Paul -
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For your info
Andy M.

Sandia National L
Albuquerque, New Mex

October 18, 1982

A. R. Marchese
U. S. Nuclear Regulatory Commission
Generic Issues Branch
Office of Nuclear Reactor Regulation
Mail Stop: 268
Washington, DC 20555

Dear Andy:

Your letter dated August 6, 1982, asked me to examine the possibility of evaluating a rapid depressurization and decay heat removal system for Combustion Engineering (CE) plants that do not have power operated relief valves (PORVs). You indicated that this evaluation should logically fall under the scope of Task Action Plan A-45 (TAP A-45), "Shutdown Heat Removal Requirements," and that TAP A-45 should consider the design criteria, the performance requirements, and the value and impact of providing a depressurization and decay heat removal system. You stated that in order to support a licensing decision by NRR on the San Onofre 2 power plant, the depressurization evaluation under TAP A-45 must be completed by June 1983.

In responses to your request, I sent you a letter on September 14, 1982, which asked that you clarify what type of assessment is expected of TAP A-45 for the CE depressurization issue. On September 28, 1982, we met in Albuquerque, and during our meeting you outlined the limits of the TAP A-45 scope of work for evaluating the value and impact of providing a rapid depressurization capability for CE plants not having PORVs. This letter documents my understanding of what TAP A-45 will provide to NRR by June 1983 to support an NRC evaluation of San Onofre 2.

Referring to the NRC letter dated March 26, 1982, to Mr. A. E. Scherer, Director of Nuclear Licensing at Combustion Engineering, fourteen detailed questions on the need for having a depressurization capability have been identified. Because many of these questions are not directly related to TAP A-45, or they are being addressed by other NRC programs, you stated on September 28 that TAP A-45 should limit its work scope on the depressurization issue to questions 1, 5, and 8a through 8d and questions 10, 11, and 12 of the fourteen questions described in NRC's March 26th letter. For questions 1 and 5 which involve assessing the effectiveness of auxiliary pressurizer sprays for reducing reactor coolant system pressures and assessing the benefits of PORVs for removing decay heat following a loss of all steam generators, you

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indicated that TAP A-45 is expected only to review and comment on the technical validity of information to be supplied to Sandia by NRC from other sources. We agreed that to support a June 1983 completion date, information relevant to questions 1 and 5 should be in Sandia's hands by the end of March 1983.

For questions 8a through 8d and questions 10, 11, and 12, you indicated that TAP A-45 is expected to perform an independent analysis of the relevant issues. Because of this more direct involvement, the following paragraphs outlined the way in which I plan to integrate these questions into the existing TAP A-45 program plan.

1. Question 8. "For the extended loss of main and auxiliary feedwater case where feed/bleed would be a potential backup:

   a. What is the frequency of loss of main feedwater events; break down initiators that affect more than main feedwater, e.g., DC power?

   b. What is the probability of recovering main feedwater? Provide your bases such as availability of procedures and the human error rates.

   c. What is the probability of losing all auxiliary feedwater (given Item a)? Include considerations of recovering auxiliary feedwater as well as common cause failures (including those which could affect main feedwater availability and support system dependencies) and failures that could be hidden from detection via tests.

   d. What is the uncertainty in the estimates provided for a), b) and c)?"

   TAP A-45 Approach

   This question is consistent with the scope and schedule of TAP A-45 Subtask 3.3.1 "Modify PRAs (Probabilistic Risk Assessments) to Reflect Grouped LWRs." As part of the PRA modification effort under Subtask 3.3.1, a consistent set of accident initiators will be identified which can lead to the loss of a plant's normal heat sink, resulting in the need for decay heat removal. Plans in TAP A-45 call for reviewing the data bases and models used in completed PRAs to identify all credible mechanisms by which main feedwater and auxiliary feedwater may be lost or rendered unavailable. Where uncertainties exist in quantifying the accident initiation frequencies, Subtask 3.3.1 will attempt to identify the magnitude of the uncertainties.

2. Question 10

"What is the core melt frequency from PORV initiated LOCA? Characterize the consequences."

TAP A-45 Approach

This question is consistent with the scope of TAP A-45 Subtask 3.3.2, "Estimate Core Melt and/or Release Frequencies." However, the TAP A-45 program plan start date of June 1983 for Subtask 3.3.2 falls too late to support the San Onofre evaluation deadline. Accordingly, the approach for question 10 will involve determining the contribution to overall core melt frequency of small LOCAs initiated by a stuck open PORV for all of the PRAs being investigated in TAP A-45 Subtask 3.3.1, "Modify PRAs to Reflect Grouped LWRs." This will give an indication of the relative safety significance of a PORV initiated LOCA, and it will identify what other system failures or operator errors must also occur before a stuck open PORV poses a major safety concern. With regard to characterizing the "consequences" of a PORV initiated LOCA, a lack of directly applicable demographic and meteorological information for the San Onofre site prevents an easy assessment of the public risk "consequences" of a PORV initiated LOCA core melt. Therefore, it is my interpretation that the term "consequences" refers, in this context, to the sequence of events leading to core melt and the types of containment failures and radioactive material releases which can be expected as a result of a PORV initiated LOCA. This interpretation, rather than the traditional PRA public risk definition of "consequences," will provide useful insights into the safety significance of a PORV initiated LOCA.

3. Question 11

"What is the net gain (or loss) in safety considering 8, 9 and 10 above if PORVs were to be installed? Are there any additional benefits (or drawbacks) achieved by installing PORVs? Examples of potential benefits are mitigation of ATWS and pressurized thermal shock, and reduced risk associated with depressurized primary system during a core melt."

TAP A-45 Approach

Similar to question 10, the approach planned for question 11 will involve determining the extent to which PORVs enhance or

diminish safety for all of the PRAs being investigated in TAP A-45 Subtask 3.3.1. In addition, we plan to focus attention on the Calvert Cliffs PRA in an effort to more closely reflect the design features of the Combustion Engineering San Onofre power plant. To do this efficiently, we may need the cooperation of NRC and utility personnel to help us identify design features of San Onofre which significantly differ from those of Calvert Cliffs.

With regard to the specific issues of ATWS and pressurized thermal shock, you indicated during our September 28th meeting that other NRC programs are addressing these issues and that TAP A-45 need not quantitatively access their risk contribution. Also, in reference to question 9, which relates to steam generator tube failures and is cited by question 11, we agreed that TAP A-45 should only comment on relevant work being done by Science Applications Incorporated and by Los Alamos National Laboratory.

4. Question 12

"If the results in 11 yield appreciable gain in safety, what could be the cost of installing PORVs?"

TAP A-45 Approach

This question is consistent with the scope of TAP A-45 Subtask 2.2.5, "Perform an Impact Assessment of Alternatives." However, the TAP A-45 program plan start date of February 1984 for Subtask 2.2.5 falls too late to support the San Onofre evaluation deadline. Accordingly, the approach planned for question 12 will involve starting a portion of Subtask 2.2.5 ahead of schedule. To do this, a subcontract for an effort of approximately four man months will be established with an architect engineer to evaluate the feasibility, cost, and operational impact of installing PORVs in a PWR power plant. Consideration will be given to whether or not the PORVs are installed during initial construction or after the plant has operated. Support systems, structures, instrumentation, maintenance, and testing impacts will also be considered.

Because this effort goes beyond that originally planned for FY 83, additional funding of about $50,000 for this fiscal year will be needed by December 1982 to support contracting. It is anticipated that this increased funding in FY 83 will be balanced by a corresponding budget decrease in FY 84, as the scope of Subtask 2.2.5 is reduced to reflect the completed PORV evaluation for San Onofre.

I hope that you find this letter to be responsive to your August 6th request for support from TAP A-45 and that I have accurately reflected your understanding of TAP A-45's role in the San Onofre depressurization issue.

Sincerely,

Dennis

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