

ENCLOSURE TO DCP/NRC1395

ERRATA TO WCAP 14407, REV. 3,
"WGOthic APPLICATION TO AP600"

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Enclosure 1

The film outlet temperature is given, either from a boundary condition or from the outlet temperature of the preceding clime in the stack. To ensure stability, the film outlet temperature is defined to be the same as the average temperature.

$$T_{out} = T_{avg} \quad (3-3)$$

The inner film surface boundary condition forces the heat flux from the outer surface of the conductor wall to equal the heat flux into the film. The solid film interface boundary condition is:

$$k_{wall} \frac{\partial T}{\partial x} \Big|_{wall} = k_{film} \frac{\partial T}{\partial x} \Big|_{film} \quad (3-4)$$

The outer film surface boundary condition equates the energy leaving the outer film layer surface to the energy entering the atmosphere. The energy leaving the film surface may enter the atmosphere through a combination of convection, evaporation, and radiation. The outer film surface boundary condition is:

$$-k_{film} \frac{\partial T}{\partial x} \Big|_{film} = h_c(T_{surf,1} - T_{air}) + h_M h_{fg} (P_{stm}^{air} - P_g^{film}) + \epsilon \sigma (T_{surf,1}^4 - T_{surf,2}^4) \quad (3-5)$$

where:

- h_c = convection heat transfer coefficient from the film to the air (Btu/sec-ft²-°F)
- T_{air} = air temperature (°F)
- h_M = mass transfer coefficient (lbm/sec-ft²-psi)
- h_{fg} = latent heat of vaporization of the film (Btu/lbm)
- P_{stm}^{air} = partial pressure of steam in the air (psi)
- P_g^{film} = saturation pressure of steam at the film surface temperature, $T_{surf,1}$ (psi)
- ϵ = emissivity of film surface
- σ = Stefan-Bolzrman constant
- $T_{surf,2}$ = temperature of second radiative surface (°R)

The four film equations are:

$$\frac{T_{avg} - T_{avg,old}}{\Delta t} = \frac{4k_{film}}{\rho_{film}c_{p,film}} \frac{T_{surf,1} - 2T_{avg} + T_{wall,1}}{\delta x_{film}^2} + v_z \frac{T_{in} - T_{out}}{\Delta Z} \quad (3-6)$$

$$k_{wall} \left. \frac{\partial T}{\partial x} \right|_{wall} = k_{film} \left. \frac{\partial T}{\partial x} \right|_{film} \quad (3-7)$$

$$-k_{film} \left. \frac{\partial T}{\partial x} \right|_{film} = h_c (T_{surf,1} - T_{air}) + h_M h_{fg} (P_{stn}^{air} - P_g^{film}) + \epsilon \sigma (T_{surf,1}^4 - T_{surf,2}^4) \quad (3-8)$$

$$T_{out} = T_{avg} \quad (3-9)$$

The wall conduction equation is tightly coupled to these film equations. For points within the wall, the conduction equation is simply a one-dimensional partial differential equation:

$$\frac{\partial T}{\partial t} = \frac{k}{\rho c_p} \frac{\partial^2 T}{\partial x^2} \quad (3-10)$$

By replacing the derivatives with finite differences, this partial differential equation is replaced with a system of algebraic equations. The superscript "n" identifies the point (node) at which the derivatives are to be calculated.

$$\frac{T_{wall,n} - T_{wall,n,old}}{\Delta t} = \frac{k_{wall}}{\rho_{wall}c_{p,wall}} \frac{T_{wall,n+1} - 2T_{wall,n} + T_{wall,n-1}}{\Delta x_{wall}^2} \quad (3-11)$$

This equation, along with Equations (3-6 through 3-9), can be considered to be the system of equations for a climate.



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DCP/NRC1415
NSD-NRC-98-5759
Docket No.: 52-003

August 17, 1998

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 2055

ATTENTION: T. R. Quay

SUBJECT: RESPONSE TO NRC LETTERS CONCERNING REQUEST FOR WITHHOLDING
INFORMATION

- Reference:
1. Letter, Donohew to Liparulo, "Request for withholding information from public disclosure for Westinghouse AP600 design letters of November 21, 1994," dated August 1, 1995.
 2. Letter, McIntyre to Quay, "Status review of AP600 proprietary submittals," dated September 18, 1995.
 3. Letter, Jackson to Liparulo, "Request for withholding information from public disclosure for Westinghouse AP600 design letters of June 20, 19954," dated November 16, 1995.
 4. Letter, McIntyre to Quay, "WCAP-14845, 'Scaling analysis for AP600 containment pressure during design basis accidents', Rev 3. errata," DCP/NRC1379, dated June 9, 1998.
 5. Letter, McIntyre to Quay, "Errata to WCAP-14407, Rev 3, WGOTHIC application to AP600," DCP/NRC1395, dated July 14, 1998.
 6. Letter, McIntyre to Quay, "Response to NRC letter of August 23, 1995, 'Request for withholding information in the design certification application for the AP600'," DCP/NRC1400, dated July 22, 1998.

Dear Mr. Quay:

Reference 1 provided the NRC assessment of the Westinghouse claim that proprietary information was provided in a letter dated November 21, 1994, that contained presentation materials from the November 15 through 17, 1994, meeting where the AP600 passive containment cooling system was discussed. The NRC assessment was that some, but not all, of the material was sufficiently specific to

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Enclosure 2

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the AP600 and the AP600 passive containment cooling testing to reveal distinguishing aspects of the passive containment cooling system and improve a competitors advantage. Our 1995 request, Reference 2, indicated that the material provided in the Westinghouse letter of November 21, 1994, was presentation material that was intended for clarification only, not part of the formal review material and requested that the material be returned to Westinghouse. At the time this subject was being discussed with the NRC technical staff, the information was considered to be proprietary by Westinghouse since it contained information that had commercial value to Westinghouse. If this presentation material was indeed used by the staff in development of the AP600 final safety evaluation report, then at this time, almost four years later, this information will no longer considered to be proprietary by Westinghouse.

Reference 3 provided the NRC assessment of the Westinghouse claim that proprietary information was provided in a letter dated June 20, 1995, which provided a copy of WCAP-14382, "WGOTHIC Code Description and Validation." The NRC assessment was that all of the material identified as proprietary, with the exception of Figure 8-19, "Large scale PCS Instrumentation Elevations" would be accepted as proprietary by the NRC. The Reference 3 pointed out that this same figure was nonproprietary on page 3-12 of WCAP-14382. Figure 8-19, therefore, will no longer considered to be proprietary by Westinghouse.

Westinghouse has been verbally informed by the NRC that the Westinghouse letter of June 9, 1998, (reference 4), 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 June 9, 1998, letter contained errata for WCAP-14845, Revision 3, which is a proprietary report and for WCAP-14846, Revision 3, which is the nonproprietary version of WCAP-14845. 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 June 9, 1998, letter, none of the errata pages for WCAP-14845 contained Westinghouse proprietary information, thus no affidavit was necessary and the letter can be placed in the NRC public document room.

Westinghouse has been verbally informed by the NRC that the Westinghouse letter of July 14, 1998, (reference 5), 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 July 14, 1998, letter contained errata for WCAP-14407, Revision 3, 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 July 14, 1998, letter, none of the errata pages for WCAP-14407 contained Westinghouse proprietary information, thus no affidavit was necessary and the letter can be placed in the NRC public document room.

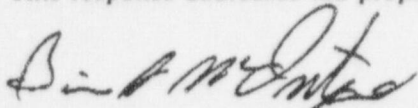
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August 17, 1998

On August 14, 1998, Westinghouse was verbally informed by the NRC that the information contained in Chapter 18 of Revision 0 of the AP600 Standard Safety Analysis Report (SSAR) that was submitted to the NRC on June 26, 1992, and was requested to be withdrawn by Reference 6, forms the basis of the Chapter 18 of the AP600 Final Safety Evaluation report that will soon be issued by the NRC and therefore cannot be withdrawn without seriously affecting the FSER issuance date. To maintain this information as proprietary, Westinghouse would have to provide a marked proprietary version and a corresponding nonproprietary version of this material. Reference 6 pointed out that Chapter 18 has been entirely reformatted since the SSAR was submitted originally as a result of Westinghouse significantly changing the approach being taken to human factors as a part of design certification. As a result, the information in Revision 0 through 8 of the SSAR is essentially no longer applicable to the AP600 design certification process, except for the information contained in Subsection 18.9.8.1 - Development of emergency operating procedures and Tables 18.9.8-1 through 18.9.8-37 - Emergency response guidelines, which was declared to be nonproprietary in Reference 6. Given the desire to complete the AP600 FSER and Final Design Approval in a timely manner, Westinghouse will no longer consider the material in Chapter 18 of Revisions 0 through 8 of the SSAR to be proprietary.

This response addresses the proprietary issues delineated in the references.



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