October 30, 2000

Mr. Richard Bernier, Chairman
CE Owners Group
Mail Stop 7868
Arizona Public Service Company
Palo Verde Nuclear Generating Station
P.O. Box 52034
Phoenix, Arizona 85072-2034

SUBJECT: COMBUSTION ENGINEERING OWNERS GROUP - REQUEST FOR ADDITIONAL INFORMATION (RAI) REGARDING TOPICAL REPORT CE NPSD-683, REV. 06, "DEVELOPMENT OF A RCS PRESSURE AND TEMPERATURE LIMITS REPORT FOR THE REMOVAL OF P-T LIMITS AND LTOP REQUIREMENTS FROM THE TECHNICAL SPECIFICATIONS" (TAC NO. MA9561)

Dear Mr. Bernier:

By letter dated September 29, 2000, the Combustion Engineering Owners Group submitted Topical Report CE NPSD-683, Rev. 06, "Development of a RCS [reactor coolant system] Pressure and Temperature Limits Report for the Removal of P-T [pressure temperature] Limits and LTOP [low temperature overpressure] Requirements from the Technical Specifications," for the NRC's staff review. The content of the report proposes a new methodology to be followed by an applicant seeking to relocate the P-T limits and LTOP system setpoints from the limiting conditions for operation of the technical specifications (TSs) into TS-controlled pressure temperature limits report (PTLR). PTLRs of this sort are controlled under the Administrative Controls Section of the TS. The staff has determined that additional information is needed to complete its review.

The enclosed request was discussed with Mr. Paggen on October 26, 2000. A mutually agreeable target date of November 9, 2000, was established for responding to the RAI. If circumstances result in the need to revise the target date, please call me at your earliest opportunity at (301) 415-1424.

Sincerely,

/RA/

Jack Cushing, Project Manager, Section 2
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Project No. 692

Enclosure: Request for Additional Information

cc w/encl: See next page

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REQUEST FOR ADDITIONAL INFORMATION

REVIEW OF COMBUSTION ENGINEERING OWNERS GROUP

TOPICAL REPORT CE NPSD-683, REV. 06

"DEVELOPMENT OF A RCS PRESSURE AND TEMPERATURE LIMITS REPORT

FOR THE REMOVAL OF P-T LIMITS AND LTOP REQUIREMENTS

FROM THE TECHNICAL SPECIFICATIONS"

General:

G1. Please include a matrix in the methodology showing the information required to be submitted in the plant specific submittals to complete the methodology (i.e., energy addition, valve characteristics, etc.).

G2. The finite element methodology for calculating the allowable pressures due to membrane stress intensity factors was not described in the CE NSSS methodology of the topical report. Please provide a detailed description of the methodology.

Clarifications:

C1. On page 3-3 in the third paragraph, it is stated that the LTOP system may include a combination of valves. It is not clear what is meant by this statement. Usually, one relief valve is sufficient for mitigating LTOP events. A second valve is usually required for redundancy. The statement seems to imply that some plants require more than one relief valve to mitigate LTOP events. Please explain the statement and provide examples of LTOP systems where a combination of valves is relied on for LTOP.

C2. On page 3-4 in the second paragraph, it is stated that according to Provision 3 of Attachment 1 to GL 96-03, "Relocation of the Pressure Temperature Limit Curves and Low Temperature Overpressure Protection System Limits," the LTOP methodology must reference ASME Code Case N-640. The GL actually suggests referencing Code Case N-514. However, depending on the plant-specific use of code cases, it may be appropriate to reference either case. A clarification of which code case to reference appears to be needed.

C3. On page 5-3, the definition of "beltline" should conform to the definition stated in Section II of 10 CFR Part 50, Appendix G.

C4. On page 6-3, the staff recommends adding carbon steels in addition to the ferritic steel material mentioned for the reactor coolant pressure boundary piping, pumps and valves.

Technical:

T1. On page 3-7 in the last paragraph, page 3-10 in the third paragraph, and page 3-17 in the second paragraph, it is indicated that analyses can assume that a steam volume exists in the pressurizer if a limit on pressurizer steam volume is included in the TS. TS restrictions normally establish the amount (volume) of steam or gas that must exist in the pressurizer but do not REQUIRE that the volume consist of steam. At lower temperatures, a licensee may use nitrogen as a cover gas in the pressurizer instead of steam. The existence of nitrogen in place of steam can affect the pressurization rate. Please address such situations in your methodology. (See 10 CFR 50.72 Event Notification (EN) Number 35705 dated May 12, 1999 from Oconee.)

T2. On page 3-11 in the second full paragraph, it is stated that operator action for transient mitigation or termination can be credited 10 minutes after initiation of the event. Does “initiation of the event” refer to the start of the event (i.e., the time at which the event begins) or does it mean the time at which information (e.g., alarms, displays, indicating that an event has occurred) is available to the operator? Specifically, what operator actions are being credited to begin 10 minutes after the initiation of the event? Does the operator verify automatic plant responses before or after the 10 minutes? Are the operator actions being credited "new," or have they all been established as part of the plant’s licensing basis? Have the operator actions being credited been modified from those established as part of the licensing basis?

To fully respond to this question, reference NRC Information Notice 97-78, "Crediting Operator Actions In Place of Automatic Actions and Modifications of Operator Actions, Including Response Times," and the guidance contained in ANSI/ANS-58.8 (1984, or 1994), "Time Response Design Criteria for Safety-Related Operator Actions."

T3. On the bottom of page 3-13, it is stated that pressurization rate is determined for each applicable transient via an analysis that produces a pressure vs. time function for <u>discharge from a water solid pressurizer</u>. This statement appears to be in regard to calculating the pressurization rate during accumulation. Consistent with the assumption regarding valve operation, which is stated earlier as "during the opening time period, the PORV remains closed and then opens instantaneously" it would be inappropriate to assume that the valve is open and discharging when calculating the pressurization rate during accumulation. Please justify your statement that the pressurization rate is determined for each applicable transient via an analysis that produces a pressure vs. time function for <u>discharge</u> from a water solid pressurizer. In addition, your statement on page 3-13 implies that you will calculate the pressurization rate (for purposes of accumulation) based on a water solid pressurizer. With certain restrictions, the report allows the use of an assumption that a steam volume exists in the pressurizer. This allowance is included to reduce the pressurization rate. Please explain how the pressurization rate is calculated for purposes of calculating accumulation for plants that are allowed to assume that a steam volume exists. Would such a plant assume <u>water solid pressurizer</u> for that calculation?

T4. The discussion under Sections 3.3.3.3 and 3.3.3.4 for the SDC Relief Valves and Pressurizer Relief Valves is lacking in detail when compared to the discussion under Section 3.3.3.2 for Power-Operated Relief Valves. For example, the discussion under the SDC Relief Valves and Pressurizer Relief Valves does not include consideration of flashing at the valve outlet. In addition, although it is stated in the report that the peak transient pressure could be higher than the lift pressure for the valve + the accumulation, no mention of valve curves in made. Also, although it is stated that for these valves, the ASME Code requires that the valves start opening at 3 percent accumulation above the set pressure and reach rated flow position at 10 percent accumulation, no discussion is provided on how the calculation of the resulting pressure increase during accumulation will be performed. Please address these items in the discussion under Sections 3.3.3.3 and 3.3.3.4.

T5. On page 3-16, it is stated that the analytical model uses equations for calculating heat transfer in the heated portions of the steam generator tubes from the secondary SG inventory to the reactor coolant. Please explain what is meant by "heated portions." In addition, please explain how the methodology will treat plugged steam generator tubes and how the number of plugged tubes will be determined for use in the analyses. Justify your answers.

T6. On the top of page 3-18, it is not clear if the assumptions for pump flow rates provide bounding analysis inputs. For example, it is stated that for both pumps maximized performance is typically based on inservice test acceptance criteria. Inservice test acceptance criteria will likely establish the minimum flow rate required to be delivered by the pumps. For LTOP analyses, it is expected that maximum flow rates be assumed. In addition, the basis for the additional 3-10 percent for HPSI pumps is not presented. Also, the requirement for assuming the maximum flow measured for charging pumps does not address instrumentation uncertainty. Please address these points.

T7. On page 3-18 at the end of the second paragraph, it is stated that the equilibrium pressure is determined for liquid input and discharge. Earlier, under Section 3.3.3.2, it is stated that the PORVs may pass subcooled water, saturated water, and/or steam depending on the pressurizer conditions during the transient. It is further stated that especially important is accounting for discharge flow reduction due to flashing at the valve outlet when the discharged water has a low degree of subcooling. Please explain how the degree of subcooling of the discharged water is handled when determining the equilibrium pressure based on liquid discharge.

T8. On top of page 3-19, it is stated that accumulation is added to the nominal setpoint to determine the maximum opening pressure. This appears incomplete because it appears to neglect instrumentation uncertainty. Please modify your writeup to include instrumentation uncertainty.

T9. On page 3-19 in the second paragraph, it is stated that mass input from the pumps into the RCS determines the decrease in the pressurizer steam volume each time step. This appears incomplete, because it does not account for the energy inputs which were converted into equivalent flow rates.

T10. On page 3-23 in the last paragraph, it is stated that the flow induced pressure drop depends on the RV flow rate, which is a function of the number of operating RCPs. While not as large, flow from SDC pumps can also have an impact on the pressure drop. Please include the effect of the SDC pumps.

T11. On page 3-24 in the second paragraph, it is stated that for the LTOP systems that use large capacity (over 1500 gpm) relieve valves connected to the pressurizer, an adjustment must be made to account for the pressure differential between the RV and the pressurizer due to flow induced losses in the surge line. Please justify the value of 1500 gpm for this purpose.

Editorial:

E1. On page 3-5 in the second full paragraph, it is stated that the LTOP methodology of the report for CE-NSSS designs is consistent with BTP RSB 5-12. The reference should be to BTP RSB 5-2 not 5-12.

E2. In several places (e.g., third paragraph on page 3-8, second paragraph on page 3-10, first full paragraph on page 3-11, first paragraph on page 3-13, second paragraph on page 3-16), the methodology states that further justification/explanation must be included in plant-specific PTLRs. This should state that the justifications must be included in plant-specific PTLR methodologies.

E3. On page 3-11 in the first full paragraph, it is stated the an **acceptable** alternate method is to determine decay heat rates separately for heatup and cooldown, recognizing the fact that the times after reactor shutdown to reach the same temperature during cooldown and heatup differ. It is also stated that decay heat input may not have to be included at all during cooldown or isothermal conditions. Please remove the word "**acceptable**" since the staff is not reviewing this portion of the method for acceptance at this time.

E4. On page 3-14, the first paragraph states that the function of peak pressure vs. setpoint "could" be developed using results from the analyses of both mass addition and energy addition transients performed for a number of setpoints. The word "could" should be replaced with the word "must".

E5. On page 3-25 in the last paragraph, it is stated that the resulting enable temperatures are then corrected for instrumentation uncertainty, as applicable. Please explain what is meant by as applicable. When would instrumentation uncertainty not be applicable?