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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 129 TO FACILITY OPERATING LICENSE NO. DPR-53

AND AMENDMENT NO. 111 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

INTRODUCTION

By the applications for license amendments dated October 1, 1986 and January 20, 1987, as supplemented on February 16 and February 26, 1988, the Baltimore Gas and Electric Company (BG&E, the licensee) requested changes to the Technical Specifications (TS) for Calvert Cliffs, Units 1 and 2. The TS changes proposed are as follows: (1) Modify the Unit 1 TS Limiting Condition For Operation (LCO) 3.3.3.2 for incore detectors by placing additional restrictions upon operability above those that were required for operation during the previous cycle (Cycle 8); (2) Change the surveillance periods of the Units 1 and 2 TS Surveillance Requirements (SRs) 4.1.3.4.c (demonstration of full length control element assembly (CEA) drop time) and 4.3.3.2.b (incore detector channel calibration) from at least once per 18 months to at least once per refueling interval, where a refueling interval shall be defined as 24 months; (3) Modify the Units 1 and 2 TS SR 4.7.11.1.1.f.3 for cycling fire suppression water system flow path valves that are not testable during plant operation, and 4.7.11.4.b, for the inspection, reracking and replacement of degraded coupling gaskets for fire hoses inside containment by extending their associated surveillance intervals from at least once every 18 months to at least once per refueling interval (24 months); (4) Renumber the Units 1 and 2 TS SR 4.7.11.1.1.f.3 as 4.7.11.1.1.g(2); TS SR 4.7.11.1.1.g as 4.7.11.1.1.g(1); and TS SR 4.7.11.1.1.f.4 as 4.7.11.1.1.f.3 and change the Units 1 and 2 TS SRs 4.7.11.1.1.g (fire suppression system flow test), 4.7.11.2.b and c (spray and sprinkler system functional test), and 4.7.11.4.c (containment fire hose stations operability and hydrostatic tests) by making administrative changes and more restrictive changes to the surveillance requirements; and (5) Change the Units 1 and 2 TS SR 4.4.10.1.2, "Augmented Inservice Inspection Program for Main Steam and Main Feedwater Piping," to update the required ASME Boiler and Pressure Vessel Code, Section XI, for Class 2 components from the 1974 Edition and addenda through Summer 1975 to the 1983 Edition with Addenda through Summer 1983. In addition, TS SR 4.4.10.1.2.a would be deleted and TS SR 4.4.10.1.2.b would be renumbered as 4.4.10.1.2 and would be clarified to reflect a new 10-year inservice inspection interval.

The February 16, and February 26, 1988 submittals provided camera-ready copies of the proposed TS changes as were requested by the licensee on January 20, 1987. The supplement to the January 20, 1987 submittal did not affect the proposed TS changes noticed in the Federal Register on January 13 1987 and did not affect the staff's proposed no significant hazards determination.

DISCUSSION AND EVALUATION

Change No. 1 proposed in the January 20, 1987 submittal to modify the Unit 1 TS LCO 3.3.3.2 for incore detector operability by making its provisions more restrictive than those required for Unit 1 Cycle 8 operation. During startup for Unit 1 Cycle 8, an unexpectedly large number of incore detector strings failed thereby placing Unit 1 close to its operability limits. To provide increased operational flexibility for Unit 1 during Cycle 8 operations, the requirements of TS LCO 3.3.3.2 were relaxed for one cycle only. In order to restore LCO 3.3.3.2 to its pre-cycle 8 requirements, the following modifications were proposed:

(1) LCO 3.3.3.2.a would require at least eight operable symmetric incore detector segment groups, with at least two of these detector segment groups at each of the four axial elevations containing incore detectors, to have sufficient operable detector segments to compute at least two azimuthal power tilt values at each of these four axial elevations. During Cycle 8, eight symmetric incore detector segment groups of no specified elevation were required with sufficient operable detector segments to compute at least two azimuthal power tilt values at three of the four axial elevations.

(2) LCO 3.3.3.2.b would require that at least 75% of all incore detector segments be operable for recalibration of the excore neutron flux detection system rather than the 50% required during Cycle 8.

(3) LCO 3.3.3.2.c would require, for monitoring the unrodded planar radial peaking factor, the unrodded integrated radial peaking factor, or the linear heat rate, that at least 75% of all incore detector locations be operable rather than the 50% required during Cycle 8.

As these proposed changes to TS LCO 3.3.3.2 are all more restrictive in nature, restoring requirements that were relaxed for Unit 1 Cycle 8, and as these proposed changes improve incore detector system performance, the NRC staff has deemed these proposed changes to be acceptable.

In the January 20, 1987 submittal, Change No. 2 proposed to extend the surveillance periods from 18 to 24 months for the Units 1 and 2 TS SRs for demonstrating full length CEA drop time (TS SR 4.1.3.4.c) and for performing incore detector channel calibrations (TS SR 4.3.3.2.b).

The current surveillance period for these test is 18 months which corresponds to the current refueling cycle. The extension in the surveillance interval to 24 months is requested to facilitate a 24-month operating cycle.

According to the current TS SR 4.1.3.4, the drop time of each full length CEA must be verified to be less than or equal to 3.1 seconds (1) following each removal of the reactor vessel head (TS SR 4.1.3.4.a), (2) following maintenance or modification of the CEA drive system which could affect specific CEA drop times (TS SR 4.1.3.4.b), and (3) at least once per 18 months (TS SR 4.1.3.4.c). The CEA drop time is measured from the time that electrical power is interrupted to a fully withdrawn CEA to the time required for the CEA to be at its 90% insertion position. This drop time testing is performed at a reactor coolant system average temperature greater than or equal to 515° F and with all four reactor coolant pumps operating. These conditions are representative of reactor conditions for reactor trips from operating conditions. The purpose of the CEA drop time testing is to ensure that scram insertion times are consistent with those used in the safety analyses.

To justify changing TS SR 4.1.3.4.c to state "at least once per refueling interval" (24 months) instead of "at least once per 18 months", BG&E analyzed CEA drop time measurements from 15 hot functional sets of test data. Eight sets of measurements were from Unit 1 and seven from Unit 2. The licensee found that the average CEA drop time for standard fuel assemblies is approximately 2.3 seconds. The maximum standard deviation for drop times from any fuel cycle is 0.094 seconds. The 15 sets of test data included data from both 12 month and 18 month fuel cycles. The licensee concluded that the data indicate that no increase in drop time trend is observed for either longer fuel cycles or due to increased periods between surveillance testing.

Factors which could adversely affect the CEA drop times when the surveillance interval is increased are (1) changes in component clearances, (2) changes in the physical configuration of the CEA or guide tubes, and (3) the buildup of corrosion products and suspended material in the coolant system that could interfere with CEA motion. The licensee stated that changes to component clearances and changes in the physical configuration of the CEA or guide tubes are more likely to occur when the reactor vessel head is removed and when maintenance is performed on the CEAs (including replacement) and that portion of the drive system directly interfacing with a fuel assembly. For these two factors, TS SRs 4.1.3.4.a and 4.1.3.4.b are applicable and not affected by the proposed change in the testing interval of TS SR 4.1.2.3.c. The licensee stated that corrosion products and suspended material in the coolant system are minimized by coolant chemistry requirements and other controls on the reactor coolant system. In addition, each full-length CEA is exercised at least once per 31 days in accordance with TS SR 4.1.3.1.2. The testing required by this TS SR should detect sticking CEAs. Each planned or unplanned reactor trip that may occur during extended 24 month fuel cycles would provide additional information on CEA drop times and operability.

The staff concurs with the licensee's assessment that extending the interval of TS SR 4.1.3.4.c from 18 months to at least once per refueling interval is acceptable. This concurrence is based on the licensee's analysis of previous fuel cycles CEA drop time measurements which do not exhibit any adverse effects for 18-month cycles as compared to 12-month cycles and on a review of other relevant factors which could adversely affect CEA drop times but are covered by other TS SRs.

Currently, the incore detection system must be demonstrated to be operable at least once per 18 months by performance of a channel calibration in accordance with TS SR 4.3.3.2.b. This channel calibration excludes the neutron detectors but includes all electronic components. The channel calibration consists of two parts: (1) a resistance check of the cable from the computer termination to the reactor core, and (2) a check of the ability of the computer to read a known voltage level. The resistance check verifies cable integrity. The licensee has reviewed tests performed since the initial startup of Calvert Cliffs Units 1 and 2. No evidence of cable degradation was found. The licensee is, however, in the process of replacing the in-containment cable with environmentally qualified cable. The design specification for the new cable will ensure that it is at least as reliable as the cable it replaces.

The second part of the channel calibration checks the computer's ability to read a know voltage level. Three known inputs are input into the computer: (1) a short circuit, (2) a 150 millivolt signal, and (3) a 250 millivolt signal. Proper computer readings are verified for each test with the voltages being between ± 2 millivolts. Other checks to verify proper computer operation are also performed and include CRT and alarm printer verification. The licensee reviewed test data from initial plant startup to the present time and reports that this test has been consistently performed satisfactorily.

To justify changing TS SR 4.3.3.2.b to state "at least once per refueling interval" (24 months) instead of "at least once per 18 months", the licensee stated that no adverse trends have been observed for test data either over time or due to the shift from 12-month to 18-month fuel cycles. In addition, performance of the power distribution TS SRs 4.2.2.1.2 and 4.2.3.2, conducted at least once per 31 Mode 1 days, provides further assurance of incore detection system operability in that an inoperable incore detector segment would probably be apparent due to the resultant skew of the peaking factors calculated through these surveillances. The licensee stated that, with the incore detector system inoperable, other methods are employed to carry out its monitoring and calibration functions.

The staff concurs with the licensee's assessment that extending the interval of TS SR 4.3.3.2.b from 18 months to at least once per refueling interval is acceptable. This concurrence is based on the licensee's analysis of previous fuel cycles' incore detection system calibration data which do not exhibit any adverse trends for 18 month fuel cycles as compared to 12 month fuel cycles and on power distribution that are imposed at least once every 31 Mode 1 TS SRs days, which will provide a check of anomalous incore detector readings.

The proposal to modify TS SR 4.7.11.1.1.f.3 affects only two fire suppression water system valves inside containment. LCO 3.7.11.1.c requires at all times an operable fire suppression water system flow path that takes a suction from the water storage tanks and transfers the water through the distribution system up to the first valve before the water flow alarm device on each sprinkler, hose standpipe or spray system riser. All valves in this flow path can be tested during unit operation with the exception of the two valves inside containment (the motor operated containment isolation valve and a manual block valve). TS SR 4.7.11.1.1.f.3 requires these two valves to be tested by cycling and verifying flow. The licensee's results from a review of plant history indicate that there has never been a failure of either valve to perform adequately. The licensee further states that there is no evidence that a 6-month extension in this surveillance interval between valve cycles would adversely impact valve operation. Hence, the probability or consequences of previously evaluated accidents would not be significantly increased by the proposed 6-month extension of the surveillance interval of TS SR 4.7.11.1.1.f.3.

The proposed modification of TS SR 4.7.11.4.b would affect only the inspection and reracking of fire hoses inside containment. A review of previously conducted containment fire hose inspections revealed no failures of the fire hoses. The licensee stated that these results were expected as it has been a licensee policy to replace all fire hoses inside containment on a three-year frequency. The licensee intends, for the 24-month operating cycle, to hydrostatically test or replace all containment fire hoses every two years.

Furthermore, test results have shown that the hose coupling gasket material has not degraded significantly over the three-year interval between hose replacements. Finally, during hose inspection, there has never been evidence of hose mildew, rot or similar damage due to chemicals, abrasion, moisture or normal wear. Thus, it is unlikely that the containment fire hoses would experience any significant degradation over the proposed 6-month surveillance interval extension.

The licensee has requested that the surveillance interval of only those tests that could not be performed during unit operation (i.e., testing and inspecting fire hoses and fire suppression water system valves inside containment) be extended to a 24-month cycle. These containment fire protection components to be tested are generally inaccessible during unit operation due to ALARA consideration, and so, will be tested during refueling outages. However, the likelihood of a fire inside containment during unit operation is much smaller than during outage work periods. Thus, the likelihood of a fire occurring inside containment, that would damage safety and safety-related systems, will not be significantly increased by this proposed 6-month test interval extension. Therefore, the margins of safety provided by these safety and safety-related systems will not be significantly reduced.

Finally, the new surveillance frequencies of these TS requirements conform with the guidance provided in National Fire Protection Association Standards Nos. 13A and 1962.

For all of the above reasons, the staff concludes that the changes proposed for TS SRs 4.7.11.1.1.f.3 and 4.7.11.4.b are acceptable.

Change No. 4 proposes to renumber the Units 1 and 2 TS SR 4.7.11.1.1.f.3 as 4.7.11.1.1.g(2); TS SR 4.7.11.1.1.g as 4.7.11.1.1.g(1); and TS SR 4.7.11.1.1.f.4 as 4.7.11.1.1.f.3 and to modify the Units 1 and 2 TS SRs 4.7.11.1.1.g, 4.7.11.2.b & c and 4.7.11.4.c by making more restrictive changes to the current surveillance requirements. These changes were requested in the January 20, 1987 submittal. The proposed restrictive changes to the surveillance requirements are as follows:

(1) the surveillance interval for performing a fire suppression water system flow test in accordance with TS SR 4.7.11.1.g would be changed to "at least once per refueling inte val" (24 months) from the currently required "at least once per 3 years,"

(2) the spray and sprinkler system cycling test of each flow path valve would be conducted at least every 12 months. Currently, only testable valves are required to be cycled at least every 12 months by TS SR 4.7.11.2.b, whereas TS SR 4.7.11.2.c.1.b requires the cycling of those not testable during plant operation at least every 18 months. All of these valves, however, are testable during plant operation, making TS 4.7.11.2.c.1.b superfluous. Consequently, the licensee has proposed deletion of TS 4.7.11.2.c.1.b and of the word "testable" from the phrase "by cycling each testable valve" in TS 4.7.11.2.b,

(3) fire hose station valve operability and hose hydrostatic tests currently are required by TS 4.7.11.4.c to be performed at least once per 3 years. The licensee has proposed that these tests on fire hose stations inside containment be required to be performed at least once refueling interval (24 months).

These proposed administrative and restrictive changes, as described above, will provide equivalent or improved fire protection and suppression capability as compared to the current TS requirements. In addition, these proposed TS surveillance requirements conform with the fire protection guidance provided in National Fire Protection Association Standards Nos. 13A and 1962. Therefore, the NRC staff finds these changes, as proposed, to be acceptable.

As provided in the October 1, 1986 amendment request, Change No. 5 proposes to update the Units 1 and 2 TS SR 4.4.10.1.2 to the requirements of the 1983 Edition of the ASME Boiler and Pressure Vessel Code, Section XI, with Addenda through Summer 1983. Currently, the licensee is required to comply with the 1974 Edition with Addenda through Summer 1975.

The first 10-year ASME Code Section XI inservice inspection (ISI) interval ended on April 1, 1987 for Calvert Cliffs Unit 1 and on July 3, 1987 for Unit 2. Section 50.55a(g)(4)(ii) of 10 CFR requires that inservice examinations during successive 120-month (10 year) ISI intervals comply with the requirements of the latest edition of the ASME Code that was

incorporated in 10 CFR 50.55a(b)(2) twelve months prior to the start of the ISI interval. The latest edition and addenda of the ASME Code in 10 CFR 50.55a(b)(2) on April 1, 1986 was the 1983 Edition with Addenda through Summer 1983.

When 10 CFR 50.55a(b)(2) was changed to require use of the 1983 Edition of the ASME Code for ISI, the NRC staff determined that the use of the 1983 Edition vice use of the previously required 1974 Edition was preferential as adoption of the 1983 Code Edition would permit the use of improved methods for inservice inspection of nuclear power plants.

The changes to TS SR 4.4.10.1.2 that result from shifting to the 1983 Edition of the ASME Code provide requirements that are at least as conservative as those provided by the 1974 Edition. Furthermore, this change does not impact any TS SRs other than those specifically set forth in TS SR 4.4.10.1.2.

In addition, the licensee has proposed the deletion of TS SR 4.4.10.1.2.a and the renumbering and clarification of TS SR 4.4.10.1.2.b. These changes are purely administrative. TS SR 4.4.10.1.2.a was provided to establish baseline data during the first 18 months of plant operation. This one-time requirement has been satisfied as this baseline data has been established. Thus, this surveillance requirement is moot. TS SR 4.4.10.1.2.b was clarified to reflect entry into 10-year intervals that are subsequent to the first 10-year interval. This change has no other practical impact upon this surveillance requirement.

Therefore, for the reasons give above, the NRC staff has determined that the changes to TS SR 4.4.10.1.2 proposed to reflect the licensee's update to the 1983 ASME Code are acceptable.

ENVIRONMENTAL CONSIDERATION

These amendments involve a change to requirements with respect to the installation or use of the facilities' components located within the restricted areas as defined in 10 CFR 20 and changes to the 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 Sec 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.

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.

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