Docket No. 50-382

November 17, 1993

Mr. Ross P. Barkhurst
Vice President Operations
Entergy Operations, Inc.
Post Office Box B
Killona, Louisiana 70066

Dear Mr. Barkhurst:

SUBJECT: ISSUANCE OF AMENDMENT NO. 89 TO FACILITY OPERATING LICENSE NPF-38 - WATERFORD STEAM ELECTRIC STATION, UNIT 3 (TAC NO. M87211)

The Commission has issued the enclosed Amendment No. 89 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 August 5, 1993.

The amendment changes the Appendix A Technical Specifications for the Containment Spray System to clarify the requirements for Applicability in Mode 4 and to increase the testing interval for verifying that each containment spray nozzle is unobstructed.

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:
David L. Wigginton, Senior Project Manager
Project Directorate IV-1
Division of Reactor Projects - III/IV/V
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 89 to NPF-38
2. Safety Evaluation

cc w/enclosures:
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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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. 89
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 August 5, 1993, 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. 89 , 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.

FOR THE NUCLEAR REGULATORY COMMISSION

William Beckner

William D. Beckner, Director
Project Directorate IV-1
Division of Reactor Projects - III/IV/V
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: November 17, 1993

ATTACHMENT TO LICENSE AMENDMENT NO. 89

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	INSERT PAGES
3/4 6-16	3/4 6-16
3/4 6-17	3/4 6-17
B 3/4 6-3	B 3/4 6-3

CONTAINMENT SYSTEMS

CONTAINMENT VENTILATION SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.1.7 Each containment purge supply and exhaust isolation valve (CAP 103, CAP 104, CAP 203, and CAP 204) shall be OPERABLE and may be open at no greater than the 52° open position allowed by the mechanical stop for less than 90 hours per 365 days.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

a. With a containment purge supply and/or exhaust isolation valve(s) open for greater than or equal to 90 hours per 365 days at any open position, close the open valve(s) or isolate the penetration(s) within 4 hours, otherwise be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With a containment purge supply and/or exhaust isolation valve(s) having a measured leakage rate exceeding the limits of Surveillance Requirement 4.6.1.7.2, restore the inoperable valve(s) to OPERABLE status within 24 hours, otherwise be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.1.7.1 The cumulative time that the purge supply or exhaust isolation valves are open during the past 365 days shall be determined at least once per 7 days.

4.6.1.7.2 At least once per 3 months* each containment purge supply and exhaust isolation valve with resilient material seals shall be demonstrated OPERABLE by verifying that the measured leakage rate is less than or equal to 0.06 L_a when pressurized to P_a.

4.6.1.7.3 Each containment purge supply and exhaust isolation valve shall be demonstrated OPERABLE during each COLD SHUTDOWN exceeding 24 hours by verifying that the mechanical stops limit the valve opening to a position $\leq$ 52° open.

*Until STARTUP following the first refueling outage, the containment purge supply and exhaust isolation valves shall be tested during each COLD SHUTDOWN exceeding 24 hours unless performed in the previous 92 days.

3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS

CONTAINMENT SPRAY SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.2.1 Two independent containment spray systems shall be OPERABLE with each spray system capable of taking suction from the RWSP on a containment spray actuation signal and automatically transferring suction to the safety injection system sump on a recirculation actuation signal. Each spray system flow path from the safety injection system sump shall be via an OPERABLE shutdown cooling heat exchanger.

APPLICABILITY: MODES 1, 2, 3, and 4*.

ACTION:

With one containment spray system inoperable, restore the inoperable spray system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours; restore the inoperable spray system to OPERABLE status within the next 48 hours or be in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.2.1 Each containment spray system shall be demonstrated OPERABLE:

a. At least once per 12 hours by verifying that the water level in the containment spray header riser is > 149.5 feet MSL elevation.

b. At least once per 31 days by verifying that each valve (manual, power-operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is correctly positioned to take suction from the RWSP.

c. By verifying, that on recirculation flow, each pump develops a total head of greater than or equal to 219 psid when tested pursuant to Specification 4.0.5.

d. At least once per 18 months, during shutdown, by:

   1. Verifying that each automatic valve in the flow path actuates to its correct position on a CSAS test signal.

*With Reactor Coolant System pressure > 400 psia.

SURVEILLANCE REQUIREMENTS (Continued)

2. Verifying that upon a recirculation actuation test signal, the safety injection system sump isolation valves open and that a recirculation mode flow path via an OPERABLE shutdown cooling heat exchanger is established.

3. Verifying that each spray pump starts automatically on a CSAS test signal.

e. At least once per 10 years by performing an air or smoke flow test through each spray header and verifying each spray nozzle is unobstructed.

LIMITING CONDITION FOR OPERATION

3.6.2.2 Two independent groups of containment cooling fans shall be OPERABLE with one fan system to each group.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With one group of the above required containment cooling fans inoperable, restore the inoperable cooling fan to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours; restore the inoperable containment cooling fan to OPERABLE status within the next 48 hours or be in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.2.2 Each group of containment cooling fans shall be demonstrated OPERABLE:

a. At least once per 31 days by:

1. Starting each fan group not already running from the control room and verifying that each fan group operates for at least 15 minutes.

2. Verifying a cooling water flow rate of greater than or equal to 625 gpm to each cooler.

b. At least once per 18 months by:

1. Verifying that each fan group starts automatically on an SIAS test signal.

2. Verifying a cooling water flow rate of greater than or equal to 1325 gpm to each cooler.

3/4.6.1.7 CONTAINMENT VENTILATION SYSTEM (Continued)

Leakage integrity tests with a maximum allowable leakage rate for purge supply and exhaust isolation valves will provide early indication of resilient material seal degradation and will allow the opportunity for repair before gross leakage failure develops. The 0.60 La leakage limit shall not be exceeded when the leakage rates determined by the leakage integrity tests of these valves are added to the previously determined total for all valves and penetrations subject to Type B and C tests.

3/4.6.2 DEPRESSURIZATION AND COOLING SYSTEMS

3/4.6.2.1 and 3/4.6.2.2 CONTAINMENT SPRAY SYSTEM and CONTAINMENT COOLING SYSTEM

The OPERABILITY of the Containment Spray System and the Containment Cooling System ensures that containment depressurization and cooling capability will be available in the event of a LOCA or MSLB for any double-ended break of the largest reactor coolant pipe or main steam line. Under post-accident conditions these systems will maintain the containment pressure below 44 psig and temperatures below 269.3°F during LOCA conditions or 413.5°F during MSLB conditions. The systems also reduce the containment pressure by a factor of 2 from its post-accident peak within 24 hours, resulting in lower containment leakage rates and lower offsite dose rates.

The Containment Spray System also provides a mechanism for removing iodine from the containment atmosphere under post-LOCA conditions to maintain doses in accordance with 10 CFR Part 100 limits as described in Section 6.5.2 of the FSAR.

In MODE 4 when shutdown cooling is placed in operation, the Containment Spray System is realigned in order to allow isolation of the spray headers. This is necessary to avoid a single failure of the spray header isolation valve causing Reactor Coolant System depressurization and inadvertent spraying of the containment. To allow for this realignment, the Containment Spray System may be taken out-of-service when RCS pressure is $\leq$ 400 psia. At this reduced RCS pressure and the reduced temperature associated with entry into MODE 4, the probability and consequences of a LOCA or MSLB are greatly reduced. The Containment Cooling System is required OPERABLE in MODE 4 and is available to provide depressurization and cooling capability.

3/4.6.3 CONTAINMENT ISOLATION VALVES

The OPERABILITY of the containment isolation valves ensures that the containment atmosphere will be isolated from the outside environment in the event of a release of radioactive material to the containment atmosphere or pressurization of the containment and is consistent with the requirements of GDC 54 through GDC 57 of Appendix A to 10 CFR Part 50. Containment isolation within the time limits specified for those isolation valves designed to close automatically ensures that the release of radioactive material to the environment will be consistent with the assumptions used in the analyses for a LOCA.

The opening of locked or sealed closed containment isolation valves on an intermittent basis under administrative control includes the following considerations: (1) stationing an operator, who is in constant communication with control room, at the valve controls, (2) instructing this operator to close these valves in an accident situation, and (3) assuring that environmental conditions will not preclude access to close the valves and that this action will prevent the release of radioactivity outside the containment.

"Containment Isolation Valves", previously Table 3.6-2, have been incorporated into Plant Procedure UNT-005-026.

3/4.6.4 COMBUSTIBLE GAS CONTROL

The OPERABILITY of the equipment and systems required for the detection and control of hydrogen gas ensures that this equipment will be available to maintain the hydrogen concentration within containment below its flammable limit during post-LOCA conditions. Either recombiner unit is capable of controlling the expected hydrogen generation associated with (1) zirconium-water reactions, (2) radiolytic decomposition of water, and (3) corrosion of metals within containment. These hydrogen control systems are consistent with the recommendations of Regulatory Guide 1.7, "Control of Combustible Gas Concentrations in Containment Following a LOCA," March 1971.

3/4.6.5 VACUUM RELIEF VALVES

The OPERABILITY of the primary containment to annulus vacuum relief valves with a setpoint of less than or equal + 0.3 psid ensures that the containment internal pressure differential does not become more negative than the containment design limit for internal pressure differential of 0.65 psi. This situation would occur, for the worst case, if all containment heat removal systems (containment spray, containment cooling, and other HVAC systems) were inadvertently started with only one vacuum relief valve OPERABLE.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 89 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 August 5, 1993, Entergy Operations, Inc. (the licensee), submitted a request for changes to the Waterford Steam Electric Station, Unit 3, Technical Specifications (TSs). The requested changes would modify TS 3.6.2.1 to indicate that the containment spray system may be mode inoperable prior to initiation of shutdown cooling and would modify TS surveillance 4.6.2.1.e to increase the spray nozzle air or smoke test interval from at least once per 5 years to at least one per 10 years.

2.0 EVALUATION

Mode 4 Operation

The containment spray system is one of two containment heat removal systems. The other is the containment cooling system. The containment spray system serves the dual purposes of (1) post-accident containment heat removal and (2) post-accident fission product removal. Should a loss-of-coolant accident (LOCA) or main steam line break (MSLB) accident occur, the containment spray system condenses the steam released to the containment atmosphere, thereby reducing the containment pressure. The containment spray system also provides an iodine removal function. These safety functions are required by the TSs to be operable during MODE 1, MODE 2, MODE 3 and MODE 4, except during shutdown cooling operation.

During normal operation, the reactor coolant system (RCS) conditions are maintained at 2250 psig and approximately 590°F. The normal procedure for bringing the plant to cold shutdown involves cooling and depressurizing the RCS to a temperature of $\leq$350°F and pressure of $\leq$400 psi (i.e., $\approx$392 psi). At this point, MODE 4 conditions are met (i.e., RCS temperature <350°F and k_{eff} <0.99) and shutdown cooling (SDC) operation is initiated. The TSs provide that when this condition (i.e., Mode 4 in shutdown cooling operation) is met, the containment spray systems may be made inoperable. The reason for this TS provision is that during SDC operation, a single spurious actuation of the spray header isolation valve for either containment spray train, would result in diversion of coolant from the RCS into the containment (i.e., a form of

LOCA). The spray header valves at Waterford 3 are of a fail-open design (air is bled off to open them) and thus considered particularly vulnerable to spurious opening. In consideration of this, Bases 3/4.6.2.1 and 3/4.6.2.2 of the TSs state:

> When shutdown cooling is placed in operation, the containment spray system is no longer required OPERABLE in order to allow realignment and isolation of the spray headers. This is necessary to avoid a single failure of the spray header isolation valve causing RCS depressurization and inadvertent spraying of the containment. At the reduced RCS pressure and temperature associated with entry into shutdown cooling, the probability and associated heat loads of a LOCA or MSLB are greatly reduced. The OPERABILITY of the containment cooling system in MODE 4 is sufficient to provide depressurization and cooling capability.

The containment cooling system noted above consists of four fan coolers (two per train) and a ducted distribution system. Each fan cooler has two banks of cooling coils and a two-speed axial fan enclosed in a casing. Three fan coolers are normally operated at high speed. Upon initiation of a safety injection signal, all four fan coolers are operated at low speed.

Realignment of the RCS to shutdown cooling is a step-by-step process. The shutdown procedure involves a period of time during which the containment spray system has been made inoperable, due to the above concern, but SDC is not yet established. During this period, the containment spray systems TS operability requirements are not met. The licensee is therefore required to declare the spray system INOPERABLE, and enter the specified ACTION STATEMENT. This ACTION STATEMENT involves a required plant shutdown. The licensee must also make certain reports and notifications required by the Emergency Plan, 10 CFR Part 50, and plant administrative procedures, even though the plant is already in the process of being shutdown. The amendment proposed by the licensee would explicitly allow containment spray systems to be made inoperable at any time the RCS temperature is <350°F and RCS pressure is also <400 psi (regardless of whether SDC has been initiated). The proper shutdown procedure could then be followed without invoking an entry into the ACTION STATEMENT.

The safety concern is whether the containment is adequately protected from overpressure, and whether 10 CFR Part 100 radiological dose consequence requirements would be met in event of an accident during the transition period of operation. The licensee's application indicates, and the Bases (cited above) state, that the fan coolers are available and have sufficient capacity to provide containment depressurization and cooling, in the event of a LOCA or MSLB at the reduced pressure and temperature conditions of Mode 4. This is confirmed by staff calculations. At normal RCS temperature and pressure conditions, approximately 36% of the break fluid discharged by a LOCA would flash to steam whereas, at the MODE 4 entry conditions, less than 7% of the

break discharge fluid would flash to steam. It can thus be seen that the containment heat challenge is significantly reduced during MODE 4. Accordingly, the facility is adequately protected. (It is noted that, with both containment spray subsystems INOPERABLE and subsequent reliance on the containment cooling system as the sole system for containment heat removal, it is not clear from available analyses whether a single failure vulnerability may exist. However, the period of time involved is very short - less than the associated ALLOWED OUTAGE TIME for loss of one train of containment cooling.)

The sole effect of the proposed change is to eliminate a nuisance administrative burden. The change has no adverse effect on safety, and is therefore acceptable.

Air or Smoke Test

The staff has reviewed the submittal by Entergy Operations, Inc. for the Waterford Steam Electric Station, Unit No. 3 to revise the Surveillance Requirement (SR) 4.6.2.1.e for performing an air or smoke flow test of the Containment Spray System nozzles. The proposed change is to extend the frequency from once every 5 years to once every 10 years. We concur that the proposed TS change is consistent with the Technical Specification Improvement Program as supported in the implemented NUREG-1366 "Improvements to Technical Specification Requirements" and NUREG-1432 "Standard Technical Specifications Combustion Engineering Plants". Both NUREG-1366 (Item 8.1) and NUREG-1432 (SR 3.6.6B.9) suggest a 10-year interval for spray nozzle testing.

The licensee has also determined that the testing and containment conditions are consistent with the increase in the interval for testing. Nozzle clogging at other facilities was as the result of coating materials on carbon steel piping. The piping at Waterford is stainless steel. The last test at Waterford of the spray nozzles was in April 1988, and the nozzles were verified open. We agree that the plant conditions warrant the extension of the test interval for the Waterford spray nozzles. This TS change is acceptable.

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 (58 FR 48383). 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: W. Long
D. Wigginton

Date: November 17, 1993