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BGE

September 6, 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
Response to Request for Additional Information Concerning Isolation Provisions for the Service Water System

REFERENCES:

(a) Letter from Mr. R. E. Denton (BGE) to NRC Document Control Desk, dated July 7, 1993, Evaluation of Isolation Provisions for Service Water System (TAC Nos. M77301; M77302)

(b) Letter from Mr. D. G. McDonald, Jr. (NRC) to Mr. R. E. Denton (BGE), dated November 3, 1993, Request for Additional Information concerning Isolation Provisions for the Service Water System - Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2 (TAC Nos. M87189; M87190)

(c) Letter from Mr. R. E. Denton (BGE) to NRC Document Control Desk, dated March 4, 1994, Evaluation of Isolation Provisions for the Service Water System (TAC Nos. M87189; M87190)

During a system design review conducted in 1989, we identified a potential vulnerability to the loss of the non-safety-related (NSR) portion of the Service Water (SRW) System during a Safe Shutdown Earthquake, which would cause a loss of inventory in the safety-related (SR) portion of the SRW System. This potential vulnerability was identified in Licensee Event Report 89-23. We initially reported that we would resolve this potential deficiency by installing a diverse isolation signal to the isolation valves between the SR and NSR portions of the SRW System. We subsequently determined that automatic isolation of the NSR portion of the SRW System was not an appropriate solution because it would degrade the reliability of the SR portion of the SRW System. We then decided to resolve the potential deficiency by assessing the seismic adequacy of the NSR portion of the SRW System and physically modifying the system strengthen five identified potential break points. These modifications are complete. We reported this in Reference (a).

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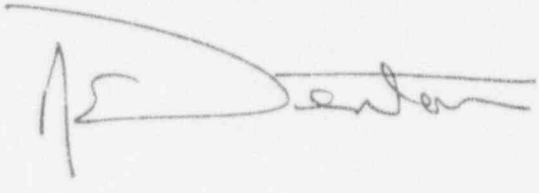
In response to Reference (a), NRC requested additional information (Reference b). The majority of the questions related to the use of walkdowns, as opposed to analytical methods, to determine the seismic adequacy of the NSR portions of the SRW System. We requested a meeting in lieu of providing the additional information in writing (Reference c). The NRC has since expressed a preference for obtaining the requested information prior to a meeting. This letter is a response to that request.

Attachment (1) provides an explanation of our basis for performing an engineering evaluation using walkdowns instead of engineering analyses. We are reviewing this SRW System potential vulnerability within the scope of our Individual Plant Examination of External Events (IPEEE) (Generic Letter [GL] 88-20, Supplement 4) and as an addition to our seismic verification effort (GL 87-02). We believe that this is the appropriate treatment for this issue. We considered that the alternative of using a deterministic approach involving extensive seismic analyses to upgrade the plant would result in a very large expenditure of resources with little if any safety benefit. The information we have to date suggests that this issue does not represent a significant risk to the public, and as such, does not justify the expenditure of these resources. However, at the completion of the IPEEE analysis, if the risk is determined to be sufficiently high, appropriate actions will be taken to reduce the risk to acceptable levels.

Since this issue is being evaluated within the scope of our IPEEE, we have not performed a deterministic evaluation of the piping. Therefore, the information requested in Reference (b) is not available. In lieu of that information, we request that the NRC accept our IPEEE review of this issue for its resolution.

Should you have any further questions regarding this matter, we will be pleased to discuss them with you.

Very truly yours,



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Attachment: As Stated

cc: D. A. Brune, Esquire
J. E. Silberg, Esquire
M. J. Case, NRC
D. G. McDonald, Jr., NRC
T. T. Martin, NRC
P. R. Wilson, NRC
R. I. McLean, DNR
J. H. Walter, PSC

ATTACHMENT (1)

BASIS FOR ACTIVITIES SURROUNDING THE SEISMIC EVALUATION OF THE CALVERT CLIFFS SERVICE WATER SYSTEM CHRONOLOGY

As stated in UFSAR Section 8.4.1, the emergency diesel generators and their auxiliaries are designed to withstand seismic Category I accelerations and are installed in seismic Category I structures. The Service Water (SRW) System is an auxiliary system for the emergency diesel generators. The safety-related (SR) portion of the SRW System meets this seismic criteria. It is designed to withstand seismic Category I accelerations and is installed in a seismic Category I building (Auxiliary Building). The licensing basis remains silent concerning any seismic criteria for the non-safety-related (NSR) portion of the SRW System. Calvert Cliffs was designed with isolation valves between the SR and NSR portions of the SRW System. The intent of this design was to provide adequate separation between the SR and NSR portions, so the SR portion could perform its safety function following a Loss of Coolant Accident (LOCA). However, during the initial design of the system, consideration of seismic events alone (not in combination with a LOCA) was not given for the isolation scheme. Therefore, we do not have automatic isolation between the SR and NSR portions of the SRW System for a seismic event alone.

Our SRW System design has previously been reviewed in detail by NRC. In May 1980, we experienced a complete loss of SRW due to air entrainment. This event resulted in an exhaustive study of our SRW System by NRR and AEOD (Reference 1). During this study, the seismic vulnerability of our SRW System was noted in the AEOD report (Section 4.3). However, the only recommendation made was to revise the Standard Review Plan (SRP) to clarify isolation requirements for SRW Systems (Recommendation a.6). The study noted that our SRW isolation scheme was in accordance with the guidance then provided in Section 9.2.2 of the SRP. The AEOD noted that the SRP could have given licensees inadequate information concerning automatic isolation. AEOD inferred from the SRP that automatic isolation on a safety injection actuation signal (SIAS) was both necessary and sufficient for older plants because the primary area of concern has been the LOCA (Finding i). Our design isolates the SR and NSR portions on SIAS only. No recommendations were made for Calvert Cliffs to evaluate or change our isolation scheme.

We did not ignore the concerns stated in the study. There were nine recommendations made in the report. Seven recommendations required plant actions such as hardware and procedural changes made to enhance system operation. All of these actions were completed. Two recommendations required action by the NRC Staff (issuance of an IE Circular and a revision to the SRP). The issue of SR/NSR isolation for a non-LOCA event was handled by the recommendation to change the guidance in the SRP. We were not requested to consider, nor did we make, any changes to the system configuration to address seismic vulnerabilities.

The issue of SRW vulnerabilities continued to be reviewed and evaluated through 1984 as Generic Issue (GI) 36 - Loss of Service Water. Several internal NRC memoranda (references 2-4) discuss the resolution of GI 36, including the issue of isolation provisions between the SR and NSR portions of the SRW System. Again, the discussion focused on revising the SRP instead of requiring licensee actions. The GI was closed in 1986 on the basis of revising the SRP alone without additional plant modifications.

In 1989, the issue of SR/NSR isolation during a seismic event was once again raised by our plant staff. It was reported by a voluntary Licensee Event Report (LER 89-23, Reference 5), which we subsequently re-characterized as being required by 10 CFR 50.73. We investigated several different types of modifications to provide the type of automatic isolation now required by the SRP. The modifications proposed proved impractical because they would have decreased SRW reliability based on the unique

features of our design. Therefore, we set out to assure that we had minimized the possibility of gross failure of the piping in the Turbine Building during a seismic event. As noted in the AEOD report (Reference 1), "This situation [referring to a scenario involving a Design Basis Event] is not unsafe, but its likelihood of occurrence should be minimized . . . ." We agree that a scenario involving the loss of SRW following a seismic event is not unsafe. However, we also agree that the likelihood of a total loss of SRW should be minimized. That is why we undertook a seismic review of the non-safety-related portion of the system.

The seismic review of the NSR SRW equipment was done using the same type of walkdown and evaluation procedures approved for verifying the seismic adequacy of electrical and mechanical equipment (References 6, 7 and 8). We have reasonable assurance that the NSR SRW System will adequately withstand the forces imposed by a seismic event and continue to allow the SR portion to perform its safety function. Note that these assurances are not based on engineering calculations, but are based on NRC approved approaches to evaluating seismic adequacy. In addition, the NSR portion of the SRW System is being evaluated using the methodology and criteria submitted for GL 88-20, Supplement 4, the Individual Plant Examination of External Events (IPEEE) (Reference 10).

REGULATORY HISTORY FOR SEISMIC ISSUES

The issue of seismic qualification of mechanical and electrical equipment was designated as Unresolved Safety Issue A-46 in December 1980 (Reference 11). The safety concern was that equipment in nuclear power plants with construction permit applications docketed before 1972 was not reviewed according to current licensing criteria. The NRC Staff determined that it is not feasible to require older operating plants to meet current licensing requirements (NUREG-1211, Reference 12). Therefore, a number of alternative processes were investigated. The process chosen used seismic experience data to evaluate the seismic capability of equipment. This alternative provided the most reasonable and cost effective means to ensure that the intent of GDC 2 is met. To implement this resolution to USI A-46, the NRC issued GL 87-02 (Reference 6). Supplement 1 to GL 87-02 (Reference 7) approved the industry's methodology and criteria for evaluating equipment. This methodology was used to review the SR portions of the SRW System. The experience database used for GL 87-02, Supplement 1, considers commercial heavy industry experience during seismic events. Therefore, it is reasonable to use this approach for our NSR SRW System also, especially in light of the small magnitude of our Safe Shutdown Earthquake. We recognize that the methodology given in GL 87-02, Supplement 1, is for mechanical and electrical equipment only, and not piping; however, the IPEEE review will address any piping concerns not covered by the GL 87-02 review.

Additionally, the Commission issued a policy statement on severe accidents in August 1985 (Reference 11), which concluded that existing plants posed no undue risk to the public health and safety. It also recognized, through probabilistic risk assessments, that systematic examinations are beneficial in identifying plant-specific vulnerabilities to severe accidents. As part of the implementation of that policy statement, the NRC issued GL 88-20 (Reference 13). Supplement 4 of the GL (Reference 9) recognized that the risk from external events, such as earthquakes, could be a significant contributor to core damage in some instances. The NRC provided several methods for evaluating the risk posed by seismic events. The method we are using for our facility was described to the NRC (Reference 10). This is the same method that is being used to evaluate NSR portions of the SRW System.

Another regulatory initiative which was considered in support of our response to this issue was to reevaluate the seismic hazard methodology used in the performance of IPEEE. In April 1994, the NRC issued draft NUREG-1488 (Reference 14) which described the latest evaluation of seismic hazards for plants in the Eastern United States. Revisions of the Lawrence Livermore National Laboratory seismic hazard methodology over the past 15 years have resulted in a continuous decrease in the assessed annual probability for exceeding the Safe Shutdown Earthquake. These results confirm that the mean seismic hazard at most eastern United States plants is low.

The risk to the public from the SRW System seismic vulnerability must be weighed against other risks to determine if this SRW System risk is sufficiently high to warrant modifications. This level of risk will be established in conjunction with the completion of our IPEEE. At that time, appropriate action will be taken.

CONCLUSION

We believe that the lack of seismic qualification for the NSR portion of our SRW System poses no significant risk to the public. We also believe that the cost of modifying the facility based on a deterministic approach alone is not justified, given the low probability of a seismic event in the eastern United States (including Calvert Cliffs) and the experienced-based response of equipment to a seismic event. The entire system is being evaluated as part of our IPEEE analysis. In the event that this issue is determined to be a significant vulnerability, we will take action to remedy this concern.

REFERENCES

1. Letter from C. Michelson (NRC) to L. B. Russell (BGE), dated December 17, 1981, Report on the Calvert Cliffs Unit 1 Loss of Service Water on May 20, 1980

2. Memo from C. J. Heltemes, Jr. (AEOD) to H. R. Denton (NRR), dated May 2, 1983, Response to NRR Comments on AEOD Report, "Calvert Cliffs Unit 1 Loss of Service Water on May 20, 1980."

3. Memo from H. R. Denton (NRR) to C. J. Heltemes, Jr. (AEOD), dated September 15, 1983, Response to NRR Comments on AEOD Report, "Calvert Cliffs Unit 1 Loss of Service Water on May 20, 1980"

4. Memo from H. R. Denton (NRR) to R. J. Mattson (DSI), dated February 15, 1984, Schedule for Resolving and Completing Generic Issue 36 - Loss of Service Water (Calvert Cliffs Unit 1)

5. Letter from L. B. Russell (BGE) to Document Control Desk (NRC), dated January 19, 1990, LER 89-23, Revision 0

6. Generic Letter 87-02, dated February 19, 1987, Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors, Unresolved Safety Issue A-46

7. Supplement 1 to Generic Letter 87-01 That Transmits Supplemental Safety Evaluation Report No. 2 on SQUG Generic Implementation Procedure, Revision 2, as Corrected on February 14, 1992, Dated May 22, 1992

8. Letter from G. C. Creel (BGE) to Nuclear Regulatory Commission, dated September 18, 1992, Response to Generic Letter 87-02, Supplement 1 on Seismic Qualification Utility Group (SQUG) Resolution of USI A-46

9. Generic Letter 88-20, Supplement 4, dated June 28, 1991, Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities - 10 CFR 50.54(f)

10. Letter from G. C. Creel (BGE) to Nuclear Regulatory Commission, dated December 19, 1991, Generic Letter 88-20, Supplement 4, Individual Plant Examination of External Events for Severe Accident Vulnerabilities.

11. USNRC Policy Statement on Severe Accidents, dated August 8, 1985, 50 FR 32138

12. NUREG 1211, Dated February 1987, Regulatory Analysis for Resolution of Unresolved Safety Issue A-46, Seismic Qualification of Equipment in Operating Plants

13. Generic Letter 88-20, dated November 23, 1988, Individual Plant Examination for Severe Accident Vulnerabilities - 10 CFR 50.54(f)

14. NUREG 1488 (draft), dated October 1993, Revised Livermore Seismic Hazard Estimates for 69 Nuclear Power Plant Sites East of the Rocky Mountains