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JOSEPH A. TIERNAN
VICE PRESIDENT
NUCLEAR ENERGY

February 21, 1986

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

ATTENTION: Mr. A. C. Thadani, Project Director
PWR Project Directorate #8
Division of PWR Licensing - B

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318
Regulatory Guide 1.97 Review

REFERENCES:
(a) Letter from A. E. Lundvall, Jr., to J. R. Miller, Subject: Regulatory Guide 1.97 Review, dated December 1, 1984

(b) Letter from A. C. Thadani, to A. E. Lundvall, Jr., Subject: EG&G Report, dated December 9, 1985

Gentlemen:

Supplement 1 to NUREG-0737 (Generic Letter No. 82-33) requires each licensee to review the post-accident monitoring instrumentation available at their facility and to compare this instrumentation with the recommendations of Regulatory Guide 1.97. Reference (a) provided you with the results of this review and comparison. A report reviewing our submittal prepared by your consultant, EG&G, was recently forwarded to us, Reference (b). This letter provides our comments on EG&G's report which you requested in Reference (b).

For four items (3.3.1, Neutron Flux; 3.3.3, Core Exit Temperature; 3.3.5, Containment Sump Water Level; 3.3.22, Vent From Steam Generator Safety Relief Valves or Atmospheric Dump Valves), EG&G states that environmental qualification has been clarified by the Environmental Qualification Rule, 10 CFR 50.49. They then conclude that Regulatory Guide 1.97 has been superseded by a regulatory requirement and any exception to the rule is beyond the scope of this review and should be addressed in accordance with 10 CFR 50.49.

EG&G's conclusion is not consistent with previous agreements made between BG&E and the NRC Staff. It is our position that the post-accident monitoring instrumentation that will be included in our program for qualifying electrical equipment in accordance with 10 CFR 50.49 shall be determined in the Regulatory Guide (RG) 1.97 Review. The Environmental Qualification Rule, 10 CFR 50.49, codifies the environmental qualification methods and criteria that meet the Commission's requirements. The rule states that, along with other electrical equipment important to safety, certain post-

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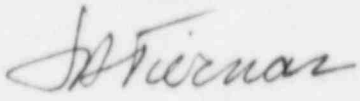
accident monitoring equipment shall be covered by this rule. Regulatory Guide 1.97 is cited in a footnote within the rule as providing specific guidance concerning the types of post-accident monitoring variables that should be monitored.

Additional comments on each item in EG&G's report are included in the attachment to this letter.

Should you have additional questions regarding this matter, please do not hesitate to contact us.

Very truly yours,



JAT/WPM/dmk

Attachment

cc: D. A. Brune, Esquire
J. E. Silberg, Esquire
D. H. Jaffe, NRC
T. Foley, NRC

3.3.1 Neutron Flux

Refer to the discussion concerning the relationship between 10 CFR 50.49 and this Regulatory Guide (RG) 1.97 review provided in the letter.

We plan to install a wide range neutron flux monitoring system. The planned system shall consist of at least two environmentally qualified channels per unit. This system will meet the guidelines of RG 1.97.

3.3.2 RCS Soluble Boron Concentration

EG&G refers to our deviation from RG 1.97 concerning range (0 to 5000 ppm vs. 0 to 6000 ppm). EG&G states that this deviation is being addressed by the NRC as part of their review of NUREG-0737, Item II.B.3. Therefore, additional information is not provided for this item.

3.3.3 Core Exit Temperature

Refer to the discussion concerning the relationship between 10 CFR 50.49 and this RG 1.97 review provided in the letter.

EG&G restates our intention of evaluating the adequacy of the existing instrumentation and upgrading the equipment, if necessary. The instrumentation is being upgraded and shall be included in our environmental qualification program.

Additionally, EG&G requests that we justify the deviation of 300°F in the upper range (2000°F vs. 2300°F) or expand the range to that recommended by RG 1.97. The range stated in Reference (a) is for the existing plant computer. We will add new indicators which will measure temperature from 200°F to 2300°F in accordance with RG 1.97 guidance.

3.3.4 Degrees of Subcooling

EG&G states that the NRC is reviewing the acceptability of this variable as part of their review of NUREG-0737, Item II.F.2. Therefore, additional information is not provided for this item.

3.3.5 Containment Sump Water Level

Refer to the discussion concerning the relationship between 10 CFR 50.49 and this RG 1.97 review provided in the letter.

3.3.6 Radiation Level in Circulating Primary Coolant

EG&G concludes that the instrumentation supplied for this variable is adequate and, therefore, acceptable. Therefore, additional information is not provided for this item.

3.3.7 Accumulator Tank Level and Pressure

EG&G states that the existing instrumentation is not acceptable. Environmentally qualified instruments are necessary to monitor the status of these tanks in accident and post-accident conditions.

The four separate and independent safety injection tanks are each connected to one of the four reactor vessel cold leg pipes. The driving head for water injection is provided by nitrogen gas pressure within the tanks at a minimum pressure of 200 psig. As the reactor coolant system pressure falls below tank pressure, check valves open in the line connecting each tank to the reactor coolant system and the contents of the tank are transferred to the reactor vessel. The tanks operate as a passive stored-energy safety feature; therefore, no outside power source, signal, or operator action is required for their operation during a design basis accident. The level and pressure instruments are only used to monitor the status of the tanks during normal operation to assure that the safety injection system is prepared to serve its safety function. Therefore, a downgrade of the instrumentation requirements to Category 3 is appropriate.

3.3.8 Flow in High Pressure Injection System

EG&G indicates that the instrumentation provided covers a range of 0 to 300 gpm whereas the pump design flow is 345 gpm. Therefore, the range is not as recommended by RG 1.97 (0 to 110 percent of design flow).

The High Pressure Safety Injection (HPSI) System contains three HPSI pumps. The discharge piping from the three pumps combine at a common main header and a common auxiliary header. Each header then branches off into four injection pathways to the reactor coolant system. Flow is measured on each of the four injection pathways, not at the pump discharge. Upon receipt of a safety injection actuation signal two pumps start automatically with the flow distributed between the four injection paths. Based on accident analysis and flow calculations the maximum flow in each leg is expected to be approximately 200 gpm. This is well within the 0 to 300 gpm range of the existing instrumentation.

3.3.9 Refueling Water Storage Tank Level

EG&G concludes that the existing instrumentation is adequate to monitor the operation of the storage tank during all accident and post-accident conditions. Therefore, additional information is not provided for this item.

3.3.10 Pressurizer Heater Status

EG&G responds to our justification that the existing design is adequate for post-accident monitoring by calling Section II.E.3.1 of NUREG-0737 to our attention. This requires a number of pressurizer heaters to have the capability of being powered by emergency power sources.. Therefore, the subject instrumentation is to be provided to prevent overloading a diesel generator.

After a Safety Injection Actuation Signal (SIAS), the back-up heaters can only be added manually (locally) by an operator. Existing procedures prevent the operator from adding the heaters until after the diesel loading has been verified and spare capacity exists in excess of the 300 KW required for the heaters. Diesel loading is verified from the load center ammeters or the diesel KW meter; both have been reviewed with respect to RG 1.97 in Reference (a).

3.3.11 Quench Tank Level

EG&G concludes that the existing instrumentation is adequate to monitor the operation of this tank during all accident and post-accident conditions. Therefore, additional information is not provided for this item.

3.3.12 Steam Generator Level

EG&G concludes that the existing range is adequate for the intended monitoring function. Therefore, additional information is not provided for this item.

3.3.13 Containment Atmosphere Temperature

EG&G states that since the worse case postulated accident will not increase the containment atmosphere temperature above 274°F, the range of 0 to 300°F is adequate to monitor this variable during all accident and post-accident conditions. Therefore, additional information is not provided for this item.

3.3.14 Containment Sump Water Temperature

EG&G believes that we have provided insufficient justification for deleting this variable.

As stated in our Final Safety Analysis Report, Net Positive Suction Head (NPSH) is ensured for the HPSI pumps because the containment sump water level is +15 feet plant elevation at the time of RAS (Recirculation Actuation Signal) and the centerline of the pump is at (-)12 feet plant elevation. Minimum NPSH requirements are not dependent on the water temperature in the containment sump, therefore this variable is not used in the management of a design basis accident and is not required for post-accident monitoring.

3.3.15 Makeup Flow-In

EG&G concludes that the instrumentation provided is acceptable since this variable is not utilized in conjunction with a safety system. Therefore, additional information is not provided for this item.

3.3.16 Letdown Flow-Out Volume Control Tank Level

EG&G concludes that the instrumentation provided is acceptable since these variables are not utilized in conjunction with a safety system. Therefore, additional information is not provided for this item.

3.3.17 Component Cooling Water Temperature to Engineered Safety Features (ESF) System

Since our deviation of 10°F out of the maximum span of 200°F is 5 percent, EG&G considers this deviation minor and acceptable. Therefore, additional information is not provided for this item.

3.3.18 Component Cooling Water Flow to ESF System

EG&G suggests that we commit to install the recommended flow instrumentation, or provide supporting justification or alternatives for this exception.

Our position in Reference (a) is that the need to monitor component cooling water flow will be reevaluated and if we find it necessary, we will add flow indicators. Preliminary results indicate that existing system temperature and pressure measurement devices provide an adequate verification of the status of the component cooling water system. Our review is continuing, however, and if operational considerations indicate flow measurement is required it will be added.

3.3.19 High Level Radioactive Liquid Tank Level

EG&G concludes that the existing range is adequate to monitor the operation of these tanks during all accident and post-accident conditions. Therefore, additional information is not provided for this item.

3.3.20 Radioactive Gas Holdup Tank Pressure

EG&G concludes that the instrumentation provided for this variable is adequate to monitor the operation of these tanks and is, therefore, acceptable. Therefore, additional information is not provided for this item.

3.3.21 Radiation Exposure Rate

Based on the use of portable monitors if the radiation levels reach or exceed the upper limit of the range, EG&G finds the proposed range for the radiation exposure rate monitors acceptable. Therefore, additional information is not provided for this item.

3.3.22 Vent from Steam Generator Safety Relief Valves or Atmospheric Dump Valves

Refer to the discussion concerning the relationship between 10 CFR 50.49 and this RG 1.97 review provided in the letter.

The instrumentation shall be environmentally qualified for the only postulated event requiring this instrumentation, i.e., a steam generator tube rupture. Contrary to our initial position, we now consider this a Category 2 variable and no changes are necessary.

3.3.23 All Identified Plant Release Points

EG&G states that the justification provided by the BG&E for the range deviation is unacceptable. We should either expand the range to that recommended by the regulatory guide or submit analysis that shows that the existing range will not be exceeded during accident and post-accident conditions.

A wide range noble gas monitor continuously monitors noble gas in the main plant vent. In addition, it is equipped for particulate and iodine grab samples. Based on a correlation between noble gas and iodine concentrations a rough indication of iodine levels can be obtained from the noble gas monitor. In the event that noble gas concentrations are high, grab samples can be taken at time intervals necessary to achieve the higher range recommended by RG 1.97 for iodine and particulates.

3.3.24 Estimation of Atmospheric Stability

EG&G finds that the instrumentation is acceptable to determine the atmospheric stability. Therefore, additional information is not provided for this item.