

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

February 15, 2000

Template = URR-058

**SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 - ISSUANCE OF AMENDMENT NO. 157 RE: AMENDMENT FOR A PREVIOUSLY UNREVIEWED SAFETY QUESTION REGARDING EMERGENCY DIESEL GENERATOR FUEL OIL STORAGE AND TRANSFER SYSTEMS DESIGN BASIS (TAC NO. MA4940)**

Dear Mr. Dugger:

The Commission has issued the enclosed Amendment No. 157 to Facility Operating License No. NPF-38 for the Waterford Steam Electric Station, Unit 3. The amendment consists of changes to the Final Safety Analysis Report (FSAR) in response to your request for an amendment dated March 3, 1999.

The amendment revises FSAR Section 9.5.4.1. The revision changes this section to explicitly list the Waterford 3 deviations from American National Standards Institute (ANSI) Standard N195-1976.

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

Sincerely,  
 /RA/

N. Kalyanam, Project Manager, Section 1  
 Project Directorate IV & Decommissioning  
 Division of Licensing Project Management  
 Office of Nuclear Reactor Regulation

Docket No. 50-382

- Enclosures: 1. Amendment No. 157 to NPF-38  
 2. Safety Evaluation

cc w/encls: See next page

OGC FILE REGISTER UNIT

DISTRIBUTION:

File Center	PUBLIC	PDIV-1 Reading	OGC
ACRS	G.Hill(2)	W.Beckner	K.Brockman,RIV
J.Kilcrease,RIV	L.Hurley,RIV	S.Richards (cover ltr only)	R.Scholl (e-mail SE)
D.Shum			

\*SE input dated September 24, 1999, was provided and no major changes were made.

To receive a copy of this document, indicate "C" in the box							
OFFICE	PDIV-1/PM	C	PDIV-1/LA	C	SPLB/DSSA*	OGC	PDIV-1/SC
NAME	N.Kalyanam		D.Johnson		D.Shum/GHubbard		R.Gramm
DATE	2/10/00		2/15/00		09/24/99	2/10/00	2/15/00

DOCUMENT NAME: G:\PDIV-1\Waterford\AMD4940.WPD

OFFICIAL RECORD COPY

DF01

Waterford Generating Station 3

cc:

Administrator  
Louisiana Department of Environmental  
Quality  
P. O. Box 82215  
Baton Rouge, LA 70884-2215

Regional Administrator, Region IV  
U.S. Nuclear Regulatory Commission  
611 Ryan Plaza Drive, Suite 1000  
Arlington, TX 76011

Vice President, Operations Support  
Entergy Operations, Inc.  
P. O. Box 31995  
Jackson, MS 39286

Parish President Council  
St. Charles Parish  
P. O. Box 302  
Hahnville, LA 70057

Director, Nuclear Safety & Regulatory  
Affairs  
Entergy Operations, Inc.  
17265 River Road  
Killona, LA 70066-0751

Executive VP & Chief Operating Officer  
Entergy Operations, Inc.  
P. O. Box 31995  
Jackson, MS 39286-1995

Wise, Carter, Child & Caraway  
P. O. Box 651  
Jackson, MS 39205

Chairman  
Louisiana Public Service Commission  
Baton Rouge, LA 70825-1697

General Manager Plant Operations  
Entergy Operations, Inc.  
17265 River Road  
Killona, LA 70066-0751

Licensing Manager  
Entergy Operations, Inc.  
17265 River Road  
Killona, LA 70066-0751

Winston & Strawn  
1400 L Street, NW  
Washington, DC 20005-3502

Resident Inspector/Waterford NPS  
P. O. Box 822  
Killona, LA 70066-0751



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

ENERGY OPERATIONS, INC.

DOCKET NO. 50-382

WATERFORD STEAM ELECTRIC STATION, UNIT 3

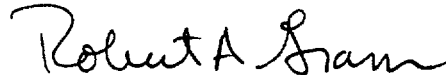
AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 157  
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 3, 1999, 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 to approve changes to the Final Safety Analysis Report (FSAR) Section 9.5.4.1, to explicitly list the Waterford Steam Electric Station, Unit 3, deviations from American National Standards Institute (ANSI) Standard N195-1976, as set forth in the application for amendment by Entergy Operations, Inc., dated March 3, 1999. Entergy Operations, Inc. shall update the FSAR to reflect the revised licensing basis authorized by this amendment in accordance with 10 CFR 50.71(e).
3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days from the date of issuance. Implementation of the amendment is the incorporation into the Final Safety Analysis Report Update, the changes to the description of the facility as described in the licensee's application dated March 3, 1999, and evaluated in the staff's Safety Evaluation attached to this amendment.

FOR THE NUCLEAR REGULATORY COMMISSION



Robert A. Gramm, Chief, Section 1  
Project Directorate IV & Decommissioning  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Date of Issuance: February 15, 2000



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 157 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 3, 1999, Entergy Operations, Inc. (the licensee), submitted a request for changes to the Waterford Steam Electric Station, Unit 3 (Waterford 3), Final Safety Analysis Report (FSAR). The requested changes would revise FSAR Section 9.5.4, "Diesel Generator Fuel Oil Storage and Transfer Systems," to explicitly list the Waterford 3 deviations from the guidance described in American National Standards Institute (ANSI) N195-1976, "Fuel Oil System for Standby Diesel Generators."

2.0 BACKGROUND

There are two emergency diesel generators (EDGs) for Waterford 3. Each EDG is equipped with a fuel oil storage and transfer system, which consists of a feed (day) tank, a fuel oil storage tank (FOST), a fuel oil transfer pump, and its associated piping, valves, instrumentation, and controls. Each EDG FOST has a usable capacity of 40,959 gallons. Each feed tank, which has a capacity of 613 gallons, is automatically filled from its own EDG FOST by its own EDG fuel oil transfer pump. Fuel oil is fed to the EDG engine by gravity via a connection at the bottom of the feed tank. Two cross-ties, one between the fuel oil transfer pump suctions and the other between the fuel oil transfer pump discharge headers, and two normally closed valves on each cross-tie, are provided between the EDG fuel oil storage and transfer systems to enable the fuel oil transfer pump of either EDG to fill either or both feed tanks from either FOST. All safety-related portions, including the cross-ties, of the EDG fuel oil storage and transfer systems are Seismic Category I designed.

Regulatory Guide (RG) 1.137, Revision 1, "Fuel-Oil Systems for Standby Diesel Generators," endorses ANSI N195-1976, which requires that the on-site fuel oil storage be sufficient to operate the minimum number of EDGs required following the limiting design basis accident (DBA) for 7 days. The minimum fuel oil required to be maintained in the storage tanks is based on either a 7 day time-dependent load calculation plus 10% margin, or a more conservative calculation method, which assumes that the EDG operates at continuous rated capacity for 7 days.

Current Waterford 3 technical specifications (TS), which require a minimum of 38,760 gallons of fuel oil to be maintained in the FOST for each EDG, were established, based on a time-dependent load calculation, to provide 7 days of operation for each EDG plus 10% margin following a DBA.

In July 1997, the licensee performed an engineering evaluation in response to the staff's concerns identified during a Nuclear Regulatory Commission (NRC) inspection (reference: NRC Inspection Report 50-382/97-10, dated June 16, 1997) conducted from April 28 through May 2, 1997, regarding the minimum fuel oil required to be maintained in the FOST for each EDG. Results of the engineering evaluation, based on a time dependent load calculation with uncertainties accounted for (i.e., vortex, engine performance, fuel oil quality, instrument error, etc.), indicate that the minimum fuel oil required to be maintained in each FOST per the current TS is only sufficient to operate its associated EDG for 7 days plus approximately 1% margin. In addition, some areas of noncompliance with ANSI N195-1976 were identified during the engineering evaluation. ANSI N195-1976, in part, requires that FOST fuel oil inventory shall include an explicit allowance for fuel consumption required for periodic testing, suction from feed tank shall be from above the tank bottom, an overflow line from the feed tank to the FOST shall be provided, and pressure indication shall be provided at the discharge of the fuel oil transfer pump. Waterford 3 EDG fuel oil storage and transfer system does not comply with these ANSI N195-1976 standards.

By letter dated July 15, 1997, the licensee proposed, with justifications, to retain the current TS for minimum fuel oil required to be maintained in each of the FOSTs; not to have an explicit allowance for fuel consumption required for periodic testing; to retain the existing design of the EDG suction at the bottom of the feed tank; to retain the existing design for the feed tank overflow to discharge to a floor drain, which is a part the sump pump system which goes to the oil separators; and not to have pressure indication at the transfer pump discharge. Subsequently, by letter dated March 3, 1999, i.e., by the instant license amendment request, the licensee proposed to revise the FSAR by adding the following to Section 9.5.4, "Diesel Generator Fuel Oil Storage and Transfer Systems" to reflect the above proposals:

All safety-related portions of the Waterford 3 diesel engine fuel oil storage and transfer system are Seismic Category I, safety class 3, and designed to ANSI Standard N195-1976, "Fuel Oil Storage System for Standby Diesel Generator," with the exceptions as listed below:

- a) The Waterford 3 Emergency Diesel Generator (EDG) Fuel Oil Storage Tanks (FOSTs) contain a seven-day fuel oil supply using the time dependent method for calculating stored fuel oil. The Waterford 3 EDG FOSTs do not contain an explicit allowance for margin.
- b) The Waterford 3 EDG FOSTs do not contain an explicit allowance for fuel consumption required for periodic testing.
- c) The Waterford 3 EDG fuel oil feed tank suction is located on the bottom of the feed tank.

- d) The Waterford 3 EDG fuel oil feed tank overflow discharges to the sump pump system.
- e) The Waterford 3 EDG fuel oil transfer system does not have a pressure indicator located at the discharge of the fuel oil transfer pumps.

### 3.0 EVALUATION

#### A. EDG FOST Not Having Sufficient (10%) Margin

The minimum fuel oil required to be maintained in each FOST per the current TS is only sufficient to operate its associated EDG for 7 days plus approximately 1% margin. The licensee stated that there are numerous diesel fuel oil vendors in the vicinity of Waterford 3, which is located in a heavy industrial corridor of Louisiana where there are many oil refineries and oil storage facilities. Waterford 3 is capable of replenishing EDG fuel oil via tanker truck, train or barge and will have fuel oil readily available when there is a need for replenishment. In addition, Waterford 3 has two cross-ties between the two EDG fuel oil storage and transfer systems which enable either one of the EDGs to be supplied from either one of the EDG FOSTs. With the ability to cross-tie the two EDG fuel oil storage and transfer systems, one EDG will be able to operate continuously for a period of well over 7 days.

Based on its review of the licensee's rationale, the staff concludes that the fuel oil inventory maintained in the EDG FOSTs at Waterford 3 meets the intent of the guidance described in ANSI N195-1976 and that Waterford 3 will have sufficient fuel oil for EDG operation to power the safety systems required to mitigate design basis accidents.

In addition, the licensee performed an analysis to evaluate the impact of the proposed FSAR change involving FOST capacity on plant risk. The licensee concluded that the increase in risk resulting from the proposed change to the licensing basis is insignificant. The staff did not believe it was necessary to conduct a detailed review of the licensee's analysis; however, the staff agrees with the licensee's conclusion that the impact of the proposed FSAR change on risk is low. The staff believes the impact of the proposed FSAR change to be low since the change solely impacts risk during Loss of Offsite Power (LOOP) conditions for a duration of about 7.07 days. When a LOOP of this duration occurs, the FSAR change will reduce the operator response time to replenish the FOST to prevent the loss of a diesel generator from 7.7 days to 7.07 days for each of the EDGs. The staff believes that, given the relatively large recovery times, this reduction in response time will not significantly affect the calculated human error probabilities of operator response time. In addition, the change in the probability of recovery of alternating current power in the time frame between 7.07 days and 7.7 days is very small. Therefore, the staff agrees that the risk impact of the proposed FSAR change involving FOST capacity is small.

#### B. Allowance of Fuel Oil for Periodic Testing

ANSI N195-1976 requires the fuel oil inventory maintained in FOSTs to include an allowance for fuel consumption required by periodic testing. The Waterford 3 EDG FOSTs do not contain an explicit allowance for fuel consumption required for periodic testing.

During or after EDG periodic test runs per the TS Surveillance Requirement (SR), the fuel oil inventory in the FOSTs may decrease to a level which is below the 7 day EDG run time capacity. In order to maintain the operability status of the EDGs at all times and preclude unnecessary entry into the TS action statements, the staff, as described in the Safety Evaluation Report for Amendment 92 to Waterford 3 FSAR, allowed the EDG fuel oil inventory at Waterford 3 to fall below the 7 day supply, but above a 6 day supply (38,000 gallons), for a period not to exceed 5 days (provided replacement fuel oil is onsite within the first 48 hours). These restrictions, which provide a degree of flexibility before declaring an EDG inoperable, are consistent with the intent of the guidance described in the improved Combustion Engineering Standard Technical Specifications (NUREG-1432).

#### C. Feed Tank Suction Location

ANSI N195-1976 requires the suction from EDG feed tank to be from above the tank bottom. The suction of the Waterford 3 EDG feed tank is located at the tank bottom. As indicated above, the licensee proposed to retain the existing design of the EDG suction at the bottom of the feed tank.

The licensee stated that the quality of fuel oil maintained in the fuel oil storage and transfer system is tested and is controlled via TS SRs which ensure a high level of fuel oil reliability. The fuel oil in each feed tank is replenished every 31 days during the EDG monthly required surveillances. The probability of fuel degradation in a feed tank which may cause blockage problems at the suction is small. Also, operating experience at Waterford 3 has shown that, since initial startup, there have not been any water or filter blockage problems attributed to the suction from the feed tank bottom. Therefore, having the EDG fuel supply suction located at the feed tank bottom in lieu of located above the feed tank bottom will have an insignificant or no impact on the fuel oil supply to the EDGs at Waterford 3.

Based on its review of the licensee's rationale, the staff agrees with the licensee that having the EDG fuel supply suction located at the feed tank bottom in lieu of located above the feed tank bottom has an insignificant or no impact on the fuel oil supply to the EDGs at Waterford 3. Therefore, the staff finds the licensee's proposal to retain the existing design of the EDG suction at the bottom of the feed tank acceptable.

#### D. Fuel Oil Feed Tank Overflow Discharge

ANSI N195-1976 requires the EDG feed tank overflow to be discharged back to the FOST. The Waterford 3 EDG feed tank overflow line discharges to the sump pump system via a drain. As indicated above, the licensee proposed to retain the existing design for the feed tank overflow line discharges to the sump pump system.

The licensee stated that the possibility exists that the fuel oil in the EDG FOST could be depleted if the transfer pump continues to run. However, for this to occur, two safety measures would have to fail (multiple failures). The feed tank high level pump switch (that stops the transfer pump) and the feed tank high level alarm (that alerts the control room) would have to fail. The concurrent failures of the feed tank high level pump switch and the feed tank high level alarm are very remote. The licensee further stated that assuming conditions occurred which drained one entire EDG FOST, plant procedures have provisions to direct operators to



manually align fuel oil supply from the other EDG FOST via one of the cross-ties to ensure seven days of fuel oil is available for one EDG. During the situation when the fuel oil transfer pump of one EDG is aligned to supply fuel oil to the feed tank of the other EDG, the feed tank levels (high or low) will be monitored and controlled by operators by turning the fuel oil transfer pump on and off.

Based on its review of the licensee's rationale, the staff agrees with the licensee that having the EDG fuel oil feed tank overflow discharged to the sump pump system in lieu of discharged back to the FOST will have an insignificant or no impact on the fuel oil supply to the EDGs at Waterford 3. Therefore, the staff finds the licensee's proposal to retain the existing design for the feed tank overflow discharge to the sump pump system acceptable.

#### E. Pressure Indication

As indicated above, ANSI N195-1976 requires one pressure indicator to be located in the discharge of the fuel oil transfer pump to indicate performance degradation of the pump. Waterford 3 does not have a pressure indicator on the discharge of the transfer pump.

The Waterford 3 transfer pumps are designed for automatic operation and are automatically started when the low level is reached in the EDG feed tanks and automatically stopped when the high level is reached. The EDG feed tanks also contain high and low level alarms and indications in the control room. If a failure of the transfer pump occurred, indication would appear in the control room via an alarm on low feed tank level, and the other transfer pump would be started to deliver fuel oil to operate the EDG.

The licensee stated that inservice testing of the transfer pumps in accordance with the guidance described in American Society of Mechanical Engineers (ASME), Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," is performed once per quarter to verify that pump performance has not degraded. During the inservice tests, temporary pressure instrumentation is installed on the discharge of the pump to measure pump differential pressure. In addition, the transfer pumps are functionally tested every month during routine testing of the EDGs. These tests will ensure a high level of reliability and availability of the fuel oil transfer pump. Therefore, the licensee concluded that this requested deviation regarding pressure indicator on the discharge of the transfer pump from ANSI N195-1976 will not prevent the EDG from having 7 days of fuel oil available.

Based on its review of the licensee's rationale, the staff agrees with the licensee that not having a pressure indicator on the discharge of the transfer pump will have an insignificant or no impact on the fuel oil supply to the EDGs at Waterford 3. Therefore, the staff finds the licensee's requested deviation regarding pressure indicator on the discharge of the transfer pump from ANSI N195-1976 acceptable.

Based on its review and the above evaluation, the staff concludes that the fuel oil storage and transfer system for each EDG at Waterford 3 has a high level of reliability and availability, the design of the fuel oil storage and transfer system and the EDG fuel oil maintained at Waterford 3 meet the intent of the guidance described in ANSI N195-1976, and the licensee will have adequate and reliable fuel oil inventory in the storage tanks for 7 days of continuous EDG operation following a loss of coolant accident at Waterford 3. Therefore, the staff finds the licensee's proposal to revise the FSAR, Section 9.5.4, "Diesel Generator Fuel Oil Storage and

Transfer Systems," to reflect the above cited exception to the requirements of ANSI N195-1976 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. 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 NRC has previously issued a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding (64 FR 62713, November 17, 1999). 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: D. Shum

Date: February 15, 2000