

April 30, 1987

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

Mr. H. B. Tucker, Vice President  
Nuclear Production Department  
Duke Power Company  
422 South Church Street  
Charlotte, North Carolina 28242

Dear Mr. Tucker:

Subject: Issuance of Amendment Nos. 158, 158, and 155 to Facility Operating Licenses DPR-38, DPR-47, and DPR-55 - Oconee Nuclear Station, Units 1, 2, and 3 (TAC Nos. 61377, 61378, 61379)

The Nuclear Regulatory Commission has issued the enclosed Amendment Nos. 158, 158, and 155 to Facility Operating Licenses Nos. DPR-38, DPR-47 and DPR-55 for the Oconee Nuclear Station, Units 1, 2, and 3. These amendments consist of changes to the Station's common Technical Specifications (TSs) in response to your request dated February 12, 1986, as revised on October 10 and additional information sent on October 20, 1986.

The amendments revise the TSs to describe the operation and maintenance of the containment hydrogen recombiner system which will be the primary method for maintaining hydrogen concentration in the post-accident atmosphere below the deflagration limit. The Hydrogen Purge System which presently contributes to hydrogen control will be available as a backup system if needed.

A copy of our Safety Evaluation is also included. Notice of issuance of the enclosed amendments will be included in the Commission's bi-weekly Federal Register notice.

Sincerely,

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Helen N. Pastis, Project Manager  
Project Directorate II-3  
Division of Reactor Projects - I/II

Enclosures:

1. Amendment No. 158 to DPR-38
2. Amendment No. 158 to DPR-47
3. Amendment No. 155 to DPR-55
4. Safety Evaluation

cc w/enclosures: See next page

PDII-3/DRP-I/II  
MDuncan/rad  
04/16/87

PDII-3/DRP-I/II  
HPastis  
04/16/87

PDII-3/DRP-I/II  
BJYoungblood  
04/30/87

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Mr. H. B. Tucker  
Duke Power Company

Oconee Nuclear Station  
Units Nos. 1, 2 and 3

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

DUKE POWER COMPANY

DOCKET NO. 50-269

OCONEE NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 158  
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 Power Company (the licensee) dated February 12, 1986, as revised October 10 and additional information sent on October 20, 1986, 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 set forth in 10 CFR Chapter 1;
  - D. The issuance of this license 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 amended by changes to the Technical Specifications as indicated in the attachments to this license amendment, and Paragraph 3.B of Facility Operating License No. DPR-38 is hereby amended to read as follows:

3.B Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 158, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

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

FOR THE NUCLEAR REGULATORY COMMISSION

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B.J. Youngblood, Director  
Project Directorate II-3  
Division of Reactor Projects - I/II

Attachment:  
Technical Specification  
Changes

Date of Issuance: April 30, 1987

PDII-3/DRP-I/II  
MDuncan/rad  
04/16/87

PDII-3/DRP-I/II  
HPastis  
04/16/87

OGC-Bethesda  
CWoodward  
04/20/87

PDII-3/DRP-I/II  
BJYoungblood  
04/30/87



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

DUKE POWER COMPANY

DOCKET NO. 50-270

OCONEE NUCLEAR STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No.158  
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 1 (the facility) Facility Operating License No. DPR-47 filed by the Duke Power Company (the licensee) dated February 12, 1986, as revised October 10 and additional information sent on October 20, 1986, 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 set forth in 10 CFR Chapter 1;
  - D. The issuance of this license 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 amended by changes to the Technical Specifications as indicated in the attachments to this license amendment, and Paragraph 3.B of Facility Operating License No. DPR-47 is hereby amended to read as follows:

3.B Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 158, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

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

FOR THE NUCLEAR REGULATORY COMMISSION

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B.J. Youngblood, Director  
Project Directorate II-3  
Division of Reactor Projects - I/II

Attachment:  
Technical Specification  
Changes

Date of Issuance: April 30, 1987

PDII-3/DRP-I/II  
MDuncan/rad  
04/16/87

PDII-3/DRP-I/II  
HPastis  
04/16/87

QGC-Bethesda  
04/30/87

PDII-3/DRP-I/II  
BJYoungblood  
04/30/87



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

DUKE POWER COMPANY

DOCKET NO. 50-287

OCONEE NUCLEAR STATION, UNIT 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 155  
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 1 (the facility) Facility Operating License No. DPR-38 filed by the Duke Power Company (the licensee) dated February 12, 1986, as revised October 10 and additional information sent on October 20, 1986, 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 set forth in 10 CFR Chapter 1;
  - D. The issuance of this license 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 amended by changes to the Technical Specifications as indicated in the attachments to this license amendment, and Paragraph 3.B of Facility Operating License No. DPR-55 is hereby amended to read as follows:

3.B Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 155, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

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

FOR THE NUCLEAR REGULATORY COMMISSION

151

B.J. Youngblood, Director  
Project Directorate II-3  
Division of Reactor Projects - I/II

Attachment:  
Technical Specification  
Changes

Date of Issuance: April 30, 1987

PDII-3/DRP-I/II  
MDuncan/rad  
04/16/87

PDII-3/DRP-I/II  
HPastis  
04/16/87

OGC-Bethesda  
04/20/87

PDII-3/DRP-I/II  
BJYoungblood  
04/30/87

ATTACHMENT TO LICENSE AMENDMENTS

AMENDMENT NO. 158 TO DPR-38

AMENDMENT NO. 158 TO DPR-47

AMENDMENT NO. 155 TO DPR-55

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

Replace the following pages of the Appendix "A" Technical Specifications with the attached pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change.

<u>Remove Page</u>	<u>Insert Page</u>
3.16-1	3.16-1
--	3.16-2
4.4-17	4.4-17
4.4-18	4.4-18
4.4-19	--

### 3.16 CONTAINMENT HYDROGEN CONTROL SYSTEMS

#### Applicability

Applies to the Containment Hydrogen Recombiner System (including portable hydrogen recombiner unit and the Hydrogen Recombiner System flow path) and the Reactor Building Hydrogen Purge System whenever any Oconee unit is above cold shutdown conditions.

#### Objective

To define the conditions necessary to assure the availability of adequate containment hydrogen control capability.

#### Specifications

- 3.16.1 The Containment Hydrogen Control Systems shall be operable as follows:
- a. A portable hydrogen recombiner unit shall be operable and available for connection to the affected unit.
  - b. If no portable hydrogen recombiner unit is operable and available for connection to the affected unit, a portable hydrogen recombiner unit shall be restored to an operable status within 7 days.
  - c. If the conditions in 3.16.1.b cannot be satisfied, the Reactor Building Hydrogen Purge System shall be verified operable within the next 48 hours.
  - d. With the Reactor Building Hydrogen Purge System operable, restore a hydrogen recombiner unit to operating status within 30 days or submit a report to the NRC within the next 30 days describing the circumstances resulting in inoperable equipment and plans for returning the equipment to service and for any interim surveillance testing of the purge system.
  - e. With a portable hydrogen recombiner unit operable, the Reactor Building Hydrogen Purge System is not required to be operable.
- 3.16.2 If the conditions under Technical Specification 3.16.1.c are not met, the Oconee Units shall be in hot shutdown within the next 12 hours and in cold shutdown in an additional 24 hours.
- 3.16.3 Components in the Containment Hydrogen Control Systems' flow path shall be operable on each Oconee unit with the following exceptions.
- a. If the flow path is inoperable it shall be restored to operable status within 7 days.
  - b. If an inoperable flow path is not restored to operable status within 7 days, then the affected unit shall be at hot shutdown within the next 12 hours and at cold shutdown within an additional 24 hours.

## Bases

The Containment Hydrogen Control Systems are required at approximately 460 hours (19.2 days) following a LOCA to limit hydrogen concentration to 4.1 percent by volume.

The Containment Hydrogen Recombiner System is utilized as the primary method to maintain the post-accident containment atmosphere hydrogen concentration below its lower flammability limit of 4.1 percent by volume. The Containment Hydrogen Recombiner System includes a portable hydrogen recombiner which will be moved to the affected unit following a LOCA, anchored to its foundation, and connected to piping penetrations. Also included is a portable control panel, which will be locally mounted near the recombiner, anchored to its foundation and connected to its motor control center and the recombiner.

The Reactor Building Hydrogen Purge System is composed of a portable purging station and a portion of the Penetration Room Ventilation System. The purge system is operated as necessary (if the Containment Hydrogen Recombiner System is inoperable) to maintain the hydrogen concentration below the control limit.

The Containment Hydrogen Recombiner System is the preferable method of post-accident hydrogen control since it produces no radioactive gaseous release to the atmosphere. Therefore, the Containment Hydrogen Recombiner System will be utilized as the primary method to control the containment hydrogen concentration below 4.1 percent by volume.

## Reference

FSAR, Section 15.16

#### 4.4.3 CONTAINMENT HYDROGEN CONTROL SYSTEMS

##### Applicability

Applies to the Containment Hydrogen Control Systems.

##### Objective

To verify that the Containment Hydrogen Control Systems are operable.

##### Specifications

##### 4.4.3.1 Containment Hydrogen Recombiner System In-place Testing

During each refueling outage, an in-place system test shall be performed on a recombiner unit. This test shall consist of:

- a. Visual inspection of the system.
- b. Connection of the hydrogen recombiner unit to the Reactor Building.
- c. Hydrogen recombiner unit operation in the post-LOCA configuration with flow greater than 50 SCFM. Operation at recombination temperature is not required by this test.

##### 4.4.3.2 Containment Hydrogen Recombiner System Operational Performance Testing

- a. The testing requirement of this section may be performed without connecting the system to one of the Reactor Buildings.
- b. The isolation flanges on the Containment Hydrogen Recombiner System permanent piping shall be leak tested on each unit at refueling to ensure adequate isolation.
- c. At a refueling outage frequency:
  1. Calibrate all recombiner instrumentation and control circuits.
  2. Operate a recombiner unit at design flow rate  $\pm 10\%$  and allow unit to reach recombination temperature.

##### 4.4.3.3 Reactor Building Hydrogen Purge System Testing

- a. Prior to declaring this system operable, a system test shall be performed.
- b. This test shall consist of:
  1. Visual inspection of the system.

2. Installation of new carbon and HEPA filters and in-place filter leakage test per ANSI-N510-1975 (minimum DOP efficiency 99%, minimum halogenated hydrocarbon removal 99%).
3. Connection of the system to a Reactor Building.
4. Flow measurement using flow instruments in the portable purging station.
5. Verification that the pressure drop across the combined HEPA filters and charcoal adsorber banks is less than six inches of water at the system design flow rate ( $\pm 10\%$ ).
6. Verification of the operability of the heater at rated power when tested in accordance with ANSI N510-1975.

#### Bases

The control panel mounted near the recombiner enables the operator to control and monitor system parameters for all functions of the recombiner system except containment isolation valve operation. The control and monitor functions include: process temperature indications, temperature control, flow indication, start/stop switch, low temperature timer and various annunciators. Therefore, the operational performance testing ensures operability.

The penetrations to and from the hydrogen recombiner are shared with the gaseous radiation monitoring pump. Since this pump is normally in operation and since there is no system isolation valve on the supply branch to the recombiner, the blind flanges are the only means of system isolation. Therefore, these flange joints should be leak tested periodically to ensure adequate isolation.

The hydrogen recombiner unit performance test should be conducted with full flow and with the heaters energized. The capability of the recombiner to achieve the required recombination temperature and flow rate is considered an adequate test of recombination efficiency. Gas inlet and outlet sampling is not required.

The pre-operational testing requirements for the Reactor Building Hydrogen Purge System are applicable only when the system is required to be operable as required by Technical Specification 3.16.1.c. Requirements for interim surveillance testing of the Reactor Building Hydrogen Purge System during any period of its required operability will be reported to the NRC as described in Technical Specification 3.16.1.d.

New carbon and HEPA filters are installed during pre-operational testing. HEPA filters are installed before the charcoal adsorbers to prevent clogging of the iodine adsorbers. The charcoal adsorbers are installed to reduce the potential release of radioiodine. Bypass leakage for the charcoal adsorbers and particulate removal efficiency for HEPA filters are determined by halogenated hydrocarbon and DOP, respectively.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
SUPPORTING AMENDMENT NO. 158 TO FACILITY OPERATING LICENSE NO. DPR-38  
AMENDMENT NO. 158 TO FACILITY OPERATING LICENSE NO. DPR-47  
AMENDMENT NO. 155 TO FACILITY OPERATING LICENSE NO. DPR-55

DUKE POWER COMPANY

OCONEE NUCLEAR STATION, UNITS 1, 2, and 3

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

I. INTRODUCTION

By letter dated February 12, 1986 as revised on October 10 and supplemented on October 20, 1986. Duke Power Company (the licensee) proposed changes to the Technical Specifications (TSs) of Facility Operating Licenses Nos. DPR-38, DPR-47 and DPR-55 for the Oconee Nuclear Station, Units 1, 2, and 3. These amendments would change the station's common TSs 3.16 and 4.4.3 to describe the operation and maintenance of the Containment Hydrogen Recombiner System (CHRS) which will serve as the primary method for maintaining hydrogen concentration in the post-accident containment atmosphere below the deflagration limit. The October 10, 1986 letter revised the February 12, 1986 application and submitted TS 4.4.3 which was rewritten and rearranged for clarity. The October 20, 1986 letter responded to our request for additional information.

II. DISCUSSION

The Oconee Final Safety Analysis Report (FSAR) describes both purging and recombination as methods for controlling post-accident containment hydrogen concentrations. However, the CHRS is a preferable method of post-accident hydrogen control because it produces no radioactive gaseous release to the atmosphere.

The Hydrogen Purge System which presently contributes to hydrogen control will be available as a backup system, if needed. The licensee has indicated that the assignment of the primary control function to the CHRS will improve the safety of the plant because its capacity for handling containment gases is larger than that of the Hydrogen Purge System. Also, the resulting gases will be recirculated back to the containment after recombination, thus no radioactivity will be released to the atmosphere.

III. EVALUATION

One of the requirements specified in 10 CFR 50.44(c)(3)(ii) "Standards for combustible gas control system in light-water cooled power reactors," of the hydrogen control rule is that plants with purge and repressurization systems

for hydrogen control following a loss of coolant accident (LOCA) must provide an internal recombiner or have the capability for installing an external recombiner following the start of an accident. The licensee chose the latter option and has capability for installing external recombiners in all of the Oconee units. A single recombiner will be shared by the three units. Although the capability for hydrogen recombination is already implemented in the Oconee plant, the present TSs still identify the Hydrogen Purge Systems as the primary method for controlling post-accident hydrogen concentration.

#### Description of the Containment Hydrogen Recombiner System

The licensee requested that TS 3.16 and 4.4.3 be changed to make hydrogen recombination the primary method for controlling hydrogen concentration in the containment after an accident and relegating containment purge as a backup mode of operation. The proposed TS changes are consistent with the standard TS. The recombiner used in the Oconee Nuclear Station is of a standard design - a thermal recombiner of a type presently used in several other plants. The recombiner itself and the power and control cabinet are mounted on two separate skids. The recombiner can be easily moved to the affected unit, anchored to its foundation and connected by flexible metal piping to the Penetration Room Ventilation System (PRVS) piping which runs to and from the containment penetrations. The power and control cabinet will be locally mounted near the recombiners. The recombiner is designed to process 90 scfm of containment gases, however, because of significant pressure drops in the connecting ducts, its actual output will be lower, but will exceed 50 scfm. This flow rate is higher than the operating flow rates in the Hydrogen Purge System. Recombination of hydrogen-air mixtures containing more than 0.5 v/o hydrogen can be made with 95% efficiency.

When connected to the PRVS piping, the recombiner will take the gases containing hydrogen from the containment building, recombine the hydrogen with oxygen from air, and return the resulting gas mixture back to the containment. In this way, no gases containing radioactivity will leave the containment building. All the piping and equipment associated with the recombiner system are designed to withstand a safe shutdown earthquake without a loss of function except for electric power which when interrupted can be manually restored using alternate power sources. Therefore, the design of the recombiner is suitable for performing its intended function.

#### Conclusion

Based on the above considerations, the staff concludes that the assignment of the primary post-accident hydrogen control function to the CHRS and relegation of the Hydrogen Purge System as a backup meet the requirements of General Design Criterion (GDC) 41, "Containment atmosphere cleanup." The staff further concludes that the proposed revision to TS 3.16 and 4.4.3 satisfactorily reflects this change in systems and is consistent with the Standard Technical Specifications. The proposed revisions to the TSs also meet the requirements of GDC 42, "Inspection of Containment atmosphere cleanup systems," and GDC 43 "Testing of containment atmosphere cleanup systems" for inspection and testing of containment atmosphere cleanup systems. The staff, therefore, finds the change to the TS for hydrogen control to be acceptable.

#### IV. ENVIRONMENTAL CONSIDERATION

These amendments involve a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. We have 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 these amendments involve no significant hazards consideration, and there has been no public comment on such finding. Accordingly, these 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 these amendments.

#### V. CONCLUSION

The Commission made a proposed determination that the amendments involve no significant hazards consideration which was published in the Federal Register (52 FR 5853) on February 26, 1987, and consulted with the state of South Carolina. No public comments were received, and the state of South Carolina did not have any comments.

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: April 30, 1987

Principal Contributors: K. Parczewski  
H. Pastis

DATED: April 30, 1987

AMENDMENT NO. 158 TO FACILITY OPERATING LICENSE DPR-38 - Oconee Nuclear Station, Unit 1  
AMENDMENT NO. 158 TO FACILITY OPERATING LICENSE DPR-47 - Oconee Nuclear Station, Unit 2  
AMENDMENT NO. 155 TO FACILITY OPERATING LICENSE DPR-55 - Oconee Nuclear Station, Unit 3

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