Charles R. Pierce
Regulatory Affairs Director

Southern Nuclear Operating Company, Inc.
40 Inverness Center Parkway
Post Office Box 1295
Birmingham, Alabama 35201

Tel 205.992.7872
Fax 205.992.7601

SOUTHERN COMPANY

January 13, 2014

Docket Nos.: 50-321
50-366

NL-14-0059

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

Edwin I. Hatch Nuclear Plant
ISI Program Alternative HNP-ISI-ALT-18, Version 1
Response to NRC Request for Additional Information

Ladies and Gentlemen:

By letter dated December 16, 2013, Southern Nuclear Operating Company (SNC) requested NRC approval of ASME Section XI Code Alternate HNP-ISI-ALT-18 to support testing of the reactor pressure vessel (RPV) flange seal leak-off piping. Specifically, SNC requested NRC approval of the methods described in ASME Code Case N-805 as an alternate to the inspection requirements of ASME Section XI Code, Table IWB-2500-1, Examination Category B-P, Item Number B15.10, as it applies to the Hatch Unit 1 and Unit 2 RPV flange seal leak-off piping.

By email dated December 26, 2013, the NRC requested additional information to facilitate completion of its review. The questions contained in the NRC request for information, with the SNC response to each, is enclosed.

This letter contains no NRC commitments. If you have any questions, please contact Ken McElroy at (205) 992-7369.

Respectfully submitted,

C. R. Pierce

C. R. Pierce
Regulatory Affairs Director

CRP/TWS/

Enclosure: ASME Code Alternative HNP-ISI-ALT-18, Version 1 – Response to NRC Request for Additional Information

cc: Southern Nuclear Operating Company
Mr. S. E. Kuczynski, Chairman, President & CEO
Mr. D. G. Bost, Executive Vice President & Chief Nuclear Officer
Mr. D. R. Vineyard, Vice President – Hatch
Mr. B. L. Ivey, Vice President – Regulatory Affairs
Mr. D. R. Madison, Vice President – Fleet Operations
RTYPE: CHA02.004

U. S. Nuclear Regulatory Commission
Mr. V. M. McCree, Regional Administrator
Mr. R. E. Martin, NRR Senior Project Manager - Hatch
Mr. E. D. Morris, Senior Resident Inspector – Hatch

ENCLOSURE

EDWIN I. HATCH NUCLEAR PLANT
ISI PROGRAM ALTERNATIVE HNP-ISI-ALT-18, VERSION 1

RESPONSE TO NRC REQUEST FOR
ADDITIONAL INFORMATION

ENCLOSURE

EDWIN I. HATCH NUCLEAR PLANT
ISI PROGRAM ALTERNATIVE HNP-ISI-ALT-18, VERSION 1

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION

NRC RAI 1

The NRC requires deviations from the ASME Code, Section XI, in accordance with Title 10 of the Code of Federal Regulations (10 CFR) 50.55a(a)(3)(ii) be pre-approved. RFA HNP-ISI-ALT-18 was submitted for the fourth 10-year ISI interval which commenced on January 1, 2006, and will end on December 31, 2015, for Hatch, Units 1 and 2. The RPV flange leak-off piping is required to be subject to system leakage test each refueling outage in accordance with Table IWB-2500-1, Examination Category B-P, Item No. B15.10 of the ASME Code, Section XI. Had the licensee performed the test in the previous refueling outages of the fourth 10-year ISI interval in accordance with IWB-5220 as specified in Table IWB-2500-1? If the answer is No, discuss the reason(s) for not obtaining the NRC prior authorization for deviation from the requirement in the previous outage(s) of the fourth 10-year ISI interval? If the answer is Yes, discuss why the required test cannot be performed in the upcoming outage of the fourth 10-year ISI interval.

SNC Response

Testing of the reactor pressure vessel (RPV) flange seal leak-off piping has not been performed for Hatch, Units 1 and 2, in a manner consistent with the requirements of the ASME Section XI Code. Although the Hatch Unit 1 and Unit 2 RPV flange seal leak-off piping is included in the scope of the VT-2 leak tests required by the ASME Section XI Code for Class 1 piping, testing does not include pressurization of the seal leak-off piping necessary to allow identification of leakage from the RPV flange seal leak-off piping. NRC approval of Code Alternative HNP-ISI-ALT-18 will allow SNC use of the methods described in ASME Code Case N-805, in lieu of those associated with the standard VT-2 leak test, and bring SNC into compliance with the requirements of ASME Section XI for the Class 1 RPV flange seal leak-off piping.

SNC became aware of the above described deficiency via NRC enforcement action associated with failure of others to perform adequate VT-2 testing of the seal leak-off piping as required by the ASME Section XI Code. As a result, SNC incorporated plans to perform the required test during the upcoming Hatch Unit 1 refueling outage, scheduled to begin in February 2014, using the methods described in ASME Code Case N-805, as previously approved by the NRC for power reactor licensees, as an alternative to the ASME Section XI Code.

A practical means for demonstrating the integrity of the RPV flange seal leak-off system piping did not exist prior to development of the methods described in ASME Code Case N-805. That is, pressurization of the RPV flange seal leak-off piping could not be performed without: (1) removal of the RPV head; intentional failure of the inner RPV flange seal; reinstallation of the vessel head; and repressurization of the RCS piping; or (2) implementation of design modifications to facilitate testing. Accordingly, use of the methods described in Code Case N-805 is required due to physical limitations of the RPV seal leak-off piping design that makes testing in accordance with the ASME Section XI VT-2 requirements impractical to perform.

In summary, SNC believes the methods described in ASME Code Case N-805 provide the only practical means for demonstrating the integrity of the RPV seal leak-off piping. NRC approval of HNP-ISI-ALT-18 will allow SNC testing of the RPV flange seal leak-off piping during the upcoming Unit 1 outage using an alternate method that is approved by the ASME Section XI Code Committee.

NRC RAI 2

Could the subject piping be pressurized and inspected in the beginning of a refueling outage before removing the RPV head? Discuss the hardship and potential personnel radiation exposure including an estimate for person-roentgen equivalent man (rem) exposure with consideration of as low as reasonably achievable (ALARA) for the system leakage test performed in accordance with IWB-5220 before removing the RPV head.

SNC Response

As currently configured, it is not possible to pressurize the RPV leak-off piping for inspection at the beginning of the refueling outage prior to removal of the RPV head. In order to do so, physical modification of the RPV flange leak-off piping would be required. Although the configuration of the two units is slightly different, both units would require modifications in order to allow pressurization of the seal leak-off piping prior to removal of the RPV head.

Implementation of design modifications to facilitate performance of the VT-2 pressure test on the RPV flange seal leak-off piping and subsequent testing will result in significant radiological exposure (i.e., dose). In addition, introduction of new test connections and valves to facilitate VT-2 testing of the seal leak-off piping results in new potential leakage paths inside the drywell and offsets any benefit associated with performing the

VT-2 pressure test. Although the time required for implementation of the design modification cannot be accurately estimated without first preparing the design, the dose fields in the Unit 1 and Unit 2 drywells are estimated to be in the range of 30-100 mrem/hour and 14-80 mrem/hour, respectively, with the higher dose rates occurring in the vicinity of the reactor vessel flange.

In summary, use of the methods described in ASME Code Case N-805 were developed by the ASME Section XI Code Committee to provide an acceptable means for leak testing the RPV flange seal leak-off piping. As cited in SNC's December 16, 2013 request for approval of HNP-ISI-ALT-18, the NRC has previously reviewed and approved use of the methods described in ASME Code Case N-805 as an alternative for compliance with the VT-2 testing requirements of ASME Section XI for the RPV flange seal leak-off piping. Based on the above, implementation of the design modifications necessary to allow performance of the VT-2 leak test required by ASME Section XI, and the corresponding radiological exposure, represents an unnecessary regulatory burden without a commensurate increase in public health and safety and is not consistent with ALARA principles.

NRC RAI 3

In Section titled "Background and Reason for Request" of the Enclosure to RFA HNP-ISI-ALT-18, the licensee stated that "...This monitor connects to a pressure switch that will alarm to the main control room if pressure increases to 600 pounds per square inch gauge (psig)...". Discuss how the pressure switch operates if the leakoff has a 100 percent through wall flaw and if the RPV inner O-ring seal fails. Would there be a scenario that the pressure would not reach to 600 psig to trigger the alarm in the control room? Discuss the likelihood of this scenario.

SNC Response

The RPV flange seal leak-off piping is designed to the requirements of ANSI B31.1 and ASME Section III for Hatch Units 1 and 2, respectively. As such, there is a low probability of 100% thru-wall leakage of the RPV flange seal leak-off piping as evident by the lack of external degradation or corrosion during performance of VT-2 testing of Class 1 piping inside the drywell.

In the unlikely event that a 100% thru-wall leak exists, concurrent with failure of the RPV flange inner seal, it is possible that the pressure in the seal leak-off piping would fail to reach the 600 psig alarm setpoint

necessary to annunciate in the MCR. If this were to occur, operators in the MCR would see an increase in drywell pressure and temperature, as well as an increase in unidentified leakage collected by the drywell floor sump. Leakage collected by the drywell sump is considered unidentified RCS leakage and as such is limited to ≤ 5 gpm by Technical Specification (TS) Limiting Condition of Operation (LCO) 3.4.4.b.

Hatch Unit 2 FSAR Section 7.6.7.2.3.5 describes the failure of the RPV flange inner seal and failure of the RPV flange outer seal and states, "If both the inner and outer head seals fail, the leak is detected by an increase in drywell temperature and pressure." Additionally, leakage from both the inner and outer RPV flange seals will be detected by the RCS Leakage Detection Instrumentation required by LCO 3.4.5.a. Similarly, leakage from a 100% thru-wall leak in the RPV flange seal leak-off piping, concurrent with leakage of the RPV flange inner seal, would provide similar, if not identical, indications to the MCR (i.e., increased drywell temperature and pressure, concurrent with increased unidentified leakage to the dry floor sump).

In summary, Hatch has not observed any degradation or corrosion of the RPV flange seal leak-off piping during inspections performed inside the drywell. In the unlikely event of a 100% thru-wall leak in the RPV flange seal leak-off piping at the time of failure of the inner RPV flange seal, alternate methods are available to operators in the MCR to identify the leakage and take appropriate actions based on the requirements of TS LCO 3.4.4.

NRC RAI 4

Provide the maximum pressure the leakoff line would be exposed if the RPV inner O-ring fails. If the maximum pressure inside the leakoff line is greater than the design pressure which is 600 psig for Unit 1 and 900 psig for Unit 2, discuss how the pressure in the leakoff line would be kept below design pressure to ensure the structural integrity of the subject pipe if the inner O-ring fails.

SNC Response

The rated design pressures for the Unit 1 and Unit 2 RPV flange seal leak-off piping components is 600 psig and 900 psig, respectively. However, it should be noted that these design ratings are based on a corresponding temperature of 850 °F.

In the event of a failure of the RPV flange inner seal, the maximum pressure in the RPV leak-off line would be approximately 1060 psia at 550 °F. The design rating (i.e., pressure and temperature) of the RPV flange seal leak-off piping is 1118 psig at 563°F for Unit 1 and 1250 psig at 575 °F for Unit 2, consistent with the requirements of ANSI B31.1 and ASME Section III for Class 1 piping, as applicable.

In summary, design of the RPV seal leak-off piping in accordance with the requirements specified in the applicable design Code of Record for Units 1 and 2 provides adequate assurance that the piping can withstand reactor pressure at the corresponding reactor design temperature.

NRC RAI 5

In Section titled "Background and Reason for Request" of the Enclosure to RFA HNP-ISI-ALT-18, the licensee stated that "The option to intentionally fail the inner seal of the vessel flange to establish normal operating pressure and temperature on the leak-off piping is not considered a viable option due to the increased dose that would result from the need to replace the inner seal." Provide an estimate for person-rem exposure with consideration of ALARA.

SNC Response

Activities necessary to fail the inner RPV flange seal and perform the RPV flange seal leak-off piping pressure test involve significant radiological exposure. Absent a corresponding increase in public health and safety, SNC does not consider intentionally failing the seal and performing the RPV flange seal leak-off piping pressure test to be a viable option.

The following activities would be required to perform the VT-2 leak test based on the assumption that outage activities have been completed and the reactor vessel head has not been reinstalled:

- Perform activities to fail the inner seal
- Set the reactor vessel head
- Tension the reactor vessel head

- Pressurize the reactor coolant system to normal operating pressure
- Walk-down the RPV flange seal leak-off line to identify visual leakage
- Depressurize the reactor coolant system
- De-tension the reactor vessel head
- Remove the reactor vessel head
- Replace the inner and outer seals

SNC estimates the cumulative radiological exposure necessary to perform the above activities specifically required to fail the RPV flange seal and perform the required VT-2 examination of the RPV flange seal leak-off piping to be approximately 5 rem per outage.