August 19, 1996

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Mr. J. W. Hampton
Vice President, Oconee Site
Duke Power Company
P. O. Box 1439
Seneca, SC 29679

SUBJECT: ISSUANCE OF TECHNICAL SPECIFICATION AMENDMENTS - OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3 (TAC NOS. M95679, M95680, M95681)

Dear Mr. Hampton:

The Commission has issued the enclosed Amendment Nos. 217 , 217, and 214 to Facility Operating License Nos. DPR-38, DPR-47, and DPR- 55, respectively, for the Oconee Nuclear Station, Units 1, 2, and 3. These amendments are in response to your application dated June 6, 1996, and supplemental information dated August 1, 1996.

The amendments revise the Technical Specification requirements related to testing of the Low Pressure Service Water pumps and valves, LPSW-4 and LPSW-5, to reflect a design change to remove the Engineered Safeguards signal from the valves.

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

Sincerely,

Original signed by:

David E. LaBarge, Sr. Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

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

Enclosures:
1. Amendment No. 217 to DPR-38
2. Amendment No. 217 to DPR-47
3. Amendment No. 214 to DPR-55
4. Safety Evaluation

cc w/enclosures: See next page

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

August 19, 1996

Mr. J. W. Hampton
Vice President, Oconee Site
Duke Power Company
P. O. Box 1439
Seneca, SC 29679

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4. Safety Evaluation

cc w/enclosures: See next page

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

DUKE POWER COMPANY

DOCKET NO. 50-269

OCONEE NUCLEAR STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 217
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 June 6, 1996, and supplemental information dated August 1, 1996, 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, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and Paragraph 3.B of Facility Operating License No. DPR-38 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 217, 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, to be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specifications
Changes

Date of Issuance: August 19, 1996

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

DUKE POWER COMPANY

DOCKET NO. 50-270

OCONEE NUCLEAR STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 217
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-38 filed by the Duke Power Company (the licensee) dated June 6, 1996, and supplemental information dated August 1, 1996, 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, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and Paragraph 3.B of Facility Operating License No. DPR-47 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 217, 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, to be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specifications
Changes

Date of Issuance: August 19, 1996

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

DUKE POWER COMPANY

DOCKET NO. 50-287

OCONEE NUCLEAR STATION, UNIT 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 214
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-38 filed by the Duke Power Company (the licensee) dated June 6, 1996, and supplemental information dated August 1, 1996, 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, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and Paragraph 3.B of Facility Operating License No. DPR-38 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 214, 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, to be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Technical Specifications
Changes

Date of Issuance: August 19, 1996

ATTACHMENT TO LICENSE AMENDMENT NO. 217

FACILITY OPERATING LICENSE NO. DPR-38

DOCKET NO. 50-269

AND

TO LICENSE AMENDMENT NO. 217

FACILITY OPERATING LICENSE NO. DPR-47

DOCKET NO. 50-270

AND

TO LICENSE AMENDMENT NO. 214

FACILITY OPERATING LICENSE NO. DPR-55

DOCKET NO. 50-287

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

REMOVE	INSERT
4.5-1	4.5-1
4.5-2	4.5-2 *
4.5-3	4.5-3

* overflow page - no change

4.5 EMERGENCY CORE COOLING SYSTEMS AND REACTOR BUILDING COOLING SYSTEM PERIODIC TESTING

4.5.1 Emergency Core Cooling Systems

Applicability

Applies to periodic testing requirements for the Emergency Core Cooling Systems.

Objective

To verify that the Emergency Core Cooling Systems are operable.

Specification

4.5.1.1 System Tests

4.5.1.1.1 High Pressure Injection System

a. During each refueling outage, a system test shall be conducted to demonstrate that the system is operable. A test signal will be applied to demonstrate actuation of the High Pressure Injection System for emergency core cooling operation.

b. The test will be considered satisfactory if control board indication verifies that all components have responded to the actuation signal properly; all appropriate pump breakers shall have opened or closed and all valves shall have completed their travel.

4.5.1.1.2 Low Pressure Injection System

a. During each refueling outage, a system test shall be conducted to demonstrate that the system is operable. The test shall be performed in accordance with the procedure summarized below:

(1) A test signal will be applied to demonstrate actuation of the Low Pressure Injection System for emergency core cooling operation.

(2) Verification of the engineered safety features function of the Low Pressure Service Water pumps and manual alignment from the control room of valves LPSW-4 and LPSW-5 shall be made to demonstrate operability of the Low Pressure Injection coolers. [1]

b. The test will be considered satisfactory if control board indication verifies that all components have responded to the ES actuation signal properly; all appropriate ES actuated pump breakers shall have opened or closed, and all ES actuated valves shall have completed their travel. In addition, valves LPSW-4 and LPSW-5 shall have completed their travel.

[1] The ES function of valves LPSW-4 and LPSW-5 shall be verified during each refueling outage. This surveillance requirement may be discontinued and replaced by the valve surveillance in 4.5.1.1.2.a.(2) when the ES signals are removed from LPSW-4 and LPSW-5. Removal of the ES signal from valves LPSW-4 and LPSW-5 is scheduled in the U3EOC16, U1EOC17, and U2EOC16 refueling outages successively.

4.5.1.1.3 Core Flooding System

a. During each refueling outage, a system test shall be conducted to demonstrate proper operation of the system. During pressurization of the Reactor Coolant System, verification shall be made that the check and isolation valves in the core flooding tank discharge lines operate properly.

b. The test will be considered satisfactory if control board indication of core flood tank level verifies that all valves have opened.

4.5.1.2 Component Tests

4.5.1.2.1 Valves - Power Operated

a. Valves LP-17, -18, shall only be tested every cold shutdown unless previously tested during the current quarter.

b. During each refueling outage the following LPI system valves shall be cycled manually to verify the manual operability of these power operated valves:

(1) LPI pump discharge (ES) LP-17,-18
(2) LPI discharge throttling LP-12,-14
(3) LPI discharge header crossover LP-9,-10
(4) LPI discharge to HPI/RBS LP-15,-16

4.5.1.2.2 Check Valves

Periodic individual leakage testing[a] of valves CF-12, CF-14, LP-47 and LP-48 shall be accomplished prior to power operation after every time the plant is placed in the cold shutdown condition for refueling, after each time the plant is placed in a cold shutdown condition for 72 hours if testing has not been accomplished in the preceding 9 months, and prior to returning the valve to service after maintenance, repair or replacement work is performed. Whenever integrity of these valves cannot be demonstrated, the integrity of the remaining valve in each high pressure line having a leaking valve shall be determined and recorded daily. In addition, the position of the other closed valve located in the high pressure piping shall be recorded daily. For the allowable leakage rates and limiting conditions for operation, see Technical Specification 3.1.6.10.

Bases

The Emergency Core Cooling Systems are the principle reactor safety features in the event of loss of coolant accident. The removal of heat from the core provided by these systems is designed to limit core damage.

The High Pressure Injection System under normal operating conditions has one pump operating. The HPI system test required by Specification 4.5.1.1.1 verifies that the HPI system responds as required to actuation of ES channels 1 and 2.

(a) To satisfy ALARA requirements, leakage may be measured indirectly (as from the performance of pressure indicators) if accomplished in accordance with approved procedures and supported by computations showing that the method is capable of demonstrating valve compliance with the leakage criteria.

The LPI system test required by Specification 4.5.1.1.2 verifies that the LPI system responds as required to actuation of ES channels 3 and 4. In addition, this test verifies that the LPSW pumps respond as required to actuation of ES channels 3 and 4 and that LPSW-4 and -5 (LPSW supply valves to LPI coolers) respond as required to manual alignment from the control room. The test required by Specification 4.5.3 verifies the containment heat removal capability of the LPI coolers (in conjunction with the RBCUs and RB Spray system).

The low pressure injection pumps are tested singularly for operability by opening the borated water storage tank outlet valves and the bypass valves in the borated water storage tank fill line. This allows water to be pumped from the borated water storage tank through each of the injection lines and back to the tank.

Testing the manual operability of power-operated valves in the Low Pressure Injection System gives assurance that flow can be established in a timely manner even if the capability to operate a valve from the control room is lost.

With the reactor shut down, the valves in each core flooding line are checked for operability by reducing the Reactor Coolant System Pressure until the indicated level in the core flood tanks verify that the check and isolation valves have opened.

Power Operated Valves LP-17 and LP-18, are boundary valves between high pressure and low pressure design piping. As such, functional testing of these valves is performed during cold shutdown conditions when the Reactor Coolant System pressure is below the design pressure of the Low Pressure Injection System piping and the potential for over-pressurization of the low pressure system is eliminated. Check Valves CF-12, CF-14, LP-47, and LP-48 are located on the high pressure piping and therefore can be leak tested with the Reactor Coolant System at hot shutdown conditions.

REFERENCE

(1) FSAR, Section 6

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 217 TO FACILITY OPERATING LICENSE NO. DPR-38

AMENDMENT NO. 217 TO FACILITY OPERATING LICENSE NO. DPR-47

AND AMENDMENT NO. 214 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

1.0 INTRODUCTION

By application dated June 6, 1996, as supplemented by letter dated August 1, 1996, Duke Power Company (the licensee) proposed amendments to the Technical Specifications (TS) for the Oconee Nuclear Station (ONS) Units 1, 2, and 3. The requested changes would revise the Technical Specification surveillance requirements related to testing of the Low Pressure Service Water (LPSW) pumps and valves to reflect a design change to remove the Engineered Safeguards (ES) signal from the valves. The proposal would change the low pressure injection system refueling outage test from verification of the operability of the LPSW system that supplies cooling water to the low pressure coolers, to verification of the operability of the LPSW pumps and manual alignment of valves LPSW-4 and LPSW-5. The August 1, 1996, letter provided clarifying information that did not change the scope of the June 6, 1996, application and the initial proposed no signficant hazards consideration determination.

2.0 BACKGROUND

The licensee is upgrading the Emergency Condenser Circulating Water system to resolve several service water issues. One of these issues, Violation 93-25-03, Example A, "Inadequate Net Positive Suction Head for LPSW Pumps," found that the net positive suction head available (NPSHa) for the LPSW pumps would be less than the NPSH required (NPSHr) under certain design basis conditions. These conditions involve the loss-of-coolant accident (LOCA) concurrent with a loss of offsite power (LOOP), a single failure of one of the LPSW pumps, and a loss of instrument air. The loss of instrument air would cause the LPSW flow control valves that normally control flow to the low pressure injection (LPI) coolers to fail open, resulting in the potential for inadequate NPSH. The concurrent flow demand by non-essential LPSW loads would also impact the ability to maintain adequate NPSH, which would continue to exist until operator actions could be taken to isolate non-essential loads and reduce flow to the coolers.

3.0 SYSTEM DESCRIPTION

The LPSW system provides cooling water for normal and emergency services throughout the station. Safety-related functions served are the reactor building cooling units, decay heat removal coolers, high pressure injection pump motor bearing coolers, motor-driven emergency feedwater pump motor coolers, and turbine-driven emergency feedwater pump cooling water jacket. Oconee Units 1 and 2 have a shared LPSW system that includes three pumps and Unit 3 has its own LPSW system that includes two pumps.

The present design requires Engineered Safeguards Channels 3 and 4 to actuate at either 550 psig reactor coolant system (RCS) pressure or 3 psig reactor building (RB) pressure. Actuation of these channels, which would occur several seconds after a LOCA, automatically opens valves LPSW-4 and LPSW-5 on the affected Oconee unit to admit LPSW flow through the A and B LPI coolers respectively. Initially, following actuation of the ES signals, the LPI System would be operating in the injection mode, taking suction from the borated water storage tank (BWST). When a specified minimum level is reached in the BWST, operators would establish the recirculation mode for injection into the RCS by aligning LPI pump suction to the Reactor Building Emergency Sump (RBES). Because the water in the BWST is at low (ambient) temperature and the water in the RBES would be elevated due to the LOCA, LPSW cooling water flow through the LPI coolers is only necessary for removing heat from the LPI while in the RBES recirculation mode. The BWST contains enough water inventory to support LPI injection for at least 30 minutes after a large break LOCA.

To provide adequate NPSH during all design basis conditions, the LPSW flow demand after a LOCA/LOOP would be reduced to decrease NPSHr by isolating LPSW flow from any unnecessary loads early in the LOCA/LOOP. However, flow to the LPSW non-essential header cannot be isolated too early without significant equipment damage to turbine-generator equipment that is normally cooled by the LPSW non-essential header.

To resolve the NPSH issue, the licensee has proposed to remove the ES signal that automatically opens valves LPSW-4 and LPSW-5. After establishing RBES recirculation, operators would then isolate flow to the LPSW non-essential header and throttle open LPSW-4 and LPSW-5 from the control room. This will maintain LPSW flow demand low enough so that the NPSHa remains greater than NPSHr.

Removal of the ES signal requires a change to the surveillance test specified in TS 4.5.1.1.2.a.(2). This TS requires a functional verification of the ES function of LPSW-4 and LPSW-5 on a refueling outage frequency. Under the proposed change, the reference to ES would be changed so that the test applies to the LPSW pumps, but not to the valves. A further TS change would verify the capability of the operators to open the valves from the control room during the refueling outage test.

4.0 EVALUATION

TS 4.5.1.1.2.a.(2) requires verification of the ES features function of the LPSW system that supplies cooling water to the low pressure coolers in order to verify operability of the coolers. The associated Bases state that the purpose of the surveillance test is to verify that the LPSW pumps and valves LPSW-4 and LPSW-5 respond to actuation of ES Channels 3 and 4.

Presently, automatic opening of LPSW-4 and LPSW-5 upon actuation of ES Channels 3 and 4 simplifies operator action by pre-staging the necessary LPSW cooling flow to the LPI coolers in preparation for operator alignment from the LPI injection mode to the LPI RBES recirculation mode. However, the licensee has determined that removal of the automatic signal from the valves would not significantly affect the burden on the operators during a LOCA. During the first 30 minutes after a LOCA/LOOP, actions performed by the operators would not be affected by the proposed change. During this time, operators would verify proper operation of ES equipment, monitor BWST level, begin switchover to RBES recirculation at the appropriate RBES level, and isolate the LPSW non-essential header after completion of switchover to the recirculation mode. Isolation of the non-essential header would require closing one valve in each header, controls for which will be located in the control room upon completion of the same modification that removes the ES signal from the LPSW valves.

Should instrument air be lost during a LOCA, the air-operated valves that normally control flow through the LPI coolers would fail to their full-open position. With the modification installed, motor-operated valves LPSW-4 and LPSW-5 could be used to throttle LPSW flow through the LPI coolers. The existing design basis takes credit for throttling these valves from the full open position within 30 minutes after a LOCA/LOOP to reduce NPSHr.

The licensee has analyzed the consequences of changing the timing of the opening of the LPSW-4 and LPSW-5 valves from immediately after receipt of the ES signal (which would, therefore, occur prior to establishing recirculation flow from the RBES) to manually opening the cooler outlet valves after RBES flow of hot water through the cooler has been established. The operator actions that would be necessary to establish LPSW cooling water flow to the LPI coolers can be taken within 5 to 10 minutes after switchover to RBES recirculation. Analysis was performed for a 30-minute delay. The licensee determined that this condition will have no significant impact on the reactor building heat removal or environmental qualification requirements, peak containment pressure, potential for thermal effects on the LPI coolers, maintenance of adequate core cooling, and LPI and Building Spray NPSH requirements.

A single failure analysis of the LPSW system performed by the licensee has concluded that no single failure could cause a simultaneous failure of a single LPSW pump and one of the valves required to isolate the LPSW non-essential header, a condition that would result in inadequate NPSH if it occurred. Each valve that is required to close to isolate the LPSW non-essential header is powered from separate power supplies from the power supply for the LPSW pumps. Each of these valves is or will be powered from Class 1E power supplies.

The licensee's probabilistic risk assessment for replacing the automatic actuation of LPSW-4 and LPSW-5 with operator actions determined that the change has a negligible impact on the projected core melt frequency.

By reducing the LPSW flow to the LPI coolers during the initial phase of a design basis accident, the potential exists for the LPSW pumps to be operated below the recommended minimum continuous flow rate of 4250 gpm per pump, or for a stronger pump to deadhead a weaker pump during low flow conditions. To avoid pump damage due to low flow conditions, the licensee will install a minimum flow line for each LPSW pump.

The system modifications, including removal of the ES signals, are presently planned to be implemented during the refueling outages starting in October 1996 for Unit 3, May 1997 for Unit 1, and August 1997 for Unit 2. To reflect the time-dependence of the modification, the licensee has proposed a footnote that will indicate that the present TS requirements will remain in effect for each unit until the modification has been completed for the unit.

The licensee also proposed changes to TS 4.5.1.1.2.b to differentiate between the test acceptance criteria for ES actuated and non-ES actuated components since LPSW-4 and LPSW-5 will become non-ES actuated components. These valves will no longer receive an ES actuation signal; however, the test acceptance criterion will be to ensure that they have completed their travel.

An additional change has been proposed to the Bases to reflect the proposed changes to the TS surveillance requirements.

The staff has evaluated the changes to the TS and the plant modification to remove the automatic operation of the LPSW-4 and LPSW-5 valves and replace it with operator actions to control cooling water flow through the LPI coolers. These actions are within the capability of the operator to perform during an accident condition. In addition, adequate controls and indications will be provided in the control room to operate these valves. There appears to be no adverse safety consequences to the modification to the LPSW system and valves. The licensee will perform tests to demonstrate acceptable LPSW pump operation under minimum flow conditions following completion of the modification. The staff, therefore, has determined that the proposed changes to the TS are appropriate to support the modification. They also provide the necessary surveillance test requirements to ensure operability of the LPSW pumps and valves on a refueling outage frequency. Therefore, the proposed change is acceptable.

5.0 STATE CONSULTATION

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

6.0 ENVIRONMENTAL CONSIDERATION

The amendments change 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 (61 FR 37298). 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.

7.0 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.

Principal Contributor: David E. LaBarge

Dated: August 19, 1996