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

December 5, 2016

Mr. Charles R. Pierce
Regulatory Affairs Director
Southern Nuclear Operating Company, Inc.
P.O. Box 1295 / Bin 038
Birmingham, AL 35201-1295

SUBJECT: EDWIN I. HATCH NUCLEAR PLANT, UNIT NOS. 1 AND 2 – REQUEST FOR ADDITIONAL INFORMATION (CAC NOS. MF8110 AND MF8111)

Dear Mr. Pierce:

By letter dated July 1, 2016, as supplemented by letter dated August 24, 2016, Southern Nuclear Operating Company submitted a license amendment request (LAR) to revise the Edwin I. Hatch Nuclear Plant (HNP), Units Nos. 1 and 2, Technical Specification 5.5.12, "Primary Containment Leakage Rate Testing Program," to allow the following:

(1) An increase in the existing Type A integrated leakage rate test program test interval from 10 years to 15 years, in accordance with Nuclear Energy Institute (NEI) Topical Report NEI 94-01, Revision 3-A, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," and the conditions and limitations specified in NEI 94-01, Revision 2-A.

(2) Adoption of an extension of the containment isolation valve leakage testing (Type C) frequency from the 60 months currently permitted by Title 10 of the *Code of Federal Regulations* Part 50, Appendix J, Option B, to a 75-month frequency for Type C leakage rate testing of selected components in accordance with NEI 94-01, Revision 3-A.

(3) Adoption of the use of ANSI/ANS 56.8-2002, "Containment System Leakage Testing Requirements."

(4) Adoption of a more conservative grace interval of 9 months for Type A, Type B, and Type C leakage tests in accordance with NEI 94-01, Revision 3-A. The proposed amendments would also make an administrative change to delete the information regarding the performance of the next HNP, Unit No. 1, Type A test no later than April 2008, and the next HNP, Unit No. 2, Type A test no later than November 2010, as both Type A tests have already occurred.

The U.S. Nuclear Regulatory Commission staff has determined that further information is needed to complete its review. A request for additional information is enclosed. The NRC staff discussed the additional information with representatives of your staff on December 2, 2016. During that call, Mr. Bates agreed to provide your response within 60 days of the date of this letter.

If you have any questions, please contact me at (301) 415-3229 or Michael.Orenak@nrc.gov.

Sincerely,

Michael D. Orenak, Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-321 and 50-366

Enclosure:
Request for Additional Information

cc w/enclosure: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION

LICENSE AMENDMENT REQUEST REGARDING CHANGES TO THE PRIMARY

CONTAINMENT LEAKAGE RATE TESTING PROGRAM

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

EDWIN I. HATCH NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-321 AND 50-366

By letter dated July 1, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16188A268), as supplemented by letter dated August 24, 2016 (ADAMS Accession No. ML16238A477), Southern Nuclear Operating Company (the licensee) submitted a license amendment request (LAR) to revise (LAR) to revise the Edwin I. Hatch Nuclear Plant (HNP), Units Nos. 1 and 2, Technical Specification (TS) 5.5.12, "Primary Containment Leakage Rate Testing Program," to allow the following:

(1) An increase in the existing Type A integrated leakage rate test (ILRT) program test interval from 10 years to 15 years, in accordance with Nuclear Energy Institute (NEI) Topical Report NEI 94-01, Revision 3-A, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," and the conditions and limitations specified in NEI 94-01, Revision 2-A.

(2) Adoption of an extension of the containment isolation valve (CIV) leakage testing (Type C) frequency from the 60 months currently permitted by Title 10 of the *Code of Federal Regulations* Part 50, Appendix J, Option B, to a 75-month frequency for Type C leakage rate testing of selected components in accordance with NEI 94-01, Revision 3-A.

(3) Adoption of the use of ANSI/ANS 56.8-2002, "Containment System Leakage Testing Requirements."

(4) Adoption of a more conservative grace interval of 9 months for Type A, Type B, and Type C leakage tests in accordance with NEI 94-01, Revision 3-A. The proposed amendments would also make an administrative change to delete the information regarding the performance of the next HNP, Unit No. 1, Type A test no later than April 2008, and the next HNP, Unit No. 2, Type A test no later than November 2010, as both Type A tests have already occurred.

The U.S. Nuclear Regulatory Commission (NRC) staff has determined that further information is needed to complete its review.

Enclosure

Request for Additional Information (RAI) 1

Section 3.2.4, "ILRT History," of the July 1, 2016, application, contains two tables, "Table 3.2.4-1, Unit 1 Type A ILRT History," and "Table 3.2.4-2, Unit 2 Type A ILRT History." Both tables provide test dates and leakage rates about the historical ILRTs performed for HNP, Unit Nos. 1 and 2. All historical ILRT leakage rate values contained in both Table 3.2.4-1 and Table 3.2.4-2 are below the limits of both TS 5.5.12 and TS 5.5.12.a. However, the test pressure values for the six HNP, Unit Nos. 1 and 2, historical ILRT as-found leakage rates were not included.

Section 9.2.3, "Extended Test Intervals," of NEI 94-01, Revision 2 and 2-A, states, in part:

> Acceptable performance history is defined as successful completion of two consecutive periodic Type A tests where the calculated performance leakage rate was less than 1.0 L_a [the maximum allowable Type A test leakage rate at P_a, where P_a equals the calculated peak containment internal pressure related to the design-basis loss-of-coolant accident].

Section 3.2.11, "Type A Test Pressure," of ANSI/ANS 56.8-1994, "American National Standard for Containment System Leakage Testing Requirements" (ADAMS Accession No. ML11327A024), states, in part:

> The Type A test pressure shall not be less than $0.96P_{ac}$ [calculated peak accident containment internal pressure, also defined as P_a above] nor exceed P_d [containment design pressure].

Please provide the test pressure values for the two most recent as-found Type A tests for HNP, Unit Nos. 1 and 2, and state if they satisfy the requirements of Section 9.2.3 of NEI 94-01, Revision 2 and 2-A, and Section 3.2.11 of ANS 56.8-1994.

RAI 2

Section 9.1.2, "Test Interval," of NEI 94-01, Revision 3-A, states that extensions in test intervals are allowed based upon two consecutive, periodic successful Type A tests. At the time of the two previous Type A tests, the guidance of NEI 94-01, Revision 0 (ADAMS Accession No. ML11327A025), was used to determine if the tests were considered successful. NEI 94-01, Revision 0, Section 9.2.3, "Extended Test Intervals," states, in part:

> For purposes of determining an extended test interval, the performance leakage rate is determined by summing the UCL [upper confidence limit] (determined by containment leakage rate testing methodology described in ANSI/ANS 56.8-1994) with As-left MNPLR [minimum pathway leakage rate] leakage rates for penetrations in service, isolated or not lined up in their accident position (i.e., drained and vented to containment atmosphere) prior to a Type A test. In addition, any leakage pathways that were isolated during performance of the test because of excessive leakage must be factored into the performance determination. If the leakage can be determined by a local leakage rate test, the As-found MNPLR for

that leakage path must also be added to the Type A UCL. If the leakage cannot be determined by local leakage rate testing, the performance criteria for the Type A test are not met.

Please provide the following information for (1) the HNP, Unit No. 1, Type A tests performed in March 2008 and April 1993; and (2) the HNP, Unit No. 2, Type A tests performed in March 2009 and November 1995:

(a) The as-left minimum pathway leakage rate (MNPLR) for all Type B and Type C pathways that were in service, isolated, or not lined up in their test position (i.e., drained and vented to containment atmosphere) prior to performing the Type A test.

(b) List all the pathways and the associated leakage rate that contribute to MNPLR in item (a), above.

(c) The performance leakage rate (PLR) (= UCL + MNPLR).

(d) Determine if the "as-found" Type A test meets the performance criterion by showing if PLR ≤ maximum allowable Type A test leakage rate at P_a (i.e., L_a).

(e) Cite the calculation method for UCL (i.e., mass point method from ANSI/ANS-56.8-1994, total time, or point to point, etc.).

RAI 3

Sections 10.2.1.4, "Corrective Action," and 10.2.3.4, "Corrective Action," of NEI 94-01, Revision 3-A, state, in part, that for unacceptable Type B and Type C test results, respectively:

> ...a cause determination should be performed and corrective actions identified that focus on those activities that can eliminate the identified cause of failure with appropriate steps to eliminate recurrence.

Please provide the following additional information about Table 3.4.5-1, "Unit 1 Type B and C LLRT Program Implementation Review," from the July 1, 2016, submittal:

(a) For the two local leak rate test (LLRT) failures during 1RF26 (i.e., 2014) associated with Penetration 221A and Penetration 26, please provide additional information beyond that of table notes (1) and (2) about the corrective actions performed during 1RF26 and the LLRT history of the CIVs associated with these two penetrations.

(b) Please provide information on 3 examples of repetitive failures of administrative limits for LLRTs associated with any HNP, Unit No. 1, Type B or Type C penetrations since 2006. Also, please provide the details of all corrective actions performed to prevent reoccurrence.

Please provide the following additional information about Table 3.4.5-2, "Unit 2 Type B and C LLRT Program Implementation Review," from the July 1, 2016, submittal.

(c) For the two LLRT failures during 2RF22 (i.e., 2013) associated with Penetration 41 and Penetration 26, and the LLRT failure during 2RF23 (i.e. 2015) associated with Penetration 225K, please provide additional information beyond table notes (1), (2), and (3) about the corrective actions performed during these two refueling outages and the LLRT history of the CIVs associated with these three penetrations.

(d) Please provide information on 3 examples of repetitive failures of the administrative limits for LLRTs associated with any HNP, Unit No. 2, Type B or Type C penetration since 2006. Also, please provide details of all corrective actions performed to prevent reoccurrence.

RAI 4

In a Appendix J, Option B, LLRT program, the percentage of Type B or Type C components on repetitive frequencies can vary depending on the maintenance program and corrective action process.

(a) Please provide the total number (i.e., population) and percentage of the total number of HNP, Unit Nos. 1 and 2, Type B tested components currently on a 120-month extended performance-based test interval. Provide the numbers for HNP, Unit Nos. 1 and 2, separately.

(b) Please provide the total number (i.e., population) and percentage of that total number of HNP, Unit Nos. 1 and 2, Type C CIVs currently on a 60-month extended performance-based test interval. Provide the numbers for HNP, Unit Nos. 1 and 2, separately.

(c) Please discuss how the percentages reported in (a) and (b) above support an extended test interval of up to 75 months for both HNP, Unit Nos. 1 and 2, Type C tested CIVs in accordance with the guidance of NEI 94-01, Revision 3-A.

RAI 5

In Table 3.7.1-1, "NEI 94-01, Revision 2-A, Limitations and Conditions," of the July 1, 2016, application, the fourth Limitation/Condition states:

> The licensee addresses any tests and inspections performed following major modifications to the containment structure, as applicable. (Refer to SE [safety evaluation] Section 3.1.4.).

The HNP Response for HNP, Unit Nos. 1 and Unit 2, states:

> There are no major modifications planned.

The above HNP Response is forward looking with respect to plans for any future HNP, Unit Nos. 1 and 2, containment modifications. However, both HNP, Unit Nos. 1 and 2, containments have been in service for greater than 35 years. Sections 3.1.2, "Suppression Chamber"; 3.1.3, "Vent System"; and 3.5.2, "IN [Information Notice] 88-82, Torus Shells with Corrosion and Degraded Coatings in BWR [Boiling-Water Reactor] Containments," of the application all briefly describe modifications to the HNP, Unit Nos. 1 and 2, containments.

Please provide additional historical information (i.e., a synopsis) about any modifications, and the subsequent associated post-modification testing, to the HNP, Unit Nos. 1 and 2, containments, since the most recent ILRTs, and demonstrate consistency with the guidance of NEI 94-01, Revision 2-A, SE Section 3.1.4.

RAI 6

Section 4.2.6 of Electric Power Research Institute (EPRI) Report 1018243, "Risk Impact Assessment of Extended Integrated Leak Rate Testing Intervals," states that, "[p]lants that rely on containment overpressure for net positive suction head (NPSH) for emergency core cooling system (ECCS) injection for certain accident sequences may experience an increase in CDF [Core Damage Frequency]," therefore, requiring a risk assessment. EPRI Report 1018243 is the NRC-approved version of EPRI Report 1009325, Revision 2.

(a) Section 5.2.4 of EPRI Report 1018243 includes guidance on performing this risk assessment and provides the following examples of accident scenarios to be considered:

- LOCA [loss-of-coolant accident] scenarios where the initial containment pressurization helps to satisfy the NPSH requirements for early injection in BWRs or PWR [pressurized-water reactor] sump recirculation

- Total loss of containment heat removal scenarios where gradual containment pressurization helps to satisfy the NPSH requirements for long term use of an injection system from a source inside of containment...

The July 1, 2016, LAR only discusses large-break LOCA initiators, which is not necessarily the same as a LOCA scenario (when the LOCA is not the initiating event). LOCA initiators are a relatively small contributor to the internal events CDF. However, other internal events initiators (e.g., transients) or conditions (e.g., station blackout) could result in a consequential LOCA. Please explain how all the accident scenarios that could impact NPSH for the ECCS pumps were considered.

(b) The LAR summarizes the results of Modular Accident Analysis Program (MAAP) analysis modeling a "large break LOCA (28" diameter recirculation line break)" and concludes, in part, that:

> ...loss of ECCS NPSH is not a concern for sequences where one or more trains of RHR [residual heat removal] containment heat removal operate.

Discuss any key assumptions in the MAAP analysis that may be non-conservative and impact the loss of NPSH assessment.

(c) For LOCA scenarios with containment heat removal unavailable, the licensee states that containment overpressure will lead to containment failure and that in the HNP, Unit Nos. 1 and 2, probabilistic risk assessment (PRA), containment failure is assumed to result in a loss of ECCS core injection. The licensee concludes that a preexisting containment failure (as might be detected by the Type A ILRT), resulting in the loss of adequate NPSH to the ECCS pumps, would have the same result as containment overpressure, and therefore, there is no change in CDF. Overstating the contribution of containment overpressure to the loss of ECCS appears to be non-conservative with respect to the change in CDF for this application. Please provide justification for the assumption that containment overpressure leads to containment failure and a loss of ECCS, or provide an updated risk analysis.

RAI 7

In Section 4.2 of Attachment 3 to the LAR, the licensee discusses the CDF and large early release frequency values for HNP, Unit Nos. 1 and 2. The licensee further highlights a plant design difference in the feedwater injection lines where it concludes that the design difference will not impact the risk assessment for the ILRT interval, and that the Unit No. 1 model is representative of Unit No. 2 for the purposes of the ILRT risk assessment. Please provide a detailed discussion of the design differences between HNP, Unit No. 1, and HNP, Unit No. 2, that have significant impact on the CDF. Additionally, please provide a justification for concluding that the Unit No. 1 model is representative of Unit No. 2 for the purposes of the ILRT risk assessment or provide the Unit No. 2 plant-specific confirmatory analysis.

RAI 8

Section 5.8 of Attachment 3 to the LAR addresses the risk impact from external events for the ILRT extension.

(a) The risk estimates from all external hazards, except for seismic risk, is based on the results from the individual plant examination of external events (IPEEE). Since the IPEEE study was completed in 1995, please assess these external events for the current state of HNP and discuss the effect on the LAR.

(b) The LAR calculates an "external events multiplier" of 0.51 by dividing the external events CDF by the internal events CDF calculated during the individual plan examination (IPE). This multiplier is then applied to the internal events Class 3b frequency, which is estimated based on the current internal events PRA and has a much lower CDF estimate than the IPE. This approach underestimates the risk due to external events by at least an order of magnitude. Please justify your approach for using the "external events multiplier" or update your analysis to correctly capture the impact from external events.

RAI 9

In Section 3.3.2.3, "Plant Changes Not Yet Incorporated into the PRA Model," of Enclosure 1 of the LAR, the licensee stated, in part, that:

> A review of the current open items in the database for HNP identified no permanent plant design or operational changes that would significantly impact the results of the risk assessment...

In Table B.2-1, "Resolution of the Hatch PRA Peer Review F&Os Associated with the 10 Not Met SRs [Supporting Requirements]," in Attachment 3 of the August 24, 2016, supplement, Fact and Observation (F&O) MU-C1 identified some deficiencies in the PRA model update process. Please discuss how this review of plant changes not incorporated into the PRA model was performed. Also, please discuss any plant design or operational changes that have not been reflected in the PRA and their impact on the LAR.

RAI 10

F&Os IFQU-A6-2-7 and IE-A9-1-4 appear to be missing parts of the resolution and resolution status in Tables B.2-1 and B.2-2, "Resolution of the Hatch PRA Peer Review F&Os Associated with the5 [sic] Cat I met only SRs," of Attachment 3 to the LAR, respectively. Please provide the complete information for these F&Os.

If you have any questions, please contact me at (301) 415-3229 or Michael.Orenak@nrc.gov.

Sincerely,

/RA/

Michael D. Orenak, Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-321 and 50-366

Enclosure:
Request for Additional Information

cc w/enclosure: Distribution via Listserv

DISTRIBUTION:
PUBLIC LPL2-1 R/F
RidsACRS_MailCTR Resource
RidsNrrDorlLpl2-1 Resource
RidsNrrDraApla Resource
RidsNrrLALRonewicz Resource
RidsNrrPMHatch Resource
RidsRgn2MailCenter Resource
DNold, NRR
JEvans, NRR
RidsNrrDssSbpb Resource

ADAMS Accession No.: ML16330A128 *by e-mail

OFFICE	DORL/LPL2-1/PM	DORL/LPL2-1/LA	DSS/SBPB/BC	DRA/APLA/BC	DORL/LPL2-1/BC	DORL/LPL2-1/PM
NAME	MOrenak	LRonewicz	RDennig (JBettle for)	SRosenberg	MMarkley	MOrenak
DATE	12/02/2016	11/29/2016	10/19/2016	10/31/2016	12/05/2016	12/05/2016

OFFICIAL RECORD COPY