

November 2, 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. 88 TO FACILITY OPERATING LICENSE
NPF-38 - WATERFORD STEAM ELECTRIC STATION, UNIT 3 (TAC NO. M86483)

The Commission has issued the enclosed Amendment No. 88 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 May 6, 1993.

The amendment changes the Appendix A Technical Specifications by increasing the voltage during load rejection tests on the emergency diesel generators (EDGs).

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. 88 to NPF-38
2. Safety Evaluation

cc w/enclosures:
See next page

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#53-161

OFC	LA:PD4-1	PM:PD4-1	OTSB	OGC	D:PD4-1
NAME	P. Noonan	D. Wigginton:pk	C. Grimes		W. Beckner
DATE	9/28/93	9/29/93	10/17/93	10/14/93	11/2/93
COPY	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO

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

November 2, 1993

Docket No. 50-382

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

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Sincerely,

A handwritten signature in dark ink, appearing to read "D. L. Wigginton", is written above the typed name.

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. 88 to NPF-38
2. Safety Evaluation

cc w/enclosures:
See next page

Mr. Ross P. Barkhurst
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Waterford 3

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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. 88
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 May 6, 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.

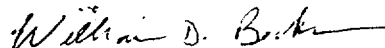
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C(2) of Facility Operating License No. NPF-38 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 88, 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 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 2, 1993

ATTACHMENT TO LICENSE AMENDMENT NO. 88

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

3/4 8-5

B 3/4 8-2

INSERT PAGES

3/4 8-5

B 3/4 8-2

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

3. Verify the other properties specified in Table 1 of ASTM-D975-1977 and Regulatory Guide 1.137, Revision 1, October 1979, Position 2.a., when tested in accordance with ASTM-D975-1977; analysis shall be completed within 14 days after obtaining the sample but may be performed after the addition of new fuel oil. Failure to meet this requirement shall not affect diesel generator OPERABILITY; however, corrective action shall be initiated within 72 hours to return the fuel oil supply to within acceptable limits.
- d. At least once per 18 months during shutdown by:
 1. Verifying the generator capability to reject a load of greater than or equal to 498 kW (HPSI pump) while maintaining voltage at $4160 + 420, -240$ volts and frequency at $60 + 4.5, -1.2$ Hz.
 2. Verifying the generator capability to reject a load of 4400 kW without tripping. The generator voltage shall not exceed 5023 volts during and following the load rejection.
 3. Simulating a loss-of-offsite power by itself, and:
 - a) Verifying deenergization of the emergency busses and load shedding from the emergency busses.
 - b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds after the auto-start signal, energizes the auto-connected shutdown loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the shutdown loads. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at $4160 + 420, -240$ volts and $60 + 1.2, -0.3$ Hz during this test.
 4. Verifying that on an SIAS actuation test signal (without loss-of-offsite power) the diesel generator starts on the auto-start signal and operates on standby for greater than or equal to 5 minutes. The steady-state generator voltage and frequency shall be $4160 + 420, -240$ volts and 60 ± 1.2 Hz within 10 seconds after the auto-start signal; the generator voltage and frequency shall be maintained within these limits during this test.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

5. Simulating a loss-of-offsite power in conjunction with an SIAS actuation test signal, and
 - a) Verifying deenergization of the emergency busses and load shedding from the emergency busses.
 - b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 10 seconds after the auto-start signal, energizes the auto-connected emergency loads through the load sequencer and operates for greater than or equal to 5 minutes. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160 ± 420 , -240 volts and 60 ± 1.2 , -0.3 Hz during this test.
 - c) Verifying that all automatic diesel generator trips, except engine overspeed and generator differential, are automatically bypassed upon loss of voltage on the emergency bus concurrent with a safety injection actuation signal.
6. Verifying the diesel generator operates for at least 24 hours. During the first 2 hours of this test, the diesel generator shall be loaded to an indicated 4700 to 4900 Kw* and during the remaining 22 hours of this test, the diesel generator shall be loaded to an indicated 4200 to 4400 Kw.* The generator voltage and frequency shall be 4160 ± 420 , -240 volts and 60 ± 1.2 Hz within 10 seconds after the start signal; the steady-state generator voltage and frequency shall be 4160 ± 420 volts and 60 ± 1.2 , -0.3 Hz during this test. Within 5 minutes after completing this 24-hour test, perform Surveillance Requirement 4.8.1.1.2.d.3b.**
7. Verifying that the auto-connected loads to each diesel generator do not exceed the 2000-hour rating of 4400 kW.

*This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band for special testing under direct monitoring of the manufacturer or momentary variation due to changing bus loads shall not invalidate the test.

**If Surveillance Requirement 4.8.1.1.2d.3b is not satisfactorily completed, it is not necessary to repeat the preceding 24-hour test. Instead, the diesel generator may be operated at an indicated 4200-4400 kw* for 1 hour or until internal operating temperatures have stabilized.

3/4.8 ELECTRICAL POWER SYSTEMS

BASES

3/4.8.1, 3/4.8.2, and 3/4.8.3 A.C. SOURCES, D.C SOURCES, and ONSITE POWER DISTRIBUTION SYSTEMS

The OPERABILITY of the A.C. and D.C. power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety-related equipment required for (1) the safe shutdown of the facility and (2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant A.C. and D.C. power sources and distribution systems satisfy the requirements of General Design Criterion 17 of Appendix A to 10 CFR Part 50.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the safety analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss-of-offsite power and single failure of the other onsite A.C. source. The A.C. and D.C. source allowable out-of-service times are based on Regulatory Guide 1.93, "Availability of Electrical Power Sources," December 1974. When one diesel generator is inoperable, there is an additional ACTION requirement to verify that all required systems, subsystems, trains, components, and devices that depend on the remaining OPERABLE diesel generator as a source of emergency power are also OPERABLE, and that the steam-driven auxiliary feedwater pump is OPERABLE. This requirement is intended to provide assurance that a loss-of-offsite power event will not result in a complete loss of safety function of critical systems during the period one of the diesel generators is inoperable. The term verify as used in this context means to administratively check by examining logs or other information to determine if certain components are out-of-service for maintenance or other reasons. It does not mean to perform the Surveillance Requirements needed to demonstrate the OPERABILITY of the component.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that (1) the facility can be maintained in the shutdown or refueling condition for extended time periods and (2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status.

The Surveillance Requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guides 1.9 "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, and 1.108 "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," Revision 1, August 1977, and 1.137, "Fuel Oil Systems for Standby Diesel Generators," Revision 1, October 1979. The provision allowing diesel generator starts utilizing manufacturers' recommended prelube and/or warmup procedures, including longer starting and loading periods, is to minimize stress and wear on the diesel engine and is in accordance with Generic Letter 84-15 concerning Diesel Generator Reliability and Station Blackout. Fast starts from ambient conditions (includes lubricating and warmup systems operating while in standby lineup) at least once every 184 days is in accordance with RRAB PRA analysis of this surveillance.

ELECTRICAL POWER SYSTEMS

BASES

A.C. SOURCES, D.C. SOURCES, AND ONSITE POWER DISTRIBUTION SYSTEMS (Continued)

The diesel generator Surveillance testing performed once per 18 months during shutdown is in accordance with Regulatory Guide 1.108, Regulatory Position C.2. The maximum voltage limit in Surveillance test 4.8.1.1.2.d.2 was increased to 5023 volts in response to NRC Information Notice 91-13; Inadequate Testing of Emergency Diesel Generators. A maximum voltage limit is provided to ensure that components electrically connected to the diesel generator are not damaged as a result of the momentary voltage excursion experienced during this test.

The Surveillance Requirement for demonstrating the OPERABILITY of the station batteries are based on the recommendations of Regulatory Guide 1.129, "Maintenance Testing and Replacement of Large Lead Storage Batteries for Nuclear Power Plants," February 1978, and IEEE Std 450-1980, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations."

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery terminal voltage on float charge, connection resistance values and the performance of battery service and discharge tests ensures the effectiveness of the charging system, the ability to handle high discharge rates and compares the battery capacity at that time with the rated capacity.

Table 4.8-2 specifies the normal limits for each designated pilot cell and each connected cell for electrolyte level, float voltage, and specific gravity. The limits for the designated pilot cells float voltage and specific gravity, greater than 2.13 volts and 0.015 below the manufacturer's full charge specific gravity or a battery charger current that had stabilized at a low value, is characteristic of a charged cell with adequate capacity. The normal limits for each connected cell for float voltage and specific gravity, greater than 2.13 volts and not more than 0.020 below the manufacturer's full charge specific gravity with an average specific gravity of all the connected cells not more than 0.010 below the manufacturer's full charge specific gravity, ensures the OPERABILITY and capability of the battery.

Operation with a battery cell's parameter outside the normal limit but within the allowable value specified in Table 4.8-2 is permitted for up to 7 days. During this 7-day period: (1) the allowable values for electrolyte level ensures no physical damage to the plates with an adequate electron transfer capability; (2) the allowable value for the average specific gravity of all the cells, not more than 0.020 below the manufacturer's recommended full charge specific gravity, ensures that the decrease in rating will be less than the safety margin provided in sizing; (3) the allowable value for an individual cell's specific gravity, ensures that an individual cell's specific gravity will not be more than 0.040 below the manufacturer's full charge specific gravity and that the overall capability of the battery will be maintained within an acceptable limit; and (4) the allowable value for an individual cell's float voltage, greater than 2.07 volts, ensures the battery's capability to perform its design function.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 88 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 May 6, 1993, Entergy Operations, Inc. (the licensee), submitted a request for changes to the Waterford Steam Electric Station, Unit 3, Technical Specifications (TS). The requested changes would revise the surveillance requirement to increase the emergency diesel generator (EDG) voltage limit during the load rejection test to address the safety issues identified in NRC Information Notice (IN) 91-13, "Inadequate Testing of Emergency Diesel Generators."

2.0 BACKGROUND

NRC Information Notice (IN) 91-13, "Inadequate Testing of Emergency Diesel Generators," was issued to alert licensees to inadequacies in the testing of emergency diesel generators (EDGs) at nuclear power plants. Specifically, some EDG testing had not adequately verified the capability of the EDG to carry the maximum expected loads; the reactive power delivered by the EDG on loss of load had not been adequately addressed in determining the maximum EDG load rejection test voltage. Upon evaluating IN 91-13, Waterford 3 subsequently increased the reactive power delivered by the EDG during surveillance testing, which resulted in a higher steady-state EDG voltage. The increase in the higher steady-state EDG voltage in turn resulted in the need to increase the TS limit for the maximum EDG voltage during the load rejection test, thus prompting the following proposed change.

3.0 EVALUATION

Information Notice 91-13 was intended to alert addresses to inadequacies in the testing of emergency diesel generators at nuclear power plants. Specifically, some EDG testing has not adequately verified the capability of the EDG to carry maximum expected loads. The intent of the required testing is to assure that the EDG can dependably carry accident loads. It is important that the worst-case conditions (frequency, voltage, electrical power factor, and environment) be considered when the EDG is tested. Waterford TS Surveillance Requirement 4.8.1.1.2.d.6 requires loading the EDG between 4200-4400 kW for 22 hours, and between 4700-4900 kW for 2 hours. The

current Waterford 3 TS does not adequately account for reactive power loading on the EDG. The EDGs at Waterford 3 have been tested at approximately 4400 kW and 1000 kVARs for 22 hours and approximately 4840 kW and 1000 kVARs for 2 hours. The 4400 kW load is in accordance with the practices described in IN 91-13; however, the 1000 kVAR load is less than the expected reactive loading during a worst-case accident at Waterford 3 (2600 kVARs is expected during the worst-case accident). In response to the IN, Waterford 3 increased the reactive power load to a range of 2700 to 3300 kVARs during surveillance testing. However, this increase in reactive power resulted in a higher EDG steady state voltage and the EDG exceeding the TS limit of 4875 volts during the subsequent load rejection test.

The licensee discussed the test results with the manufacturer and it was determined that the EDG was being tested in accordance with limits that were too stringent. The manufacturer claimed that it may not be possible for the EDG voltage to be less than the present limit of 4784V during the load rejection test if the steady state voltage prior to the test is greater than 4160V. The manufacturer recommended that the maximum steady state voltage (4400V) of the EDG plus 15% (5060V) would be an acceptable upper limit for the EDG voltage during the load rejection test and would not result in component damage. In order to determine a conservative EDG voltage limit during the load rejection test, EDG performance was considered at its upper steady state voltage. The EDG is rated to perform within the limits of its capability curve at a maximum voltage of 4160V plus 5% (4368V). Thus, a value of 4368V plus 15% (5023V) was chosen. This value for the EDG voltage limit satisfies the capability curve of the diesel, the manufacturer recommendations, and will also allow the EDG to be tested in accordance with the practices described in NRC IN 91-13.

In our review, we had concerns regarding the length of time at the voltage level of 5023V, load damage, and high starting currents of large motors due to the increased voltage. It was confirmed by the licensee that the EDG would only remain at the voltage level of 5023V for a few seconds and that there would be no damage to the EDG or its connected loads due to the short duration of the increased voltage. Finally, there would be no risk of large motor starting currents because no motors would be started during EDG surveillance testing.

The TS change permits more meaningful EDG load rejection testing without risk of damage to the EDG or its connected loads. Further, the change is supported by the manufacturer and enables the licensee to address issues identified in NRC IN 91-13. Based on the above information, the proposed change is acceptable.

4.0 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.

5.0 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 34078). 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.

6.0 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: M. D. Pratt

Date: November 2, 1993