

May 7, 2002

Mr. James Mallay
Director, Regulatory Affairs
Framatome ANP, Richland, Inc.
2101 Horn Rapids Road
Richland, WA 99352

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION ON TOPICAL REPORT
BAW-10166PA, REVISION 4, "BEACH - BEST ESTIMATE ANALYSIS CORE
HEAT TRANSFER - A COMPUTER PROGRAM FOR REFLOOD HEAT
TRANSFER DURING LOCA" APPENDICES H AND I (TAC NO. MB3866)

Dear Mr. Mallay:

By letter dated December 10, 2001, Framatome ANP submitted for staff review Topical Report BAW-10166PA, Revision 4, "BEACH - Best Estimate Analysis Core Heat Transfer - A Computer Program for Reflood Heat Transfer During LOCA," Appendices H and I.

The staff has completed its preliminary review of BAW-10166, Appendices H and I, and has identified a number of items for which additional information is needed to continue its review. The enclosed request for additional information (RAI) was discussed with your staff on April 16, 2002. A mutually agreed upon target date of May 28, 2002, was established for responding to the RAI. Please provide the requested information so that the review can be completed in a timely manner. Partial submittals would be welcomed to minimize delays.

Pursuant to 10 CFR 2.790, we have determined that the enclosed RAI does not contain proprietary information. However, we will delay placing the RAI in the public document room for a period of ten (10) working days from the date of this letter to provide you with the opportunity to comment on the proprietary aspects only. If you believe that any information in the enclosure is proprietary, please identify such information line by line and define the basis pursuant to the criteria of 10 CFR 2.790.

If you have any questions, please call me at (301) 415-1436.

Sincerely,

/RAI

Drew Holland, Project Manager, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Project No. 693

Enclosure: Request for Additional Information

May 7, 2002

Mr. James Mallay
Director, Regulatory Affairs
Framatome ANP, Richland, Inc.
2101 Horn Rapids Road
Richland, WA 99352

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION ON TOPICAL REPORT
BAW-10166PA, REVISION 4, "BEACH - BEST ESTIMATE ANALYSIS CORE
HEAT TRANSFER - A COMPUTER PROGRAM FOR REFLOOD HEAT
TRANSFER DURING LOCA" APPENDICES H AND I (TAC NO. MB3866)

Dear Mr. Mallay:

By letter dated December 10, 2001, Framatome ANP submitted for staff review Topical Report BAW-10166PA, Revision 4, "BEACH - Best Estimate Analysis Core Heat Transfer - A Computer Program for Reflood Heat Transfer During LOCA," Appendices H and I.

The staff has completed its preliminary review of BAW-10166, Appendices H and I, and has identified a number of items for which additional information is needed to continue its review. The enclosed request for additional information (RAI) was discussed with your staff on April 16, 2002. A mutually agreed upon target date of May 28, 2002, was established for responding to the RAI. Please provide the requested information so that the review can be completed in a timely manner. Partial submittals would be welcomed to minimize delays.

Pursuant to 10 CFR 2.790, we have determined that the enclosed RAI does not contain proprietary information. However, we will delay placing the RAI in the public document room for a period of ten (10) working days from the date of this letter to provide you with the opportunity to comment on the proprietary aspects only. If you believe that any information in the enclosure is proprietary, please identify such information line by line and define the basis pursuant to the criteria of 10 CFR 2.790.

If you have any questions, please call me at (301) 415-1436.

Sincerely,

/RA/

Drew Holland, Project Manager, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Project No. 693

Enclosure: Request for Additional Information

DISTRIBUTION:

PUBLIC (NO DPC Folder for 10 days)

PDIV-2 R/F

RidsOgcRp

RidsAcrcAcnwMailCenter

RidsNrrPMDHolland

RidsNrrLAEPeyton

JWermiel

ACCESSION NO.: ML021200177

OFFICE	PDI-2/PM	PDIV-2/LA	PDIV-2/SC
NAME	DHolland	EPeyton	SDembek
DATE	5-3-02	5/3/02	5/6/02

OFFICIAL RECORD COPY

REQUEST FOR ADDITIONAL INFORMATION

BAW-10166PA, REVISION 4, "BEACH - BEST ESTIMATE ANALYSIS CORE HEAT TRANSFER - A COMPUTER PROGRAM FOR REFLOOD HEAT TRANSFER DURING LOCA." APPENDICES H AND I

FRAMATOME ANP

PROJECT NO. 693

1. The BEACH code has been compared to the FLECHT-SEASET and FLECHT cosine series reflood test data. Since these data contain non-powered rods, thimbles, and filler materials, rod-to-rod thermal radiation can constitute as much as 20 – 30 percent of the total heat removal capability. In the FLECHT cosine series tests, a radial power profile in the bundle is simulated that will increase the rod-to-rod thermal radiation. Since thermal rod-to-rod radiation is not modeled in BEACH, please demonstrate that thermal rod-to-rod radiation is not appreciable in the test comparisons. For those tests and hot rod locations where rod-to-rod radiation is appreciable, comparing the BEACH rod surface heat transfer coefficient to the test data is considered inappropriate since the overall test data heat transfer coefficient contains convection in addition to thermal radiation. In this case, thermal rod-to-rod radiation should be subtracted from the test data so that only convection remains for the comparison. This will assure that the BEACH calculated convective heat transfer coefficient was not tuned to match test data containing convection plus rod-to-rod thermal radiation.
2. The BEACH prediction of Test 8037 shows in Figure I-12 that BEACH predicts a very early quench due to the overprediction of the quench front advance. The premature quench prediction suggests that clad oxidation could be severely underpredicted if this occurs during a plant calculation. Please explain why the BEACH code overpredicted the quench front advance resulting in the early quench. Since this test contained an increase in the subcooling of the inlet coolant, the overprediction could be due to anomalies in the sub-cooled boiling model. Also, provide additional information demonstrating that this behavior occurs infrequently when BEACH is compared to other test data, particularly for those FLECHT tests which produce peak clad temperatures (PCTs) greater than 2000°F.
3. What is the uncertainty in the temperature in the clad temperature versus elevation plots from the FLECHT data comparisons shown in Figures. I-1, I-2, I-3, I-4, and I-5 from BAW-10166PA, Revision 5? These plots failed to capture some of the thermocouple temperatures along the axis of the FLECHT heater rods. Please show that when the uncertainty in temperature is included, the BEACH calculated temperatures capture all of the temperature data points.
4. FLECHT-SEASET tests were used to demonstrate BEACH performance for low reflood rates and high initial reflood PCT loss-of-coolant accident (LOCA) events. In the FLECHT-SEASET test predictions to demonstrate BEACH low reflood rate performance, BEACH underpredicted the test PCT in 4 of the 5 cases. In the FLECHT-SEASET test prediction to demonstrate higher initial reflood temperature, the BEACH-calculated PCT also tended toward underprediction of the data. Please explain

what is peculiar about the FLECHT-SEASET tests, or the BEACH modeling, that makes BEACH tend to underpredict their data at high temperatures?

5. How do the Power shapes for North Anna and FLECHT and FLECHT-SEASET compare?
6. Please provide the reference showing the BEACH drop size predictions compared to reflood data. If not available, please show a plot of drop sizes at the hot spot predicted by BEACH for the reflood tests presented in BAW-10166PA, Revision 4. For the FLECHT-SEASET cases, please also show the data as a comparison.