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ARTHUR E. LUNDVALL, JR.
VICE PRESIDENT
SUPPLY

May 17, 1983

Director of Nuclear Reactor Regulation
Attention: Mr. R. A. Clark, Chief
Operating Reactors Branch #3
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Calvert Cliffs Nuclear Power Plant
Units Nos. 1 & 2; Dockets Nos. 50-317 and 50-318
Main Steam Line Break Inside Containment

Gentlemen:

Our letter of May 4, 1983 (A. E. Lundvall to R. A. Clark, same subject) provided early notification of the results of recent main steam line break (MSLB) analyses performed in response to issues arising from I&E Bulletin 80-04. The letter addressed the potentially adverse impacts of a MSLB inside containment concurrent with a failed-open main feedwater regulating valve (MFRV) and provided a schedule for performing confirmatory analyses and completing corrective plant modifications. Finally, the letter provided information demonstrating the safety of continued operations at Calvert Cliffs until such time as corrective modifications can be completed.

Enclosure 1 provides a final version of our justification for continued operation and incorporates several editorial and clarifying corrections to the information provided in our May 4 letter.

On May 5, 1983 a telephone conference was held between the NRC and BG&E during which we were informed that the NRC Staff had approved the justification for continued operation contingent upon our completion of the following actions:

- o Providing responses to five technical questions pertaining to the containment pressure analysis; and
- o Submitting the results of engineering analyses by May 17, 1983 which demonstrate the efficacy of the proposed plant modifications with regard to prompt termination of runout feedwater flow after a MSLB.

Our responses to the five NRC Staff questions are provided in Enclosure 2.

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Enclosures 3 and 4, respectively, provide the results of the containment pressure response and core return-to-power analyses which were performed since May 5. These analyses assume that the feedwater system pumps are automatically tripped on a containment high pressure signal. In the limiting case for the containment pressure response, the calculated peak pressure is 53.0 psig occurring at 60 seconds into the event. In the limiting case for return-to-power, DNBR limits are not violated and no fuel failures are predicted.

It is important to note that both of the analyses described in Enclosures 3 and 4 retain many of the conservatisms originally discussed in our justification for continued operation (Enclosure 1). This is particularly true of the containment pressure analysis. Analytical work has been underway using the RELAP code to explicity model the feedwater expansion/flashing phenomenon. This effort will yield a more realistic (reduced) prediction of feedwater flow to the affected steam generator following a trip of main feedwater (MFW) system pumps. Unfortunately, the complexity of this analysis is such that revised predictions for feedwater flow under flashing conditions were not available for inclusion in the analyses reported in Enclosures 3 and 4. We expect to report these results in our followup submittal scheduled for June 1, 1983 (see Enclosure 1).

In addition to the above, we have confirmed by engineering analysis that the assumed containment spray actuation delay time of 60 seconds is overly conservative. Ongoing analyses appear to support a delay time on the order of 30-40 seconds for the spray headers to fill. Again, this information was not available for inclusion in the containment pressure analysis reported in Enclosure 3; however, it will be explicitly considered in the final analysis that will be the subject of our June 1 submittal.

We are confident that proper treatment of feedwater flashing and containment spray system performance will yield a calculated peak containment pressure less than the licensed design limit of 50 psig. Based on our present evaluation of these conservatisms, we conclude that an automatic trip of the MFW system pumps upon containment high pressure will provide satisfactory protection against the effects of a main steam line break inside containment (concurrent with a failed-open MFRV).

Insufficient time was available to duplicate the analyses described above to evaluate the efficacy of rapid closure of the main feed isolation valve (MFIV). However, since the automatic feedwater system trip would result in a greater total feedwater flow to the affected steam generator after a MSLB than would be the case with a fast-acting isolation valve, the former modification will yield more severe analytical results. Based on the results reported in Enclosures 3 and 4 and our evaluation of the relative feedwater volumes that would be made available to the affected steam generator with these modifications, we conclude that a MFIV with a closure time of about 15 seconds would also provide adequate protection against the effects of MSLB.

On the basis of these conclusions, we are proceeding with the installation of the MFW system trip. As indicated in Enclosure 1, we expect to complete this modification at both units by November 17, 1983. By strict definition, this trip will be nonsafety-grade due to the classification of the MFW system pumps. However, to ensure high

reliability, the trip signal will originate at a safety-grade source and all components will be safety-grade up to the final trip relays. Delivery of safety-grade relays in time to support our November 17 installation schedule may present a problem. In that event, we would procure and install nonsafety-grade relays in order to maintain this schedule. We would then upgrade the trip circuitry with safety-grade relays no later than May 1, 1984.

The information presented in this letter and its enclosures constitutes our response to the remaining I&E Bulletin 80-04 open issues.

If you should have any questions, please do not hesitate to contact us.

Sincerely,

for A. E. Lundvall, Jr.

AEL/BSM/pdy

Enclosures

cc: J. A. Biddison, Jr., Esq.
G. F. Trowbridge, Esq.
Mr. D. H. Jaffe, NRC
Mr. R. E. Architzel, NRC
Mr. C. Herrick, Franklin Research Center