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April 5, 1991

U. S. Nuclear Regulatory Commission  
Washington, DC 20555

ATTENTION: Document Control Desk  
SUBJECT: Calvert Cliffs Nuclear Power Plant  
Unit No. 2; Docket No. 50-318  
Request for Regional Waiver of Compliance

Gentlemen:

Baltimore Gas & Electric (BG&E) Company requests a Regional waiver of compliance from certain requirements of Calvert Cliffs Unit 2 Technical Specification 3.6.1.7, "Containment Purge System." That Specification requires, in MODES 1, 2, 3, and 4, that "The containment purge supply and exhaust isolation valves shall be closed by isolating air to the air operator and maintaining the solenoid air supply valve deenergized." We request a waiver to allow operating the containment purge supply and exhaust isolation valves in Mode 3 (Hot standby) and Mode 4 (Hot shutdown) for the purpose of purging the Unit 2 containment, and to conduct local leak rate testing (and repairs, if required) of the containment purge valves upon completion of the purge. This also constitutes a waiver from Technical Specifications 3.6.1.1, "Containment Integrity," inasmuch as containment purge applies to that Specification.

#### CIRCUMSTANCES

Unit 2 is in MODE 3, in the process of starting up for Cycle 9 operation following shutdown in March, 1989. During the refueling outage, new insulation was installed on the Unit 2 Reactor Coolant System piping. In addition, substantial maintenance involving penetrants and lubricants in the plant has been conducted. As the plant has been heated up from cold shutdown, off-gassing from the new insulation and heat-up of fluid residues has unexpectedly resulted in high levels of carbon monoxide inside the containment building. While some work can be completed wearing breathing equipment, in order to allow for personnel access to complete all necessary maintenance and surveillance items the containment must be purged. If the containment is not purged in MODE 3 or 4, the unit will have to be cooled down to MODE 5 (cold shutdown) then heated back up, causing an unnecessary transient on the plant. This would also delay starting up Unit 2.

The situation could not be avoided. Similar insulation was installed on Unit 1, but far less new insulation was necessary and the phenomenon did not occur. Previous outages resulted in lower concentrations of contaminants, but it was impractical to quantify the expected concentrations or to

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eliminate them before plant heatup. Therefore, no basis existed for expecting this phenomenon during this startup.

### SAFETY SIGNIFICANCE AND POTENTIAL CONSEQUENCES

The containment purge system includes a supply penetration with a supply fan and two 48 inch butterfly valves for containment isolation, one inside and one outside containment, and an exhaust penetration with an exhaust fan and two 48 inch butterfly valves for containment isolation, again one inside and one outside containment.

Purging the Unit 2 containment will involve opening these 48 inch air-operated butterfly valves at the supply and the exhaust containment penetrations. These are openings that are normally shut in MODES 1 through 4 due to Loss of Coolant Accident (LOCA) considerations. If a LOCA occurs while purging, a release of a portion of the containment atmosphere would be possible before the valves are shut.

Unit 2 has been shut down for over two years. The decay heat of the reactor is very low. Therefore, the chances of overheating of the fuel, fuel failure, and introduction of fission products into the reactor coolant are also low. The activity in the reactor coolant is also low. If a LOCA did occur, the overall activity concentrations of any released containment atmosphere would be very low relative to previous accident analysis conditions. Also, the actual time of purging will be minimized, further reducing the chance that the worst case of a LOCA while purging could occur.

An evaluation was performed to assess the consequences of a LOCA while purging containment for the present decay heat and Reactor Coolant System conditions. The source term considered to leak from the containment in the current LOCA analysis consisted of 100% of noble gases and 50% of halogen fission product gases contained in the fuel. These fission products were decayed the appropriate amount to reflect current conditions and conservatively assumed to be totally released to the environment in analyzing the effects of a potential LOCA during purge. The results for whole body dose were 4.2 rem, which is greater than the present accident analysis result of 2.2 rem but is far below the 10 CFR Part 100 limit of 25 rem. The thyroid dose result was lower than the present analysis result due to the decay of iodine, the primary contributor to that dose.

### COMPENSATORY ACTIONS

After the final purge and prior to Unit 2 entry into MODE 2, the containment purge supply and exhaust isolation valves will be local leak rate tested.

### DURATION OF WAIVER

This waiver is requested for as long as Unit 2 does not enter MODE 2 (Startup). Purging will be scheduled to optimize containment carbon monoxide removal while minimizing purge time. The

majority of the required purging is expected to be completed with the initial purge, but additional purges may be necessary to address any delayed off-gassing.

### BASIS FOR NO SIGNIFICANT HAZARDS CONSIDERATIONS

The proposed waiver 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 waiver:

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

The probability of previously evaluated accidents is not affected by this waiver, because the change in containment ventilation does not impact any LOCA initiation scenario.

The consequences, however, are affected. An evaluation was performed to assess the consequences of a LOC while purging containment for the present decay heat and Reactor Coolant System operations. The source term considered to leak from the containment in the current analysis consisted of 100% of noble gases and 50% of halogen fission products contained in the fuel. These fission products were decayed the appropriate amount to reflect current conditions and conservatively assumed to be totally released to the environment in analyzing the effects of a potential LOCA during purge. The results for whole body dose were 4.2 rem, which is greater than the present accident analysis result of 2.2 rem but is far below the 10 CFR Part 100 limit of 25 rem. The thyroid dose result was lower than the present analysis result due to the decay of iodine, the primary contributor to that dose.

Additionally, the likelihood of failure of the fuel assemblies which would result in the fission product release is substantially reduced because of the lower heat generation of the fission products in the fuel. Consideration of a similar case when analyzing long decayed fuel (3 years decayed) indicates that they would be sufficiently cooled in air to prevent fuel failure.

Therefore, there is not 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.*

This waiver would not result in a change to the plant itself and involves an operation that is routinely carried out in other MODES. Therefore it would not create the

possibility of a new or different type of accident from any accident previously evaluated.

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

Containment integrity is essential for limiting the potential release of activity to the environment during a LOCA. A LOCA during power operations results in pressurization of the containment with activated reactor coolant plus the potential for fuel cladding failure as decay heat is generated and reactor coolant pressure is reduced. Cladding failure could release fission products to the Reactor Coolant System, then possibly to the containment and then possibly to the environment as well.

Calvert Cliffs Unit 2 has not been operated at power for over two years. Therefore there is very little decay heat in the reactor and the level of activity in the reactor coolant system is low. The amount of purging time will be limited and analysis has shown that the worst case LOCA while purging would not result in exceeding off site dose rate limits. Given these considerations the affect on margin of safety of purging containment while in Mode 3 or 4 is not significant.

#### ENVIRONMENTAL CONSEQUENCES

The purge operation will introduce fresh outside air into the upper containment, while drawing air from the lower levels and exhausting it through the plant's main vent, via high efficiency filtering and radiation monitoring devices. The effect of the release of the small amounts of carbon monoxide in question to the environment will be negligible and not irreversible.

#### SAFETY COMMITTEE REVIEW

This proposed waiver of Technical Specification 3.6.1.7 and 3.6.1.1 for Unit 2 and our discussion of significant hazards considerations have been reviewed by our Plant Operations and Safety Review Committee. They concur that utilization of this waiver will not result in an undue risk to the health and safety of the public.

