



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

November 4, 2010

Mr. Mark J. Ajluni
Manager, Nuclear Licensing
Southern Nuclear Operating Company, Inc.
40 Inverness Center Parkway
P.O. Box 1295
Birmingham, AL 35201

SUBJECT: EDWIN I. HATCH NUCLEAR PLANT, UNIT NOS. 1 AND 2, ISSUANCE
OF AMENDMENTS REGARDING REVISION TO TECHNICAL SPECIFICATIONS
LIMITING CONDITION FOR OPERATION 3.1.2, "REACTIVITY ANOMALIES"
(TAC NOS. ME3006 AND ME3007)

Dear Mr. Ajluni:

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 263 to Renewed Facility Operating License DPR-57 and Amendment No. 207 to Renewed Facility Operating License NPF-5 for the Edwin I. Hatch Nuclear Plant, Units 1 and 2, respectively. The amendments revise the method for conducting the reactivity anomaly determination in Technical Specification 3.1.2, "Reactivity Anomalies," in response to your application dated December 17, 2009, as supplemented on October 5, 2010.

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

Sincerely,


Robert E. Martin, Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-321 and 50-366

Enclosures:

1. Amendment No. 263 to DPR-57
2. Amendment No. 207 to NPF-5
3. Safety Evaluation

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2. Accordingly, the license is hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. DPR-57 is hereby amended to read as follows:

- (2) Technical Specifications

The Technical Specifications (Appendix A) and the Environmental Protection Plan (Appendix B), as revised through Amendment No. 263 , are hereby incorporated in the renewed license. Southern Nuclear shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Gloria Kulesa, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to Renewed Facility
Operating License No. DPR-57
and the Technical Specifications

Date of Issuance: November 4, 2010

ATTACHMENT TO LICENSE AMENDMENT NO. 263

RENEWED FACILITY OPERATING LICENSE NO. DPR-57

DOCKET NO. 50-321

Replace the following pages of the License and the Appendix A Technical Specifications (TSs) with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages

License

4

TSs

3.1-4

Insert Pages

License

4

TSs

3.1-4

for sample analysis or instrument calibration, or associated with radioactive apparatus or components;

- (6) Southern Nuclear, pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This renewed license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Section 50.54 of Part 50, and Section 70.32 of Part 70; all applicable provisions of the Act and the rules, regulations, and orders of the Commission now or hereafter in effect; and the additional conditions specified or incorporated below:

(1) Maximum Power Level

Southern Nuclear is authorized to operate the facility at steady state reactor core power levels not in excess of 2804 megawatts thermal.

(2) Technical Specifications

The Technical Specifications (Appendix A) and the Environmental Protection Plan (Appendix B), as revised through Amendment No. are hereby incorporated in the renewed license. Southern Nuclear shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

The Surveillance Requirement (SR) contained in the Technical Specifications and listed below, is not required to be performed immediately upon implementation of Amendment No. 263. The SR listed below shall be successfully demonstrated prior to the time and condition specified:

SR 3.8.1.18 shall be successfully demonstrated at its next regularly scheduled performance

(3) Fire Protection

Southern Nuclear shall implement and maintain in effect all provisions of the fire protection program, which is referenced in the Updated Final Safety Analysis Report for the facility, as contained in the updated Fire Hazards Analysis and Fire Protection Program for Edwin I. Hatch Nuclear Plant Units 1 and 2, which was originally submitted by letter dated July 22, 1986. Southern Nuclear may make changes to the fire protection program without prior Commission approval only if the changes

3.1 REACTIVITY CONTROL SYSTEMS

3.1.2 Reactivity Anomalies

LCO 3.1.2 The reactivity difference between the monitored core k_{eff} and the predicted core k_{eff} shall be within $\pm 1\% \Delta k/k$.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Core reactivity difference not within limit.	A.1 Restore core reactivity difference to within limit.	72 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.2.1 Verify core reactivity difference between the monitored core k_{eff} and the predicted core k_{eff} is within $\pm 1\% \Delta k/k$.	Once within 24 hours after reaching equilibrium conditions following startup after fuel movement within the reactor pressure vessel or control rod replacement <u>AND</u> 1000 MWD/T thereafter during operations in MODE 1



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SOUTHERN NUCLEAR OPERATING COMPANY, INC.

GEORGIA POWER COMPANY

OGLETHORPE POWER CORPORATION

MUNICIPAL ELECTRIC AUTHORITY OF GEORGIA

CITY OF DALTON, GEORGIA

DOCKET NO. 50-366

EDWIN I. HATCH NUCLEAR PLANT, UNIT NO. 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 207
Renewed License No. NPF-5

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to the Edwin I. Hatch Nuclear Plant, Unit 2 (the facility) Renewed Facility Operating License No. NPF-5 filed by Southern Nuclear Operating Company, Inc (the licensee), acting for itself, Georgia Power Company, Oglethorpe Power Corporation, Municipal Electric Authority of Georgia, and City of Dalton, Georgia (the owners), dated December 17, 2009, as supplemented on October 5, 2010, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as set forth in 10 CFR 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 set forth in 10 CFR Chapter I;
 - 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 hereby amended by page changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-5 is hereby amended to read as follows:

- (2) Technical Specifications

- The Technical Specifications (Appendix A) and the Environmental Protection Plan (Appendix B), as revised through Amendment No. 207 , are hereby incorporated in the renewed license. Southern Nuclear shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Gloria Kulesa, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to Renewed Facility
Operating License No. NPF-5
and the Technical Specifications

Date of Issuance: November 4, 2010

ATTACHMENT TO LICENSE AMENDMENT NO. 207
RENEWED FACILITY OPERATING LICENSE NO. NPF-5
DOCKET NO. 50-366

Replace the following pages of the License and the Appendix A Technical Specifications (TSs) with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages

License

4

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Insert Pages

License

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TSs

3.1-4

- (6) Southern Nuclear, pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.
- C. This renewed license shall be deemed to contain, and is subject to, the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Section 50.54 of Part 50, and Section 70.32 of Part 70; all applicable provisions of the Act and the rules, regulations, and orders of the Commission now or hereafter in effect; and the additional conditions² specified or incorporated below:

(1) Maximum Power Level

Southern Nuclear is authorized to operate the facility at steady state reactor core power levels not in excess of 2,804 megawatts thermal, in accordance with the conditions specified herein.

(2) Technical Specifications

The Technical Specifications (Appendix A) and the Environmental Protection Plan (Appendix B), as revised through Amendment No. 207¹, are hereby incorporated in the renewed license. Southern Nuclear shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

(3) Additional Conditions

The matters specified in the following conditions shall be completed to the satisfaction of the Commission within the stated time periods following the issuance of the renewed license or within the operational restrictions indicated. The removal of these conditions shall be made by an amendment to the license supported by a favorable evaluation by the Commission.

(a) Fire Protection

Southern Nuclear shall implement and maintain in effect all provisions of the fire protection program, which is referenced in the the Updated Final Safety Analysis Report for the facility, as contained

² The original licensee authorized to possess, use, and operate the facility was Georgia Power Company (GPC). Consequently, certain historical references to GPC remain in certain license conditions.

3.1 REACTIVITY CONTROL SYSTEMS

3.1.2 Reactivity Anomalies

LCO 3.1.2 The reactivity difference between the monitored core k_{eff} and the predicted core k_{eff} shall be within $\pm 1\% \Delta k/k$.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Core reactivity difference not within limit.	A.1 Restore core reactivity difference to within limit.	72 hours
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SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.1.2.1 Verify core reactivity difference between the monitored core k_{eff} and the predicted core k_{eff} is within $\pm 1\% \Delta k/k$.	Once within 24 hours after reaching equilibrium conditions following startup after fuel movement within the reactor pressure vessel or control rod replacement <u>AND</u> 1000 MWD/T thereafter during operations in MODE 1



UNITED STATES
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO

AMENDMENT NO. 263 TO RENEWED FACILITY OPERATING LICENSE NO. DPR-57

AND

AMENDMENT NO. 207 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-5

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

EDWIN I. HATCH NUCLEAR PLANT, UNIT NOS. 1 AND 2

DOCKET NOS. 50-321 AND 50-366

1.0 INTRODUCTION

By application dated December 17, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML100190316), as supplemented by letter dated October 5, 2010, (ADAMS Accession No. ML102790096) Southern Nuclear Operating Company, Inc (SNC, the licensee), requested changes to the Technical Specification (TS) 3.1.2, "Reactivity Anomalies," for the Edwin I. Hatch Nuclear Plant, Unit Nos. 1 and 2 (HNP). The requested change would allow a change in the method used to perform the reactivity anomaly check.

The supplement dated October 5, 2010, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on February 23, 2010 (75 FR 8142).

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix A, General Design Criteria (GDC) 26, "Reactivity control system redundancy and capability," GDC 28, "Reactivity limits," and GDC 29, "Protection against anticipated operational occurrences," require that reactivity within the core be controllable to ensure that subcriticality is achievable and maintainable under cold conditions (most reactive conditions). In addition, the same GDC also specify that applicable fuel design limits must not be exceeded during normal operations and anticipated operational occurrences.

The reactivity anomaly check required by HNP TS 3.1.2 serves, in part, to satisfy the above GDC by comparing the observed reactivity behavior of the core (at hot operating conditions) to the expected reactivity behavior that was calculated prior to the start of operation. This ensures that certain assumptions in the design basis accident and transient safety analyses remain valid. Any

Enclosure

difference between these two observations is compared to the TS 3.1.2.1 acceptance criterion of $\pm 1\% \Delta K/k$, and if the criterion is not met, the action required by the TS is then taken.

The U.S. Nuclear Regulatory Commission (NRC, the Commission) staff also notes that the proposed TS is consistent with changes that have been made to other plant TS, as noted in references 1, 2 and 3.

3.0 TECHNICAL EVALUATION

Current Method for Reactivity Anomaly Check

The licensee currently assesses reactivity anomalies at HNP by using rod density to determine the effective reactivity coefficient (k_{eff}). This is primarily because early core monitoring systems did not calculate core critical k_{eff} values for comparison to design values. Rod density was used instead as a convenient representation of core reactivity. The HNP TS require that the reactivity anomaly check be done by comparing a predicted control rod density (calculated prior to the start of operation for a particular cycle) to an actual control rod density. The comparison is done at the frequencies specified by Surveillance Requirement (SR) 3.1.2.1.

The licensee stated that, while being a convenient measurement of core reactivity, the control rod density method has limitations, such as differing impacts on reactivity from deeply inserted central control rods versus control rods on the outer edge of the core, or shallowly inserted rods. The licensee indicated that it is not uncommon for reactivity anomaly concerns to arise during operation simply because of greater use of near-edge or shallow inserted control rods than anticipated, when in fact no true anomaly exists.

Under the current method, an anomaly would be the difference between the predicted and measured control rod density in the reactor under the existing conditions, e.g., time in cycle, power level and control rod pattern. The observed anomaly is then translated into a reactivity difference between the two values (the measured versus the predicted control rod density) for comparison to the TS limit of $\pm 1\% \Delta K/k$. If the limit is exceeded, the licensee has 12 hours to meet the SR or be in hot shutdown.

Specifically, a calculation is made of the number of notches inserted in the rod patterns, and also the number of average notches required to make a change of $\pm 1\% \Delta K/k$ around the predicted critical k_{eff} . The notches are converted to rod density and plotted with an upper and lower bound representing the $\pm 1\% \Delta K/k$ acceptance band as a function of cycle exposure. This curve is then used as the predicted rod density during the cycle. In actuality, the comparison is still based on critical k_{eff} with a "translation" of acceptance criteria to rod density.

Proposed Method for Reactivity Anomaly Check

The proposed change to the TS would eliminate the translations of reactivity into control rod densities. It would instead use comparison of existing and predicted k_{eff} directly. The proposed TS change will not change the frequency or any condition within the SR.

Advances in computational methods and computer technology support the proposed HNP amendment. The revised method for evaluating a potential reactivity anomaly compares measured core k_{eff} to predicted core k_{eff} . Measured core k_{eff} is calculated by the

three-dimensional (3D) core simulator model in the plant's core monitoring system based on measured plant operating data. The predicted core k_{eff} , as a function of cycle exposure, is developed prior to the start of each operating cycle and incorporates benchmarking of exposure-dependent 3D core simulator k_{eff} behavior in previous cycles and any fuel vendor recommended adjustments due to planned changes in fuel design, core design, or operating strategy for the upcoming cycle.

The NRC staff has reviewed the information provided by the licensee and concludes that use of actual to predicted k_{eff} instead of rod density eliminates the limitations described above, provides for a technically superior comparison, is a simple and straightforward approach with current computer codes and methods, and is acceptable.

The licensee also assessed the impact of this request on the HNP transient and accident analyses, and determined that the proposed changes will not affect any of the transient and accident analyses. This is because only the method of performing the reactivity anomaly surveillance is changing, and the proposed method will provide an adequate acceptable estimate as discussed above. Furthermore, the anomaly check will continue to be performed at the current required frequency. The NRC staff concludes that the licensee's determination in this regard is acceptable.

Technical Specification Changes

The current LCO [limiting condition for operation] 3.1.2 and SR 3.1.2.1 are, respectively:

The reactivity difference between the actual rod density and the predicted rod density shall be within $\pm 1\% \Delta K/k$.

Verify core reactivity difference between the actual rod density and the predicted rod density is within $\pm 1\% \Delta K/k$

The proposed LCO 3.1.2 and SR 3.1.2.1 are respectively:

The reactivity difference between the monitored core k_{eff} and the predicted core k_{eff} shall be within $\pm 1\% \Delta K/k$.

Verify core reactivity difference between the monitored core k_{eff} and the predicted core k_{eff} is within $\pm 1\% \Delta K/k$

The licensee indicated that its proposed TS change is consistent with the BWR/6 Standard Technical Specifications (STS) for reactivity anomalies. However no discussion of the applicability of the BWR/6 STS to the HNP BWR/4 design was provided. Additional information was requested and the licensee responded by letter dated October 5, 2010. The licensee indicated that, although HNP is a BWR/4 plant it has the equipment (hardware and software) in place to perform the reactivity anomaly surveillance using the method in the BWR/6 STS. In its response, the licensee states that HNP utilizes the Global Nuclear Fuels (GNF) 3D MONICORE system, which incorporates the PANACEA Version 11 computational program that allows direct comparison of predicted k_{eff} to monitored k_{eff} , as required by the licensee's proposed TS revision. As a result, the NRC staff has concluded that the HNP BWR/4 plant is capable of meeting the surveillance requirements specified in the BWR/6 STS for reactivity anomalies. The NRC staff has also concluded that is acceptable to apply the BWR/6 STS format for reactivity anomalies to

HNP.

Summary

The NRC staff has reviewed the request by SNC to revise HNP TS 3.1.2. Based on the review, the NRC staff concludes that these revisions are acceptable and will provide an improved approach for the determination of reactivity anomalies required by this TS.

SNC also made associated changes to the TS Bases.

4.0 STATE CONSULTATION

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

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. 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 (*75 Federal Register* 8142-8143, dated February 23, 2010). 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 the amendments will not be inimical to the common defense and security or to the health and safety of the public.

7.0 REFERENCES

1. License amendment for Brunswick Steam Electric Plant, September 5, 1997, ML020370074.
2. License amendment for Susquehanna Steam Electric Station, July 30, 1998, ML010160119.
3. License amendment for Grand Gulf Nuclear Station, February 21, 1995, ML021480411.

Principal Contributors: Anthony Attard, NRR/DSS

Patrick Boyle, NRR/DORL

Date: November 4, 2010

November 4, 2010

Mr. Mark J. Ajluni
Manager, Nuclear Licensing
Southern Nuclear Operating Company, Inc.
40 Inverness Center Parkway
P.O. Box 1295
Birmingham, AL 35201

SUBJECT: EDWIN I. HATCH NUCLEAR PLANT, UNIT NOS. 1 AND 2, ISSUANCE OF AMENDMENTS REGARDING REVISION TO TECHNICAL SPECIFICATIONS LIMITING CONDITION FOR OPERATION 3.1.2, "REACTIVITY ANOMALIES" (TAC NOS. ME3006 AND ME3007)

Dear Mr. Ajluni:

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 263 to Renewed Facility Operating License DPR-57 and Amendment No. 207 to Renewed Facility Operating License NPF-5 for the Edwin I. Hatch Nuclear Plant, Units 1 and 2, respectively. The amendments revise the method for conducting the reactivity anomaly determination in Technical Specification 3.1.2, "Reactivity Anomalies," in response to your application dated December 17, 2009, as supplemented on October 5, 2010.

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

Sincerely,

/RA/

Robert E. Martin, Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-321 and 50-366

Enclosures:

1. Amendment No. 263 to DPR-57
2. Amendment No. 207 to NPF-5
3. Safety Evaluation

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