JAN 26 1994

MEMORANDUM FOR: Charles Z. Serpan, Jr., Chief
Engineering Issues Branch
Division of Safety Issue Resolution
Office of Nuclear Regulatory Research

FROM: Michael Marshall, Reactor Engineering Intern
Engineering Issues Branch
Division of Safety Issue Resolution
Office of Nuclear Regulatory Research

SUBJECT: SUMMARY OF JANUARY 11 & 12, 1994 MEETING BETWEEN NRC AND SEA TO DISCUSS TASK 6, "POTENTIAL FOR LOSS OF LPCI CAPABILITY IN BWRS DUE TO LOCA GENERATED DEBRIS"

On January 11 and 12, 1994, RES and NRR staff members met with SEA representatives to discuss issues concerning the draft report "Parametric Study of the Potential for BWR ECCS Blockage Due to LOCA Generated Debris" and Task 6 activities. Lists containing meeting attendees are attached.

The NRC staff and SEA representatives discussed the content of the draft report and the insights gained from the parametric analysis. A list of NRC staff comments on the draft report is attached. The following topics were emphasized during the discussion: (1) debris generation model, (2) Section 5 equations, (3) NPSH calculations, and (4) sensitivity analysis. The estimated frequency of ECCS strainer blockage was 4.6E-05/Rx-Yr, and the conditional probability of strainer blockage leading to a loss of NPSH (given a LOCA and model assumptions) was 0.31. NRC staff members stated that the parametric analysis performed by SEA was well done and documented. The report, with some revisions, will be the focal point of a planned February 23, 1994 open meeting. This analysis does not include credit for recovery actions, which could mitigate debris blockage. Also the contractor has not evaluated potential fixes (e.g., backflush). These items will be evaluated before the work scope is completed.

RES and NRR staff members discussed releasing a copy of the draft report to Duane Arnold Energy Center. Duane Arnold was the reference plant used in the Task 6 analysis, and the licensee had requested a copy of the draft for review. NRR has assumed the responsibility for sending Duane Arnold a "revised" preliminary draft report with a cover letter. The cover letter (to be drafted by NRR) will discuss findings and how these findings relate to the Duane Arnold Plant.

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Changes to the Task 6 work scope were discussed. M. Marshall, R. Elliott, and G. Zigler will agree upon the wording of a revised subtask 6.4 work scope. The NRC staff does not believe, at this time, that experiments will be needed to complete the Task 6 analysis. Therefore, SEA was advised that the proposed Alden Research Laboratory support would not be needed.

SEA will be submitting a revised proposal to the Office of Contracts, which will include a revised work scope and new cost estimates, by January 24, 1994. The RES staff suggested that SEA prepare a comparative cost and scope table similar to the one below and submit it to the NRC.

subtask #	original cost estimate	actual cost	revised cost estimate	original scope	revised scope	original deliverable s	revised deliverable s

SEA was also instructed to minimize its work effort on Task 6 during the months of January and February 1994 to conserve remaining funds. However, the following items were identified by NRC staff members as areas that SEA could continue to work, provided that the results would be used to complete the overall work scope. The list (in order of priority) is:

(1) Revise and mail the draft report "Parametric Study of the Potential for BWR ECCS Blockage Due to LOCA Generated Debris" by January 21, 1994. After NRC review and approval, SEA will mail the draft to potential meeting attendees, if directed by the NRC (Target Date: February 3, 1994).

(2) Prepare visual aids for the planned February 23, 1994 open meeting.

(3) Extend the current debris generation model to include insulated targets in the area near a weld break and to calculate the change in the conditional ECCS strainer blockage probability.

(4) Estimate the change in the core damage frequency associated with the conditional ECCS strainer blockage probabilities, using available plant analysis (e.g., IPE submittals and NUREG-1150).

(5) Begin the corrosion product and foreign material evaluation literature search, upon receipt of a revised subtask 6.4 work scope.

ORIGINAL SIGNED BY

Michael L. Marshall Jr.
Reactor Engineering Intern
Engineering Issues Branch
Division of Safety Issue Resolution
Office of Nuclear Regulatory Research

cc: J. Murphy, RES
A. Thadani, NRR
R. Lobel, NRR
R. Barrett, NRR
J. Cucura, ADM
Meeting Attendees

Attachments:
1) List of 01/11/94 Meeting Attendees.
2) List of 01/12/94 Meeting Attendees.
3) 01/11/94 Meeting Agenda.
4) Listing of NRC Comments on the Draft "Parametric Study of the Potential for BWR ECCS Blockage Due to LOCA Generated Debris," made during the January 11 and 12, 1994 Meetings.

References:
1) "Parametric Study of the Potential for BWR ECCS Blockage Due to LOCA Generated Debris," December 1993, DRAFT.
2) Letter from J. Fields to G. Zigler; Subject: Contract No. NRC-04-91-071, Task Order No. 6; Dated: January 11, 1994.

DSIR/EIB	DSIR/EIB	DSIR/EIB
MMarshall:jf	ASerkiz	PNorian
01/24/94	01/26/94	01/26/94

MEETING ATTENDANCE

DATE: 01/11/94

PLACE: NL/S rm. 360

TIME: 1:00 pm

SUBJECT:

Name	Organization	Phone #
Marty Virgilio	NRR/DSSA	301-505-3226
Vincent Leung	RES/DSIR	301-492-3911
Richard E. Johnson	RES/DSIR/EIB	301-492-3909
Al Serkiz	RES/DSIR/EIB	301-492-3942
Richard Lobel	NRR/DSSA/SCSB	301-504-2865
Rob Elliott	NRR/DSSA/SCSB	301-504-1397
Rich Barrett	NRR/DSSA/SCSB	301-504-3027
Robert Pulsifer	NRR/DRPW/PDIII-3	301-504-3016
Gilbert Zigler	SEA	505-884-2300
Frank Sciacca	SEA	301-468-7371
Paul Norian	RES/DSIR/EIB	301-492-3910
Michael Marshall	RES/DSIR/EIB	301-492-3713

MEETING ATTENDANCE

DATE: 01/12/94

PLACE: NL/S conf. Rm. 13B

TIME: 9:30 am

SUBJECT:

Name	Organization	Phone #
Vincent Leung	RES/DSIR	301-492-3911
Al Serkiz	RES/DSIR/EIB	301-492-3942
Rob Elliott	NRR/DSSA/SCSB	301-504-1397
Gilbert Zigler	SEA	505-884-2300
Frank Sciacca	SEA	301-468-7371
Paul Norian	RES/DSIR/EIB	301-492-3910
Michael Marshall	RES/DSIR/EIB	301-492-3713

Meeting Between NRR and RES Staff Concerning the Analysis Potential for Loss of Low Pressure Coolant Injection Capability in BWRs Due to LOCA Generated Debris

DATE: 01/11/94
TIME: 1:00 pm
PLACE: NL/S conference room B
TOPIC: see agenda below

AGENDA ITEMS

1) Clarify the evaluation of long-term corrosion products and foreign materials.

2) Discuss NRC comments on the draft report "Parametric Study of the Potential for BWR ECCS Blockage Due to LOCA Generated Debris" with SEA.

3) Discuss releasing the draft report "Parametric Study of the Potential for BWR ECCS Blockage Due to LOCA Generated Debris" in its current form to Duane Arnold Energy Center.

Typical NRC Comments on the Draft "Parametric Study of the Potential for BWR ECCS Blockage Due to LOCA Generated Debris," made during the January 11 and 12, 1994 Meetings

1) Are the pipe breaks modeled as unidirectional cones as indicated by figure 5-3? The figure and the text disagree. The text describes symmetrical cone. SEA verified on 01/12/94 that a symmetrical cone was used to in the calculations.

2) Does the model include small breaks in large pipe?

3) Section 4.0 does not explicitly show how SEA used the weld break estimates to calculate pipe break estimates. This section should be similar to section 3.2 of NUREG/CR-3394, vol.1.

4) Did SEA compare the volume generated in the analysis with the volume generated at Barsebäck?

5) Equation 5.1 may not be correct. Should "I" be "2I?" Is the equation correct in the code?

6) Was spray operation in the containment considered in the transport model?

7) Is the transport factor of 0.75 in the lower drywell overly conservative?

8) What is the approach velocity near the strainer given figure 3-15 and the text on page 3-21? Is it large enough to attract debris?

9) Is the NPSH used in the analysis, from the NRR scoping Survey?

10) SEA should stamp "PRELIMINARY DRAFT" on every page of the report before it is released publicly.

11) SEA should use the term ECCS strainer blockage instead of ECCS blockage (esp. report title).

12) SEA should make sure the descriptions of the Perry event and Barsebäck incident are correct. Compare them to the PERRY LER and the Barsebäck press releases.

13) SEA should make sure that the term conditional probability is clearly defined in report (esp. executive summary). A suggested definition is the probability of a ECCS strainer blockage given a LOCA and modeling assumptions.

14) Figures B and A lack labels.

15) The reference to RG 1.82 on pg 1-2 may not be appropriate since it applies to PWRs only.

16) SEA should proof the text to ensure that two spaces follow the end of sentences (i.e., periods) and there is a space after semicolons and commas.

17) How did SEA develop figures 5-1 and 5-2?

18) Is footnote 2 on pg 2-6 correct?

19) Is the pool velocity mentioned on pg 2-6 correct?

20) Is the item 1 of section 2-6 correct?

21) Aod RG 1.82, Rev. 1 to the references in pg 2-10.

22) If a different insulation is used or if targets are include, would the negligible weld still be consider negligible?

23) The RHR and the LPCS pumps have different NPSH margins. Is the 14 feet of H_2O a correct allowable head loss?

24) SEA should reference PCI reports in section 5.

25) SEA should state on pg 5-15 that the proposed network resistance model was for PWRs.

26) Was equation 5-6 (and other empirical equations) correctly converted from the metric system? Since it is an empirical non-linear equation, there is not a one to one relationship between the English and SI conversion.

27) Is identifying the value "t" in the section 5.0 equation as "as fabricated" accurate? Is the term "equivalent" thickness more correct? Is "t" the thickness on the strainer surface?

28) Is the term "shredded" more appropriate than "as fabricated" in item 2 on pg 5-21?

29) Is the axis titles on fig. 5-4 correct?

30) It should be explicitly stated that this analysis did not give credit for operator action and did not include all targets.

31) On pg 7-17, second bullet item, delete the term "large-break." (check the rest of the report to make sure that the LOCA characterized in the analysis is not refereed to as a large, medium , or small.) Also add the words and modeling assumptions behind LOCA.

32) Delete section 7.5

33) Remove the source code, QA, and V&V from the appendix.

JAN 2 6 1994

DISTRIBUTION:
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Meeting Attendees
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