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ARTHUR E. LUNDVALL, JR.
VICE PRESIDENT
SUPPLY

March 23, 1981

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

ATTENTION: Mr. R. A. Clark, Chief
Operating Reactors Branch #3
Division of Licensing

SUBJECT: Calvert Cliffs Nuclear Power Plant
Units 1 and 2, Docket Nos. 50-317 and 50-318
Detection of Boron Dilution Incident

REFERENCES (A): R. A. Clark to A. E. Lundvall letter, dated
12/12/80, Unit 1 License Amendment No. 48

(B): R. A. Clark to A. E. Lundvall letter, dated
2/10/81, Unit 2 License Amendment No. 31



Gentlemen:

References (A) and (B) issued Amendment Numbers 48 and 31 to the Facility Operating Licenses for Calvert Cliffs Nuclear Power Plant, Units 1 and 2 respectively. These amendments noted that no positive alarm presently exists to alert the operator to a dilution event that may be in progress and required that such an alarm be provided. BG&E agreed to develop a means of such notification during the current cycle for each unit.

Background

We find that operator notification can be provided with minimal hardware modifications and minor software modifications by monitoring the Wide Range Log Channels (WRLC) of the Nuclear Instrumentation with the plant computer when in Modes 3 through 6. Operability of at least two WRLC of Nuclear Instrumentation is presently required by Technical Specifications and computer availability to date is better than 98% for both units. The computer alarm causes a flashing indication on the computer monitor adjacent to the reactor control panel and the alarming parameter is also logged by the Alarm Typewriter. As a backup to this system, the plant boronometer is also available when the Charging and Letdown system is in operation and may also be used to monitor the Shutdown Cooling system when in cold shutdown and during refueling. In the unlikely event that both the WRLC alarm and the boronometer are inoperable when shutdown, shutdown margin will be increased and/or the WRLC signals will be logged such that the operator will be alerted with sufficient time to respond.

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Technical Specification Change

To provide the required time for operator action while avoiding spurious alarms, additional margin will be provided when in cold shutdown with the Reactor Coolant System filled to the center of the hot leg pipes. This will be accomplished by requiring 4.3% shutdown margin when the pressurizer level is below 90 inches in mode 5 and by limiting dilution sources to the capacity of one charging pump (44 GPM). These steps increase the time from initiation of the dilution event until shutdown margin is lost from 19.6 to 51.7 minutes.

Proposed modifications to Technical Specification Pages 3/4 1-3, 3/4 3-3, 3/4 3-4, 3/4 3-5, 3/4 3-8, 3/4 3-9 and 3/4 9-2 are attached.

Safety Analysis

It should be noted that plant equipment, practice, and administrative controls provide significant margin above that assumed for the boron dilution incident.

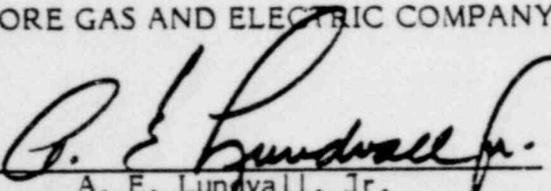
1. Operation of the makeup system to borate or dilute actuates an annunciator on the control panel which sounds until acknowledged by the operator.
2. Although the most limiting case for cold shutdown and refueling assumes that the RCS is filled only to the center of the reactor coolant hot leg pipes and that all Control Element Assemblies (CEA's) are fully withdrawn, the plant has never been in this configuration to date.
3. During refueling, the analysis assumes 3 charging pumps (44GPM each) to be operable, although plant practice is to tag out at least two pumps when RCS temperature is below 275°F.
4. In cold shutdown the analysis assumes 2 charging pumps to be operable, although plant practice is to tag out at least two pumps when RCS temperature is below 275°F.
5. During refueling operations, inverse multiplication is calculated as each fuel assembly is loaded or CEA removed from the core. CEA swaps are performed one at a time over the core or in the CEA Change Machine in the refueling pool. CEA's are removed to the spent fuel pool only for inspection so that few CEA's are withdrawn at any one time. All CEA's are fully inserted at all other times. The analysis assumes all CEAs are removed and the RCS is filled to the center of the hot leg pipes.

6. The plant is not routinely in cold shutdown with the RCS filled only to the center of the RCS hot leg pipes. CEA withdrawal in this mode would involve at most one CEA at a time to check drive and position indication equipment. The analysis assumes all CEA's are fully withdrawn.
7. The analysis assumes a RCS volume of 2778 cubic feet when the system is filled to the center of the hot leg pipes. This includes only the volume in the Reactor Vessel to the bottom of the hot leg pipes and does not include the volume of the Shutdown Cooling System, which is required to be operable, or the volume of the RCS piping that is partially filled.
8. When shutdown, the signal from one operable WRLC is trended continuously on a dedicated pen recorder on the reactor control panel, providing the operator with a visual indication of trend in neutron population.
9. The analysis assumes 4.0% shutdown margin in hot standby (Mode 3) and hot shutdown (Mode 4) although 4.3% shutdown margin is actually provided.

Incorporation of the WRLC alarm feature and increasing the time to criticality when the RCS is partially drained provides additional margin in the event of inadvertent boron dilution. The Plant Operations and Safety Review Committee (POSRC) and the Offsite Safety Review Committee (OSSRC) have concluded that the proposed modification does not constitute an unreviewed safety question and that the proposed action does not present an undue risk to the health and safety of the public.

Very truly yours,

BALTIMORE GAS AND ELECTRIC COMPANY


A. E. Lundvall, Jr.
Vice President - Supply

STATE OF MARYLAND, CITY OF BALTIMORE, TO WIT:

Arthur E. Lundvall, Jr., being duly sworn states that he is Vice

Office of Nuclear Reactor Regulation
Page four

President of the Baltimore Gas and Electric Company, a corporation of the State of Maryland; that he executed the foregoing Amendment for the purposes therein set forth; that the statements made in said Amendment are true and correct to the best of his knowledge, information, and belief; and that he was authorized to execute the Amendment on behalf of said Corporation.

WITNESS, My Hand and Notarial Seal this 23 day of March 1981.

[Signature]
Notary Public

My Commission Expires: July 1, 1982

Attachment

AEL/MEB/djs

cc: J. A. Biddison, Esquire
G. F. Trowbridge, Esquire
Messrs. E. L. Conner, Jr., NRC
P. W. Kruse, CE