

August 19, 1999

Mr. W. R. McCollum, Jr.
Vice President, Oconee Site
Duke Energy Corporation
P. O. Box 1439
Seneca, SC 29679

SUBJECT: OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3 RE: CLARIFICATION OF AMENDMENTS (TAC NOS. MA3765, MA3766, MA3767)

Dear Mr. McCollum:

By letter dated July 19, 1999, the staff issued Amendment Nos. 305, 305 and 305 to Facility Operating Licenses DPR-38, DPR-47, and DPR-55, respectively, for the Oconee Nuclear Station, Units 1, 2, and 3. The amendments consist of changes to the Updated Final Safety Analysis Report in response to your application dated October 2, 1998, and supplements dated November 20, December 21, 1998, and May 13, 1999. In these submittals you supplied information related to an unreviewed safety question regarding the use of a small amount of containment overpressure to ensure sufficient net positive suction head for the reactor building spray and low pressure injection pumps during the post loss of coolant accident recirculation phase.

Following review of the amendments, it has been determined that certain clarifications are necessary, as shown on the enclosed pages. Please replace the original pages with the enclosed. We have verified that the changes do not affect the analysis or conclusions reached by the staff in the safety evaluation. We regret any inconvenience this may have caused.

Sincerely,

Original signed by:
David E. LaBarge, Senior Project Manager, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-269, 50-270 and 50-287

Enclosure: Identification of changes

cc w/encl: See next page

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

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Sincerely,

A handwritten signature in black ink, appearing to read "D. LaBarge".

David E. LaBarge, Senior Project Manager, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-269, 50-270 and 50-287

Enclosure: Identification of changes

cc w/encl: See next page

Oconee Nuclear Station

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IDENTIFICATION OF CHANGES

1. Revised Unit 1, 2, and 3 License pages 1: The word "approximately" was added before the numbers 3000 and 30000 to avoid confusion and agree with the safety evaluation.
2. Safety evaluation page 2 and 3: The sentence "It is the increased flow due to the instrument uncertainty that results in the need for containment overpressure to prevent cavitation of the RBS and/or the LPI pumps" has been removed because it is unnecessary to the evaluation.
3. Safety evaluation page 3: "containment overpressure" was removed from the description of P_b to more correctly indicate how the term is used in the formula.
4. Safety evaluation page 3, Table 1 heading: "Overpressure" was changed to "Pressure" to more correctly indicate the description of the pressure values that were used in the evaluation.
5. Safety evaluation page 3, Table 1: The negative values shown as the first two values in the P_b column (-2.11 and -0.97) were changed to "0" and a footnote added to more accurately show that the reactor building pressure does not decrease below atmospheric pressure following an accident. This is the condition that was assumed in the analysis.

Enclosure



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

DUKE ENERGY CORPORATION

DOCKET NO. 50-269

OCONEE NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 305
License No. DPR-38

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to the Oconee Nuclear Station, Unit 1 (the facility) Facility Operating License No. DPR-38 filed by the Duke Energy Corporation (the licensee) dated October 2, 1998, as supplemented November 20, 1998, December 21, 1998, and May 13, 1999, 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 to authorize changes to the Oconee Updated Final Safety Analysis Report to allow a total of 2.2 pounds per square inch of containment overpressure for the time period of approximately 3000 to approximately 30000 seconds after a hot leg break LOCA to be credited in the calculation of NPSH available for the building spray and the low pressure injection pumps during the recirculation phase of a loss of coolant accident (LOCA).

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DUKE ENERGY CORPORATION

DOCKET NO. 50-270

OCONEE NUCLEAR STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 305
License No. DPR-47

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to the Oconee Nuclear Station, Unit 2 (the facility) Facility Operating License No. DPR-47 filed by the Duke Energy Corporation (the licensee) dated October 2, 1998, as supplemented November 20, 1998, December 21, 1998, and May 13, 1999, 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 to authorize changes to the Oconee Updated Final Safety Analysis Report to allow a total of 2.2 pounds per square inch of containment overpressure for the time period of approximately 3000 to approximately 30000 seconds after a hot leg break LOCA to be credited in the calculation of NPSH available for the building spray and the low pressure injection pumps during the recirculation phase of a loss of coolant accident (LOCA).

DUKE ENERGY CORPORATION

DOCKET NO. 50-287

OCONEE NUCLEAR STATION, UNIT 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 305
License No. DPR-55

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to the Oconee Nuclear Station, Unit 3 (the facility) Facility Operating License No. DPR-55 filed by the Duke Energy Corporation (the licensee) dated October 2, 1998, as supplemented November 20, 1998, December 21, 1998, and May 13, 1999, 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 to authorize changes to the Oconee Updated Final Safety Analysis Report to allow a total of 2.2 pounds per square inch of containment overpressure for the time period of approximately 3000 to approximately 30000 seconds after a hot leg break LOCA to be credited in the calculation of NPSH available for the building spray and the low pressure injection pumps during the recirculation phase of a loss of coolant accident (LOCA).

3.0 EVALUATION

3.1 Minimum Containment Pressure Analysis

In order to demonstrate that adequate containment pressure is available, the licensee performed a calculation of containment pressure that included assumptions to minimize the calculated pressure. The assumptions were also intended to maximize the post-LOCA sump temperature. The methods used have been previously approved by the staff and documented in Duke Power Company Topical Report DPC-NE-3003-PA. The staff safety evaluation on these methods was issued on March 15, 1995, and approved the methods for reactor building pressure calculations.

The licensee's October 2, 1-998, letter to the staff discussed the assumptions made to minimize reactor building pressure. The staff has reviewed these assumptions and finds them acceptable since they tend to minimize reactor building pressure. In general, these assumptions minimize the amount of air initially in the containment, minimize the effect of passive heat sinks, and maximize the reactor power (e.g., the decay heat is maximized by adding what is called a 2σ uncertainty). Since the licensee intended to also maximize the sump water temperature, the licensee performed sensitivity studies to determine what values to use for certain parameters, such as Reactor Building Cooling Unit (RBCU) fouling when the effect was not clear.

The staff finds the licensee's containment calculations, in support of the NPSH calculations, to be acceptable since they were performed with approved methods using conservative input.

3.2 NPSH Analysis

At Oconee, containment overpressure is defined as the difference between the reactor building pressure and the vapor pressure of the sump fluid. The staff has previously approved credit for containment overpressure for some facilities when the objective of Safety Guide 1 (Reference 5) cannot be met. However, approval was not considered until all other options, such as throttling or orificing, had been demonstrated to be impractical.

According to Licensee Event Report (LER) 269/1998-12, Revision 1 (Reference 6), throttling of the RBS and LPI pumps has been considered. To ensure adequate pump NPSH, the Emergency Operating Procedure (EOP) contains steps to throttle the flow rate of both the LPI and RBS systems to limit total flow in the common suction piping. This requirement is documented in both the LPI and the RBS system design basis documents. Operator action is required to initially throttle RBS flow from the BWST to 1500 gallons per minute (gpm) as indicated by flow instrumentation and to throttle flow to 1000 gpm just prior to realigning RBS suction to the emergency reactor building sump.

Revision 0 of calculation OSC-4467, "RB Pressure Needed for RBS Operation (Recirculation Phase)," (Reference 7) did not account for the effects of instrument uncertainty on the assumed flows in either the RBS or LPI systems. This was corrected in Revision 1 of OSC-4467. Currently, Revision 8 of OSC-4467 states that, for long term cooling during the recirculation phase, instrument uncertainty results in a RBS flow of 1150 gpm (versus 1000 gpm without instrument uncertainty) and a LPI flow of 3310 gpm (versus 3000 gpm).

At Oconee, the hot leg break is bounding for NPSH analyses since it results in a higher sump temperature and lower reactor building pressure when compared to small breaks or a large break of the cold leg. Additionally, the licensee assumed a single failure of one LPI train, one RBS train, and one reactor building cooling unit (RBCU) in their NPSH analyses.

Duke provided the following relationship that was used to calculate the available NPSH for the LPI and RBS pumps in Calculation OSC-4467, Revision 8:

$$NPSHA = P_b(C) + P_a(C) + H_s - h_f - P_{sat}(C)$$

where:

- P_b = reactor building pressure (psig)
- P_a = atmospheric pressure (psia)
- H_s = static head of submergence (ft)
- h_f = friction losses in piping system (ft)
- P_{sat} = saturation pressure at sump temperature (psia)
- C = conversion factor to convert psig to ft. of water

The Oconee NPSH analyses also assume that the sump screen and grating are 50 percent blocked. This results in a negligible friction head loss of 0.01 foot. Therefore, this friction loss was not considered in the NPSH analyses. Table 1 lists the sump temperatures and containment overpressure assumed in the NPSH analyses.

Table 1: Containment Pressure Assumed in NPSH Analyses

Sump Temperature (°F)	P_{sat} (psig)	P_b (psig) (2.2 psi > P_{sat})
195	-4.31	0 ¹
200	-3.17	0 ¹
205	-1.93	0.27
210	-0.58	1.62
215	0.89	3.09
220	2.49	4.69
225	4.21	6.41
229.6	5.94	8.14

Using the worst case conditions, and assuming credit for 2.2 psi of reactor building overpressure, the licensee calculated that the NPSH available was 19.76 feet for the RBS pumps and 18.48 feet for the LPI pumps (Reference 4).

¹It is assumed that post-accident building pressure does not decrease below atmospheric pressure.