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BGE

April 15, 1994

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
Letter Documenting Telephone Conference Discussion of Unit 1 Incore Instrumentation Flange Leakage Relative to Unit 2 OPERABILITY

REFERENCES:
(a) BGE Test Report of December 20, 1993, Documenting Validation Testing of Old and New Closure Design for Unit 2 Incore Instrumentation Flanges

(b) Telephone Conference Call with NRC and BGE Representatives of April 1, 1994, same subject

The purpose of this letter is to summarize a discussion held between Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation and Region I personnel and Baltimore Gas and Electric Company staff during a telephone conference call held 9:00 a.m., April 1, 1994, to discuss Unit 2 OPERABILITY relative to accelerated boric acid attack observed on Unit 1 Incore Instrumentation (ICI) Flange assembly. Attachment (1) is provided summarizing topics discussed in Reference (b) to justify Unit 2 OPERABILITY with a new design closure for the ICI flange detector joint. Reference (a) has been previously transmitted to Region I representatives.

We appreciated the opportunity to discuss the technical aspects of this subject with Nuclear Regulatory Commission representatives. Should you have any questions regarding this information, Mr. Peter Chabot at (410) 260-2115 is available to discuss them with you.

Very truly yours,

Charles H. Cruse

CHC/LOW/bjd

Attachment

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cc: D. A. Brune, Esquire
J. E. Silberg, Esquire
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ATTACHMENT (1)

SUMMARY OF ACTIONS TAKEN BY BGE TO RESOLVE OPERABILITY CONCERNS ON UNIT 1 AND UNIT 2 FOR OBSERVED ICI FLANGE LEAKAGE

Following shutdown for scheduled refueling of Unit 2, in March of 1993, evidence of boric acid leakage and corrosion was discovered on the Unit 2 Incore Instrumentation (ICI) flange assemblies. An OPERABILITY evaluation was performed to justify continued operation of Unit 1 based on observed leakage of Unit 2 ICI flanges and guidance contained in Nuclear Regulatory Commission Generic Letter 88-05. This evaluation was presented to our Plant Operations and Safety Review Committee (POSRC) and subsequently approved by the Plant General Manager (PGM).

In April, 1993, a root cause analysis concluded that the leakage observed on Unit 2 resulted from inadequate gasket sealing of the ICI detector joint. The analysis along with a modified design incorporating a thicker gasket and Belleville washers was presented to the POSRC and approved by the PGM. This new flange detector joint design was incorporated into Unit 2 during the outage.

In June, 1993, following indications of increasing ambient temperature in Unit 1 containment we shutdown the unit to investigate. The increasing containment temperature was due to fouling of the containment air cooler heat exchanger surfaces with boric acid deposits. Investigations revealed ICI detector joint leakage similar to that observed in March, 1993, on Unit 2. We concluded the fouling of heat exchanger surfaces to be a result of the ICI detector joint leakage. A revised Unit 1 OPERABILITY determination was presented to POSRC during which the following major topics were reviewed:

- Technical Specification and UFSAR reviews
- Evaluation of effects of boric acid on Reactor Vessel head
- Evaluation of continued boric acid corrosion effects on the ICI flange nut and bolt assembly
- Evaluation of fuel failure effects on continued leakage to the containment atmosphere
- Evaluation of off-site dose effects
- Evaluation of the ICI flange studs and nuts in a degraded condition

Based on the results of these reviews and corrective actions conducted during the shutdown of Unit 1, the POSRC concurred that the ICI flange closures were OPERABLE and that the unit could continue to operate until the next scheduled refueling outage.

Concurrently, the Offsite Safety Review Committee reviewed the root cause determination for the ICI detector joint leakage results. Following completion of maintenance activity to clean and return the containment air coolers to service and with the recommendation of the POSRC, the PGM made the decision to restart Unit 1 based on the following considerations:

> **Nuclear Safety** - analysis determined there would be no significant impact on nuclear safety by deferring repairs to the next scheduled refueling outage. The amount of leakage was extremely small and means were available to detect a significant increase in ICI detector joint leakage by measuring the efficiency of the containment coolers and containment contamination levels.

Our efforts to redesign the ICI detector joint and install the modification on Unit 2 during the spring, 1993, refueling outage gave us a high degree of confidence that we had fully addressed the leakage phenomena previously observed on Unit 2 during the outage. However, we continued to pursue redesign options through discussions with our gasket vendor and Nuclear Steam Supply System vendor. As a result of our continued evaluation of this issue, in early December, 1993, a full pressure and full temperature steam test of the ICI flange seal plug and gasket assembly was performed. This testing was done to validate the findings of root cause analysis of the ICI flange leakage observed on

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Unit 2 and to demonstrate the adequacy of a redesigned ICI flange closure assembly incorporated on Unit 2.

The test was designed to approximate the internal reactor coolant system temperature and pressure conditions of the ICI flange assemblies during normal MODE 1 operating conditions. The test did not attempt to fully simulate external conditions of the ambient environment of the flange assembly. The test was comprised of a pre-hydrostatic test at 3125 psi at room temperature, a pre-helium test at 1000 psi at room temperature, a heat-up to 650^{O}F and two thermal cycles to below 500^{O}F followed by a four hour hold at nominal conditions of 650^{O}F and 2200 psi. A final hydrostatic and helium test was repeated. This test regimen demonstrated that the redesigned ICI flange closure assembly incorporated in Unit 2 did not leak and that the old design closure did leak.

Since return to power operations following the Spring, 1993, refueling outage we have had no indication of ICI detector joint leakage from external monitoring parameters for Unit 2, specifically:

- No unusual indications in containment atmosphere air activity (i.e., particulate, iodine, or radiogas)

- RADCON observations during routine power entries into the Unit 2 containment have continued to note no significant increase in loose surface contamination either in the general areas of containment or on the containment air cooler heat exchange surfaces.

- There have been no unusual indications of routinely monitored containment air cooler and containment atmospheric operating parameters such as:

  - fan amperage
  - containment dome temperature
  - containment dome humidity
  - reactor cavity temperature

In January, 1994, following an automatic trip previously reported in LER 94-001 personnel entered the Unit 2 containment to inspect for evidence of boric acid build up on the containment air coolers, indicative of past problems with Unit 2 ICI detector joint leakage. No evidence of boric acid deposits was found. Swipe surveys taken of containment surfaces further demonstrated normal expected radiological conditions characteristic of no leakage from the ICI flange assemblies.

Future Actions to Ensure Continued OPERABILITY of Unit 2

On a routine basis, containment air cooler parameters and containment contamination levels are being monitored and evaluated for adverse trends indicative of ICI detector joint leakage. This monitoring program will be continued until the new design implemented on both units has been fully validated.

We will perform a visual inspection of Unit 2 ICI flange assemblies during a scheduled May, 1994 shutdown of Unit 2.

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An evaluation to determine the root cause of accelerated boric acid corrosion of Unit 1 ICI flange components is underway. We will apprise the Resident Inspectors in June, of progress we have made to date in determining the root cause of the accelerated corrosion rate observed on Unit 1.