REQUEST FOR ADDITIONAL INFORMATION
REGARDING GRAND GULF NUCLEAR STATION UNIT 1
15 PERCENT EXTENDED POWER UPRATE LICENSE AMENDMENT
TAC NO. ME4679
DOCKET NO. 50-416

By letter dated September 8, 2010 (Agencywide Documents Access and Management System, Accession No. ML1002660403), Entergy Operations, Inc. (Entergy, the licensee), submitted a request to amend the Facility Operating License No. NPF-29 for Grand Gulf Nuclear Station, Unit 1 (GGNS). The licensee proposed a license amendment request (LAR) for an extended power uprate (EPU) to increase the maximum reactor core power operating limit from 3898 megawatts thermal (MWt) to 4408 MWt. The U.S. Nuclear Regulatory Commission (NRC) staff has determined that the following additional information is needed for the NRC staff to complete our review of this amendment .

1. In Figure 2.3-1 of Section 2.3 of the LAR, the licensee presented the worst case environmental qualification (EQ) enveloping accident temperature profiles. Explain whether Figure 2.3-1 represents profiles for both high energy line break (HELB) and loss-of-coolant accident (LOCA) conditions. Also, describe the impact of the change in rate between the existing drywell temperature and drywell temperature under EPU conditions on the EQ of equipment.

2. With regards to Section 2.3.1, provide, in table form, a list of parameters (i.e., temperature, pressure, humidity, chemical spray, submergence, and radiation) that shows that the EQ limits remain bounding under EPU conditions for Normal Operation, Accident (LOCA), Accident (MSLB/HELB), and Post Accident for both inside and outside containment (e.g., Auxiliary Building, Turbine Building, Containment Façade, etc.). Include the existing EQ limits in your response and show how EQ margins (e.g., temperature, pressure, radiation, etc.) are being maintained.

3. In Section 2.3.2.1 of the LAR, the licensee stated that the grid stability analysis has determined that the power uprate will not adversely affect bulk power transmission system steady-state power flow (thermal ratings and voltage), stability, short circuit duty, or power transfer level. Provide a detailed discussion on the effects of the power uprate on the degraded voltage setpoint and how the existing setpoint remains acceptable under EPU conditions.

4. In Section 2.3.2.2 of the LAR the licensee stated that the existing protective relay settings for the main generator will have to be recalculated due to the increased EPU power output. Further, in Attachment 8 to the EPU, the licensee stated that changes to the protective relay setpoints for the main unit differential and main transformer differential relays are required due to EPU power output levels and the increased size of the main transformer. Provide further discussion in regards to calculations performed to demonstrate the adequacy of the new relay settings for the main generator and main transformers.

ENCLOSURE

5. In Section 2.3.3.2, the license stated that selective coordination is maintained between the pump motor breakers and the 34.5 kilovolt (kV), 6.9 kV, and 4.16 kV switchgear main feeder breakers. Explain what is intended by 'selective coordination.'

6. In Section 2.3.3 of the LAR, the licensee stated that there are no changes to the emergency diesel generator loads or load sequencing for EPU. Describe the impact on the emergency diesel generators due to the extended loading time resulting from the EPU?

7. In Section 2.3.3 of the LAR, the licensee stated that the electrical analysis software Electrical Transient Analysis Program (ETAP) was utilized to compute load, voltage drop, and short circuit current values for the alternating current power components. Describe the pedigree of the ETAP software (i.e., is it a nuclear qualified version) used to perform these electrical analyses. Provide a summary of the results obtained from ETAP that shows the changes in electrical load demand.

8. In Section 2.3.5 of the LAR, the licensee stated that evaluation of the Class 1E battery capacity has shown that there is enough battery capacity to support decay heat removal during SBO for the required coping duration. Provide detailed information that shows that the Class 1E battery capacity and Compressed Air Capacity remain bounding for Station Blackout under EPU conditions (i.e., provide the pre and post-EPU capacities and the design capacity of the Batteries and Compressed Air supply).

9. In Section 2.3.5 of the LAR, the license stated that evaluation of areas with equipment necessary to cope with station blackout (SBO) has shown that equipment operability is maintained because the SBO environment is milder that the existing design and qualification bases. Provide the summary of this evaluation.

10. Appendix H of NUMARC 87-00, Rev. 1 lists the dominant areas of concern for the analysis of the effects of loss of ventilation under SBO conditions. For boiling water reactors, the dominant areas of concern are the high-pressure coolant injection (HPCI)/high-pressure core spray (HPCS) and reactor core isolation cooling (RCIC) pump rooms and the main steam tunnel. In Section 2.3.5 of the LAR, the licensee stated that the following areas were evaluated for the effect of loss of ventilation due to an SBO: drywell, steam tunnel, RCIC room, control room and upper cable spreading room and switchgear room/inverter room. Please confirm that the HPCI/HPCS pump rooms have been evaluated for the effect of loss of ventilation due to an SBO and provide a summary of the evaluation

11. In Attachment 8 to the LAR, the licensee stated that the increased isophase bus current due to EPU will result in exceeding the design limit for both the main bus and the self-cooled delta bus. Further, the licensee proposes to replace the isophase bus duct cooler and fans to increase the heat removal capability of the bus duct cooling system for both buses. Provide further discussion in regards to calculations performed to demonstrate the adequacy of the new bus duct cooling system and how this system will be able to perform its function under EPU conditions.

12. In attachment 12 to the LAR, "Grid Stability Evaluation," the gross generation at maximum power is stated to be 1503.5 Mega Wats electric (MWe), whereas Table 2.3-3 in Safety Analysis Report indicates the EPU duty as 1600 Mega Volt Amperes at 0.95 power factor which translates to 1520 MWe. Please explain the differences of these

two values and provide the maximum output of the generator in MWe with power factor value on EPU duty.

13. In attachment 12 to the LAR, “Grid Stability Evaluation,” it is stated that approximately 216 Mega Volt Amperes Reactive of additional reactive power capability is required to meet the Interconnection Agreement. It is also stated that the capacitor banks will be installed throughout the system and will be controlled by operational procedure. Please confirm that these capacitors are scheduled to be installed and connected to the system prior to EPU operation.