

Charles H. Cruse
Vice President
Nuclear Energy

Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, Maryland 20657
410 495-4455



*A Member of the
Constellation Energy Group*

November 22, 1999

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318
License Amendment Request: Revision to Ventilation Filter Testing Program
Technical Specification per Generic Letter 99-02

Pursuant to 10 CFR 50.90, Baltimore Gas and Electric Company hereby requests an amendment to Operating License Nos. DPR-53 and DPR-69 to incorporate the changes described below into the Technical Specifications for Calvert Cliffs Units 1 and 2.

The proposed amendment revises Technical Specification (TS) 5.5.11, "Ventilation Filter Testing Program" for laboratory testing of charcoal in our engineered safety feature (ESF) ventilation systems to reference the latest charcoal testing standard (American Society for Testing and Materials [ASTM] D3803-1989, "Standard Test Method for Nuclear-Grade Activated Carbon"). This TS change was requested by the Nuclear Regulatory Commission (NRC) in Generic Letter 99-02, "Laboratory Testing of Nuclear-Grade Activated Charcoal," and is based on the NRC's determination that testing nuclear-grade activated charcoal to standards other than ASTM D3803-1989 does not provide assurance for complying with the current licensing basis as it relates to the dose limits of General Design Criterion 19 of Appendix A to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR) and Subpart A of 10 CFR Part 100. The generic letter provided a sample TS that the NRC considers acceptable. The proposed revision to TS 5.5.11 meets the intent of the sample TS. Specifically, the proposed change removes the reference to testing in accordance with American National Standards Institute N510-1975 and changes the allowable methyl iodide penetration to an acceptance criterion that is derived from applying a safety factor of two to the charcoal filter efficiency assumed in our design basis dose analysis. The proposed changes will ensure that the charcoal filters used in ESF ventilation systems will perform in a manner that is consistent with the particular ESF charcoal adsorption efficiencies assumed in the analyses of design basis accidents. The proposed changes are shown in the marked-up Technical Specification page in Attachment (3).

A081

PDR A00010500317

SCHEDULE

During the 2000 Refueling Outage, a sample of the charcoal adsorber from the iodine removal system (IRS) ventilation system is scheduled to undergo laboratory testing. Currently, the NRC's enforcement discretion makes it unnecessary for licensees to perform parallel testing of charcoal to the old and new standards just to demonstrate compliance with the existing TS. We plan to test the charcoal sample from the IRS in accordance with ASTM D3803-1989, as required by the conditions of enforcement discretion. In light of enforcement discretion and no safety benefit from performing parallel testing, we do not plan to test the charcoal sample from the IRS in accordance with the existing TS. To avoid reporting a condition prohibited by TS in accordance with 10 CFR 50.73, "Licensee Event Report System," the TS would have to be changed when the next laboratory test is performed. Therefore, we request that this change be approved by February 1, 2000.

ASSESSMENT AND REVIEW

We have evaluated the significant hazards considerations associated with this proposed amendment, as required by 10 CFR 50.92, and have determined that there are none (see Attachment 2 for a complete discussion). We have also determined that operation with the proposed amendment will not result in any significant change in the types or significant increases in the amounts of any effluents that may be released offsite, and no significant increases in individual or cumulative occupational radiation exposure. Therefore, the proposed amendment is eligible for categorical exclusion as set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment is needed in connection with the approval of the proposed change. The Plant Operations and Safety Review Committee and the Offsite Safety Review Committee have reviewed this proposed change and concur that operation with the proposed change will not result in an undue risk to the health and safety of the public.

ATTACHMENT (1)

SUMMARY DESCRIPTION AND SAFETY ANALYSIS

ATTACHMENT (1)

SUMMARY DESCRIPTION AND SAFETY ANALYSIS

Safety-related air-cleaning units used in our engineered safety features (ESF) ventilation systems reduce the potential onsite and offsite consequences of a radiological accident by adsorbing radioiodine. Charcoal filters are used in these systems. Analyses of design-basis accidents assume a particular ESF charcoal filter adsorption efficiency when calculating offsite and Control Room operator doses. The Technical Specifications (TS) require a laboratory test of charcoal filter samples to determine whether the filter adsorber efficiency is within an acceptable limit. The laboratory test acceptance criteria provide assurance that the efficiency assumed in the accident analysis is valid throughout the operating cycle.

The Nuclear Regulatory Commission's (NRC's) and the nuclear industry's understandings of the appropriate laboratory tests for nuclear-grade charcoal have evolved over the years. It was initially assumed that high-temperature/high-relative-humidity (RH) conditions were the most severe. Recent testing shows this not to be the case. As indicated in Generic Letter 99-02, "Laboratory Testing of Nuclear-Grade Activated Charcoal," dated June 3, 1999, data from laboratory tests at temperatures of 30°C [86°F], 80°C [176°F], and 130°C [266°F] show significant increases in iodine-removal capabilities as the test temperature increases. As the temperature of the charcoal is increased, there is an increase in the reaction rate, which results in the charcoal being able to adsorb more iodine than it could at lower temperatures. Therefore, testing at the elevated temperatures results in a non-conservative estimation of the actual iodine-removal capability of the charcoal, and testing at 30°C [86°F] gives results that represent a more conservative assessment of the adsorption capability of the charcoal. In addition, water retained by the charcoal at lower temperatures decreases its efficiency in adsorbing radioiodine. The quantity of water retained by charcoal is dependent on temperature, and less water is retained as the temperature rises. As the humidity in the gasses passing through the charcoal is increased, more water is retained by the charcoal, which results in a decrease in its efficiency in adsorbing radioiodine. Now, it has become clear that low temperature/high humidity conditions are the most severe. Therefore, the most conservative test is at low-temperature/high humidity conditions. Testing to the criteria in the existing TS can lead to a non-conservative estimation of the charcoal's ability to adsorb radioiodine following an accident.

The NRC issued Generic Letter 99-02 requesting all addressees adopt American Society for Testing and Materials (ASTM) D3803-1989, "Standard Test Method for Nuclear-Grade Activated Carbon" for laboratory testing of charcoal samples obtained from charcoal adsorber banks installed in ESF filter ventilation systems listed in the TSs. As discussed in the generic letter, the NRC considers ASTM D3803-1989 to be the most accurate and most realistic protocol for testing charcoal in ESF ventilation systems because it offers the most conservative determination of the adsorption capability of the charcoal. The TSs list five ESF ventilation systems for which laboratory testing of a sample of the charcoal adsorber is required. These requirements are located in TS 5.5.11.c.

The five ESF ventilation systems listed in the TSs are: (1) Control Room Emergency Ventilation System (CREVS), (2) Emergency Core Cooling System (ECCS) Pump Room Exhaust Filtration System (PREFS), (3) Penetration Room Exhaust Ventilation System (PREVS), (4) Spent Fuel Pool Exhaust Ventilation System (SFPEVS), and (5) Iodine Removal System (IRS).

Currently, TS 5.5.11.c requires that we demonstrate for each of the ESF ventilation systems that a laboratory test of a sample of the charcoal adsorber, when obtained as described in Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, demonstrates the methyl iodide (elemental iodine for the IRS) penetration is less than or equal to the value specified below when tested in accordance with American National Standards Institute (ANSI) N510-1975 and the testing protocol of ANSI D3803-1989, at a temperature of less than or equal to 30°C (130°C for the IRS) and greater than or equal to the relative humidity specified as follows:

ATTACHMENT (1)

SUMMARY DESCRIPTION AND SAFETY ANALYSIS

<u>ESF Ventilation System</u>	<u>Penetrations</u>	<u>RH</u>
CREVS	10%	95%
ECCS PREFS	10%	95%
PREVS	10%	95%
SFP Ventilation System	10%	95%
IRS	5%	95%

The proposed changes will make TS 5.5.11.c similar to the sample TS provided in Generic Letter 99-02 for plants with improved TSs. The proposed revision to TS 5.5.11 meets the intent of the sample TS. Where changes to the existing TS have not been made to make them conform with the sample TS provided in Generic Letter 99-02 for plants with improved TS, the existing TS provide greater test condition flexibility over the sample TS while being conservative with respect to the most severe temperature and RH testing conditions. The proposed change removes the reference to testing in accordance with ANSI N510-1975 and changes the allowable methyl iodide penetration to an acceptance criterion that is derived from applying a safety factor of two to the charcoal filter efficiency assumed in our design basis dose analysis. The proposed changes will ensure that the charcoal filters used in ESF ventilation systems will perform in a manner that is consistent with the particular ESF charcoal adsorption efficiencies assumed in the analyses of design basis accidents. The proposed changes are as follows:

The parenthetical statement “elemental iodine for the IRS” is removed. The IRS is designed to collect, within the Containment, the iodine released following a loss-of-coolant accident. The Updated Final Safety Analysis Report states that IRS charcoal filter testing is performed to demonstrate that the installed charcoal adsorbents will perform satisfactorily in removing both elemental and organic iodides for design conditions of flow, temperature, and RH. The testing for methyl iodide penetration accounts for both organic and elemental iodine. The ASTM D3803-1989 standard requires air with methyl iodide to be injected through the charcoal beds to challenge the capability of the charcoal. Methyl iodide is not adsorbed by charcoal as readily as elemental iodine in charcoal. Therefore, the use of methyl iodide instead of elemental iodine will yield more conservative test results for organic and elemental iodine penetration.

The reference to ANSI N510-1975 is removed. The generic letter states that the latest acceptable methodology for the laboratory testing of the charcoal is ASTM Standard D3803-1989, “Standard Test Method for Nuclear-Grade Activated Carbon.” The use of any standard other than ASTM D3803-1989 to test the charcoal sample may result in a non-conservative estimation of the capability of the charcoal to adsorb radioiodine. The reference to ANSI D3803-89 is removed and replaced with the editorially-correct reference to the ASTM Standard D3803-1989.

The parenthetical statement “130°C for the IRS” is removed. This change will result in the IRS charcoal sample being tested at less than or equal to 30°C. Testing at the higher temperature (130°C) results in a non-conservative estimation of the actual iodine-removal capability of the charcoal, and testing at 30°C [86°F] results in a more conservative estimation of the capability of the charcoal. As the temperature of the charcoal is increased, there is an increase in the reaction rate, which results in the charcoal being able to adsorb more iodine than it could at lower temperatures.

The methyl iodide penetrations for the ESF ventilation systems are changed to the allowable methyl iodide penetrations calculated using the equation provided in Generic Letter 99-02 (shown below) with a factor of safety of two. American Society for Testing and Materials D3803-1989 is a more conservative and demanding test than older tests; therefore, the NRC indicated in Generic Letter 99-02 that licensees who upgrade their TS to this new protocol will be able to use a safety factor as low as two for determining the acceptance criteria for charcoal filter efficiency.

ATTACHMENT (1)

SUMMARY DESCRIPTION AND SAFETY ANALYSIS

$$\text{Allowable Penetration} = \frac{[100\% - \text{Methyl Iodide Efficiency for Charcoal Credited in Our Accident Analysis}]}{\text{Safety Factor}}$$

The specific penetration changes are as follows:

CREVS - The 10% allowable penetration is changed to 5%. The current accident analysis assumes 90% methyl iodine removal efficiency. The change to 5% penetration incorporates the factor of safety of two.

ECCS PREFS – The 10% allowable penetration is changed to 50%. No credit is taken for this filtration system in the current accident analysis. The change to 50% penetration incorporates the factor of safety of two.

PREVS – The 10% allowable penetration is changed to 35%. The current accident analysis assumes 30% methyl iodine removal efficiency. The change to 35% penetration incorporates the factor of safety of two.

SFP Ventilation System – Change the 10% allowable penetration to 15%. The current accident analysis assumes 70% for the methyl iodine removal efficiency. The change to 15% penetration incorporates the factor of safety of two.

IRS – Change the 5% allowable penetration to 35%. The current accident analysis assumes 30% methyl iodine removal efficiency. The change to 35% penetration incorporates the factor of safety of two.

The RH for the CREVS is changed from 95% RH to 70% RH. Generic Letter 99-02 indicated that the testing may be performed at 70% RH with humidity control. The generic letter also described the methods of providing humidity control that the NRC considers acceptable. The generic letter states, "Humidity control can be provided by heaters or NRC-approved analysis that demonstrates that the air entering the charcoal will be maintained less than or equal to 70% RH under worst-case design-basis conditions." We are not able to provide humidity control by the methods listed in Generic Letter 99-02. The CREVS's humidity control is provided by air conditioning (not heaters), and an NRC-approved analysis could not be found on our docket. However, in a letter from G. S. Vissing (NRC) to Baltimore Gas and Electric Company, "Summary of the April 7, 1998, Meeting with Representatives of BGE Concerning the Control Room Habitability Issue with a Main Steam Line Break," dated April 20, 1998, the NRC indicated that because of the unique operation of the CREVS during an accident (the ventilation system is operated in the recirculation mode), with technical justification, the filters could be tested at a RH of 70% rather than the existing 95%. Recent plant modifications to the ventilation system ensure that air entering the charcoal will be maintained less than or equal to 50% RH under all design-basis accident conditions. Although higher RH conditions are more severe than lower RH conditions, conducting the test at 70% RH is conservative with respect to the calculated 50% RH worst-case design-basis condition. Therefore, conducting the test at 70% RH will provide a conservative estimation of the charcoal's ability to adsorb organic and elemental radioiodine under worst-case design-basis conditions.

ATTACHMENT (2)

DETERMINATION OF SIGNIFICANT HAZARDS

ATTACHMENT (2)
DETERMINATION OF SIGNIFICANT HAZARDS

The proposed amendment revises the ventilation filter testing program for laboratory testing of charcoal in our engineered safety feature (ESF) ventilation systems. The revised Technical Specification (TS) will reference the latest charcoal testing standard (American Society for Testing and Materials [ASTM] D3803-1989, "Standard Test Method for Nuclear-Grade Activated Carbon") and test conditions that are more representative of the limiting accident conditions. This TS change was requested by the Nuclear Regulatory Commission (NRC) in Generic Letter 99-02, "Laboratory Testing of Nuclear-Grade Activated Charcoal," and is based on the NRC's determination that testing nuclear-grade activated charcoal to standards other than ASTM D3803-1989 does not provide adequate assurance for complying with the current licensing basis as it relates to the dose limits of General Design Criterion 19 of Appendix A to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR) and Subpart A of 10 CFR Part 100.

The proposed change has been evaluated against the standards in 10 CFR 50.92 and has been determined to not involve a significant hazards consideration, in that operation of the facility in accordance with the proposed amendments:

1. *Would not involve a significant increase in the probability or consequences of an accident previously evaluated.*

This proposed change makes changes to the methods, test conditions, and acceptance criteria associated with the performance of the laboratory tests of charcoal samples. The affected equipment is used to mitigate the consequences of an accident and are not accident initiators. This proposed change does not make any changes to the method of obtaining the charcoal sample. No structural changes or modifications are being made to the ESF ventilation equipment. This proposed change does not make any changes to equipment, procedures, or processes that increase the likelihood of an accident. Therefore, this proposed change does not involve a significant increase in the probability of an accident previously evaluated.

The ESF ventilation systems are designed to mitigate the consequences of accidents. The design basis analysis of the accidents account to varying degrees for the reduction in airborne radioactive material provided by the charcoal filters. The proposed change will change the charcoal filter test protocol to ASTM D3803-1989. The use of this standard will produce more accurate and reproducible laboratory test results and provides a more conservative estimate of charcoal filter capability. The proposed change makes changes to the methyl iodide penetration acceptance criteria to ensure that the charcoal filters are capable of performing their required safety function for the expected operating cycle. This proposed change will make it more likely that the charcoal will meet its intended safety function as described in the Updated Final Safety Analysis Report. Therefore, the proposed change does not significantly increase the consequences of an accident previously evaluated.

Based on the above, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. *Would not create the possibility of a new or different type of accident from any accident previously evaluated.*

The proposed change will not make any physical changes to the plant or changes to the ESF ventilation system operation. The proposed change is limited to the ESF ventilation system testing protocol, test conditions, and acceptance criteria. These changes are administrative in nature. This proposed change does not make any changes to the method of obtaining the charcoal sample. This proposed change does not cause any ESF ventilation equipment to be operated in a new or different manner. No structural changes or modifications are being made to the ESF ventilation equipment. This proposed change does not create any new interactions between any

ATTACHMENT (2)

DETERMINATION OF SIGNIFICANT HAZARDS

plant components. Therefore, the possibility of a new or different type of accident is not created by this proposed change.

3. *Would not involve a significant reduction in a margin of safety.*

The safety function of the ESF ventilation systems is to mitigate the consequences of accidents by reducing the potential release of radioactive material to the environment or the Control Room following a design basis accident. The TS requirements for laboratory testing of charcoal samples provides assurance that the charcoal filters in these systems are capable of reducing airborne radioactive material to within acceptable limits. The proposed license amendment requires the use of the latest NRC-accepted charcoal testing standard and makes changes to the charcoal testing methyl iodide removal efficiency acceptance limits in accordance with the formula provided by the NRC in Generic Letter 99-02. The proposed license amendment continues to provide assurance that the charcoal filters are capable of reducing airborne radioactive material to within acceptable limits. Therefore, the proposed change does not involve a significant reduction in a margin of safety.

ATTACHMENT (3)

TECHNICAL SPECIFICATION MARKED-UP PAGE

Page 5.0-25