



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 98 TO FACILITY OPERATING LICENSE NO. NPF-29  
ENTERGY OPERATIONS, INC., ET AL.  
GRAND GULF NUCLEAR STATION, UNIT 1  
DOCKET NO. 50-416

## 1.0 INTRODUCTION

By letter dated September 11, 1991, the licensee (Entergy Operations, Inc.), submitted a request for changes to the Grand Gulf Nuclear Station, Unit 1 (GGNS) Technical Specifications (TS). The requested changes would revise the high reactor pressure trip setpoint for the ATWS Recirculation Pump Trip (RPT) from 1095 psig to 1126 psig. This change was requested in response to two events that occurred at GGNS involving RPT actuations during non-ATWS plant transients. When the recirculation pumps are tripped during an anticipated pressurization transient with scram, there is the potential for thermal stratification problems caused by reduced coolant mixing, including violation of the 100° F per hour cooldown rate TS limit. The proposed TS change should reduce the likelihood of unnecessary RPT actuations and help alleviate the associated operational problems.

## 2.0 EVALUATION

The ATWS RPT is designed to mitigate the consequences of an ATWS event, in conjunction with the Alternate Rod Insertion (ARI) system, by providing an alternate means of reducing reactor power. This is accomplished by tripping the recirculation pumps to zero speed, thus causing a rapid reduction in core flow, and a reduction in core power. The ATWS instrumentation initiates the RPT on two signals, high reactor pressure and low reactor water level, both indicative of continued energy generation in the reactor following a failure to scram.

The high reactor pressure setpoint should initiate RPT at a pressure higher than the setpoint for the Reactor Protection System (RPS) scram on high reactor pressure. However, the setpoint for RPT must be low enough to mitigate an ATWS event without exceeding the ATWS limits that protect the fuel, vessel, and containment from damage. Another factor in determining the pressure setpoint is the relationship of the ATWS RPT pressure setpoint to the setpoint of the Safety Relief Valves (SRVs). The recirculation pumps may be

tripped spuriously during an anticipated pressure transient with scram if the ATWS RPT initiation is not set above the vessel pressure expected to result from the event with pressure control provided by the automatic bypass valves or the SRVs. A spurious RPT can result in thermal stratification problems in the reactor vessel. This has occurred twice recently at GGNS, both times resulting in a cooldown rate, as measured at the vessel bottom drain, in excess of the 100° F per hour TS heatup/cooldown rate limit.

GGNS has performed a plant specific ATWS analysis to support increasing the ATWS RPT high reactor pressure setpoint. The calculation was performed using the same methodology as previous GGNS ATWS analyses, employing the REDY and STEMP computer codes. The possible initial power/flow conditions were evaluated by the licensee. They determined that the most limiting initial condition for the ATWS event is the GGNS Maximum Extended Operating Domain (MEOD) control rod line "knee point", corresponding to 100% power and 75% core flow on the power to flow map. The events that were specifically analyzed are the Turbine Trip and the Main Steam Isolation Valve (MSIV) Closure. The analyses demonstrated that the proposed trip setpoint of 1126 psig is adequate to mitigate the event without exceeding the ATWS limits that protect the plant radiological release barriers, i.e., peak suppression pool temperature of less than 185° F and peak RPV pressure less than 1500 psig (Service Level C) at the bottom of the RPV. The analyses were performed using approved methods, and the results are acceptable.

The following TS change has been proposed for GGNS:

Table 3.3.4.1-2, "ATWS Recirculation Pump Trip System Instrumentation setpoints," Item 2, Reactor Vessel Pressure - High Trip Setpoint and allowable value. Change Trip Setpoint from 1095 psig to 1126 psig, and change Allowable Value from 1102 psig to 1139 psig.

Based on the staff evaluation in Section 2.0 above, the staff concludes that the proposed TS concerning the ATWS RPT setpoints are acceptable.

### 3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Mississippi 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 in 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 (56 FR 51925). 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: A. Cabbage

Date: May 26, 1992