

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

January 30, 1987

Posted
 Amat. 153
 to DPR-47

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

Mr. Hal B. Tucker
 Vice President - Nuclear Production
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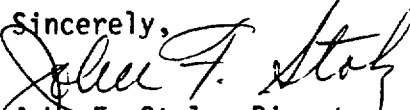
Dear Mr. Tucker:

The Commission has issued the enclosed Amendments Nos. 153, 153 and 150 to Facility Operating Licenses Nos. DPR-38, DPR-47 and DPR-55 for the Oconee Nuclear Station, Units Nos. 1, 2 and 3. These amendments consist of changes to the Station's licenses in response to your request dated January 14, 1986, as supplemented on April 10, June 18, 1986 and January 15, 1987.

These amendments revise the licenses to extend the duration of the licenses to 40 years from the date of issuance of the full power licenses. Therefore, Oconee Unit 1 Operating License is extended to February 6, 2013, Oconee Unit 2 to October 6, 2013, and Oconee Unit 3 to July 19, 2014. Prior to the issuance of these amendments, all three Oconee Unit licenses would have expired on November 6, 2007.

The Pressurized Thermal Shock (PTS) Rule, 10 CFR 50.61, requires that the projected assessment of the RT_{PTS} must be updated whenever changes in core loadings, surveillance measurements or other information (including changes in capacity factor) indicate a significant change in the projected values. This ensures that the licensees will track the accumulated fluence for the limiting beltline materials throughout the life of the plant to verify that their assumptions remain valid. In this regard we request that you submit a reevaluation of the RT_{PTS} and comparison with the predicted value in any future Pressure-Temperature submittals which are submitted as required by 10 CFR 50, Appendix G. This request is covered under OMB Clearance No. 3150-0011.

Notice of Issuance of the enclosed amendments will be included in the Commission's biweekly Federal Register notice.

Sincerely,

 John F. Stolz, Director
 PWR Project Directorate #6
 Division of PWR Licensing-B

Enclosures:

1. Amendment No. 153 to DPR-38
2. Amendment No. 153 to DPR-47
3. Amendment No. 150 to DPR-55
4. Safety Evaluation

cc w/enclosures:
 See next page

Mr. H. B. Tucker
Duke Power Company

Oconee Nuclear Station
Units Nos. 1, 2 and 3

cc:

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

DUKE POWER COMPANY

DOCKET NO. 50-269

OCONEE NUCLEAR STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

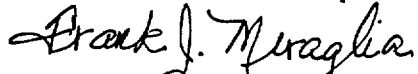
Amendment No. 153
License No. DPR-38

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Duke Power Company (the licensee) dated January 14, 1986, as supplemented on April 10, June 18, 1986, and January 15, 1987, 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 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;
 - 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, paragraph 4 of Facility Operating License No. DPR-38 is hereby amended to read as follows:

This license amendment is effective as of the date of issuance and shall expire at midnight, February 6, 2013.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Frank J. Miraglia, Director
Division of PWR Licensing-B

Date of Issuance: January 30, 1987



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

DUKE POWER COMPANY

DOCKET NO. 50-270

OCONEE NUCLEAR STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 153
License No. DPR-47

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Duke Power Company (the licensee) dated January 14, 1986, as supplemented on April 10, June 18, 1986, and January 15, 1987, 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 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;
 - 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, paragraph 4 of Facility Operating License No. DPR-47 is hereby amended to read as follows:

This license amendment is effective as of the date of issuance and shall expire at midnight, October 6, 2013.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Frank J. Miraglia, Director
Division of PWR Licensing-B

Date of Issuance: January 30, 1987



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

DUKE POWER COMPANY

DOCKET NO. 50-287

OCONEE NUCLEAR STATION, UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

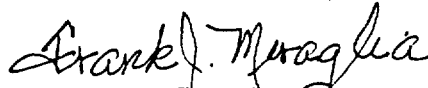
Amendment No. 150
License No. DPR-55

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Duke Power Company (the licensee) dated January 14, 1986, as supplemented on April 10, June 18, 1986, and January 15, 1987, 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 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;
 - 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, paragraph 4 of Facility Operating License No. DPR-55 is hereby amended to read as follows:

This license amendment is effective as of the date of issuance and shall expire at midnight, July 19, 2014.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION


Frank J. Maglia, Director
Division of PWR Licensing-2

Date of Issuance: January 30, 1987

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



SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 153 TO FACILITY OPERATING LICENSE NO. DPR-38

AMENDMENT NO. 153 TO FACILITY OPERATING LICENSE NO. DPR-47

AMENDMENT NO. 150 TO FACILITY OPERATING LICENSE NO. DPR-55

DUKE POWER COMPANY

OCONEE NUCLEAR STATION, UNITS NOS. 1, 2 AND 3

DOCKETS NOS. 50-269, 50-270 AND 50-287

1.0 INTRODUCTION

By application dated January 14, 1986 (Reference 1), as supplemented on April 10, June 18, 1986, and January 15, 1987, Duke Power Company (the licensee) requested amendments to Facility Operating Licenses Nos. DPR-38, DPR-47 and DPR-55 for the Oconee Nuclear Station, Units Nos. 1, 2 and 3. The proposed amendments would extend the expiration dates of these licenses from November 6, 2007 to February 6, 2013 for Unit 1, October 6, 2013 for Unit 2, and July 19, 2014 for Unit 3.

2.0 DISCUSSION

Section 103.c of the Atomic Energy Act of 1954 states that a license is to be issued for a specified period not to exceed 40 years. 10 CFR 50.51 specifies that each license will be issued for a fixed period of time not to exceed 40 years from the date of issuance. The currently licensed term for Oconee Nuclear Station, Units 1, 2 and 3, is 40 years commencing with the issuance of the construction permits which was on November 6, 1967. Accounting for the time that was required for plant construction, this represents an effective operating license term of 34 years for Units 1 and 2; and 33 years for Unit 3. Consistent with Section 103.c of the Atomic Energy Act and Section 50.51 of the Commission's regulations, the licensee, by the January 14, 1986 application, seeks extensions of the operating license terms for Oconee Units 1, 2 and 3 so the fixed period of the licenses would be from the date of the operating license issuance.

3.0 EVALUATION

The following evaluation was conducted to assure that the licensee's "as low as reasonably achievable" (ALARA) measures and dose projections are applicable for the additional years of plant operation and are in accordance with 10 CFR Part 20, "Standards For Protection Against Radiation" and Regulatory Guide 8.8, "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Reasonably Achievable" (Revision 3).

3.1 ALARA Measures

The licensee stated that operating and maintenance personnel will follow specific plans and procedures to ensure that ALARA goals are achieved in the extended years of operation. High radiation exposure operations will be planned and carried out by personnel trained in radiation protection and who will be using proper equipment. During such activities, personnel will be monitored for exposure to radiation and contamination. When major maintenance, repair, surveillance, and refueling tasks are completed, the experience gained from these activities will be factored into the radiation protection procedures and enhance future job procedures and techniques to reduce personnel exposures. The licensee anticipates improvements in robotics, remote surveillance, remote tooling, decontamination, improved computer resources, etc. to be factors in the future toward achieving ALARA doses. If the projected total person-rem increases during the extended years, higher levels of supervision and management oversight will be employed to audit and approve the ALARA reviews. In addition, the station and general office health physics staff will be available for advice, consultation, and review of any tasks with a relatively high potential radiological hazard.

The licensee has established an ALARA committee at each station consisting of management and representatives from various plant operating groups, including liaison from the general office health physics staff. The purpose of this committee is to 1) conduct and appraise the effectiveness of the ALARA program at the nuclear facility, 2) ensure that it is properly implemented at each Duke Unit, and 3) confirm that it appropriately integrates Duke management philosophy and NRC regulatory requirements and guidance. The licensee has a radiation protection and ALARA program which has been recognized by the NRC staff as adequate overall in the Systematic Assessment of License Performance (SALP) from 1980 to 1986 (Category 2 rating), "Inspection Report" (50-269/86-05, 50-270/86-05, 50-287/86-05) and in recent discussions with NRC Region II inspectors. We, therefore, concur that Oconee Nuclear Station has an adequate health physics organization, radiation protection program, and that personnel are trained for the additional years of operation. We further conclude that the updated Final Safety Analysis Report (FSAR) for Oconee (Operational Radiation Protection) is in accordance with 10 CFR Part 20 and is consistent with the criteria of Regulatory Guide 8.8. Thus, we find the ALARA program and practices to be acceptable.

3.2 Dose Assessment

The licensee provided tables specifying person-rem exposures at Oconee Units 1, 2 and 3 by plant system independent of when these exposures were obtained (e.g., during normal operations, maintenance, repair, or refueling activities) and by whom (e.g., plant operations personnel, plant maintenance personnel, or contractor/vendor personnel). The NRC staff has audited the licensee's dose assessment for the extended years (2007-2014) against the criteria of Standard Review Plan (SRP) Section 12.3. The licensee based the estimate on 11 years of operating experience, engineering judgment and on personnel exposure at Oconee Units 1, 2 and 3 for the years 1974 through 1984. The licensee expects the additional years of operation of Oconee Nuclear Station to result in an average of 1200 person-rem per year

for all three units. Currently, operating Pressurized Water Reactors (PWRs) average more than 530 person-rems per unit annually (1983 through 1985) with some plants experiencing an annual dose as high as 1300 person-rems. These average doses are based on widely varying yearly doses at PWRs.

3.3 Conclusion on Radiation Protection

Based on the above, we conclude that the licensee's dose assessment is acceptable and the Oconee radiation protection program is adequate for ensuring that occupational radiation exposures will be maintained in accordance with ALARA guidelines and in compliance with 10 CFR Part 20 requirements.

3.4 Pressure Vessel Toughness

The licensee for the Oconee Nuclear Station, in response to the requirements of 10 CFR 50.61, "Fracture Toughness Requirements For Protection Against Pressurized Thermal Shock Events," submitted information on the projected values of the RT_{PTS} to the expiration of their current operating licenses, i.e., November 6, 2007. RT_{PTS} means the reference temperature which is a calculated value and is used as a screening criterion.

In the pressurized thermal shock (PTS) evaluation, the NRC staff found that Oconee Units 1 and 3 will not reach the screening criterion within the projected 40 calendar years of operation. However, for Oconee Unit 2, the staff estimated that for 40 calendar years of operation (32 effective full power years at an 80% load factor), the $RT_{PTS} = 309.7^{\circ}\text{F}$, i.e., it will exceed the applicable 10 CFR Part 50.61 screening criterion of 300°F .

For the proposed license extension, the licensee submitted RT_{PTS} projection for Oconee Unit 2 for 40 calendar years of operation but with a load factor of .74 from January 1986 to October 2013 (Reference 2). The following evaluation concerns the proposed license extension for Oconee Unit 2.

In the Oconee Unit 2 PTS evaluation, the NRC staff estimated that at the expiration of the current operating license in November 2007, the plant would accumulate about 25 effective full power years (with an 80% load factor) and the RT_{PTS} will reach 292°F . The licensee now proposes to project a 74% utilization factor and increase RT_{PTS} to 299°F to complete 40 calendar years of operation, i.e., to October 6, 2013. The justification is that Oconee Unit 2 up to now experienced an average load factor of only 65%. In addition, it is assumed that the Cycle 8 type of low leakage loading will be used for all subsequent cycles. It is estimated that 28.24 effective full power years will be accumulated in 40 calendar years of operation.

In the PTS evaluation, peripheral weld WF-25 was identified as the critical element. For WF-25, the initial $RT_{NDT} = 0^{\circ}\text{F}$, the uncertainty $M = 59^{\circ}\text{F}$, and the chemistry factor = 236.6°F . In the case of a peripheral weld, the maximum azimuthal and maximum axial fluence values are required. Fluence up to and including Cycle 4 was calculated using the DOT code. Beyond Cycle 4, fluence

values were based on extrapolations. The particular method is described in BAW-1845 (Reference 3). The basic assumption for the extrapolation is that the flux above 1.8 MeV at the core edge is proportional to the flux above 1.0 MeV at the inside surface of the core. This is a reasonable assumption which accounts for neutron scattering and energy loss from the edge of the core to the vessel inside surface. The core edge flux was determined with PDQ calculations. Calculations based on BAW-1845 have proven to be accurate. This method of flux estimation is reasonably conservative and acceptable.

For the end of the proposed license expiration date, it is estimated that the plant will experience 28.24 effective full power years (at 74% load factor; January 23, 1986 to October 6, 2013) with a maximum fluence to weld WF-25 of 1.06×10^{19} n/cm².

Then:

$$RT_{PTS} = 59 + 236.6 \times 1.06^{0.27} = 59 + 240.4 = 299.4^\circ\text{F}$$

which is below the applicable 10 CFR 50.61 screening criterion of 300°F and, hence, is acceptable.

In view of:

- (a) the Pressure-Temperature updating requirements for the fracture toughness of the beltline material in 10 CFR Part 50, Appendix G, "Fracture Toughness Requirements", and
- (b) the fact that the RT_{PTS} value is readily available from the calculation of the Pressure-Temperature limits, and
- (c) the NRC staff's desire to be informed on the current value of the RT_{PTS} for all PWRs,

we request that the licensee submit a reevaluation of the Oconee Unit 2 RT_{PTS} and a comparison to the prediction of Reference 2 along with future Pressure-Temperature operating limits which are required by 10 CFR Part 50, Appendix G. The Pressurized Thermal Shock (PTS) Rule, 10 CFR 50.61, requires that the projected assessment of the RT_{PTS} must be updated whenever changes in core loadings, surveillance measurements or other information (including changes in capacity factor) indicate a significant change in the projected values. This ensures that the licensees will track the accumulated fluence for the limiting beltline materials throughout the life of the plant to verify that their assumptions remain valid.

3.5 Conclusion on Pressure Vessel Toughness

Based on the above, we conclude that the licensee's evaluation provides adequate assurance that the Oconee Unit 2 reactor vessel will not exceed the PTS screening criterion of 300°F at the proposed license expiration date of October 6, 2013. The licensee's evaluation is based on a projected utilization factor of 74% and no change in future fuel cycles (i.e., a low leakage core). Based on actual experience at the Oconee Nuclear Station, the

utilization factor is closer to 65%. The licensee expects the actual utilization factor not to exceed 74% for the remaining period until 2013. Based on past experience, we agree that it is reasonable to expect plant performance will not exceed this value. We have reviewed the licensee's evaluation and we find it acceptable, provided that the PTS screening criterion is not exceeded and all measures taken to stay below 300°F. In any event, the requirements of 10 CFR 50.61 will assure that plant operation remains within an acceptable range. For Oconee Units 1 and 3, we also find them acceptable in that adequate assurance is provided that they also will not exceed the PTS screening criterion.

3.6 Effects Upon Systems and Equipment

The licensee's request for extension of the operating licenses is based on the fact that a 40-year service life was considered during the design and construction of the plant. This does not mean that some components will not wear out during the plant lifetime. Rather, design features were incorporated which provide for inspectability of structures, systems and equipment. Surveillance and maintenance practices which were implemented in accordance with the ASME code and the facility Technical Specifications provide assurance that any unexpected degradation in plant equipment will be identified and corrected. The design of the reactor vessel and its internals considered the effects of 40 years of operation, and a comprehensive vessel material surveillance program is maintained in accordance with 10 CFR Part 50, Appendix H. Surveillance capsules placed inside the reactor vessels provide a means of monitoring the cumulative effects of power operation.

Aging analyses have been performed for all safety-related electrical equipment in accordance with 10 CFR 50.49, "Environmental qualification of electrical equipment important to safety for nuclear power plants," identifying qualified lifetimes for this equipment. These lifetimes will be incorporated into plant equipment maintenance and replacement practices to ensure that all safety-related electrical equipment remains qualified and available to perform its safety function regardless of the overall age of the plant.

3.7 Summary of Findings

Based upon the above, we find that extension of the operating licenses for Oconee Nuclear Station, Units 1, 2 and 3, to allow a 40-year service life is consistent with the safety analyses for the Oconee Station and that the Commission's previous safety findings are not changed. All issues associated with plant systems and equipment, including aging and changes in fracture toughness properties of materials, have been addressed and are acceptable for 40 years of operation. The site continues to meet the guidelines of 10 CFR Part 100. Accordingly, we find the proposed change to the expiration dates of the Oconee Nuclear Station, Units 1, 2 and 3, Facility Operating Licenses to be acceptable.

4.0 ENVIRONMENTAL CONSIDERATION

An Environmental Assessment and Finding of No Significant Impact relating to the proposed extension of the Facility Operating Licenses' termination dates for the Oconee Nuclear Station, Units 1, 2 and 3, was published in the Federal Register on January 29m 1987 (52 FR 2964).

5.0 CONCLUSION

We have 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, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Dated: January 30, 1987

Principal Contributors: J. Minns, L. Lois

REFERENCES

1. Letter from H. B. Tucker, Duke Power Company, "Oconee Nuclear Station, Dockets Nos. 50-269, -270, -287," dated January 14, 1986.
2. Letter from H. B. Tucker, Duke Power Company, to H. R. Denton, "Oconee Nuclear Station, Dockets Nos. 50-269, -270, -287," dated April 10, 1986.
3. BAW-1845, "Pressure Vessel Fluence Analysis for 177-FA Reactors," C. L. Whitmarsh, Babcock & Wilcox, Lynchburg, Virginia, dated June 1978.