

March 25, 2003

Mr. P. E. Katz, Vice President  
Calvert Cliffs Nuclear Power Plant, Inc.  
Calvert Cliffs Nuclear Power Plant  
1650 Calvert Cliffs Parkway  
Lusby, MD 20657-4702

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2  
RESPONSE TO GENERIC LETTER 96-06, ASSURANCE OF EQUIPMENT  
OPERABILITY AND CONTAINMENT INTEGRITY DURING DESIGN-BASIS  
ACCIDENT CONDITIONS, DATED SEPTEMBER 30, 1996 (TAC NOS. M96792  
AND M96793)

Dear Mr. Katz:

Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions," dated September 30, 1996, included a request for licensees to evaluate cooling water systems that serve containment air coolers to assure that they are not vulnerable to waterhammer and two-phase flow conditions. The Constellation Energy Group (previously the Baltimore Gas and Electric Company) provided its assessment for the Calvert Cliffs (CC1-2) Units 1 and 2 letter dated January 28, 1997, and additional information provided in letters dated May 2, 1997, February 20, 1998, June 30, 1998, July 20, 1998, November 30, 1998, July 25, 2002, and December 3, 2002. The Nuclear Regulatory Commission (NRC) staff has completed its review of these letters and provide the following evaluation concerning (1) thermal overpressurization and (2) waterhammer and two phase flow.

#### THERMAL OVERPRESSURIZATION

In its submittal of January 28, 1997, CC1-2 identified six penetrations potentially vulnerable to a water solid volume that may be subjected to an increase in pressure due to heating of trapped fluid. The affected six lines are: Reactor Coolant Pump Seal Controlled Bleed Off Lines; Plant Service Water Lines; Refueling Pool Recycle Inlet Lines; Containment Plant Heating Outlet Lines; Containment Plant Heating Inlet Lines; and, Refueling Pool Outlet to Fuel Pool Cooling Lines. CC1-2 determined that the affected lines are operable based on the criteria in Appendix F of Section III of the American Society of Mechanical Engineers Boiler Pressure and Vessel Code (ASME Code). For its long term corrective actions, CC1-2 committed to update plant Operating Instructions to include draining prior to returning the unit to operation, install pressure relief devices, or add insulation to the piping section, as required.

In response to the staff's request for additional information of May 6, 1998, CC1-2 in its submittal of July 20, 1998, stated that it has updated its plant Operating Instructions to require draining of the Plant Service Water Lines, the Refueling Pool Recycle Inlet Lines, and the Refueling Pool Outlet to Fuel Pool Cooling Lines, prior to returning the unit to operation following outages. CC1-2 also performed thermal transient analysis of the Containment Plant Heating Inlet and the Containment Plant Heating Outlet Lines, taking credit for the insulation,

and determined that the lines meet the design basis limits provided in the Updated Final Safety Analysis Report (UFSAR). In the original configuration, the Reactor Coolant Pump Seal Controlled Bleed Off Line was not insulated. CC1-2 has modified this line to include insulation. CC1-2 performed thermal transient analysis of the modified Reactor Coolant Pump Seal Controlled Bleed Off Line and determined that the piping meets the UFSAR design basis limits. The staff finds this evaluation reasonable and acceptable.

#### WATER HAMMER AND TWO PHASE FLOW

Based primarily on the information that was provided in letters dated January 28, 1997, July 25, 2002, and December 3, 2002, it is the NRC staff's understanding that the waterhammer scenarios discussed in GL 96-06 will be prevented by placing the service water pumps on step "0" in the loading sequence of the emergency diesel generator so that flow is restored to the containment air coolers before bulk boiling occurs, thereby eliminating the potential for any significant waterhammer to occur. Based on conservative assumptions as discussed in CC1-2's letter dated December 3, 2002, we understand that after the loading sequence modifications have been made, the minimum time from pump start to bulk boiling is predicted to be 1.4 seconds. Finally, the staff understands that CC1-2 has performed conservative calculations that demonstrate that Calvert Cliffs does not experience conditions in the service water system that would result in two-phase flow. The staff is satisfied with CC1-2's response and consider the waterhammer and two-phase flow elements of GL 96-06 to be closed.

#### CONCLUSION

The NRC staff finds that CC1-2's corrective actions are reasonable and provide an acceptable resolution for the issue of thermally-induced pressurization of piping runs penetrating the containment and eliminating potential waterhammer and two phase flow to occur. We request that you inform the NRC when the necessary modifications have been fully implemented for our status tracking in the Project Manager's Report.

Sincerely,

**WRAI**

Guy S. Vissing, Senior Project Manager, Section 1  
Project Directorate  
Division of Licensing and Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-317 and 50-318

cc: See next page

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WATER HAMMER AND TWO PHASE FLOW

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Sincerely,  
*IRA*

Guy S. Vissing, Senior Project Manager, Section 1  
Project Directorate  
Division of Licensing and Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-317 and 50-318

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