The amendment change is applicable to the procedural operation of the ice condenser, but not its physical design. Therefore, the licensee's general description of the ice condenser is omitted for this section.

The term "ice fusion" refers to a condition established when an ice basket freshly loaded with flake ice achieves stability at the operating temperature of the ice condenser (i.e., when the ice freezes or otherwise solidifies such that it tends to stay in the ice basket when agitated). In order for the ice condenser to perform its energy absorption and pressure mitigation functions, the ice condenser lower inlet doors must open to allow the mass release from a LOCA or HELB to enter the ice condenser, and the ice bed ice mass and geometry must be adequate to support heat transfer to the ice bed.

If the ice was not sufficiently fused during a seismic event similar or greater than an OBE, the loose ice could spill out of the baskets and impair the operability of the ice condenser during a DBA. Excessive ice spillage (or fallout as referred to in WCAP-8110) could potentially block the lower doors, block the floor drains, restrict compression of the shock absorber assemblies, block flow channels, and decrease the ice mass in the ice baskets.

3.2 Licensee's Proposed Change to the Licensing Basis

The licensee proposed to revise the licensing basis as described in the FSAR. SQN UFSAR, Section 6.5.9.1, "Lower Inlet Doors, Design Basis, Interface Requirements," states:

Sufficient clearance is required for doors to open into the ice condenser. Items to be considered in this interface are floor clearance, lower support, structure clearance and floor drain operation.

The licensee proposed to revise the following paragraph in the UFSAR to read (new text in *italics*):

Sufficient clearance is required for doors to open into the ice condenser. Items to be considered in this interface are floor clearance, lower support, structure clearance and floor drain operation. *Original ice basket qualification testing (Topical Report WCAP-8110, Supplement 9-A) has shown freshly loaded ice is considered fused after 5 weeks. In the event of an earthquake (OBE or greater) which occurs within 5 weeks following the completion of ice basket replenishment, plant procedures require a visual inspection of applicable areas of the ice condenser within 24 hours to confirm that opening of the ice condenser lower inlet doors is not impeded by any ice fallout resulting from the seismic disturbance. The 24 hour time frame for inspection is applicable during modes where the lower inlet doors are required to be operable, otherwise perform this inspection prior to startup. This alternative method of compliance with the requirements of GDC 2 is credible based upon the reasonable assurance that the ice condenser doors will open following a seismic event during the 5 week period and the low probability of a seismic event occurring coincident with or subsequently followed by a Design Basis Accident.*

During its review of the UFSAR change against the requirements of 10 CFR 50.59, the licensee recognized that the interface requirements for the ice condenser lower inlet doors will no longer be met solely by the SQN ice condenser design considerations based on the WCAP-8110 qualification testing, but will also rely on conservatisms included in the original Westinghouse ice basket seismic testing, the licensee's practical experience with ice fusion gained through many years of ice condenser operation at SQN, and design features of the SQN ice condenser.

3.3 NRC Staff's Evaluation of Proposed UFSAR Revision

3.3.1 SQN Ice Fusion Effects Compared to WCAP-8110

As stated in Section 2.0 of this SE, the basis of the 5-week ice fusion time recommendation was derived from the original seismic qualification of ice condenser ice baskets conducted by Westinghouse in 1974, even though determination of a minimum ice fusion time was not an objective of the test program. Instead, the results of acceptable ice spillage tests conducted on ice baskets loaded for periods of 6 to 7½ weeks were used by the AEC staff to establish a "preoperational limit for minimum storage time" of ice baskets prior to initial power ascension.

As a result of a recent review of the test results documented in WCAP-8110, Supplement 9-A, the licensee has concluded that the 5-week ice fusion time selected as the licensing basis is conservative for SQN and that the SQN ice condenser design has substantial margin with respect to ice spillage. The licensee provided the following key considerations in reaching this conclusion:

- The test baskets floated freely in the lattice frames and were not fixed at one end. The floating end exacerbates the movement resulting from application of a given seismic excitation, which would tend to overstate the ice spillage in the test compared to expected spillage from an actual plant event.

- The test basket was only six feet tall and had an open top, whereas an actual ice condenser basket at SQN typically consists of four vertically stacked 12-foot sections, with only the uppermost section having an open top. The majority of ice spillage during the tests occurred from the open top of the basket. Since proportionally less ice would be expected to fall out of the lower sections of an actual ice condenser basket, the percentage of ice falling out of the test basket section overstates what would be expected during an actual plant event.

The NRC staff reviewed the analysis the licensee presented on ice fusion. The licensee's experience with ice behavior in its ice condensers has demonstrated that there is excessive conservatism in the 5-week ice fusion time recommendation. The NRC staff finds that the 5-week ice fusion time recommendation for newly added ice is conservative. The recommendation can be eliminated without any negative impact on the performance of the ice condenser, provided the licensee inspects the ice condenser within 24 hours of a seismic event greater than the OBE. The inspection provides reasonable assurance the ice condenser will perform its intended function following a DBE. If the inspection finds excessive ice spillage or damage to the ice condenser, the licensee will shut down the unit and make the necessary repairs.

3.3.2 Effect of Ice Spillage on Lower Inlet Door Performance

The redundancy of flow paths in the ice condenser provides reasonable assurance that the ice condenser would perform its function even if some lower inlet doors were partially degraded.

The ice condenser baskets at SQN consist of four vertically stacked 12-foot sections, with only the uppermost section having an open top. The licensee performed ice spillage tests, in which a majority of ice spillage occurred from the open top of the basket. The licensee's seismic analysis concluded that the quantity of ice that could fall out in a seismic event would be less than estimated in the tests. Also, the licensee concluded that the quantity of ice that falls out would be loose, and therefore, unlikely to block the inlet doors. The inspection of the ice condenser doors within 24 hours of a seismic event provides assurance that the ice spillage would not be a sufficient quantity or in a fused state that could block the free movement of the ice doors.

The NRC staff reviewed the design of the lower inlet doors, and finds that the doors would require a large amount of ice to block their free movement. This large amount is not likely shaken loose from the ice baskets even in an OBE.

3.3.3 Blocking of Floor Drains

The licensee stated that, as discussed in the UFSAR, the impact of floor drain blockage by excessive ice spillage would be negligible. As discussed in the SQN UFSAR, containment peak pressure is not affected by drain performance. There are a total of 20 ice condenser floor drains among the 24 ice condenser bays. The ice condenser design is such that for blockage of any floor drain, water would flow to adjacent bays and eventually would spill over the lower inlet door openings if necessary. Additionally, any ice on the floor of the ice condenser would be melted by the rise in temperature of the ice condenser and flowing meltwater. The licensee, thus, surmised that there would be no adverse impact on the ice condenser function for blockage of the floor drains from spillage of ice in the ice baskets.

The NRC staff finds that any ice on the floor of the ice condenser will quickly melt in the post-LOCA or post-HELB environment. This fact, plus the availability of multiple floor drains, will assure that the floor drains will not be blocked to hamper the design function of the ice condenser.

3.3.4 Blocking of Flow Channels

The licensee stated that the successful completion of SQN TSs Surveillance Requirement 4.6.5.1.b ensures that the ice accumulation on the structural steel members comprising flow channels through the ice bed is less than or equal to a 15-percent blockage of the total flow area for each safety analysis section.

Therefore, it can be reasonably assumed that any loose, granular ice that would be shaken free during a seismic event from a recently replenished ice basket cannot block flow passages that were verified to be at least 85-percent clear during the preceding surveillance inspection.

The NRC staff finds that any ice on the flow channels of the ice condenser will quickly melt in the post-LOCA or post-high energy line break environment. Thus, the flow channels will not be blocked by ice fallout to hamper the design function of the ice condenser.

3.3.5 Decrease of Ice Mass in the Ice Baskets

The licensee stated that any spillage from the SQN ice baskets would remain within the ice condenser. Although the ice would no longer be in the ice baskets, its mass would remain available to absorb energy from a LOCA or a HELB.

The NRC staff finds that ice spillage from the ice basket, regardless of quantity, is not a mechanism to reduce ice inventory in the ice condenser. Therefore, the required quantity of ice will continue to be present to ensure that the ice condenser design function is carried out in a LOCA or HELB. In addition, following an OBE, the licensee's inspection procedure will require a visual inspection of all applicable areas of the ice condensers within 24 hours.

3.4 Summary of NRC Staff's Evaluation

As explained in Section 3.2 in the SE, the original Westinghouse ice condenser basket seismic qualification as documented in WCAP-8110, Supplement 9-A, and the AEC/NRC review of WCAP-8110, has led to a 5-week storage time recommendation for freshly loaded ice baskets prior to power ascension. However, the licensee observed conservatisms in the original Westinghouse testing and operational experience of the SQN ice condenser suggest that freshly loaded, wet flake ice will adequately solidify in the ice baskets much sooner than 5 weeks. In addition, design features of the SQN ice condenser are such that the lower inlet doors of the ice condenser will not be blocked by ice spillage from a seismic event. Therefore, the NRC staff finds the LAR to revise the SQN UFSAR, which will include an inspection of the SQN ice condenser within 24 hours of a seismic event prior to the 5 weeks of the recommended ice fusion time, to be acceptable based upon the licensee utilizing the inspection to provide reasonable assurance that the SQN will be able to perform its intended function following a DBE. The licensee has also indicated that SQN will be shut down for immediate repairs to the ice condenser in the event that excessive ice spillage or ice condenser damage is found beyond what was anticipated from the seismic event.

Based on the above review, the NRC staff finds the revision to the SQN licensing basis and changes to the SQN UFSAR pertaining to ice condenser ice fusion time acceptable. The licensing basis regarding ice condenser ice fusion time is revised as depicted in the licensee's letter to the NRC, dated October 21, 2008.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Tennessee State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (74 FR 1715; January 13, 2009). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: G. Armstrong
S. Lingam

Dated: August 14, 2009

August 14, 2009

Mr. Preston D. Swafford
Chief Nuclear Officer and
Executive Vice President
Tennessee Valley Authority
3R Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2 – ISSUANCE OF AMENDMENTS
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A copy of the Safety Evaluation is also enclosed. Notice of Issuance will be included in NRC's biweekly *Federal Register* notice.

Sincerely,
/RA/

Siva P. Lingam, Project Manager
Plant Licensing Branch II-2
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License No. DPR-79
3. Safety Evaluation

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