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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 128 TO FACILITY OPERATING LICENSE NO. DPR-53

AND AMENDMENT NO. 110 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 July 31 and November 24, 1986 (as supplemented by the April 3 and June 29, 1987 submittals) and October 17, 1986 (as supplemented by the January 12, February 23, March 24 and June 29, 1987 submittals), the Baltimore Gas & 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. Change the definition of the phrase "fuel reload cycle" from 18 months to 24 months for the surveillance interval of TS Surveillance Requirement 4.6.4.1.5 which requires that the containment purge isolation valve seals be replaced at a frequency such that no individual seal remains in service greater than two consecutive fuel reload cycles.

2. Move TS Surveillance Requirements 4.6.4.1.4 and 4.6.4.1.5 from TS 3/4.6.4, "Containment Isolation Valves," to the "Containment Leakage" section of TS 3/4.6.1, "Primary Containment," and renumber them as TS Surveillance Requirements 4.6.1.2.g and 4.6.1.2.h, respectively.

3. To TS 3/4.6.4, "Containment Isolation Valves," add the Limiting Condition for Operation (LCO) Action Statement "e" which states, "The provisions of Specification 3.0.4 are not applicable provided that the affected penetration is isolated."

4. For the following TS Surveillance Requirements, modify their associated surveillance periods from "at least once per 18 months" to "at least once per refueling interval," which shall be defined as 24 months to demonstrate the operability of their associated systems and components.

    a) TS 4.6.4.1.2 - containment isolation valves in TS Table 3.6-1
    b) TS 4.6.3.1.b and d - containment iodine filter trains
    c) TS 4.6.5.2.b - containment hydrogen recombiners

d) TS 4.4.13.2 - reactor coolant system vents
e) TS 4.5.1.e - reactor coolant system safety injection tanks
f) TS 4.5.2.e - independent emergency core cooling systems (ECCS)
g) TS 4.1.2.2.c - boron injection flow path
h) TS 4.6.2.1.b - containment spray system
i) TS 4.7.3.1.b - component cooling water
j) TS 4.7.4.1.a - service water system
k) TS 4.7.5.1.b - salt water system
l) TS 4.1.2.4.a - charging pumps
m) TS 4.5.2.f - ECCS

The January 12, 1987 submittal provided further clarification of the vendor's recommendation and supporting operational data for the replacement schedule for containment purge isolation valve seal replacement (TS 4.6.4.1.5).

The February 23 and March 24, 1987 submittals provided more details concerning the aging process of charcoal and the change in containment iodine filter efficiency as a function of time in further support of the proposed change dated October 17, 1986 to the containment iodine filter train surveillance period for TS 4.6.3.1.b and d.

The April 3, 1987 submittal further clarified the containment isolation valve test data summary that was compiled in the July 31, 1986 submittal to support extending the TS 4.6.4.1.2 surveillance interval to 24 months.

Final, camera-ready versions of the proposed TS changes were submitted by the licensee on June 29, 1987.

The January 12, February 23, March 24, April 3 and June 29, 1987 supplements to the July 31, October 17 and November 24, 1986 submittals did not affect the proposed TS changes as noticed in the Federal Register (FR) on January 14, 1987 (52 FR 1550), March 12, 1987 (52 FR 7676) and April 18, 1987 (52 FR 11353) because the information in the supplements was clarification of information provided in the original amendement requests and did not affect the staff's proposed no significant hazards determinations. The FR notices advised the public that the proposed amendments concerned the items as discussed above. The supplemental information merely provided additional details concerning the proposed changes and did not constitute information different from the subject of the FR notices.

DISCUSSION AND EVALUATION

In Change No. 1 the licensee requested a proposed extension of the seal replacement interval for the containment purge isolation valves at Calvert Cliffs Nuclear Power Plant, Units 1 and 2. The current Technical Specification, TS 4.6.4.1.5, requires that these seals be replaced with new seals at a frequency which ensures that no individual seal remains in service longer than two consecutive refueling cycles. Since the length of the present reload cycle does not exceed 18 months, the seals are exposed to a service time not exceeding three years. By letter dated September 22, 1982, the licensee provided information based on the seal vendor's recommendation and on their own operating

experience which indicated that during this time, the seal material would not undergo significant degradation, and that during the three year period, the containment purge isolation valves will adequately perform their design function. By letter dated October 13, 1982, the staff concurred with the licensee's findings and approved the three year seal replacement interval. However, the licensee currently plans to extend the plant's refueling cycle to 24 months which would lengthen the maximum seal service life from three to four years without changing the requirements of TS 4.6.4.1.5.

With the extension of seal replacement interval to four years, new information was necessary in order to demonstrate that the seal material will maintain its integrity during the additional year of service time and that the performance of the containment purge isolation valves will not be impaired.

This information was provided by the licensee in the submittals dated October 17, 1986 and January 12, 1987. The licensee indicated that the seal manufacturer's recommended life for the elastomer used in the seals is five years. The seals removed after three years of service, as required by the current TS, did not show any signs of degradation. Additionally, the current TS 4.6.4.1.4 requires that the containment purge isolation valves be leak tested at potentially shorter intervals than once per refueling (performed prior to heatup after every shutdown to mode 5 if not conducted within the previous 6 months), and that the measured leakage rates be compared to the previously determined leakage rates in order to detect excessive valve degradation. The staff concludes that the vendor's recommendation concerning seal material service life, taken together with the licensee's operational experience and the requirement for periodic verification that excessive valve degradation is not occurring, provide acceptable justification for extending the service life of the containment purge isolation valve seals from three to four years.

Based on the considerations discussed above, the staff concludes that satisfactory performance of the containment purge isolation valve has been demonstrated during the proposed extended service interval from three to four years for replacement of the valve seals at Calvert Cliffs Nuclear Power Plant, Units 1 and 2. The staff further concludes that the requirements of General Design Criteria 16 and 50 for providing an essentially leak tight containment are satisfied, and the proposed extension of the seal replacement interval is, therefore, acceptable.

The Change No. 2 proposal, as provided in the November 24, 1986 submittal, to remove the Units 1 and 2 TS Surveillance Requirements 4.6.4.1.4 and 4.6.4.1.5 from TS 3/4.6.4 and relocate them in the "Containment Leakage" section of TS 3/4.6.1 is an administrative change for the following reasons:

1. LCOs 3.6.1.2 and 3.6.4.1 are applicable to the same modes, modes 1 through 4.
2. Failure to comply with the proposed TS 4.6.1.2.g or 4.6.1.2.h will prohibit entering mode 4 from mode 5 as would noncompliance with the current TS 4.6.4.14. or 4.6.4.1.5.
3. Determination of noncompliance with the proposed TS 4.6.1.2.g or 4.6.1.2.h while in modes 1 through 4 would require the unit to be shut

down in accordance with TS LCO 3.0.3, as would noncompliance with the current TS 4.6.4.1.4 or 4.6.4.1.5.

4. The surveillance frequencies and requirements are unchanged by this proposal.
5. These surveillance requirements are more closely related to the containment leakage rate requirements of LCO 3.6.1.2 than the containment isolation valve requirements of LCO 3.6.4.1. Relocation of these recuirements in TS 3/4.6.1 would provide greater consistency to the TS containment leakage rate requirements by placing them all in the same TS section.

As this change is solely administrative in nature, these proposed changes to TS 3/4.6.4 and 3/4.6.1 are deemed to be acceptable.

Technical Specification 3.0.4 states that entry into an operational mode or other specified condition shall not be made unless the conditions of the LCO are met without reliance on provisions contained in the Action requirements.

Currently, a unit may operate in mode 1 with an isolated, inoperable containment isolation valve for an indefinite period of time. If this unit is shut down, though, it may not be returned to power until the containment isolation valve is restored to operability.

Based upon their administrative nature, the staff concludes that the proposed changes to TS 4.6.4.1.4 and 4.6.4.1.5 are acceptable.

Change No. 3, as originally proposed in the July 3, 1986 submittal and as modified on November 24, 1986, would add to TS 3/4.6.4 the Action Statement "e". This Action Statement states, "The provisions of specification 3.0.4 are not applicable provided that the affected penetration is isolated." This proposal would permit startup from mode 5 to modes 4 through 1 with any of the containment isolation valves specified in TS Table 3.6-1 inoperable as long as the affected penetration was isolated.

The purpose of the operable containment isolation valves is to ensure containment isolation capability exists to prevent any possible radiological releases from the containment structure. In the event containment isolation is required, this capability will be guaranteed for inoperable containment isolation valves by isolating their associated penetrations rather than requiring them to isolate within a specified response time. If it is not feasible or practical to isolate the affected penetration and maintained it isolated, the unit would not be permitted to heat up or start up. Hence, the containment isolation capabilities would not be appreciably changed.

This proposed change is in accord with the guidelines provided in Generic Letter 87-09, "Sections 3.0 and 4.0 of the Standard Technical Specifications (STS) on the Applicability of Limiting Conditions for Operation and Surveillance Requirements," dated June 4, 1987. This Generic Letter states that, "For an LCO that has Action Requirements permitting continued operation for an unlimited period of time, entry into an operational mode or other specified condition of operation should be permitted in accordance with the Action Requirements." This

is clearly applicable to the requirements for containment isolation valve operability as unlimited operation is permitted as long as the affected penetration is isolated or repaired.

Accordingly, the proposal to make the provisions of Specification 3.0.4 not applicable to TS 3/4.6.4 for the containment isolation valves of Table 3.6-1, if the affected penetration is isolated, has been determined by the staff to be acceptable.

The licensee's submittal dated October 17, 1986, proposed several Unit 1 and 2 TS changes (Change No. 4) for surveillances that can only be performed while the units are shut down.

Currently, all of these surveillances are required to be performed at least once every 18 months. This surveillance period matches the length of the current operating cycle, thus permitting these surveillance to be performed during refueling outages. However, the licensee intends to extend the operating cycle to a full 24-month interval for both units. In order to facilitate this 24-month cycle, without forcing an unnecessary shutdown at the 18 month point for the performance of these surveillances, the licensee has requested that the associated surveillance periods for all of the surveillances included in proposed Change No. 4 (a through m) be extended to at least once per refueling interval where a refueling interval is defined as 24 months.

The containment isolation valves (CIVs) in TS Table 3.6-1 are required by TS 4.6.4.1.2 to be demonstrated operable by verifying that they stroke to their isolation positions upon receipt of their associated actuation signals.

The licensee has proposed in Change No. 4.a the extension of the current surveillance period of 18 months to an interval of 24 months (refueling interval).

Operability of the TS Table 3.6-1 CIVs is to ensure that adequate containment isolation capability exists to prevent any possible radiological releases from the containment structure in the event of a loss of coolant accident (LOCA).

Each unit at Calvert Cliffs has 25 power-operated valves that actuate upon receipt of a safety injection actuation system (SIAS) signal, a containment isolation system (CIS) signal, or a containment radiation-high system (CRS) signal.

The majority of these CIVs are tested during power operations for closure time at least every 3 months by either partial or full stroking in accordance with the requirements of TS 4.0.5. In addition, channel functional tests (CFTs) are performed on a monthly basis during power operations on SIAS, CIS and CRS circuitry to verify the operability of these systems from the as close to the sensor as practicable up to the alarm and/or trip functions. These CFTs are required by TS 4.3.2.1.1.

These tests required by TS 4.0.5 and 4.3.2.1.1 provide assurance of operability of the SIAS and CIS actuated CIVs and of their associated actuation circuity during power operation. Of the 25 power-operated CIVs required to be tested under TS 4.6.4.1.2, all but 11 are stroked (fully or partially) and have their actuation circuitry tested during power operations. Of these 11 valves, 4 are containment purge air inlet and outlet valves that are required to be kept closed while in modes 1 through 4, and therefore, cannot be stroked but more importantly, do not need to be verified to be capable of closing as they are already closed with the air supply isolated to their air operators and with their associated solenoid air supply valves deenergized. However, assurance that the CRS actuation system should work to close these valves while refueling is provided by the monthly CFTs performed on the CRS channels while operating in modes 1 through 4.

There are 7 CIVs (the remaining 7) that cannot be closed for testing during power operations. Thus, during power operations, these valves are neither isolation time stroke tested nor are their associated actuation channel logics surveilled by CFTs. These valves are the component cooling water (CCW) isolation valves (CV-3832 and CV-3833), the letdown line isolation valves (CV-515 and CV-516), the reactor coolant pump seals controlled bleedoff isolation valves (CV-505 and CV-506), and the instrument air isolation valve (MOV-2080).

The licensee provided in the April 3, 1987 submittal the results from surveillance tests conducted to determine the isolation times of 5 of these CIVs. Fourteen surveillance test results were given for each of the 5 CIVS. Of these surveillances, the first eight were performed at a 12 month refueling interval whereas, the last 6 were conducted at an 18 month refueling interval. The results showed that over time and with the 6 month change in the surveillance interval, that these 5 CIVs continued to isolate and that there was no appreciable change in their isolation times with respect to time or test interval.

Based upon the considerations discussed above and as this proposed change is consistent with the intent of the Standard Review Plan, since adequate testing of the SIAS, CIS and CRS containment isolation functions will be maintained, the staff agrees that this proposed change should not significantly reduce the containment isolation capability at Calvert Cliffs Units 1 and 2. Thus, the proposed change to TS 4.6.4.1.2 to extend the surveillance interval from at least once every 18 months to at least once per refueling interval for verifying the operability of SIAS, CIS and CRS actuated CIVs has been determined by our staff to be acceptable.

In Change No. 4.b the licensee requested modification of the Calvert Cliffs Nuclear Power Plant, Units 1 and 2 TS 4.6.3.1.b and 4.6.3.1.d regarding surveillance requirements for containment iodine filter trains. The proposed revisions would change the maximum regular test interval for certain containment iodine filter train surveillance requirements from "18 months" to each "refueling interval" to support future 24-month fuel cycles at the plant. The licensee stated that the change would eliminate the need to perform these surveillance tests inside the containment during reactor operation or during a reactor shutdown prior to a refueling outage.

Operability of the three independent containment iodine filter trains for each reactor unit assures that sufficient iodine removal capability will be available in the containment in the event of a LOCA. The surveillance requirements ensure that filter train performance will not be significantly degraded if called upon to mitigate the consequences of a LOCA. The affected surveillance tests are as follows: in-place test of charcoal adsorbers, in-place test of HEPA filters, laboratory test of charcoal adsorbent samples, filter train flow rate, filter train differential pressure, and filter train start on a containment isolation signal. Remaining unchanged would be the TS requirements for in-place tests of charcoal adsorbers and HEPA filters, laboratory tests of charcoal adsorbent, and tests of filter train flow rate following any structural maintenance on the HEPA filter or charcoal adsorber housing or following painting, fire or chemical release in any ventilation zone communicating with the system.

The licensee stated that the filter trains are "standby systems" which are used sparingly during the reactor operating cycle. Normally, the filter trains are operated only for short periods of time prior to personnel entry into the containment after a period of reactor operation. Each fan is operated about 600 to 800 hours during each fuel cycle and will automatically start on a Containment Isolation Signal (CIS) such as would occur during a LOCA. The most likely causes of potential significant performance degradation are the conditions existing during refueling outages when higher levels of dust and debris are present in the containment atmosphere, and maintenance or modifications are being undertaken in the vicinity of the filter trains.

The licensee stated that in-place tests of the charcoal adsorbers have revealed only one leak on one charcoal filter element in the past 10 years, that this leak did not significantly reduce the overall efficiency of the charcoal adsorber, and that no leaks have occurred in the past nine years. Based on this, the licensee asserted that extending the test interval from 18 months to 24 months will not significantly reduce the capability of the filter trains.

The licensee stated that the in-place tests of the HEPA filters have revealed only three leaks in individual HEPA filter elements in different filter trains in the past 10 years, that the leaks did not significantly reduce the overall ability of the HEPA filter to prevent clogging of the charcoal adsorber, and that no leaks have occurred in the past six years. Based on this, the licensee asserted that extending the test interval from 18 months to 24 months will not significantly reduce the capability of the filter trains.

The licensee stated that the laboratory tests of charcoal adsorbent samples have revealed no failures over the past 10 years. All results have been greater than 98% elemental iodine removal efficiency whereas the TS require at least a 95% removal efficiency (5% above the accident evaluation assumption of 90%). The test have also shown a very slowly decreasing trend in adsorption efficient over the past 10 years - about 2% decrease per 10 years. Based on this, the licensee asserted that extending the test interval from 18 months to 24 months will not significantly reduce the capability of the filter trains.

The licensee stated that the filter train flow rate was found to be outside of the 10% tolerance band only once in the past 10 years, that the flow rate in this case was only 6% below the allowable flow rate, and that the more recent corrective addition of periodic lubrication of the fan motor bearings will reduce the likelihood of such a problem in the future. Based on this, the licensee asserted that extending the test interval from 18 months to 24 months will not significantly reduce the capability of the filter trains.

The licensee stated that the filter train differential pressure (approximately two inches water gauge) has been significantly below the maximum allowable level of six inches water gauge with no significant increasing trend discernable. Based on this, the licensee asserted that extending the test interval from 18 months to 24 months will not significantly reduce the capability of the filter trains.

The licensee stated that the filter train fans have not failed to start during previous Integrated Engineered Safety Features (ESF) Tests, and that the ESF Logic Test will continue to verify on a monthly basis that the fans start when a CIS is initiated. Based on this, the licensee asserted that extending the test interval of the Integrated ESF Logic Test will not significantly reduce the capability of the filter trains.

NUREG-0800, "Standard Review Plan (SRP) for the Review of Safety Analysis Reports for Nuclear Power Plants," Revision 2, July 1981, Section 6.5.1, "ESF Atmosphere Cleanup Systems" provides acceptance criteria for the containment iodine filters based on meeting the relevant requirements of General Design

Criteria (GDC) 19, 41, 42, 43, 61 and 64 of Appendix A to 10 CFR Part 50. GDC 42 and 43 specifically relate to the inspection and testing of containment atmosphere cleanup systems including the iodine filters. SRP Section 6.5.1 provides that the relevant requirements of the GDC be met by satisfying the positions contained in Regulatory Guide (RG) 1.52, "Design, Testing, and Maintenance Criteria for Post Accident Engineered-Safety-Feature Atmosphere Cleanup System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants." RG 1.52 states that these systems be designed to permit appropriate periodic inspection and testing to ensure their integrity, capability, and operability. It specifies that the in-place tests of HEPA filters and carbon adsorbers be performed at least once per 18 months, and that laboratory tests of samples of carbon adsorbent be performed at least once per 18 months for systems maintained on a standby status after 720 hours of system operation.

The staff has reviewed the previously discussed information provided by the licensee, and agrees with the licensee's conclusion that extending the maximum regular test interval from 18 months to 24 months will not significantly reduce the capability of the filter trains. The staff further concludes that the integrity and operability of the filter trains will not be significantly reduced by the proposed change to the TS. Therefore, the staff concludes that the proposed 24 month maximum regular test interval for Calvert Cliffs Units 1 and 2 is an acceptable deviation from the guidelines of RG 1.52 and meets the requirements of GDC 42 and 43.

Based on the above, the staff concludes that the proposed changes to the Calvert Cliffs Units 1 and 2 TS to revise the maximum regular test interval for certain containment iodine filter train surveillance requirements from "18 months" to each "refueling interval" to support future 24-month fuel cycles meets the requirements of GDC 42 and 43 as they relate to the inspection and testing of containment atmosphere cleanup systems and are, therefore, acceptable.

In Change No. 4.c the licensee requested in the October 17, 1986 submittal approval of a proposed extension of the surveillance time for the hydrogen recombiners at Calvert Cliffs Nuclear Power Plant, Units 1 and 2 and the resulting change to TS 4.6.5.2 from at least once every 18 months to at least once per refueling interval (24 months).

This change is necessary because the licensee intends to extend future refueling cycles from 18 to 24 months, and in order to meet ALARA guidelines, inspection and testing of the hydrogen recombiners should continue to be performed when the plant is shutdown. Thus, hydrogen recombiner surveillance frequency should coincide with refueling outages. Calvert Cliffs currently has two thermal hydrogen recombiners installed inside the containments in each unit. Since only one recombiner is needed to remove post accident (LOCA) hydrogen from the containment atmosphere, redundancy is provided. The recombiners themselves are of a standard design, conforming to National Electric Code Standards with all components capable of sustaining accident environments. While the actual recombiner units are located inside the containment, their control panels are located in the control room, and power supplies in the auxiliary building. These components will, therefore, not be exposed to the post accident environment. Since recombination reaction in thermal recombiners is promoted by the thermal energy transferred to the reaction gases and not by catalytic effect of the heated surfaces, any deposits formed on these surfaces would have only insignificant effects on recombination efficiency.

There are a number of similar recombiners installed in other nuclear plants and the record of their performance is very good. Also, the licensee has examined the performance records for the hydrogen recombiners in the Calvert Cliffs Units 1 and 2 since 1977 and found that with the exception of two minor occurrences, they have provided trouble free performance. The above information indicates that a decrease in the frequency of surveillance of the hydrogen recombiners would not result in a significant reduction in their reliability, particularly since as required by TS 4.6.5.2.a, the heaters will continue to undergo 6 month functional testing for operability.

Based on the considerations discussed above, the staff concludes that the extension of the surveillance frequency for the hydrogen recombiners at Calvert Cliffs Nuclear Power Plant, Units 1 and 2 from at least once per 18 months to once every refueling cycle with an understanding that the refueling cycle will be extended to 24 months, meets the requirements of General Design Criteria 42 and 43 for inspection and testing of containment atmosphere cleanup systems since adequate reliability for the recombiners is demonstrated.

Further, the proposed change meets the intent of the standard technical specification for performance of tests and inspections requiring containment access during refueling outages in order to satisfy ALARA concerns. The staff, therefore, finds the proposed change to plant TS 4.6.5.2 to be acceptable.

The Change to No. 4.d TS Surveillance Requirement 4.4.13.2 verifies that all manual isolation valves in each reactor coolant system (RCS) vent path are locked open and that flow occurs through these vent paths when the solenoid operated vent valves are opened. The licensee has proposed in the October 17, 1986 submittal that the interval for performing this surveillance requirement be extended from at least once per 18 months to at least once per refueling interval (24-months) to facilitate a change to a 24-month operating cycle.

The function of the RCS vents is to vent noncondensible gases from high points of the RCS to assure that core cooling during natural circulation will not be inhibited. These noncondensible gases may have accumulated possibly due to fuel damage, zircaloy hydriding, nitrogen addition to the RCS from drained safety injection tanks, or unit refueling.

The RCS vent paths from the reactor vessel head and the pressurizer head to the quench tank are both located within containment.

Extending the verification that the manual vent valves are locked open from 18 to 24 months would have little or no impact upon the continued operability of the RCS vent path during power operations. These manual valves, located in containment, generally are operated only when the unit is in a refueling outage to facilitate system maintenance or RCS refill. The 6-month extension in this surveillance interval coincides with a proposed 6-month extension in the length of the operating cycle. In addition, these valves are locked and the licensee does maintain administrative controls over locked valves. As such, the likelihood of a containment entry during the operating cycle in which these valves are unlocked or unlocked and closed remains negligible.

Likewise, the probability of losing the ability to vent the RCS due to a solenoid valve power supply failure or to solenoid valve failure would remain negligible as the solenoid valves on the two separate vent lines are powered from two separate emergency buses and the probability of failure of one solenoid valve on each of the two vent lines due to material degradation is only negligibly increased due to the extension in surveillance interval. Hence, the reliability and the capability of the RCS vent system to ensure the continuation of effective natural circulation core cooling will be only minimally degraded by this surveillance interval extension of 6 months.

Based upon the above considerations, the staff concludes that the extension of the surveillance interval of TS 4.4.13.2 to verify the RCS vent path operability from at least once per 18 months to at least once every refueling interval (24 months) at Calvert Cliffs Units 1 and 2 is acceptable.

Change Nos. 4.e and 4.f were proposed by the licensee in the application dated October 17, 1986. These changes would modify the surveillance interval from 18 to 24 months for the Units 1 and 2 TS 4.5.1.e and 4.5.2.e which do the following:

a. Verify the opening of the safety injection tank (SIT) isolation valves when RCS pressure exceed 300 psia and upon receipt of a safety injection test signal

b. Verify automatic isolation and interlock action of the shutdown cooling system (SDCS) from the RCS when RCS pressure exceeds 300 psia

c. Visually inspect the containment sump for debris and degradation

d. Verify a minimum of 100 cubic feet of trisodium phosphate dodecahydrate (TSP) is maintained in the TSP storage baskets and that dissolution of a sample of TSP in borated water will raise the solution's pH, as appropriate.

The safety injection systems are designed to supply emergency core cooling in the event of a LOCA. The surveillance that verifies the opening of the SIT isolation valves when RCS pressure exceeds 300 psia or when a safety injection test signal is received is performed to ensure that in the event of a LOCA, the safety injection system will be capable of supplying emergency core cooling.

A licensee review of plant history of these surveillances as performed since 1977, a total of 10 tests, indicates that the operability of these SIT isolation valves has not significantly degraded with time as no failures of the valves to open have been noted on either reaching 300 psia RCS pressure or upon the receipt of a test safety injection signal. In addition, no system response degradation was noted as resulting from the previous 6-month surveillance interval extension from 12 to 18 months.

The automatic isolation and interlock actions of the SDCS from the RCS when RCS pressure exceeds 300 psia is provided to prevent the SDCS from exceeding design temperatures and pressure thereby preventing a possible LOCA via the SDCS. In addition, this prevents the inadvertent operation of the SDCS while at normal operating temperatures and pressures which could result in a cooldown event.

The licensee's review of plant history of these surveillances as performed since 1977, a total of 13 tests, indicates that these automatic isolation and interlock actions have not significantly degraded over time as no failures were noted in the performance of these surveillances. No system response degradation was noted as a consequence of the previous 6-month surveillance interval extension from 12 to 18 months.

The containment sump is inspected for debris and corrosion to ensure that the recirculation mode of emergency cooling will function properly in continuing to provide cooling water to the core in the event of a LOCA. This surveillance has been performed on each unit a minimum of seven times. Only once, during

the pre-operational examination of Unit 2 in 1976, was any debris noted in the sump. This debris was left in place by the construction staff. No debris has been noted since then. No sump degradation has been noted during any performance of this surveillance. Debris accumulation in the containment sump would generally be the result of refueling outage work. The probability of debris accumulating in the sump during the operating cycle is not significant. Sump degradation could occur at any time, but the previous surveillance results have shown that this degradation is not significantly time dependent as the degradation mechanisms would generally require much more time than 24 months. As such, the results of these surveillances are not expected to significantly degrade with an extension in their surveillance interval.

TSP is provided in the containment sump to prevent chloride stress corrosion cracking of certain metal components (generally post-LOCA support systems) located inside containment during operation of the emergency core cooling system. The boric acid solution injected has a pH of approximately 5. The TSP is provided to buffer this acid solution and to raise the pH to approximately 7 (neutral solution). This neutralization of the boric acid solution reduces the probability of chloride stress corrosion cracking.

TSP is a weakly basic, ionic, crystalline salt of phosphoric acid with high melting and boiling points and an extremely low vapor pressure. The TSP is very stable both chemically and physically, resulting in a shelf life that is estimated to be significantly longer than the operating life of the reactor plant. Due to the properties of the TSP, the environmental conditions inside containment during reactor operations should have only very negligible effects upon the quantity or quality of the TSP stored inside containment. Hence, an extension of this surveillance interval by 6 months would have only negligible effects upon the results of these surveillances.

The plant history for these surveillances and the properties of TSP indicate that this proposed extension of these surveillance intervals by 6 months to a total interval of 24 months would not cause any further significant degradation in system components or functions and as such, no significant increase in the probability or consequences of accidents previously analyzed would result.

These proposed changes have been determined to be consistent with the intent of the Standard Review Plan, since adequate surveillance testing of the associated systems will be maintained.

Based upon the considerations discussed above, the staff concludes that the extension of the surveillance intervals of TS 4.5.1.e and 4.5.2.e from at least once per 18 months to at least once per refueling interval (24 months) at Calvert Cliffs Nuclear Power Plant, Units 1 and 2 is acceptable.

Change Nos. 4.g through 4.m were proposed by the licensee in the application dated October 17, 1986. The proposed changes would extend the surveillance from at least once every 18 months to at least once per refueling interval (24 months) for the Units 1 and 2 TS surveillance requirements that verify, upon receipt of a safety injection actuation system (SIAS) test signal, that: 1)

each boric acid pump starts and each automatic valve in the boron injection flow path actuates to its correct position (TS 4.1.2.2.c); 2) each charging pump starts (TS 4.1.2.4.a); 3) each high-pressure safety injection (HPSI) and low-pressure safety injection (LPSI) pump starts and each automatic ECCS valve actuates to its correct position (TS 4.5.2.f); 4) each automatic valve in the containment spray flow path actuates to its correct position (TS 4.6.2.1.b.1); 5) each automatic component cooling water system valve (TS 4.7.3.1.b), service water system valve (TS 4.7.4.1.b), and salt water system valve (TS 4.7.5.1.b), which services safety related equipment actuates to its correct position.

In addition, each automatic service water system valve servicing safety related equipment is verified to actuate to its correct position (TS 4.7.4.1.b) and each containment spray pump starts (TS 4.6.2.1.b.2) upon receipt of a containment spray actuation system (CSAS) test signal.

The SIAS and CSAS actuated pumps and valves that are tested by the above 18-month surveillances are tested also for SIAS and CSAS actuation by the performance of the monthly channel functional tests (CFTs) of the engineered safety feature actuation system (ESFAS) as required in TS 3/4.3.2.

The licensee has stated that this is true for all of these 18-month tested components with the exception of the volume control tank discharge isolation valve (CVC-5011) and the service water isolation valves to the turbine building (SRW-1600, 1637, 1638, and 1639). Due to operational constraints, none of these five valves can be tested while the reactor is at power.

During power operations, the licensee's performance of the ESFAS CFTs provides assurance on a monthly basis that the CFT tested components will all actuate as required upon receipt of a SIAS or CSAS actuation signal. If a component fails to properly actuate during the CFT, action is required to restore it to operability or the affected unit would be shut down, if necessary.

The licensee conducted a review of its plant history for both Units 1 and 2. This review indicates that the SIAS and CSAS actuation functions of the five valves not tested on each unit by the ESFAS CFTs are highly reliable. Of these ten valves total (five on each unit) which have been each tested at least nine times, only one (SRW-1637) has ever failed to actuate on a SIAS or CSAS signal. This valve failed on Unit 1 during pre-operational testing when the valve failed to fully close. In 1979 at Unit 1, another apparent failure of this valve to fully close was detected. This failure was attributed to a burned-out closed indication light bulb. The low number of failures occurring in the valve test population indicates that the SIAS and CSAS actuation functions are highly reliable and that the reliability of their associated components, including those not tested by monthly ESFAS CFTs, would not be significantly degraded by the proposed increase in these surveillance intervals from 18 to 24 months.

The proposed changes are consistent with the intent of the Standard Review Plan, since adequate surveillance testing of the associated systems will be maintained.

Based upon the considerations discussed above, the staff concludes that the extension of the surveillance intervals of the proposed TS changes 4.g through 4.m from at least once per 18 months to at least once per refueling interval (24 months) at Calvert Cliffs Nuclear Power Plant, Units 1 and 2 is acceptable.

ENVIRONMENTAL CONSIDERATION

These amendments involve a change in the installation or use of the facilities' components located within the restricted areas as defined in 10 CFR 20. 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.

Dated: November 3, 1987

PRINCIPAL CONTRIBUTORS:

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 128 TO FACILITY OPERATING LICENSE NO. DPR-53

AND AMENDMENT NO. 110 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 July 31 and November 24, 1986 (as supplemented by the April 3 and June 29, 1987 submittals) and October 17, 1986 (as supplemented by the January 12, February 23, March 24 and June 29, 1987 submittals), the Baltimore Gas & 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. Change the definition of the phrase "fuel reload cycle" from 18 months to 24 months for the surveillance interval of TS Surveillance Requirement 4.6.4.1.5 which requires that the containment purge isolation valve seals be replaced at a frequency such that no individual seal remains in service greater than two consecutive fuel reload cycles.

2. Move TS Surveillance Requirements 4.6.4.1.4 and 4.6.4.1.5 from TS 3/4.6.4, "Containment Isolation Valves," to the "Containment Leakage" section of TS 3/4.6.1, "Primary Containment," and renumber them as TS Surveillance Requirements 4.6.1.2.g and 4.6.1.2.h, respectively.

3. To TS 3/4.6.4, "Containment Isolation Valves," add the Limiting Condition for Operation (LCO) Action Statement "e" which states, "The provisions of Specification 3.0.4 are not applicable provided that the affected penetration is isolated."

4. For the following TS Surveillance Requirements, modify their associated surveillance periods from "at least once per 18 months" to "at least once per refueling interval," which shall be defined as 24 months to demonstrate the operability of their associated systems and components.

    a) TS 4.6.4.1.2 - containment isolation valves in TS Table 3.6-1
    b) TS 4.6.3.1.b and d - containment iodine filter trains
    c) TS 4.6.5.2.b - containment hydrogen recombiners

d) TS 4.4.1?.2 - reactor coolant system vents
e) TS 4.5.1.e - reactor coolant system safety injection tanks
f) TS 4.5.2.e - independent emergency core cooling systems (ECCS)
g) TS 4.1.2.2.c - boron injection flow path
h) TS 4.6.2.1.b - containment spray system
i) TS 4.7.3.1.b - component cooling water
j) TS 4.7.4.1.a - service water system
k) TS 4.7.5.1.b - salt water system
l) TS 4.1.2.4.a - charging pumps
m) TS 4.5.2.f - ECCS

The January 12, 1987 submittal provided further clarification of the vendor's recommendation and supporting operational data for the replacement schedule for containment purge isolation valve seal replacement (TS 4.6.4.1.5).

The February 23 and March 24, 1987 submittals provided more details concerning the aging process of charcoal and the change in containment iodine filter efficiency as a function of time in further support of the proposed change dated October 17, 1986 to the containment iodine filter train surveillance period for TS 4.6.3.1.b and d.

The April 3, 1987 submittal further clarified the containment isolation valve test data summary that was compiled in the July 31, 1986 submittal to support extending the TS 4.6.4.1.2 surveillance interval to 24 months.

Final, camera-ready versions of the proposed TS changes were submitted by the licensee on June 29, 1987.

The January 12, February 23, March 24, April 3 and June 29, 1987 supplements to the July 31, October 17 and November 24, 1986 submittals did not affect the proposed TS changes as noticed in the Federal Register (FR) on January 14, 1987 (52 FR 1550), March 12, 1987 (52 FR 7676) and April 18, 1987 (52 FR 11353) because the information in the supplements was clarification of information provided in the original amendement requests and did not affect the staff's proposed no significant hazards determinations. The FR notices advised the public that the proposed amendments concerned the items as discussed above. The supplemental information merely provided additional de ils concerning the proposed changes and did not constitute information differe from the subject of the FR notices.

DISCUSSION AND EVALUATION

In Change No. 1 the licensee requested a proposed extension of the seal replacement interval for the containment purge isolation valves at Calvert Cliffs Nuclear Power Plant, Units 1 and 2. The current Technical Specification, TS 4.6.4.1.5, requires that these seals be replaced with new seals at a frequency which ensures that no individual seal remains in service longer than two consecutive refueling cycles. Since the length of the present reload cycle does not exceed 18 months, the seals are exposed to a service time not exceeding three years. By letter dated September 22, 1982, the licensee provided information based on the seal vendor's recommendation and on their own operating

experience which indicated that during this time, the seal material would not undergo significant degradation, and that during the three year period, the containment purge isolation valves will adequately perform their design function. By letter dated October 13, 1982, the staff concurred with the licensee's findings and approved the three year seal replacement interval. However, the licensee currently plans to extend the plant's refueling cycle to 24 months which would lengthen the maximum seal service life from three to four years without changing the requirements of TS 4.6.4.1.5.

With the extension of seal replacement interval to four years, new information was necessary in order to demonstrate that the seal material will maintain its integrity during the additional year of service time and that the performance of the containment purge isolation valves will not be impaired.

This information was provided by the licensee in the submittals dated October 17, 1986 and January 12, 1987. The licensee indicated that the seal manufacturer's recommended life for the elastomer used in the seals is five years. The seals removed after three years of service, as required by the current TS, did not show any signs of degradation. Additionally, the current TS 4.6.4.1.4 requires that the containment purge isolation valves be leak tested at potentially shorter intervals than once per refueling (performed prior to heatup after every shutdown to mode 5 if not conducted within the previous 6 months), and that the measured leakage rates be compared to the previously determined leakage rates in order to detect excessive valve degradation. The staff concludes that the vendor's recommendation concerning seal material service life, taken together with the licensee's operational experience and the requirement for periodic verification that excessive valve degradation is not occurring, provide acceptable justification for extending the service life of the containment purge isolation valve seals from three to four years.

Based on the considerations discussed above, the staff concludes that satisfactory performance of the containment purge isolation valve has been demonstrated during the proposed extended service interval from three to four years for replacement of the valve seals at Calvert Cliffs Nuclear Power Plant, Units 1 and 2. The staff further concludes that the requirements of General Design Criteria 16 and 50 for providing an essentially leak tight containment are satisfied, and the proposed extension of the seal replacement interval is, therefore, acceptable.

The Change No. 2 proposal, as provided in the November 24, 1986 submittal, to remove the Units 1 and 2 TS Surveillance Requirements 4.6.4.1.4 and 4.6.4.1.5 from TS 3/4.6.4 and relocate them in the "Containment Leakage" section of TS 3/4.6.1 is an administrative change for the following reasons:

1. LCOs 3.6.1.2 and 3.6.4.1 are applicable to the same modes, modes 1 through 4.
2. Failure to comply with the proposed TS 4.6.1.2.g or 4.6.1.2.h will prohibit entering mode 4 from mode 5 as would noncompliance with the current TS 4.6.4.14. or 4.6.4.1.5.
3. Determination of noncompliance with the proposed TS 4.6.1.2.g or 4.6.1.2.h while in modes 1 through 4 would require the unit to be shut

down in accordance with TS LCO 3.0.3, as would noncompliance with the current TS 4.6.4.1.4 or 4.6.4.1.5.

4. The surveillance frequencies and requirements are unchanged by this proposal.
5. These surveillance requirements are more closely related to the containment leakage rate requirements of LCO 3.6.1.2 than the containment isolation valve requirements of LCO 3.6.4.1. Relocation of these requirements in TS 3/4.6.1 would provide greater consistency to the TS containment leakage rate requirements by placing them all in the same TS section.

As this change is solely administrative in nature, these proposed changes to TS 3/4.6.4 and 3/4.6.1 are deemed to be acceptable.

Technical Specification 3.0.4 states that entry into an operational mode or other specified condition shall not be made unless the conditions of the LCO are met without reliance on provisions contained in the Action requirements.

Currently, a unit may operate in mode 1 with an isolated, inoperable containment isolation valve for an indefinite period of time. If this unit is shut down, though, it may not be returned to power until the containment isolation valve is restored to operability.

Based upon their administrative nature, the staff concludes that the proposed changes to TS 4.6.4.1.4 and 4.6.4.1.5 are acceptable.

Change No. 3, as originally proposed in the July 3, 1986 submittal and as modified on November 24, 1986, would add to TS 3/4.6.4 the Action Statement "e". This Action Statement states, "The provisions of specification 3.0.4 are not applicable provided that the affected penetration is isolated." This proposal would permit startup from mode 5 to modes 4 through 1 with any of the containment isolation valves specified in TS Table 3.6-1 inoperable as long as the affected penetration was isolated.

The purpose of the operable containment isolation valves is to ensure containment isolation capability exists to prevent any possible radiological releases from the containment structure. In the event containment isolation is required, this capability will be guaranteed for inoperable containment isolation valves by isolating their associated penetrations rather than requiring them to isolate within a specified response time. If it is not feasible or practical to isolate the affected penetration and maintained it isolated, the unit would not be permitted to heat up or start up. Hence, the containment isolation capabilities would not be appreciably changed.

This proposed change is in accord with the guidelines provided in Generic Letter 87-09, "Sections 3.0 and 4.0 of the Standard Technical Specifications (STS) on the Applicability of Limiting Conditions for Operation and Surveillance Requirements," dated June 4, 1987. This Generic Letter states that, "For an LCO that has Action Requirements permitting continued operation for an unlimited period of time, entry into an operational mode or other specified condition of operation should be permitted in accordance with the Action Requirements." This

is clearly applicable to the requirements for containment isolation valve operability as unlimited operation is permitted as long as the affected penetration is isolated or repaired.

Accordingly, the proposal to make the provisions of Specification 3.0.4 not applicable to TS 3/4.6.4 for the containment isolation valves of Table 3.6-1, if the affected penetration is isolated, has been determined by the staff to be acceptable.

The licensee's submittal dated October 17, 1986, proposed several Unit 1 and 2 TS changes (Change No. 4) for surveillances that can only be performed while the units are shut down.

Currently, all of these surveillances are required to be performed at least once every 18 months. This surveillance period matches the length of the current operating cycle, thus permitting these surveillance to be performed during refueling outages. However, the licensee intends to extend the operating cycle to a full 24-month interval for both units. In order to facilitate this 24-month cycle, without forcing an unnecessary shutdown at the 18 month point for the performance of these surveillances, the licensee has requested that the associated surveillance periods for all of the surveillances included in proposed Change No. 4 (a through m) be extended to at least once per refueling interval where a refueling interval is defined as 24 months.

The containment isolation valves (CIVs) in TS Table 3.6-1 are required by TS 4.6.4.1.2 to be demonstrated operable by verifying that they stroke to their isolation positions upon receipt of their associated actuation signals.

The licensee has proposed in Change No. 4.a the extension of the current surveillance period of 18 months to an interval of 24 months (refueling interval).

Operability of the TS Table 3.6-1 CIVs is to ensure that adequate containment isolation capability exists to prevent any possible radiological releases from the containment structure in the event of a loss of coolant accident (LOCA).

Each unit at Calvert Cliffs has 25 power-operated valves that actuate upon receipt of a safety injection actuation system (SIAS) signal, a containment isolation system (CIS) signal, or a containment radiation-high system (CRS) signal.

The majority of these CIVs are tested during power operations for closure time at least every 3 months by either partial or full stroking in accordance with the requirements of TS 4.0.5. In addition, channel functional tests (CFTs) are performed on a monthly basis during power operations on SIAS, CIS and CRS circuitry to verify the operability of these systems from the as close to the sensor as practicable up to the alarm and/or trip functions. These CFTs are required by TS 4.3.2.1.1.

These tests required by TS 4.0.5 and 4.3.2.1.1 provide assurance of operability of the SIAS and CIS actuated CIVs and of their associated actuation circuity during power operation. Of the 25 power-operated CIVs required to be tested under TS 4.6.4.1.2, all but 11 are stroked (fully or partially) and have their actuation circuitry tested during power operations. Of these 11 valves, 4 are containment purge air inlet and outlet valves that are required to be kept closed while in modes 1 through 4, and therefore, cannot be stroked but more importantly, do not need to be verified to be capable of closing as they are already closed with the air supply isolated to their air operators and with their associated solenoid air supply valves deenergized. However, assurance that the CRS actuation system should work to close these valves while refueling is provided by the monthly CFTs performed on the CRS channels while operating in modes 1 through 4.

There are 7 CIVs (the remaining 7) that cannot be closed for testing during power operations. Thus, during power operations, these valves are neither isolation time stroke tested nor are their associated actuation channel logics surveilled by CFTs. These valves are the component cooling water (CCW) isolation valves (CV-3832 and CV-3833), the letdown line isolation valves (CV-515 and CV-516), the reactor coolant pump seals controlled bleedoff isolation valves (CV-505 and CV-506), and the instrument air isolation valve (MOV-2080).

The licensee provided in the April 3, 1987 submittal the results from surveillance tests conducted to determine the isolation times of 5 of these CIVs. Fourteen surveillance test results were given for each of the 5 CIVS. Of these surveillances, the first eight were performed at a 12 month refueling interval whereas, the last 6 were conducted at an 18 month refueling interval. The results showed that over time and with the 6 month change in the surveillance interval, that these 5 CIVs continued to isolate and that there was no appreciable change in their isolation times with respect to time or test interval.

Based upon the considerations discussed above and as this proposed change is consistent with the intent of the Standard Review Plan, since adequate testing of the SIAS, CIS and CRS containment isolation functions will be maintained, the staff agrees that this proposed change should not significantly reduce the containment isolation capability at Calvert Cliffs Units 1 and 2. Thus, the proposed change to TS 4.6.4.1.2 to extend the surveillance interval from at least once every 18 months to at least once per refueling interval for verifying the operability of SIAS, CIS and CRS actuated CIVs has been determined by our staff to be acceptable.

In Change No. 4.b the licensee requested modification of the Calvert Cliffs Nuclear Power Plant, Units 1 and 2 TS 4.6.3.1.b and 4.6.3.1.d regarding surveillance requirements for containment iodine filter trains. The proposed revisions would change the maximum regular test interval for certain containment iodine filter train surveillance requirements from "18 months" to each "refueling interval" to support future 24-month fuel cycles at the plant. The licensee stated that the change would eliminate the need to perform these surveillance tests inside the containment during reactor operation or during a reactor shutdown prior to a refueling outage.

Operability of the three independent containment iodine filter trains for each reactor unit assures that sufficient iodine removal capability will be available in the containment in the event of a LOCA. The surveillance requirements ensure that filter train performance will not be significantly degraded if called upon to mitigate the consequences of a LOCA. The affected surveillance tests are as follows: in-place test of charcoal adsorbers, in-place test of HEPA filters, laboratory test of charcoal adsorbent samples, filter train flow rate, filter train differential pressure, and filter train start on a containment isolation signal. Remaining unchanged would be the TS requirements for in-place tests of charcoal adsorbers and HEPA filters, laboratory tests of charcoal adsorbent, and tests of filter train flow rate following any structural maintenance on the HEPA filter or charcoal adsorber housing or following painting, fire or chemical release in any ventilation zone communicating with the system.

The licensee stated that the filter trains are "standby systems" which are used sparingly during the reactor operating cycle. Normally, the filter trains are operated only for short periods of time prior to personnel entry into the containment after a period of reactor operation. Each fan is operated about 600 to 800 hours during each fuel cycle and will automatically start on a Containment Isolation Signal (CIS) such as would occur during a LOCA. The most likely causes of potential significant performance degradation are the conditions existing during refueling outages when higher levels of dust and debris are present in the containment atmosphere, and maintenance or modifications are being undertaken in the vicinity of the filter trains.

The licensee stated that in-place tests of the charcoal adsorbers have revealed only one leak on one charcoal filter element in the past 10 years, that this leak did not significantly reduce the overall efficiency of the charcoal adsorber, and that no leaks have occurred in the past nine years. Based on this, the licensee asserted that extending the test interval from 18 months to 24 months will not significantly reduce the capability of the filter trains.

The licensee stated that the in-place tests of the HEPA filters have revealed only three leaks in individual HEPA filter elements in different filter trains in the past 10 years, that the leaks did not significantly reduce the overall ability of the HEPA filter to prevent clogging of the charcoal adsorber, and that no leaks have occurred in the past six years. Based on this, the licensee asserted that extending the test interval from 18 months to 24 months will not significantly reduce the capability of the filter trains.

The licensee stated that the laboratory tests of charcoal adsorbent samples have revealed no failures over the past 10 years. All results have been greater than 98% elemental iodine removal efficiency whereas the TS require at least a 95% removal efficiency (5% above the accident evaluation assumption of 90%). The test have also shown a very slowly decreasing trend in adsorption efficient over the past 10 years - about 2% decrease per 10 years. Based on this, the licensee asserted that extending the test interval from 18 months to 24 months will not significantly reduce the capability of the filter trains.

The licensee stated that the filter train flow rate was found to be outside of the 10% tolerance band only once in the past 10 years, that the flow rate in this case was only 6% below the allowable flow rate, and that the more recent corrective addition of periodic lubrication of the fan motor bearings will reduce the likelihood of such a problem in the future. Based on this, the licensee asserted that extending the test interval from 18 months to 24 months will not significantly reduce the capability of the filter trains.

The licensee stated that the filter train differential pressure (approximately two inches water gauge) has been significantly below the maximum allowable level of six inches water gauge with no significant increasing trend discernable. Based on this, the licensee asserted that extending the test interval from 18 months to 24 months will not significantly reduce the capability of the filter trains.

The licensee stated that the filter train fans have not failed to start during previous Integrated Engineered Safety Features (ESF) Tests, and that the ESF Logic Test will continue to verify on a monthly basis that the fans start when a CIS is initiated. Based on this, the licensee asserted that extending the test interval of the Integrated ESF Logic Test will not significantly reduce the capability of the filter trains.

NUREG-0800, "Standard Review Plan (SRP) for the Review of Safety Analysis Reports for Nuclear Power Plants," Revision 2, July 1981, Section 6.5.1, "ESF Atmosphere Cleanup Systems" provides acceptance criteria for the containment iodine filters based on meeting the relevant requirements of General Design

Criteria (GDC) 19, 41, 42, 43, 61 and 64 of Appendix A to 10 CFR Part 50. GDC 42 and 43 specifically relate to the inspection and testing of containment atmosphere cleanup systems including the iodine filters. SRP Section 6.5.1 provides that the relevant requirements of the GDC be met by satisfying the positions contained in Regulatory Guide (RG) 1.52, "Design, Testing, and Maintenance Criteria for Post Accident Engineered-Safety-Feature Atmosphere Cleanup System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants." RG 1.52 states that these systems be designed to permit appropriate periodic inspection and testing to ensure their integrity, capability, and operability. It specifies that the in-place tests of HEPA filters and carbon adsorbers be performed at least once per 18 months, and that laboratory tests of samples of carbon adsorbent be performed at least once per 18 months for systems maintained on a standby status after 720 hours of system operation.

The staff has reviewed the previously discussed information provided by the licensee, and agrees with the licensee's conclusion that extending the maximum regular test interval from 18 months to 24 months will not significantly reduce the capability of the filter trains. The staff further concludes that the integrity and operability of the filter trains will not be significantly reduced by the proposed change to the TS. Therefore, the staff concludes that the proposed 24 month maximum regular test interval for Calvert Cliffs Units 1 and 2 is an acceptable deviation from the guidelines of RG 1.52 and meets the requirements of GDC 42 and 43.

Based on the above, the staff concludes that the proposed changes to the Calvert Cliffs Units 1 and 2 TS to revise the maximum regular test interval for certain containment iodine filter train surveillance requirements from "18 months" to each "refueling interval" to support future 24-month fuel cycles meets the requirements of GDC 42 and 43 as they relate to the inspection and testing of containment atmosphere cleanup systems and are, therefore, acceptable.

In Change No. 4.c the licensee requested in the October 17, 1986 submittal approval of a proposed extension of the surveillance time for the hydrogen recombiners at Calvert Cliffs Nuclear Power Plant, Units 1 and 2 and the resulting change to TS 4.6.5.2 from at least once every 18 months to at least once per refueling interval (24 months).

This change is necessary because the licensee intends to extend future refueling cycles from 18 to 24 months, and in order to meet ALARA guidelines, inspection and testing of the hydrogen recombiners should continue to be performed when the plant is shutdown. Thus, hydrogen recombiner surveillance frequency should coincide with refueling outages. Calvert Cliffs currently has two thermal hydrogen recombiners installed inside the containments in each unit. Since only one recombiner is needed to remove post accident (LOCA) hydrogen from the containment atmosphere, redundancy is provided. The recombiners themselves are of a standard design, conforming to National Electric Code Standards with all components capable of sustaining accident environments. While the actual recombiner units are located inside the containment, their control panels are located in the control room, and power supplies in the auxiliary building. These components will, therefore, not be exposed to the post accident environment. Since recombination reaction in thermal recombiners is promoted by the thermal energy transferred to the reaction gases and not by catalytic effect of the heated surfaces, any deposits formed on these surfaces would have only insignificant effects on recombination efficiency.

There are a number of similar recombiners installed in other nuclear plants and the record of their performance is very good. Also, the licensee has examined the performance records for the hydrogen recombiners in the Calvert Cliffs Units 1 and 2 since 1977 and found that with the exception of two minor occurrences, they have provided trouble free performance. The above information indicates that a decrease in the frequency of surveillance of the hydrogen recombiners would not result in a significant reduction in their reliability, particularly since as required by TS 4.6.5.2.a, the heaters will continue to undergo 6 month functional testing for operability.

Based on the considerations discussed above, the staff concludes that the extension of the surveillance frequency for the hydrogen recombiners at Calvert Cliffs Nuclear Power Plant, Units 1 and 2 from at least once per 18 months to once every refueling cycle with an understanding that the refueling cycle will be extended to 24 months, meets the requirements of General Design Criteria 42 and 43 for inspection and testing of containment atmosphere cleanup systems since adequate reliability for the recombiners is demonstrated.

Further, the proposed change meets the intent of the standard technical specification for performance of tests and inspections requiring containment access during refueling outages in order to satisfy ALARA concerns. The staff, therefore, finds the proposed change to plant TS 4.6.5.2 to be acceptable.

The Change to No. 4.d TS Surveillance Requirement 4.4.13.2 verifies that all manual isolation valves in each reactor coolant system (RCS) vent path are locked open and that flow occurs through these vent paths when the solenoid operated vent valves are opened. The licensee has proposed in the October 17, 1986 submittal that the interval for performing this surveillance requirement be extended from at least once per 18 months to at least once per refueling interval (24-months) to facilitate a change to a 24-month operating cycle.

The function of the RCS vents is to vent noncondensible gases from high points of the RCS to assure that core cooling during natural circulation will not be inhibited. These noncondensible gases may have accumulated possibly due to fuel damage, zircaloy hydriding, nitrogen addition to the RCS from drained safety injection tanks, or unit refueling.

The RCS vent paths from the reactor vessel head and the pressurizer head to the quench tank are both located within containment.

Extending the verification that the manual vent valves are locked open from 18 to 24 months would have little or no impact upon the continued operability of the RCS vent path during power operations. These manual valves, located in containment, generally are operated only when the unit is in a refueling outage to facilitate system maintenance or RCS refill. The 6-month extension in this surveillance interval coincides with a proposed 6-month extension in the length of the operating cycle. In addition, these valves are locked and the licensee does maintain administrative controls over locked valves. As such, the likelihood of a containment entry during the operating cycle in which these valves are unlocked or unlocked and closed remains negligible.

Likewise, the probability of losing the ability to vent the RCS due to a solenoid valve power supply failure or to solenoid valve failure would remain negligible as the solenoid valves on the two separate vent lines are powered from two separate emergency buses and the probability of failure of one solenoid valve on each of the two vent lines due to material degradation is only negligibly increased due to the extension in surveillance interval. Hence, the reliability and the capability of the RCS vent system to ensure the continuation of effective natural circulation core cooling will be only minimally degraded by this surveillance interval extension of 6 months.

Based upon the above considerations, the staff concludes that the extension of the surveillance interval of TS 4.4.13.2 to verify the RCS vent path operability from at least once per 18 months to at least once every refueling interval (24 months) at Calvert Cliffs Units 1 and 2 is acceptable.

Change Nos. 4.e and 4.f were proposed by the licensee in the application dated October 17, 1986. These changes would modify the surveillance interval from 18 to 24 months for the Units 1 and 2 TS 4.5.1.e and 4.5.2.e which do the following:

a. Verify the opening of the safety injection tank (SIT) isolation valves when RCS pressure exceed 300 psia and upon receipt of a safety injection test signal

b. Verify automatic isolation and interlock action of the shutdown cooling system (SDCS) from the RCS when RCS pressure exceeds 300 psia

c. Visually inspect the containment sump for debris and degradation

d. Verify a minimum of 100 cubic feet of trisodium phosphate dodecahydrate (TSP) is maintained in the TSP storage baskets and that dissolution of a sample of TSP in borated water will raise the solution's pH, as appropriate.

The safety injection systems are designed to supply emergency core cooling in the event of a LOCA. The surveillance that verifies the opening of the SIT isolation valves when RCS pressure exceeds 300 psia or when a safety injection test signal is received is performed to ensure that in the event of a LOCA, the safety injection system will be capable of supplying emergency core cooling.

A licensee review of plant history of these surveillances as performed since 1977, a total of 10 tests, indicates that the operability of these SIT isolation valves has not significantly degraded with time as no failures of the valves to open have been noted on either reaching 300 psia RCS pressure or upon the receipt of a test safety injection signal. In addition, no system response degradation was noted as resulting from the previous 6-month surveillance interval extension from 12 to 18 months.

The automatic isolation and interlock actions of the SDCS from the RCS when RCS pressure exceeds 300 psia is provided to prevent the SDCS from exceeding design temperatures and pressure thereby preventing a possible LOCA via the SDCS. In addition, this prevents the inadvertent operation of the SDCS while at normal operating temperatures and pressures which could result in a cooldown event.

The licensee's review of plant history of these surveillances as performed since 1977, a total of 13 tests, indicates that these automatic isolation and interlock actions have not significantly degraded over time as no failures were noted in the performance of these surveillances. No system response degradation was noted as a consequence of the previous 6-month surveillance interval extension from 12 to 18 months.

The containment sump is inspected for debris and corrosion to ensure that the recirculation mode of emergency cooling will function properly in continuing to provide cooling water to the core in the event of a LOCA. This surveillance has been performed on each unit a minimum of seven times. Only once, during

the pre-operational examination of Unit 2 in 1976, was any debris noted in the sump. This debris was left in place by the construction staff. No debris has been noted since then. No sump degradation has been noted during any performance of this surveillance. Debris accumulation in the containment sump would generally be the result of refueling outage work. The probability of debris accumulating in the sump during the operating cycle is not significant. Sump degradation could occur at any time, but the previous surveillance results have shown that this degradation is not significantly time dependent as the degradation mechanisms would generally require much more time than 24 months. As such, the results of these surveillances are not expected to significantly degrade with an extension in their surveillance interval.

TSP is provided in the containment sump to prevent chloride stress corrosion cracking of certain metal components (generally post-LOCA support systems) located inside containment during operation of the emergency core cooling system. The boric acid solution injected has a pH of approximately 5. The TSP is provided to buffer this acid solution and to raise the pH to approximately 7 (neutral solution). This neutralization of the boric acid solution reduces the probability of chloride stress corrosion cracking.

TSP is a weakly basic, ionic, crystalline salt of phosphoric acid with high melting and boiling points and an extremely low vapor pressure. The TSP is very stable both chemically and physically, resulting in a shelf life that is estimated to be significantly longer than the operating life of the reactor plant. Due to the properties of the TSP, the environmental conditions inside containment during reactor operations should have only very negligible effects upon the quantity or quality of the TSP stored inside containment. Hence, an extension of this surveillance interval by 6 months would have only negligible effects upon the results of these surveillances.

The plant history for these surveillances and the properties of TSP indicate that this proposed extension of these surveillance intervals by 6 months to a total interval of 24 months would not cause any further significant degradation in system components or functions and as such, no significant increase in the probability or consequences of accidents previously analyzed would result.

These proposed changes have been determined to be consistent with the intent of the Standard Review Plan, since adequate surveillance testing of the associated systems will be maintained.

Based upon the considerations discussed above, the staff concludes that the extension of the surveillance intervals of TS 4.5.1.e and 4.5.2.e from at least once per 18 months to at least once per refueling interval (24 months) at Calvert Cliffs Nuclear Power Plant, Units 1 and 2 is acceptable.

Change Nos. 4.g through 4.m were proposed by the licensee in the application dated October 17, 1986. The proposed changes would extend the surveillance from at least once every 18 months to at least once per refueling interval (24 months) for the Units 1 and 2 TS surveillance requirements that verify, upon receipt of a safety injection actuation system (SIAS) test signal, that: 1)

each boric acid pump starts and each automatic valve in the boron injection flow path actuates to its correct position (TS 4.1.2.2.c); 2) each charging pump starts (TS 4.1.2.4.a); 3) each high-pressure safety injection (HPSI) and low-pressure safety injection (LPSI) pump starts and each automatic ECCS valve actuates to its correct position (TS 4.5.2.f); 4) each automatic valve in the containment spray flow path actuates to its correct position (TS 4.6.2.1.b.1); 5) each automatic component cooling water system valve (TS 4.7.3.1.b), service water system valve (TS 4.7.4.1.b), and salt water system valve (TS 4.7.5.1.b), which services safety related equipment actuates to its correct position.

In addition, each automatic service water system valve servicing safety related equipment is verified to actuate to its correct position (TS 4.7.4.1.b) and each containment spray pump starts (TS 4.6.2.1.b.2) upon receipt of a containment spray actuation system (CSAS) test signal.

The SIAS and CSAS actuated pumps and valves that are tested by the above 18-month surveillances are tested also for SIAS and CSAS actuation by the performance of the monthly channel functional tests (CFTs) of the engineered safety feature actuation system (ESFAS) as required in TS 3/4.3.2.

The licensee has stated that this is true for all of these 18-month tested components with the exception of the volume control tank discharge isolation valve (CVC-5011) and the service water isolation valves to the turbine building (SRW-1600, 1637, 1638, and 1639). Due to operational constraints, none of these five valves can be tested while the reactor is at power.

During power operations, the licensee's performance of the ESFAS CFTs provides assurance on a monthly basis that the CFT tested components will all actuate as required upon receipt of a SIAS or CSAS actuation signal. If a component fails to properly actuate during the CFT, action is required to restore it to operability or the affected unit would be shut down, if necessary.

The licensee conducted a review of its plant history for both Units 1 and 2. This review indicates that the SIAS and CSAS actuation functions of the five valves not tested on each unit by the ESFAS CFTs are highly reliable. Of these ten valves total (five on each unit) which have been each tested at least nine times, only one (SRW-1637) has ever failed to actuate on a SIAS or CSAS signal. This valve failed on Unit 1 during pre-operational testing when the valve failed to fully close. In 1979 at Unit 1, another apparent failure of this valve to fully close was detected. This failure was attributed to a burned-out closed indication light bulb. The low number of failures occurring in the valve test population indicates that the SIAS and CSAS actuation functions are highly reliable and that the reliability of their associated components, including those not tested by monthly ESFAS CFTs, would not be significantly degraded by the proposed increase in these surveillance intervals from 18 to 24 months.

The proposed changes are consistent with the intent of the Standard Review Plan, since adequate surveillance testing of the associated systems will be maintained.

Based upon the considerations discussed above, the staff concludes that the extension of the surveillance intervals of the proposed TS changes 4.g through 4.m from at least once per 18 months to at least once per refueling interval (24 months) at Calvert Cliffs Nuclear Power Plant, Units 1 and 2 is acceptable.

ENVIRONMENTAL CONSIDERATION

These amendments involve a change in the installation or use of the facilities' components located within the restricted areas as defined in 10 CFR 20. 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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