Mr. Charles M. Dugger Vice President Operations Entergy Operations, Inc. P. O. Box B Killona, LA 70066

June 11, 1997

SUBJECT: ISSUANCE OF AMENDMENT NO. 130 TO FACILITY OPERATING LICENSE

NPF-38 - WATERFORD STEAM ELECTRIC STATION, UNIT 3 (TAC NO. M98256)

Dear Mr. Dugger:

The Commission has issued the enclosed Amendment No. 130 to Facility Operating License No. NPF-38 for the Waterford Steam Electric Station, Unit 3. The amendment consists of changes to the Technical Specifications (TSs) in response to your application dated March 27, 1997, as supplemented by letter dated May 6, 1997.

The amendment changes the Appendix A TSs by revising Technical Specification 3/4.5.2, "ECCS Subsystems - Modes 1, 2, and 3." The proposed changes add a surveillance requirement to verify the Emergency Core Cooling System (ECCS) piping is full of water at least once per 31 days, and clarifies wording of surveillance requirement 4.5.2.j. The amendment also revises the TS Bases 3/4.5.2 and 3/4.5.3 to reflect the changes.

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

> Sincerely, ORIGINAL SIGNED BY: Chandu P. Patel, Project Manager Project Directorate IV-1 Division of Reactor Projects III/IV Office of Nuclear Reactor Regulation

Docket No. 50-382

Enclosures: 1. Amendment No. 130 to NPF-38

2. Safety Evaluation

cc w/encls: See next page

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UNITED STATES NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

June 11, 1997

Mr. Charles M. Dugger Vice President Operations Entergy Operations, Inc. P. O. Box B Killona, LA 70066

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Sincerely,

Chandu P. Patel, Project Manager

Project Directorate IV-1

Chandu P. Palel

Division of Reactor Projects III/IV Office of Nuclear Reactor Regulation

Docket No. 50-382

Enclosures: 1. Amendment No. 130 to NPF-38

2. Safety Evaluation

cc w/encls: See next page

Mr. Charles M. Dugger Entergy Operations, Inc.

cc:

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UNITED STATES NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

ENTERGY OPERATIONS, INC.

DOCKET NO. 50-382

WATERFORD STEAM ELECTRIC STATION, UNIT 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 130 License No. NPF-38

- 1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Entergy Operations, Inc. (the licensee) dated March 27, 1997, as supplemented by letter dated May 6, 1997, 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 2.C(2) of Facility Operating License No. NPF-38 is hereby amended to read as follows:
 - (2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 130, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance to be implemented within 60 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Chandu P. Patel

Chandu P. Patel, Project Manager Project Directorate IV-1 Division of Reactor Projects III/IV Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical

Specifications

Date of Issuance: June 11, 1997

ATTACHMENT TO LICENSE AMENDMENT NO. 130

TO FACILITY OPERATING LICENSE NO. NPF-38

DOCKET NO. 50-382

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. The corresponding overleaf pages are also provided to maintain document completeness.

REMOVE PAGES	<u>INSERT PAGES</u>
3/4 5-4	3/4 5-4
3/4 5-7	3/4 5-7
B 3/4 5-2	B 3/4 5-2
B 3/4 5-3	B 3/4 5-3

3/4.5.2 ECCS SUBSYSTEMS - MODES 1, 2, AND 3

LIMITING CONDITION FOR OPERATION

- 3.5.2 Two independent emergency core cooling system (ECCS) subsystems shall be OPERABLE with each subsystem comprised of:
 - a. One OPERABLE high-pressure safety injection pump,
 - b. One OPERABLE low-pressure safety injection pump, and
 - c. An independent OPERABLE flow path capable of taking suction from the refueling water storage pool on a safety injection actuation signal and automatically transferring suction to the safety injection system sump on a recirculation actuation signal.

APPLICABILITY: MODES 1, 2, and 3*#.

ACTION:

- a. With one ECCS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.
- b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date. The current value of the usage factor for each affected safety injection nozzle shall be provided in this Special Report whenever its value exceeds 0.70.

^{*}With pressurizer pressure greater than or equal to 1750 psia. #With RCS average temperature greater than or equal to 500°F.

SURVEILLANCE REQUIREMENTS

- 4.5.2 Each ECCS subsystem shall be demonstrated OPERABLE:
 - a. At least once per 12 hours by verifying that the following valves are in the indicated positions with the valves key-locked shut:

<u>Valv</u>	e Number	<u>Val</u>	re Function	<u>Val</u>	<u>re Position</u>
a.	2SI-V1556 (SI-506A)	a.	Hot Leg Injection	a .	SHUT
b.	2SI-V1557 (SI-502A)	b.	Hot Leg Injection	b.	SHUT
C.	2SI-V1558 (SI-502B)	C.	Hot Leg Injection	C.	SHUT
d.	2SI-V1559 (SI-506B)	d.	Hot Leg Injection	d.	SHUT

- b. At least once per 31 days by:
 - 1. Verifying that each valve (manual, power-operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.
 - 2. Verifing the ECCS piping is full of water.
- c. By a visual inspection which verifies that no loose debris (rags, trash, clothing, etc.) is present in the containment which could be transported to the safety injection system sump and cause restriction of the pump suctions during LOCA conditions. This visual inspection shall be performed:
 - 1. For all accessible areas of the containment prior to establishing CONTAINMENT INTEGRITY, and
 - 2. Of the areas affected within containment at the completion of containment entry when CONTAINMENT INTEGRITY is established.
- d. At least once per 18 months by:
 - 1. Verifying the action of the open permissive interlock (OPI) and isolation valve position alarms of the shutdown cooling system when the reactor coolant system pressure (actual or simulated) is between 392 psia and 422 psia.

SURVEILLANCE REQUIREMENTS (Continued)

- i. Each time HPSI Pump A/B is placed in or taken out of service in place of HPSI Pump A or B, the pump being placed in service shall be demonstrated OPERABLE by:
 - 1. Verifying that each valve in the flow path is in its correct position; and
 - Verifying the pump starts manually and upon receipt of a SIAS test signal; and
 - 3. Performing Surveillance Requirement 4.5.2f.1., if not previously accomplished within the required frequency.
- j. Following any maintenance which drains portions of the system, by verifying the ECCS piping is full of water.

3/4.5.3 ECCS SUBSYSTEMS - MODES 3 AND 4

LIMITING CONDITION FOR OPERATION

- 3.5.3 As a minimum, one ECCS subsystem comprised of the following shall be OPERABLE:
 - a. One OPERABLE high pressure safety injection pump, and
 - b. An OPERABLE flow path capable of taking suction from the refueling water storage pool on a safety injection actuation signal and automatically transferring suction to the safety injection system sump on a recirculation actuation signal.

APPLICABILITY: MODES 3* and 4.

ACTION:

- a. With no ECCS subsystem OPERABLE, restore at least one ECCS subsystem to OPERABLE status within 1 hour or be in COLD SHUTDOWN within the next 20 hours.
- b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date. The current value of the usage factor for each affected safety injection nozzle shall be provided in this Special Report whenever its value exceeds 0.70.

SURVEILLANCE REQUIREMENTS

4.5.3 The ECCS subsystem shall be demonstrated OPERABLE per the applicable Surveillance Requirements of 4.5.2.

^{*}With pressurizer pressure less than 1750 psia and the RCS average temperature less than 500°F.

BASES

3/4.5.1 SAFETY INJECTION TANKS

The OPERABILITY of each of the Reactor Coolant System (RCS) safety injection tanks ensures that a sufficient volume of borated water will be immediately forced into the reactor core through each of the cold legs in the event the RCS pressure falls below the pressure of the safety injection tanks. This initial surge of water into the core provides the initial cooling mechanism during large RCS pipe ruptures.

The limits on safety injection tank volume, boron concentration, and pressure ensure that the assumptions used for safety injection tank injection in the safety analysis are met.

The safety injection tank power operated isolation valves are considered to be "operating bypasses" in the context of IEEE Std. 279-1971, which requires that bypasses of a protective function be removed automatically whenever permissive conditions are not met. In addition, as these safety injection tank isolation valves fail to meet single failure criteria, removal of power to the valves is required.

The limits for operation with a safety injection tank inoperable for any reason except an isolation valve closed minimizes the time exposure of the plant to a LOCA event occurring concurrent with failure of an additional safety injection tank which may result in unacceptable peak cladding temperatures. If a closed isolation valve cannot be immediately opened, the full capability of one safety injection tank is not available and prompt action is required to place the reactor in a mode where this capability is not required.

3/4.5.2 and 3/4.5.3 ECCS SUBSYSTEMS

The OPERABILITY of two separate and independent ECCS subsystems ensures that sufficient emergency core cooling capability will be available in the event of a LOCA assuming the loss of one subsystem through any single failure consideration. Either subsystem operating in conjunction with the safety injection tanks is capable of supplying sufficient core cooling to limit the peak cladding temperatures within acceptable limits for all postulated break sizes ranging from the double-ended break of the largest RCS cold leg pipe downward. In addition, each ECCS subsystem provides long-term core cooling capability in the recirculation mode during the accident recovery period.

When in mode 3 and with RCS temperature 500°F two OPERABLE ECCS subsystems are required to ensure sufficient emergency core cooling capability is available to prevent the core from becoming critical during an uncontrolled cooldown (i.e., a steam line break) from greater than 500°F.

BASES

ECCS SUBSYSTEMS (Continued)

With the RCS temperature below 350°F, one OPERABLE ECCS subsystem is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the limited core cooling requirements.

The trisodium phosphate dodecahydrate (TSP) stored in dissolving baskets located in the containment basement is provided to minimize the possibility of corrosion cracking of certain metal components during operation of the ECCS following a LOCA. The TSP provides this protection by dissolving in the sump water and causing its final pH to be raised to greater than or equal to 7.0. The requirement to dissolve a representative sample of TSP in a sample of water borated to be representative of post-LOCA sump conditions provides assurance that the stored TSP will dissolve in borated water at the postulated post-LOCA temperatures. A boron concentration of 3011 ppm boron is postulated to be representative of the highest post-LOCA sump boron concentration based on the assumptions used in calculation EC-S96-013. The RWSP, SITs, and RCS maximum boron concentrations assumed are conservative estimates of future anticipated boron concentrations. The assumed maximum boron concentrations for the RWSP and SITs are greater than those currently allowed in Technical Specifications in order to bound future expected increases in required boron concentrations because of longer fuel cycles and higher energy fuel designs. Post-LOCA sump pH will remain between 7.0 and 8.1 for the maximum (3011 ppm) and minimum (1504 ppm) boron concentrations calculated using the maximum and minimum post-LOCA sump volumes and conservatively assumed maximum and minimum source boron concentrations.

With the exception of system in operation, the ECCS pumps are normally in a standby, nonoperating mode. As such, flow path piping has the potential to develop voids and pockets of entrained gases. Maintaining the piping from the ECCS pumps to the RCS full of water ensures that the system will perform properly, injecting its full capacity into the RCS upon demand. This will prevent water hammer, pump cavitation, and pumping noncondensible gas (e.g., air, nitrogen, or hydrogen) into the reactor vessel following an SIAS or during SDC. The 31 day frequency takes into consideration the gradual nature of gas accumulation in the ECCS piping and the adequacy of the procedural controls governing system operation.

The Surveillance Requirements provided to ensure OPERABILITY of each component ensure that at a minimum, the assumptions used in the safety analyses are met and that subsystem OPERABILITY is maintained. Surveillance Requirements for throttle valve position stops and flow balance testing provide assurance that proper ECCS flows will be maintained in the event of a LOCA. Maintenance of proper flow resistance and pressure drop in the piping system to each injection point is necessary to: (1) prevent total pump flow from exceeding runout conditions when the system is in its minimum resistance configuration, (2) provide the proper flow split between injection points in accordance with the assumptions used in the ECCS-LOCA analyses, and (3) provide an acceptable level of total ECCS flow to all injection points equal to or above that assumed in the ECCS-LOCA analyses.

The requirement to verify the minimum pump discharge pressure on recirculation flow ensures that the pump performance curve has not degraded below that used to show that the pump exceeds the design flow condition assumed in the safety analysis and is consistent with the requirements of ASME Section XI.

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3/4.5.4 REFUELING WATER STORAGE POOL (RWSP)

The OPERABILITY of the refueling water storage pool (RWSP) as part of the ECCS also ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. The limits on RWSP minimum volume and boron concentration ensure that (1) sufficient water is available within containment to permit recirculation cooling flow to the core, and (2) the reactor will remain subcritical in the cold condition following mixing of the RWSP and the RCS water volumes with all CEAs inserted except for the most reactive control assembly. These assumptions are consistent with the LOCA analyses.

The contained water volume limit includes an allowance for water not usable because of pool discharge line location or other physical characteristics.

The lower limit on contained water volume, the specific boron concentration and the physical size (approximately 600,000 gallons) of the RWSP also ensure a pH value of between 7.0 and 11.0 for the solution recirculated within containment after a LOCA. This pH band minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components.

The maximum limit on the RWSP temperature ensures that the assumptions used in the containment pressure analysis under design base accident conditions remain valid and avoids the possibility of containment overpressure. The minimum limit on the RWSP temperature is required to prevent freezing and/or boron precipitation in the RWSP.



UNITED STATES NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO.130 TO

FACILITY OPERATING LICENSE NO. NPF-38

ENTERGY OPERATIONS, INC.

WATERFORD STEAM ELECTRIC STATION, UNIT 3

DOCKET NO. 50-382

1.0 INTRODUCTION

By application dated March 27, 1997, as supplemented by letter dated May 6, 1997, Entergy Operations, Inc. (the licensee), submitted a request for changes to the Waterford Steam Electric Station, Unit 3 (Waterford 3), Technical Specifications (TSs). The requested changes would revise Technical Specification 3/4.5.2, "ECCS Subsystems - Modes 1, 2, and 3." The proposed changes add a surveillance requirement to verify the Emergency Core Cooling System (ECCS) piping is full of water at least once per 31 days, and clarifies wording of surveillance requirement 4.5.2.j. The licensee also requested to revise the TS Bases 3/4.5.2 and 3/4.5.3 to reflect new changes.

The May 6, 1997, letter provided additional information that did not change the scope of the initial proposed no siginficant hazards consideration determination.

2.0 **EVALUATION**

The ECCS or Safety Injection System (SIS) is designed to operate following a Loss of Coolant Accident (LOCA). The SIS is comprised of the High Pressure Safety Injection System (HPSI), Low Pressure Safety Injection System (LPSI) and Safety Injection Tanks (SITs). The SIS is activated by the Safety Injection Actuation Signal (SIAS) which is initiated by either low pressurizer pressure or high containment pressure. The SIAS automatically starts the HPSI and LPSI pumps and opens the motor operated valves that provide a flow path from the discharge of these pumps to the reactor coolant system (RCS). The HPSI and LPSI pumps initially take suction from the Refueling Water Storage Pool (RWSP) and deliver borated water to the RCS for the removal of heat generated in the reactor core.

When RCS pressure drops below the SIT cover pressure, the four SITs automatically discharge their contents into the RCS. This independent phase of operation does not rely on operator action or an electrical signal. Check valves inside containment isolate the SITs from the rest of the ECCS systems. From the SI flow control valves outside containment the SI piping rises before entering the containment penetrations forming local piping high points at the

containment penetrations. When the SITs are pressurized, nitrogen laden water may leak past the check valves inside containment and depressurize allowing the nitrogen to come out of solution forming nitrogen gas pockets (voids) at the local piping high point.

Some events in December 1996, and January 1997, at Waterford 3 have revealed that some nitrogen gas pockets are accumulating in the LPSI system piping at the containment penetrations. Vents were not provided in this portion of the LPSI piping during the original Waterford 3 design. To eliminate these voids, the licensee is installing vents in this portion of the LPSI piping during current Refueling Outage (RFO) 8. Similar events have not been identified in the High Pressure Safety Injection (HPSI) system. However, due to similar piping configurations, the licensee indicated that vents will also be added to the HPSI system during RFO 8.

The proposed change to TS 3/4.5.2 will verify that the ECCS is filled with water at least once per 31 days. Verifying the ECCS is full of water at least once per 31 days will provide additional assurance that the system will perform properly, injecting its full capacity into the RCS upon demand. This will also prevent water hammer, pump cavitation, and pumping of noncondensible gas (e.g., air, nitrogen, or hydrogen) into the reactor vessel following an SIAS or during the shutdown cooling mode of operation. The 31 day frequency takes into consideration the gradual nature of gas accumulation in the ECCS piping and the adequacy of the procedural controls governing system operation. This surveillance requirement and frequency are based on the ECCS Specification in NUREG 1432, "Standard Technical Specifications - Combustion Engineering Plants". Therefore, the staff concludes that the proposed change is acceptable.

By letter dated May 6, 1997, licensee requested to clarify wording of surveillance requirement 4.5.2.j to make it consistent with the wording in surveillance requirement 4.5.2.b.2. The proposed change will verify that ECCS piping is full of water. This is a clarification of the requirement and it is acceptable to the staff.

The proposed changes to TS Bases 3/4.5.2 and 3/4.5.3 to reflect new surveillance requirement are also acceptable to the staff.

3.0 STATE CONSULTATION

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

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves 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 amendment involves no significant hazards consideration and there has been no public comment on such finding (62 FR 17234). Accordingly, the amendment meets 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 amendment.

5.0 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 amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: C. Patel

Date: June 11, 1997