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Energy Systems

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DCP/NRC1266
NSD-NRC-98-5582
Docket No.: 52-003

February 23, 1998

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: T. R. QUAY

SUBJECT: AP600 RESPONSE TO FSER OPEN ITEMS

Dear Mr. Quay:

Enclosed with this letter are the Westinghouse responses to FSER open items on the AP600. A summary of the enclosed responses is provided in Table 1. Included in the table is the FSER open item number, the associated OITS number, and the status to be designated in the Westinghouse status column of OITS.

The NRC should review the enclosures and inform Westinghouse of the status to be designated in the "NRC Status" column of OITS.

Please contact me on (412) 374-4334 if you have any questions concerning this transmittal.

B. A. McIntyre / *RPV*
Brian A. McIntyre, Manager
Advanced Plant Safety and Licensing

jml

Enclosures

cc: W. C. Huffman, NRC (Enclosures)
J. E. Lyons, NRC (Enclosures)
T. J. Kenyon, NRC (Enclosures)
J. M. Sebrosky, NRC (Enclosures)
D. C. Scaletti, NRC (Enclosures)
N. J. Liparulo, Westinghouse (w/o Enclosures)

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Table 1 List of FSER Open Items Included in Letter DCP/NRC1266		
FSER Open Item	OITS Number	Westinghouse status in OITS
410.812F	6608	Confirm W
440.810F	6606	Confirm W
440.811F	6607	Confirm W

Enclosure to Westinghouse
Letter DCP/NRC1266

February 23, 1998



Question 410.812F (OITS - 6608)

Approval of the applicability of WCOBRA/TRAC for LBLOCA analyses of AP600 is contingent on acceptable completion of documentation of WCOBRA/TRAC for 3/4 loop plants which is currently described in the Westinghouse Electric Corporation, Energy Systems Business Unit, Code Qualification Document for Best Estimate LOCA Analysis, Volumes 1 (Revision 1) to 5, WCAP-12945-P, June 1992 to June 1993.

Response:

As documented in the NRC letter dated February 9, 1998, Westinghouse plans on submitting to the Staff the above referenced documentation by March 31, 1998.

SSAR Revision: None

**Question 440.810F (OITS - 6606)**

The following addition¹ application restriction should be included in the WCOBRA/TRAC Applicability to AP600 Large-Break Loss-of-Coolant Accident report, WCAP-14171:

WCAP-14171, Revision 1, documents the application of the Westinghouse large break LOCA best estimate methodology to the AP600. In developing that methodology some parameters were not included in the uncertainty analysis. Some of these parameters were bounded conservatively while others were judged to have an insignificant impact on the low calculated PCT results and for simplicity were not considered. Among the latter set of parameters are (1) the AP600-unique passive safety system (CMTs and PRHR) modeling, and (2) fuel rod oxidation models. A bounding assessment of the potential impact of the PRHR and the CMT systems modeling on the calculated PCT was obtained by eliminating those systems from the large break LOCA transient calculation. As noted on page 2-33 of WCAP-14171, Revision 1, the effect of these systems is minor. The blowdown phase PCT values for the WCOBRA/TRAC case in which these systems were eliminated each decreased by 5 °F from the base case blowdown PCT results. The reflood phase PCT results in the WCOBRA/TRAC case without PRHR and CMT systems modeled is the same as the base case reflood PCT results.

The AP600 large break LOCA 95 percent PCT values for blowdown and reflood are reported in SSAR Table 15.6.5-9. The limiting PCT is that for the blowdown, at 1676 °F. In the event that either the blowdown or reflood phase PCT exceeds 1725 °F in a future AP600 best estimate methodology large break LOCA analysis for any reason, Westinghouse shall perform the actions described below.

- a. Repeat the global model matrix of calculations and the final 95 percent uncertainty calculations.
- b. Address the sensitivity to the CMT and PRHR modeling parameters which are not now included in the AP600 uncertainty methodology. Repeat the study that identifies the PCT sensitivity to PRHR/CMT elimination, and add the blowdown and reflood PCT impacts as a bias to their respective 95 percent PCT results.
- c. Perform an analysis of the maximum local oxidation using the techniques approved for 3/4 loop plant applications to show compliance with the applicable 10 CFR 50.46 criteria. A transient with PCT in excess of the 95 percent PCT value identified in step (a) above, augmented by the biases identified in step (c) above, would be used for the oxidation analysis. The core-wide oxidation analysis would also be performed using the methods approved for use in 3/4 loop plant applications.
- d. The results of these calculations will be submitted for staff review before their implementation.

**Response:**

A revision to the "WCOBRA/TRAC Applicability to AP600 Large-Break Loss-of-Coolant Accident report, WCAP-14171" will be issued and include the following restriction. Also, the February, 1998 NRC letter to Westinghouse titled "OPEN ITEMS ASSOCIATED WITH THE AP600 SAFETY EVALUATION REPORT (SER) ON THE APPLICABILITY OF WCOBRA/TRAC FOR LARGE BREAK LOCA ANALYSES" will be referenced in this topical report revision.

In the event that either the blowdown or reflood phase PCT exceeds 1725°F in a future AP600 best estimate methodology large break LOCA analysis for any reason, Westinghouse will perform the following actions:

- a. Repeat the global model matrix of calculations and the final 95 percent uncertainty calculations.
- b. Address the sensitivity to the CMT and PRHR modeling parameters which are not now included in the AP600 uncertainty methodology. Repeat the study that identifies the PCT sensitivity to PRHR/CMT elimination, and add the blowdown and reflood PCT impacts as a bias to their respective 95 percent PCT results.
- c. Perform an analysis of the maximum local oxidation using the techniques approved for 3/4 loop plant applications to show compliance with the applicable 10 CFR 50.46 criteria. A transient with PCT in excess of the 95 percent PCT value identified in step (a) above, augmented by the biases identified in step (b) above, would be used for the oxidation analysis. The core-wide oxidation analysis would also be performed using the methods approved for use in 3/4 loop plant applications.
- d. The results of these calculations will be submitted for staff review before their implementation.

SSAR Revision: None



**Question 440.811F (OITS - 6607)**

The WCOBRA/TRAC Applicability to AP600 Large-Break Loss-of-Coolant Accident report, WCAP-14171, should include an appendix with relevant NRC staff requests for additional information and the Westinghouse responses. The following Westinghouse letters provide the responses the staff referenced in its SER:

- (a) B. A. McIntyre, Westinghouse, letter to USNRC, Document Control Desk, "Westinghouse Responses to NRC Requests for Additional Information on the AP600," NTD-NRC-95-4598, Docket Number STN-52-003, November 17, 1995.
- (b) B. A. McIntyre, Westinghouse, letter to USNRC, Document Control Desk, "Westinghouse Responses to NRC Requests for Additional Information on the AP600," NSD-NRC-96-4908, Docket Number STN-52-003, December 10, 1996.
- (c) B. A. McIntyre, Westinghouse, letter to USNRC, Document Control Desk, "Responses to Open Items on WCOBRA/TRAC Applicability to AP600 Large-Break Loss-of-Coolant Accident," NSD-NRC-97-5171, Docket Number STN-52-003, June 10, 1997.
- (d) B. A. McIntyre, Westinghouse, letter to USNRC, Document Control Desk, "Responses to Open Items on WCOBRA/TRAC Applicability to AP600 Large-Break Loss-of-Coolant Accident," NSD-NRC-97-5240, Docket Number STN-52-003, July 18, 1997.
- (e) B. A. McIntyre, Westinghouse letter to USNRC, Document Control Desk, "Response to Telecon Request for Information on WCOBRA/TRAC," NSD-NRC-97-5332, Docket Number STN-52-003, September 18, 1997.
- (f) B. A. McIntyre, Westinghouse, letter to USNRC, Document Control Desk, "Response Requests for Additional Information on Chapter 15.6.5 of the AP600 Standard Safety Analysis Report (RAI 440.661)," NSD-NRC-97-5291, Docket Number STN-52-003, August 27, 1997.
- (g) Revisions to discussion items 8g and 17a as documented in Westinghouse fax to the NRC dated August 12, 1997.

Response:

A revision to the "WCOBRA/TRAC Applicability to AP600 Large-Break Loss-of-Coolant Accident report, WCAP-14171" will be issued and include the above requested NRC RAIs and Westinghouse responses. These will be included in an Appendix to this revised report.

SSAR Revision: None