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JOSEPH A. TIERNAN
VICE PRESIDENT
NUCLEAR ENERGY

March 10, 1987

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
Regulatory Guide 1.97 Review

REFERENCE: (a) Letter from Mr. S. A. McNeil (NRC), to Mr. J. A. Tiernan (BG&E), dated January 6, 1987, Safety Evaluation Regarding Conformance to Regulatory Guide 1.97

Gentlemen:

Your Safety Evaluation (Reference a) indicates your staff and contractor do not believe we have justified deviating from the guidance of Regulatory Guide 1.97 (RG 1.97) for:

1. Containment Sump Water Level (Narrow Range),
2. Containment Sump Water Temperature,
3. Safety Injection Tank Level or Pressure, and
4. Component Cooling Water Flow to the ESF System.

You asked us to describe how we intend to comply with the recommendations of RG 1.97 for these instruments.

We believe we have adequate justification to deviate from the guidance of the regulatory guide. It appears we may not have provided sufficient information to support our deviations. Attachment A provides more detailed justification for each instrument.

The regulatory guide explicitly states the bases for the categorization of the post-accident instruments. Our approach is to ensure that our justification is supported by the bases when we deviate from an instrument's category. Being sensitive to the basis for each instrument's categorization, we noted a few inconsistencies in your Safety Evaluation Report. For example, RG 1.97 does not consider accumulator discharge a plant safety function and accumulator tank level and pressure are not Type B variables. These, and others, are discussed in more detail in the attachment when we found it necessary to support our justification.

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Please contact us if you have any questions regarding this matter.

Very truly yours,

J A Tiernan

JAT/WPM/dlm

Attachment

cc: D. A. Brune, Esquire
J. E. Silberg, Esquire
A. C. Thadani, NRC
S. A. McNeil, NRC
T. E. Murley, NRC
T. Foley/D. A. Trimble

ATTACHMENT A
EXCEPTIONS STATED IN NRC SAFETY EVALUATION DATED JANUARY 6, 1987

The NRC listed five exceptions in their cover letter. We combined Items 3 and 4 in one response since we are asked to choose one or the other. Item 5 was incorrectly stated as temperature in the cover letter. We refer to the correct flow instrument in our response.

In each response that follows we first restate the key argument raised by the NRC and their contractor, then provide justification for our position based on the guidance in Regulatory Guide 1.97.

1. Containment Sump Water Level (Narrow Range)

NRC: Early detection of loss of coolant in the primary system cannot be obtained from the wide range sump level instruments. The narrow range sump level instruments are useful for following the course of some postulated accidents; therefore, environmentally qualified instruments must be provided.

BG&E: Regulatory Guide 1.97 (RG 1.97) does not include the basis cited by your staff, "useful for following the course of some postulated accidents," to determine if instruments should be environmentally qualified.

We used the RG 1.97 bases to determine this instrument is Category 3 (a backup or diagnostic instrument) at CCNPP for which environmental qualification is not required. The regulatory guide considers this a Category 2 instrument (instrumentation designated for indicating system operating status) for the early detection of a breach of the RCS pressure boundary. At CCNPP, pressurizer level in conjunction with cycling of the charging pumps alerts operators to excessive RCS leakage.

During steady state power operations, leaks would be indicated as follows:

- Leak rate less than 11 gpm.
  The maximum allowable total leak rate for identified plus unidentified leaks is 11 gpm.

- Leak Rate 11-55 gpm.
  Leakage in this range is indicated by the first backup charging pump cycling on and off to maintain pressurizer level between -4.1" and -9.3".
  Time response for a 33 gpm leak:
  5.57 minutes to start the first backup pump.

- Leak rate 55-99 gpm.
  Leakage in this range is indicated by the second backup charging pump cycling on and off to maintain pressurizer level between -6.5" and -13.5".
  Time response for a 77 gpm leak:
  2.02 minutes to start the first backup pump.
  4.84 minutes to start the second backup pump.

- Leak rate greater than 99 gpm.
  Leakage in this range is indicated by all three charging pumps running while pressurizer level continues to decrease, and a low level alarm.
  Time response for a 121 gpm leak:
  1.23 minutes to start the first backup pump.
  2.17 minutes to start the second backup pump.
  3.18 minutes to low level alarm.

A more detailed discussion of RCS leak detection is given in FSAR Section 4.3.

Since pressurizer level is considered a Category 1 instrument at CCNPP and Category 1 instruments must satisfy more stringent design criteria than Category 2 instruments, we believe we exceed the instrumentation requirements for early detection of a break of the RCS pressure boundary without qualified narrow range containment sump water level indication.

2. Containment Sump Water Temperature

NRC: Sump water temperature is useful in determining the proper operation of the containment cooling system; therefore, our exception to the guidelines of RG 1.97 is unacceptable. The contractor report attached to your letter states we should provide environmentally qualified instrumentation so we can take a quantitative look at the operation of the heat removal from the containment sump. They suggest RHR heat exchanger inlet temperature instruments would be a suitable alternative.

BG&E: Regulatory Guide 1.97 does not include the basis cited by your staff, "useful in determining the proper operation of the containment cooling system," or the basis cited by your contractor, "allow a quantitative look at the operation of heat removal from the containment sump."

We used the RG 1.97 bases to determine this instrument is not necessary at CCNPP, nor is the RHR heat exchanger inlet temperature instrument needed as an alternative. The basis cited in RG 1.97 for including this instrument is to monitor operation of the containment cooling systems; in this case, the containment spray system.

At CCNPP, water taken from the containment sump passes through shutdown cooling (SDC) heat exchangers before flowing to the containment spray header nozzles. The system is monitored by SDC system flow and SDC heat exchanger outlet temperature instruments. The effectiveness of the spray system depends on the difference between the spray water temperature at the nozzle and the containment atmosphere temperature. The water temperature at the containment or at the SDC heat exchanger inlet is only an indirect measure of containment heat removal and has the potential to confuse the operators. Since we consider both SDC system flow and SDC heat exchanger outlet temperature Category 2 instruments, we already satisfy the basis given in RG 1.97 (monitor the operation of the containment cooling system) without providing instrumentation for containment sump temperature.

3. & 4. Safety Injection Tank Level or Pressure

NRC: This instrument should be provided to permit the operator to determine if the plant safety function, accumulator discharge, is being performed.

BG&E: The staff's position is not consistent with the guidance given in RG 1.97. The basis cited by the staff is for a Type B variable. The regulatory guide does not consider this instrument Type B, it considers it Type D. Type D variables require a lower level of qualification than Type B variables because Type D variables measure system operating status while Type B variables measure plant safety functions (reactivity control, core cooling, maintaining reactor coolant system integrity, and maintaining containment integrity). Accumulator discharge is a measure of system operating status not a plant safety function. Type B (plant safety function) variables related to accumulator discharge such as neutron flux, RCS temperature, RCS pressure, and reactor vessel level are all qualified per the guidance in RG 1.97.

The regulatory guide also defines a Type D instrument as one that helps the operator make appropriate decisions in using the individual systems important to safety in mitigating the consequences of an accident. The regulatory guide considers this instrument Category 2, or a key instrument in accomplishing the above.

We consider this instrument Category 3 at CCNPP or a backup or diagnostic instrument to monitor the operation of the safety injection systems. When trying to apply the definition of a Type D instrument, we find that knowing if the accumulator discharged or not is not useful to the operator. The accumulators discharge very early in the event in a large break LOCA. Even if the operator were aware of the failure of an accumulator to discharge, they could not take action quickly enough to make a difference in the outcome of the event. Since the operator is relying on Type A and B variables to indicate whether plant safety functions are being accomplished, and since this instrument does not support operator actions, we have downgraded it from Category 2 to Category 3 (key to backup or diagnostic).

5. Component Cooling Water Flow to ESF System

NRC: RG 1.97 recommends that instrumentation be provided to monitor the cooling water flow to ESF equipment. The design does not provide for flow instrumentation for this variable and the licensee has not yet justified this exception. A commitment is needed from the licensee that the flow instrumentation will be installed.

BG&E: We intend to use component cooling water header pressure to ensure there is adequate flow to the ESF. Although this instrument does not provide the most direct measurement for flow, we believe it provides the operators with unambiguous information to indicate the status of the system.

At CCNPP, low component cooling water pressure would alert the operator to all system malfunctions with the exception of an inadvertently closed isolation valve to the ESF system or system blockage. However, all of these isolation valves are locked open and checked monthly and the cooling water piping is a minimum of 3/4". With good chemistry control it is highly unlikely these would clog.

We are upgrading the component cooling water header pressure instrument to meet Category 2 requirements. We are also upgrading the component cooling water temperature instruments per RG 1.97. Taken together, these instruments provide unambiguous indication of system operability.