

December 21, 1999

Mr. Charles M. Dugger
Vice President Operations
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P. O. Box B
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SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 - REQUEST FOR INFORMATION RELATED TO TECHNICAL SPECIFICATION CHANGE REGARDING EMERGENCY DIESEL GENERATOR ALLOWED OUTAGE TIME INCREASE (TAC NO. MA6176)

By letter dated July 29, 1999, Entergy Operations, Inc. proposed changes to the Waterford 3 Technical Specifications. The proposed changes would allow an outage of up to 10 days for each emergency diesel generator in order to perform a preventive or a corrective maintenance during plant operation.

After reviewing your request, the NRC staff has determined that additional information is required to complete the review. On November 29, 1999, we discussed this information with your staff during a conference call. As discussed on the telephone, please provide additional information requested in the enclosure by January 15, 2000.

Sincerely,

ORIGINAL SIGNED BY

Chandu P. Patel, Project Manager, Section 1
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-382

Enclosure: As stated

cc w/encl: See next page

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REQUEST FOR ADDITIONAL INFORMATION

WATERFORD 3

By letter dated July 29, 1999, the licensee proposed changes to the plant's Technical Specifications (TS) for extending the allowed outage time (AOT) up to ten days for each emergency diesel generator (EDG) in order to perform a preventive or a corrective maintenance during plant operation. The licensee stated that an EDG AOT extension of ten days from the existing three days may potentially result in a small increase in the "at power" risk. Although the licensee has provided risk evaluation supporting the proposed change, no information was included in their submittal on deterministic evaluation. In order for the staff to proceed with their review of the proposed change, the licensee should provide additional information to justify an increase in AOT extension. The justification should include the following:

1. Use of an alternate ac power source, if applicable, to substitute for the EDG being taken out for extended maintenance or excess redundant (three or more) EDGs, if applicable.
2. Provide a discussion and information on the reliability and availability of offsite power sources relating to the proposed change.
3. As a station blackout commitment, you committed to maintain an EDG target reliability of 0.975. Address the reliability and unavailability of EDG when EDG AOT is extended to ten days. Also, discuss the impact of an AOT extension on EDG unavailability per Maintenance Rule.
4. Provide details of the scheduled periodic inspections, maintenance, and overhauls with the approximate time required and frequency of performing each action. Also, provide the total maximum time required in the past to complete inspections, maintenance, and overhauls.
5. The staff believes that certain compensatory measures are needed during the extended EDG AOT to assure safe operation of the plant. Provide a discussion of how you would address each of the conditions listed below as they relate to Waterford 3.
 - a. The TS should include verification that the required systems, subsystems, trains, components, and devices that depend on the remaining EDG as a source of emergency power are operable before removing an EDG for preventive maintenance (PM). In addition, positive measures should be provided to preclude subsequent testing or maintenance activities on these systems, subsystems, trains, components, and devices while the EDG is inoperable.
 - b. Voluntary entry into a limiting condition for operation action statement to perform PM should be contingent upon a determination that the decrease in plant safety is small enough and the level of risk is acceptable for the period and is warranted by operational necessity.
 - c. Removal from service of safety systems and important non-safety equipment should be minimized during the extended outage of the EDG.

Enclosure

- d. Component testing or maintenance that increases the likelihood of a plant transient should be avoided; plant operation should be stable during the extended outage of the EDG.
6. The purpose of the requested amendment is to allow an increased outage time during plant power operation for performing EDG inspection, maintenance, and overhaul, which would include disassembly of the EDG. EDG operability verification after a major maintenance or overhaul may require a full load rejection test. If a full load rejection test is performed at power, the following should be addressed:
 - a. What would be the typical and worse-case voltage transients on the 4160-V safety buses as a result of a full-load rejection?
 - b. If a full-load rejection test is used to test the EDG governor after maintenance, what assurance would there be that an unsafe transient condition on the safety bus (i.e., load swing or voltage transient) due to improperly performed maintenance or repair of a governor would not occur?
 - c. Using maintenance and testing experience on the EDG, identify possible transient conditions caused by improperly performed maintenance on the EDG governor and voltage regulator. Discuss the electrical system response to these transients.
 - d. Also, the licensee should provide the tests to be performed after the overhaul to declare the EDG operable and provide justification of performing those tests at power.
 7. The condition of offsite sources of electrical power prior to and during the extended EDG outage time have additional importance. Discuss what considerations should be given to not performing the extended maintenance when the offsite grid condition or configuration is degraded or when adverse or extreme weather conditions (e.g., high winds, lightning, icing conditions) are expected. Discuss how planning of the extended EDG maintenance should consider the time needed to complete the extended EDG maintenance and the ability to accurately forecast weather conditions that are expected to occur during the maintenance. Discuss what, if any, contingency plans should be developed to restore the inoperable EDG in the event of unanticipated adverse weather or degraded grid conditions occurring which can significantly increase the probability of losing offsite electrical power.
 8. The Bases section should be modified to support the change and include the compensatory measures.
 9. The Combustion Engineering (CE) Joint Application Report CE NPSD-996 and the subsequent request for additional information response provide substantial information applicable to the proposed change. The following topics need to be discussed and resolved to complete the probabilistic risk assessment (PRA) portion of the review.

a. The risk impact of the proposed change

The incremental conditional core damage probability (ICCDP) was above $1E-6$ for either preventive or corrective maintenance. This is higher than the $5E-7$ guideline in Regulatory Guide 1.177. In such a case, the staff becomes more careful with the review and performs a more in-depth review. Waterford should provide the necessary assurance that the actual plant operation with the proposed change would still be in an acceptable risk range.

b. PRA Quality

1. Has your PRA been updated since the development of individual plant examination (IPE) and individual plant examination of externally initiated events (IPEEE)?
2. If yes, were there any independent peer reviews performed on the updates.
3. If not, what justifies that the IPE/IPEEE still represent the as-built and as-operated condition of the plant. Explain what significant modifications have since been made to the plant.
4. What PRA quality control process do you have in place to represent the as-built and as-operated condition of the plant?

c. External Event Contribution

The core damage frequency (CDF) contribution from fire was estimated to be $7.0E-6/yr$ in your IPEEE analysis. The value is still substantial (almost 50% of internal CDF of $1.5E-5/yr$) as compared with the CDF contribution from internal initiating events. Therefore, the risk impact of the proposed change would be higher than what was reported in your application. In particular, the ICCDP for a single outage would be greater than the already-high value of $3.8E-6$ for a corrective maintenance outage.

d. Level 2 Risk Impact

The staff uses Δ large early release frequency/incremental conditional large early release probability for a single outage as another acceptance threshold in accordance with applicable Regulatory Guides. The CE Owners Group report (CE NPSD-996) attempted to address the issue generically for all CE plants; however, the staff finds that plant-specific results will generally be needed to complete the review.

e. Other Miscellaneous Issues

1. Waterford 3 stated that their EDG failure-to-run probability is overly conservative because the failure to run was assumed to occur instantly at the time of EDG demand. It means that the potential for recovery of

offsite power was not modeled upon the run failure following a successful start. The staff finds, however, that the proposed change relates mainly to how sensitive the extension of EDG unavailability would be as compared to the change in reliability. Please explain.

2. The expected actual unavailability of an EDG per year was 200 hours. Given that, the increase in CDF was estimated to be 14 percent above the baseline CDF. Please explain the 200 hours by describing your experience the last several years.