



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 147 TO FACILITY OPERATING LICENSE NO. DPR-53
AND AMENDMENT NO. 148 TO FACILITY OPERATING LICENSE NO. DPR-69
BALTIMORE GAS AND ELECTRIC COMPANY
CALVERT CLIFFS NUCLEAR POWER PLANT, UNITS 1 AND 2
DOCKET NOS. 50-317 AND 50-318

1.0 INTRODUCTION

By letter dated July 10, 1987, as supplemented on August 13, 1989, and August 3, 1990, Baltimore Gas and Electric Company (BG&E) requested amendments to the Technical Specifications (TS) for the Calvert Cliffs Nuclear Power Plant, Units 1 and 2 (CC-1/2). The proposed amendments address surveillance, operability, and reporting requirements for the Reactor Vessel Level Monitoring System (RVLMS).

The RVLMS is one of three systems used to indicate the potential for inadequate core cooling. The other two systems are the Subcooling Margin Monitor (SMM) and the Core Exit Thermocouples (CETs). As stated by the licensee, the purpose of the RVLMS is to help the operator 1) track an event, 2) assess the functioning of automatic equipment, and 3) detect the consequences of mitigating actions.

The RVLMS uses a Combustion Engineering Heated Junction Thermocouple (HJTC) system to detect the presence of highly voided coolant above the top of the reactor core. The presence of highly voided coolant is inferred from the differential temperatures between vertically adjacent HJTC probes. If two HJTCs indicate approximately the same temperature, the operator can infer that the same thermodynamic conditions exist at both HJTC locations. If adjacent HJTCs indicate significantly different temperatures, the operator can infer that the hotter HJTC is in a highly voided region of the vessel, and the cooler HJTC is still in a region of the vessel that has low-void-fraction coolant.

The July 10, 1987, request was initially noticed on May 18, 1988 (53 FR 17777). Subsequently, by letter dated August 3, 1990, BG&E responded to the NRC staff's request for additional information in relation to inoperable RVLMS channels and calibration requirements. The August 3, 1990, BG&E letter modified the request by changing TS Table 3.3-10 to require that the system be restored to operable status at the next refueling instead of the initial request which required only a single channel be restored to operable status at the next refueling.

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2.0 BACKGROUND

The NRC staff provided guidance which included a TS action statement that required a plant shutdown within seven days if less than two channels of RVLMS were OPERABLE, and within 48 hours if less than one channel was OPERABLE. The NRC staff and the Combustion Engineering Owners Group (CEOG) discussed the safety significance of not having the RVLMS available, and concluded that the proposed TS was too restrictive. The CEOG submitted a less restrictive TS, which was then proposed for Palo Verde Unit 1, which the NRC staff reviewed and approved.

The Palo Verde Unit 1 TS requires that, with one RVLMS channel inoperable, either the system is restored to OPERABLE Status within seven days or a Special Report must be submitted to the NRC within 30 days detailing the cause of the inoperability and the schedule for restoring the system to OPERABLE status. With the number of OPERABLE channels two less than required (no OPERABLE channels), operation may continue until the next scheduled refueling provided an alternative method of monitoring for core and reactor coolant system voiding is available, and the licensee submits a Special Report to the NRC within 30 days detailing the cause of the inoperability and the schedule for restoring the system to OPERABLE status. The BG&E justification for the requested TS amendments is based on the staff's approval of the generic CEOG TS for Palo Verde Unit 1.

3.0 EVALUATION

The staff accepts the licensee's proposed footnote at the bottom of TS Table 3.3-10. This footnote defines an OPERABLE RVLMS channel as eight sensors in a probe, consisting of one or more operable sensors in the upper three, and three or more operable sensors in the lower five. This footnote is consistent with the previously-approved TS definition of an operable RVLMS channel.

The licensee proposes changing the phrase "reactor coolant system inventory" to "reactor coolant system voiding" in Action Statement 35.1 of the NRC staff's guidance RVLMS Technical Specifications, resulting in: "Initiate an alternative method of monitoring for reactor coolant system voiding." The licensee indicates that this statement is more consistent with the Emergency Operating Procedures (EOPs) that give guidance in determining whether voids exist in the reactor vessel and reactor coolant system. The staff finds this change acceptable.

The licensee initially proposed to substitute the words "at least one channel" for "the system" in Action Statement 35.3 of the TS, resulting in: "Restore at least one channel to OPERABLE status at the next refueling." The licensee claims that the use of "system" in Action Statement 35.3 is ambiguous because it does not define whether the "system" is comprised of one or both RVLMS channels. This statement is not consistent with the licensee's description of the RVLMS on Page 2 of their July 10, 1987, submittal, which states, "The RVLMS [Reactor Vessel Level Monitoring System] consists of two independent safety channels. Each channel consists of a probe assembly,

support tube, pressure boundary modifications, signal processing equipment and an operator interface." The licensee's letter dated August 3, 1990, modified the initial request from "at least one channel" to the "system." This is consistent with its definition of "system," as discussed above, and is also consistent with the generic guidance provided. Therefore, the NRC staff finds this acceptable.

In an NRC staff request for additional information dated August 3, 1989, the licensee was asked to address return to 100% plant power with both RVLMS channels inoperable, based on the location of the failure (inside the reactor vessel, inside the containment, or outside the containment) for operating Modes 1-5 prior to refueling, Mode 6 (refueling), and Modes 1-5 post-refueling.

The licensee's August 31, 1989, submittal states that in Modes 1-5 prior to refueling or in Mode 6, the plant cannot return to 100% power. This action is consistent with the NRC staff's guidance and is acceptable.

The licensee states that in Modes 1-5 after refueling, the plant can return to 100% power if the failure is inside the reactor vessel, because replacement of a channel is not feasible during post-refueling Modes 1-5, and there is sufficient redundant instrumentation to monitor reactor coolant system void indications. Given the diversity of instrumentation available to detect reactor coolant system void indications and the necessity to cool down the plant prior to replacing a failed channel, the licensee's response is acceptable.

The licensee states that the plant can return to 100% power if a RVLMS failure occurs inside containment when the plant is in Modes 1-5 after refueling. The licensee's justification is based on minimizing man-rem doses and short term parts availability considerations. The licensee qualifies their position by stating, "All attempts will be made to repair at least one channel. If repairs are not feasible, the Units can be operated until the next refueling shutdown as long as alternate methods of void detection are initiated." The staff notes that TS action statements concerning loss of an alternate method of monitoring voiding in the reactor coolant system (either SMM or CET) that cannot be restored to OPERABLE will force a plant shutdown. Therefore, the staff accepts the licensee's proposed criteria.

The licensee states that if a RVLMS channel becomes inoperable due to failures outside the containment during post-refueling Mode 1-5 operations, the units could return to 100% power. The licensee commits to making all attempts to repair at least one channel as soon as possible. This response is only qualitative, but does indicate a commitment on the part of the licensee to address channel inoperability when it occurs. Given the number of diverse systems for indicating the potential for inadequate core cooling, and the licensee's commitment to repair failed RVLMS channels as soon as possible, the staff finds this portion of the licensee's requested amendment acceptable.

The licensee states that the calibration frequency for the HJTC probes should be changed from R (Refueling interval) to N/A (Table 4.3-10, "Post-Accident Monitoring Instrumentation Surveillance Requirements") because, once installed, the RVLMS sensors cannot be recalibrated. Consequently, a channel check is the only surveillance performed on the HJTCs. Based on the system design and the alternate methods of monitoring voids, as previously discussed, the staff finds this response acceptable.

4.0 SUMMARY

The NRC staff has determined that the proposed TS surveillance, operability, and reporting requirements for the RVLMS at the Calvert Cliffs Nuclear Power Plant, Units 1 and 2, are acceptable based on the above discussion.

5.0 ENVIRONMENTAL CONSIDERATION

These amendments change requirements with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and change surveillance requirements. The staff has determined that these amendments involve 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 these amendments involve no significant hazards consideration and there has been no public comment on such finding. Accordingly, these amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR Section 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 these amendments.

6.0 CONCLUSION

We have 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, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Dated: September 28, 1990

PRINCIPAL CONTRIBUTORS:

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