(Table 3.3-1) obtained by monitoring the vessel over a 48 hour period at ambient conditions. Data recorded in the "FO" files of Appendix C and D also contain maximum, minimum, and average temperatures and differential temperatures as a function of time. The differential temperatures reported in the "FO" files were not corrected for the calibration offset of Table 3.3-1.

Table 3.3-2 presents a summary of the tests performed during Phase 2 and Phase 3 of the PCS test program. Repeat test runs were performed where tests did not meet the test requirements or pertinent test data was missing. The reasons for repeating tests are also indicated in Table 3.3-2.

3.3.2.1 Heat Balance

Table 3.3-3 provides a rough comparison of the heat loads as calculated from the various measurements listed below:

- Condensate mass flow rate
- External heat loss (water, air and radiation)
- Heat flux across the wall

Figure 3.3-1 illustrates the various heat balance calculations relative to the heat loss calculated from the condensate measurement. Table 2.0-1 provides estimates of the test vessel and baffle surface areas and the applicable flow areas for use in evaluation of the test data. The indicated position of the area is approximately at the middle of the identified area. The condensate heat load was calculated from the enthalpy of the steam entering minus the enthalpy of the condensate leaving while the system was at steady state; condensate flow was used for both the steam flow into the vessel and the condensate flow out of the vessel. The external heat loss sums the heat pickup of the cooling water, the heat of vaporization of water, the heat pickup of air and the estimated heat losses to the environment due to convection and radiation from the vessel bottom and baffle sides using the ambient temperature as T_∞. The convection losses were estimated using a heat transfer coefficient of 1 BTU/(hr*ft^2*°F). The convective and radiation heat losses from the bottom of the vessel were assumed negligible for all tests with an insulated bottom (Test runs less than RC053). The equations used are shown below:

$$q_{cond} = W_{cond} (H_{steam} - H_{cond}) \quad (1)$$

$$q_{ems} = q_{air} + q_{water} + q_{bottom} + q_{baffle} \quad (2)$$

$$q_{wall} = \frac{k}{l} \sum_{i} A_i \left(f_{wet} \Delta T_{max,i} + (1 - f_{wet}) \Delta T_{min,i}\right) \quad (3)$$

$$q_{air} = W_{air} C_{p,air} (T_{air,out} - T_{air,in}) + H_{water\,vapor,out} (W_{water,in} - W_{water,out}) \quad (4)$$

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$$q_{water} = H_{water,out} W_{water,out} - H_{water,in} W_{water,in} \quad (5)$$

where:

q_{cond} = heat loss calculated from the condensate flow (BTU/hr)
W_{cond} = mass flow of condensate (lb/hr)
H_{steam} = enthalpy of steam into vessel (BTU/lb_m)
H_{cond} = enthalpy of condensate leaving vessel (BTU/lb_m)
q_{env} = estimate of heat lost to environment via air and water (BTU/hr)
q_{air} = estimate of heat lost to air in annulus (BTU/hr)
q_{water} = estimate of heat lost to water flowing over the vessel and collected in the gutter (BTU/hr)
q_{bottom} = estimate of heat lost from convection and radiation on the bottom of the vessel (BTU/hr)
q_{baffle} = estimate of heat lost from convection and radiation on the outside surface of the baffle (BTU/hr)
q_{wall} = the heat loss calculated from temperature drop across the wall (BTU/hr)
W_{air} = mass flow of air through the annulus (lb/hr)
A_i = area of the cross section of interest (ft^2)
k = thermal conductivity of steel (BTU*in/(ft^2*hr*°F))
l = thickness of vessel wall (in)
f_{wet} = estimate of the fraction of circumference that is wetted
$\Delta T_{max,i}$ = maximum temperature difference of cross section i (°F)
$\Delta T_{min,i}$ = minimum temperature difference of cross section i (°F)
$C_{p,air}$ = heat capacity of air (BTU/(lb*°F))
$T_{air,in}$ = temperature at inlet to baffle
$T_{air,out}$ = temperature at outlet of baffle
$H_{water\ vapor,out}$ = enthalpy of water vapor leaving the annulus (BTU/lb)
$H_{water,out}$ = enthalpy of water leaving the vessel outside gutter (BTU/lb)
$W_{water,in}$ = mass flow of water to the top of the vessel (lb/hr)
$W_{water,out}$ = mass flow of water out of outside vessel gutter (lb/hr)
$H_{water,in}$ = enthalpy of water onto the top of the vessel surface (BTU/lb)

Equation 8 assumes that the maximum and minimum temperatures differences for a cross section are representative over the cross section and that the percentage of wet versus dry surface stays constant from top to bottom. Equation 9 assumes that all evaporated water leaves the annulus as vapor and therefore does not provide any correction for condensation of water vapor prior to exit from the annulus. The heat losses calculated from the condensate (equation 6) are considered to be the most reliable since they depend on the least number of assumptions and represent a closed system.

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DCP/NRC1412
NSD-NRC-98-5756
Docket No.: 52-003

August 14, 1998

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

ATTENTION: T. R. Quay

SUBJECT: RESPONSE TO NRC LETTERS CONCERNING REQUEST FOR WITHHOLDING INFORMATION

Reference:
1. Letter, Sebrosky to McIntyre, "Request for withholding proprietary information for Westinghouse AP600 letters dated October 10, 1994, March 30, 1995, October 3, 1996, and December 18, 1997," dated July 21, 1998.

2. Letter, Huffman to McIntyre, "Request for withholding information from public disclosure for Westinghouse AP600 design letters," dated July 14, 1998.

Dear Mr. Quay:

Reference 1 provided the NRC comments that the Westinghouse letter of October 10, 1994, appeared to contain proprietary information that was not clearly identified other than being marked "Westinghouse Proprietary Class 2" on the page and also that there was no affidavit included with the letter. The October 10, 1994, letter contained errata for WCAP-14135, which is a proprietary report. In accordance with Westinghouse company policy, each page of a proprietary report has "Westinghouse Proprietary Class 2" on the page header. Specific information that is proprietary is then indicated with brackets. It is possible that there will be no information on a page that is marked as being proprietary. In the case of the October 10, 1994, letter, none of the errata pages contained Westinghouse proprietary information, thus no affidavit was necessary and the letter can be placed in the NRC public document room.

Reference 1 also provided the NRC comments that the Westinghouse letter of March 30, 1995, appeared to contain proprietary information that was not clearly identified other than being marked "Westinghouse Proprietary Class 2" and also that there was no affidavit included with the letter. The March 30, 1995, letter contained AP600 main steam line isometric drawings which have the standard Westinghouse title block that contains a standard Westinghouse proprietary statement which should have been deleted in this case. The deadweight analysis results had no proprietary markings. These drawings are nonproprietary, thus no affidavit was necessary and the letter can be placed in the NRC public document room.

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Enclosure 2

Reference 1 further provided the NRC comments that the Westinghouse letter of October 3, 1996, appeared to contain proprietary information that was not clearly identified other than being marked "Westinghouse Proprietary Class 2" on the page and also that there was no affidavit included with the letter. The October 3, 1996, letter contained pages that were missing from some copies of WCAP-14407, which is a proprietary report. In accordance with Westinghouse company policy, each page of a proprietary report has "Westinghouse Proprietary Class 2" on the page header. Specific information that is proprietary is then indicated with brackets. It is possible that there will be no information on a page that is marked as being proprietary. In the case of the October 3, 1996, letter, none of the missing pages contained Westinghouse proprietary information, thus no affidavit was necessary and the letter can be placed in the NRC public document room.

Reference 1 additionally provided the NRC comments that the Westinghouse letter of December 18, 1997, appeared to contain proprietary information that was not clearly identified other than being marked "Westinghouse Proprietary Class 2" on the page and also that there was no affidavit included with the letter. The December 18, 1997, letter documented NRC agreed to revisions to WCAP-14326, Revision 1, WCAP-14812, Revision 1, and WCAP-14845, Revision 2, which are Westinghouse proprietary reports. In accordance with Westinghouse company policy, each page of a proprietary report has "Westinghouse Proprietary Class 2" on the page header. Specific information that is proprietary is then indicated with brackets. It is possible that there will be no information on a page that is marked as being proprietary. In the case of the December 18, 1997, letter, none of the errata pages contained Westinghouse proprietary information, thus no affidavit was necessary and the letter can be placed in the NRC public document room.

Reference 2 provided the NRC comments that the Westinghouse letter of February 10, 1997, appeared to contain proprietary information that was not clearly identified other than being marked "Westinghouse Proprietary Class 2" and also that there was no affidavit included with the letter. The February 10, 1997, letter contained drawings which were intended to assist the staff in their understanding of the Regulatory Treatment of Nonsafety Related Systems (RTNSS) implementation for the AP600 and contained the standard Westinghouse drawing title block that includes a standard Westinghouse proprietary statement which should have been deleted in this case. These drawings are nonproprietary, thus no affidavit was necessary and the letter can be placed in the NRC public document room.

Reference 2 also provided the NRC comments that the Westinghouse letter of August 18, 1997, appeared to contain proprietary information that was not clearly identified other than being marked "Westinghouse Proprietary Class 2" on the page and also that there was no affidavit included with the letter. The August 18, 1997, letter was issued to correct a printing error in several copies of proprietary report WCAP-14727, Revision 1, that were provided to the staff in advance of the normal mailing to the NRC. WCAP-14727, Revision 1, was provided to the staff by letter DCP/NRC0979, dated August 7, 1997, which included affidavit AW-97-1150. In accordance with Westinghouse company policy, each page of a proprietary report has "Westinghouse Proprietary Class 2" on the page header. Specific information that is proprietary is then indicated with brackets. It is possible that there will be no information on a page that is marked as being proprietary. In the case of the August 18, 1997, letter, any of the pages which contained proprietary information, would have had that material bracketed and should be covered by affidavit AW-97-1150, which was dated August 11, 1997.

Revision 2 further provided the NRC comments that the Westinghouse letter of November 11, 1997, appeared to contain proprietary information that was not clearly identified other than being marked "Westinghouse Proprietary Class 2" on the page and also that there was no affidavit included with the letter. The November 11, 1997, letter contained Revision 3 to WCAP-14776, which is a Westinghouse proprietary report. In accordance with Westinghouse company policy, each page of a proprietary report has "Westinghouse Proprietary Class 2" on the page header. Specific information that is proprietary is then indicated with brackets. It is possible that there will be no information on a page that is marked as being proprietary. In the case of the November 11, 1997, letter it was indicated that "although the change pages contain no bracketed proprietary information, they are marked 'Westinghouse Proprietary'." Since none of the revision pages contained Westinghouse proprietary information, no affidavit was necessary and the letter can be placed in the NRC public document room.

Revision 2 further provided the NRC comments that the Westinghouse letter of March 13, 1998, appeared to contain proprietary information that was not clearly identified other than being marked "Westinghouse Proprietary Class 2" on the page and also that there was no affidavit included with the letter. The March 13, 1998, letter contained errata for WCAP-14807, which is a proprietary report. In accordance with Westinghouse company policy, each page of a proprietary report has "Westinghouse Proprietary Class 2" on the page header. Specific information that is proprietary is then indicated with brackets. It is possible that there will be no information on a page that is marked as being proprietary. In the case of the March 13, 1998, letter, none of the errata pages contained Westinghouse proprietary information, thus no affidavit was necessary and the letter can be placed in the NRC public document room.

A large number of proprietary evaluations covering the time period February 14, 1992 to May 5, 1998, have been received over the past several months, the most recent on July 22, 1998. These evaluations are being processed. As a result of discussions with NRC management, Westinghouse will provide proper proprietary documentation for the proprietary material supporting the AP600 design certification review by August 21, 1998. The responses will be provided as they are developed. It is our understanding that providing the nonproprietary versions of documents will not constrain issuing the AP600 FSER or FDA.

This response addresses the proprietary issues delineated in the references.

Brian A. McIntyre, Manager
Advanced Plant Safety and Licensing

jml

cc: J. W. Roe - NRC/NRR/DRPM
J. M. Sebrosky - NRC/NRR/DRPM
W. C. Huffman - NRC/NRR/DRPM
H. A. Sepp - Westinghouse

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