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VICE PRESIDENT
SUPPLY

September 13, 1985

U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, D. C. 20555

ATTENTION: Mr. Edward J. Butcher, Jr., Acting Chief
Operating Reactors Branch #3
Division of Licensing

SUBJECT: Calvert Cliffs Nuclear Power Plant
Units 1 & 2; Docket Nos. 50-317 & 50-318
Inservice Inspection Program Pump and Valve Testing
Request for Relief from ASME Code Section XI Requirements
Determined to be Impractical

Gentlemen:

In accordance with 10 CFR 50.55a(g)(5)(iii), we are requesting an exemption from ASME Code Section XI requirements that have been determined to be impractical, or confirmation that existing practice is consistent with the code. If deemed appropriate, these exemptions are requested for the remaining portion of the current Inservice Inspection Program interval for both Calvert Cliffs Unit 1 & 2 as indicated in the subsequent text and is to expire on April 1, 1987. Calvert Cliffs Unit 1 is subject to the requirements of ASME Code Section XI, 1974 Edition with Addenda through Summer 1975. Unit 2 has been optionally updated to ASME Code Section XI, 1977 Edition, with Addenda through Summer 1978 for pump and valve testing only.

Exemptions are requested for the following items for Calvert Cliffs Unit 1 & 2 as indicated:

A. MEASUREMENT OF PUMP FLOW RATE (UNIT 2 ONLY)

ASME Boiler and Pressure Vessel Code, Section XI, 1977 Edition with Addenda through Summer 1978, Article IWP-3100, "Inservice Test Procedures," states:

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"IWP-3100 Inservice Test Procedure

An inservice test shall be conducted with the pump operating at nominal motor nameplate speed for constant speed drives and at a speed adjusted to the reference speed for variable speed drives. The resistance of the system shall be varied until either the measured differential pressure or the measured flow rate equals the corresponding reference value. The test quantities in Table IWP-3100-1 shall then be measured or observed and recorded as directed in this subsection. Each measured test quantity shall then be compared with the reference value of the same quantity. Any deviations determined shall be compared with the limits given in Table IWP-3100-2 and the specific corrective action taken."

TABLE IWP-3100-1
INSERVICE TEST QUANTITIES

QUANTITY	MEASURE	OBSERVE
Speed, N (if variable speed)	X	
Inlet Pressure, P_i	X ¹	
Differential Pressure, ΔP	X	
Flow Rate, Q	X	
Vibration Amplitude, V	X	
Proper Lubricant Level or Pressure		X
Bearing Temperature, T_b	X	

NOTE: (1) Measure before pump start-up and during test.

To ensure pump testing is performed under a known flow condition it has been plant policy to perform all pump testing with the pump discharge valve shut, thus establishing a zero flow condition. An exception to this policy is the testing of the Auxiliary Feedwater Pumps, which are tested with the pump discharge valve shut but with a minimum flow recirculation path open in accordance with Technical Specification Surveillance requirement 4.7.1.2.a.

During an internal audit of the pump and valve test program, it was noted that performance of pump testing with the pump discharge valve shut may not be in literal compliance with Article IWP-3100 and that an exemption may be needed for the Calvert Cliffs Test Program.

In lieu of measuring flow rate, as required by Table IWP-3100-1, the following pumps will be tested with their respective discharge flow paths isolated:

High Pressure Safety Injection
Low Pressure Safety Injection
Containment Spray
Boric Acid
Auxiliary Feedwater
Saltwater
Service Water
Component Cooling

The High and Low Pressure Safety Injection, Containment Spray, Boric Acid and Auxiliary Feedwater Pumps are provided with fixed resistance minimum flow recirculation paths which will remain open when the pump discharge flow paths are isolated. For these pumps there is no significant difference in measured pump discharge head with the minimum flow path in service or with the minimum flow path isolated as the flow rates are a very small fraction of the pump capacities. The Saltwater, Service Water, and Component Cooling Pumps are not provided with minimum flow recirculation paths.

Justification for conducting these pump tests with the pump discharge flow paths isolated in lieu of measuring flow is justified for the following reasons:

1. Reference values can be readily duplicated as required by Article IWP-3110.
2. Since reference flow rates can be duplicated for each test with the pump discharge flow path isolated, one variable in determining deviations in pump condition can be eliminated.
3. During plant operation it is not possible to test the High and Low Pressure Safety Injection, Containment Spray, Boric Acid or the Auxiliary Feedwater Pumps at flow rates greater than minimum recirculation flow. During plant operation, Reactor Coolant System pressure is greater than the shut-off head of the High and Low Pressure Safety Injection Pumps, therefore, flow rates in excess of the minimum recirculation flow cannot be established. The Containment Spray, Boric Acid, and Auxiliary Feedwater Pumps cannot be tested at greater than minimum recirculation flow because of the negative impact on plant operation and equipment.

4. Testing the Saltwater, Service Water, and Component Cooling pumps with the discharge valves shut provides the only readily duplicated condition that does not adversely affect plant operation. During testing the pump is removed from service by shutting its discharge valve. A standby pump is placed in service which allows flow rates in these plant systems to remain constant. If it were necessary to establish a reference flow rate for pump tests with the pump discharge valve open, then in the process of establishing the reference flow rate the cooling water flow to plant components could either become inadequate or excessive. Flow rates vary in these systems because cooling requirements for the components are dictated by operating conditions and seasonal changes to the prime cooling medium temperatures.
5. No flow measuring devices exist in those portions of the fluid systems associated with the pumps under discussion which would allow measurement of pump flow rate during plant operation. To install flow instrumentation of the required accuracy ($\pm 2\%$ of full scale as required by Table IWP-4110-1) would require significant plant modification and expense.
6. During pump testing any leakage past the pump flow path isolation valve would result in a lower pump differential pressure and would thus yield conservative pump test results. Similarly for those pumps which are tested on a minimum flow recirculation path, any condition which would create additional recirculation flow would yield conservative pump test results. For those pumps which are tested at minimum flow, the pump differential is essentially the same as the differential at shut-off head; thus, any flow restrictions which develop in the pump minimum flow recirculation path will yield a conservative pump test result for differential pressure.
7. Since pump flow rate will not be measured during periodic pump testing, the pump suction lines will be verified free of flow restrictions by one of the following means:
 - a. Observation of the temperature rises across cooled components during normal system operation, or
 - b. Observation of design pump flow rates during periodic check valve testing when the unit is shutdown.
8. Technical Specification 4.5.2.i and 4.7.1.2.a require testing for total developed head of the High Pressure Safety Injection and Auxiliary Feedwater Pumps, respectively, on recirculation flow to ensure pump performance is consistent with safety analysis assumptions.

B. DURATION OF TESTS (UNIT 1 & 2)

ASME Boiler and Pressure Vessel Code, Section XI, 1974 Edition with Addenda through Summer 1975 and the 1977 Edition with Addenda through Summer 1978, Article IWP-3500, "Duration of Tests", states in part:

- a. "...When measurement of bearing temperature is not required, each pump shall be run at least 5 minutes under conditions as stable as the system permits. . ."

When the Saltwater, Service Water, and Component Cooling Pumps are tested, the pump discharge valves are shut and there is no recirculation flow path. For these pumps a minimum run time of five minutes is not appropriate. When testing these pumps, they will be run at shut-off head until discharge pressure stabilizes then the pump discharge valve will be opened. Running these pumps at shut off head for five minutes or longer may cause pump degradation.

C. PUMP BEARINGS (UNIT 1 & 2)

ASME Boiler and Pressure Vessel Code, Section XI, 1974 Edition with Addenda through Summer 1975 and the 1977 Edition with Addenda through Summer 1978 Table IWP-3100-1, "Inservice Test Quantities," requires the observation of proper lubricant level or pressure when performing periodic pump testing. The pumps in the Component Cooling System have grease lubricated bearings. The bearings are greased in accordance with the manufacturer's instructions on a regular preventative maintenance schedule.

FEE DETERMINATION

Pursuant to 10 CFR 170.21, we are including BG&E Check No. B452411 in the amount of \$150.00 to the NRC to cover the application fee for this request.

Very truly yours,



AEL/JFL/BEH/pah

Attachment

cc: D. A. Brune, Esquire
G. F. Trowbridge, Esquire
D. H. Jaffe, NRC
T. Foley, NRC