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1.0 INTRODUCTION

1.1 Purpose of the Report

This report evaluates the performance of WCOBRA/TRAC in predicting the long-term cooling (LTC) thermal-hydraulic effects observed in the Oregon State University (OSU) integral systems test facility, a reduced-pressure, reduced-height facility. These tests have been scaled to the AP600 plant, including the passive safety systems. The OSU facility, the test data, and the analysis of data from these tests are described in References 1-1, 1-2, and 1-3. The relationship between the OSU experiments and the AP600 is presented in references 440.727-(1) and 440.727-(2). Reference 440.727-(1) provides a scaling analysis of the OSU test facility, including a comparison of the ideal and as-built facility dimensions. Reference 440.727-(2) documents the process used to assure that the AP600 test program has provided sufficient, high-quality data to support code validation.

The objective of this report is to examine the capability of WCOBRA/TRAC to predict key LTC thermal-hydraulic phenomena, as defined in the Phenomena Identification Ranking Table (PIRT), that were observed during selected transient tests.

Subsequent to the publication of Revision 1 of this report, additional analysis was performed and documentation developed on the subject of AP600 Long-Term Core Cooling. It should be noted that Revision 0 of this report was never published. The documentation of this material is included in Appendices A through C of this report. Of particular note, is the Long-Term Cooling Summary Report contained in Appendix B that provides an overview to the Westinghouse approach to AP600 Long-Term Core Cooling.

1.2 WCOBRA/TRAC Code Role in AP600 Safety Analysis

COBRA/TRAC was originally developed for the U.S. Nuclear Regulatory Commission (NRC) at Pacific Northwest Laboratory. Westinghouse then modified the code, added specific models, and developed the basis for applying the code for safety analysis. The code name was changed to WCOBRA/TRAC to reflect the Westinghouse modifications.

COBRA/TRAC is a combination of two codes, COBRA-TF and TRAC-PD2. The COBRA-TF computer code uses a two-fluid, three-field representation of two-phase flow. Each field is treated in three dimensions and is compressible. The three fields are: a continuous vapor field, a continuous liquid field, and an entrained liquid drop field. The conservation equations for each of the three fields and for heat transfer from and within the solid structures in contact with the fluid are solved using a semi-implicit, finite-difference numerical technique on an Eulerian mesh. COBRA-TF utilizes extremely flexible noding for both the hydrodynamic mesh and the heat transfer solution. With this flexibility, the wide variety of geometries found in components of nuclear reactor primary systems can be modeled.

TRAC-PD2 is a code designed to model the behavior of the reactor primary system. It features special models for each component in the system. These include accumulators, pumps, valves, pipes, pressurizers, steam generators (SGs), and the reactor vessel. With the exception of the reactor vessel, the thermal-hydraulic response of these components to transients is treated with a five-equation drift flux representation of two-phase flow. The TRAC-PD2 vessel module has been removed, and COBRA-TF has been implemented instead as the new vessel component in TRAC-PD2. The resulting code is COBRA/TRAC. The vessel component in COBRA/TRAC has the extended capabilities of three-field representation of two-phase flow and flexible noding.

WCOBRA/TRAC has two roles in the AP600 analysis plan:

- WCOBRA/TRAC is used for the large-break loss-of-coolant accident (LOCA) with the approved best-estimate methodology.

- WCOBRA/TRAC is used in an Appendix K version for the calculation of the AP600 plant performance for the LTC portion of both small- and large-break LOCA transients.

Since WCOBRA/TRAC was originally developed as a best-estimate large-break LOCA code, use of this code for the AP600 is straight-forward and logical. The LTC transient is a quasi-steady-state situation in which the venting of the flow from the automatic depressurization system Stage 4 (ADS4) valves is the primary flow path out of the reactor coolant system (RCS). The pressure drop in the RCS as the flow is vented affects the absolute pressure within the RCS, which then affects the injection flow from the sump or in-containment refueling water storage tank (IRWST). The effective driving heads for the IRWST, and particularly for the sump injection, are measured in feet of water. Therefore, while the system is in a quasi-steady state, there is a delicate pressure balance that can significantly affect the injection flow into the RCS.

Because of the small driving heads, the importance of the pressure drops in the system, and the fact that these pressure drops are dependent on the flow regime that the code would calculate for a particular component, as well as the modeling needed for the hot legs and ADS4 piping, it was decided to use the most accurate low-pressure code to predict the AP600 LTC transient, WCOBRA/TRAC. WCOBRA/TRAC has been compared to a wide range of low-pressure gravity reflood systems tests such as the Cylindrical Core Test Facility (CCTF) and the Slab Core Test Facility (SCTF), as well as low-pressure separate effects tests such as FLECHT, FLECHT-SEASET, and FEBA, as discussed in Reference 1-4. The WCOBRA/TRAC comparisons to the low-pressure gravity reflood tests give added confidence that this code accurately represents the low-pressure gravity reflood processes expected for the AP600 LTC transient.

The objective of the AP600 LTC plant analysis is to show that the AP600 passive safety systems have the same pedigree as active systems to provide core cooling. Therefore, the AP600 SSAR plant calculations are performed in a conservative manner using the Appendix K assumptions, which maximize the decay power to be removed, and use the upper bound line resistances such that the injection and venting capability is challenged in a conservative manner. Once the pedigree of the passive systems is established, simpler methods can be used to estimate the injection flows and the system behavior.

1.3 Important AP600 Long-Term Cooling Phenomena

The small-break LOCA and LTC periods are shown in Figure 1-1. LTC is defined as the time after which injection from the IRWST has become stable, until the plant is recovered. The same definition applies for the LTC period after a large-break LOCA. The AP600 passive safety systems indefinitely provide post-accident core cooling. The cooling flow path is from the downcomer, through the core to the containment via ADS Stages 1 to 3 (ADS1–3), ADS4, and the break. Steam generated in the core is vented to containment and condensed on the containment shell. The condensate is directed into the IRWST and the sump where it can then flow into the core through the direct vessel injection (DVI) line. The core-generated energy is removed from the containment by the passive containment cooling system. The closed-circuit reflux condensation process ensures adequate cooling inventory to maintain the core in a coolable state indefinitely.

The PIRT for the LTC transient is shown in Table 1-1 and identifies the key phenomena of interest.

When the reactor system is in the LTC mode, the primary system is drained to the hot leg level, such that the primary side of the SGs, the pressurizer, and the upper head of the reactor vessel are filled with stagnant steam. The core makeup tanks (CMTs) and accumulators have already injected, and the passive residual heat removal heat exchanger (PRHR HX) is not active because either the temperature difference across the heat exchanger is small, or IRWST level will have drained and uncovered the HX. The injection flow to the vessel comes from the IRWST as long as the IRWST head is larger than the sump head. If the IRWST has drained to the sump level, there will be injection from both the sump and the IRWST. If the IRWST has drained further and the sump head is larger, vessel injection is from the sump alone. Gravity-driven flow from the sump or IRWST is directed to the reactor vessel through the DVI line into the downcomer.

The driving force for the injection flow is the head of the sump fluid as well as the absolute pressure difference between the top of the sump and the RCS pressure in the downcomer. The driving force for core cooling is the level in the reactor downcomer, which provides the elevation head to drive the flow through the core and out of the hot leg and the ADS4 valves. Inclusion of a large vent path on the top of the hot leg through the ADS4 valves provides a low-pressure drop vent path so that ample flow through the core occurs. If this is compared to operating plants, the same downcomer head must drive the core flow through the SG primary side, which superheats the primary fluid and creates a back pressure that reduces the core inlet flow (steam binding). This situation is avoided in the AP600 by using the large vent areas on the top of the hot legs so that very little flow, if any, goes through the SGs. Also, once the IRWST drains, the ADS1–3 vent path is also available to vent the core-generated steam flow to the containment.

At the start of LTC, the DVI nozzles inject the colder water at the bottom of the IRWST. Toward the end of IRWST injection, the injected water temperature increases because of the energy that has been deposited in the IRWST from the PRHR HX and ADS1–3. The increased injection temperature, combined with the reduced IRWST flow that is due to the decreasing level in the IRWST results in a net steam generation in the core. The reactor primary system accommodates the steam generation due to the venting of the ADS4 valves. After the IRWST has drained, water will be injected from the sump. As water is injected from the sump, the flow is reduced further due to the lower sump draining head, and the injection temperature increases toward saturation. This results in a higher rate of steam production in the core, and reduced mass inventory in the core. However, the reduced inventory in the core does not imply a core uncovery; rather, the void fraction in the core increases as more boiling occurs.

Since the entire primary system is near containment pressure, the resulting core flow is determined by the gravity driving head in the downcomer, the head in the core, and the two-phase pressure drop in the core, hot legs, and ADS4. The LTC PIRT is given in Table 1-1 and contains the phenomena ranking for the IRWST injection phase as well as for the sump injection phase. Most of the highly ranked items are the same for both IRWST and sump injection. The levels in the core, upper plenum, and downcomer are all ranked high since the levels determine if the core remains covered and coolable. Most of the RCS components above the hot legs and cold legs are empty and full of stagnant steam and do not contribute to the LTC phenomena. These components are either ranked very low in the PIRT or are not applicable for this period of the transient. The decay power is ranked high since this is the source of steam generation within the vessel. Using the Appendix K assumptions for the decay heat in the AP600 plant calculations will clearly be conservative for the LTC period.

The hot leg flow pattern and the effects of the "T" connection at the top of the hot leg are ranked high since these components determine the void fraction and quality of the flow that is vented out the ADS4 valves. The venting of ADS4 valves is important since reduced ADS vent area or increased pressure drop adversely affects the flow through the core and the core steam generation rate. Higher ADS4 pressure drop reduces the core flow and increases the steam generation rate, and hence, the volume of steam that must be vented.

The IRWST flow and the sump flow are ranked high since these flows are needed to maintain core cooling. The temperature of the sump flow is also ranked high since a reduced subcooling of the sump flow results in additional steam generation in the core which then must be vented.

The DVI line resistance is ranked high. This is an important quality, because for a given head difference between the IRWST or the sump and the RCS, it is the DVI line resistance that determines the flow into the reactor vessel.

All the parameters ranked high in Table 1-1 will be evaluated in the analysis of the OSU LTC tests.

1.4 Window-Mode Analysis of Long-Term Cooling

The AP600 small-break LOCA and LTC transients can extend for very long periods (typically 5 to 24 hours), during which time there is a stable injection from the sump into the reactor vessel. While long simulations are possible, they are not practicable with WCOBRA/TRAC or any other existing systems computer code due to the extremely long computer time that is necessary.

In the WCOBRA/TRAC preliminary LTC validation report (Reference 1-5), a "window-mode" approach was used for the LTC calculations. The LTC transient is quasi-steady state, with very small changes occurring over long periods of time. The flow through the primary system is very low, but sufficient to maintain core cooling. The pressures in the RCS, IRWST, and sump are constant with very little variation, and the core decay power decreases slowly. Since this period of the transient is nearly steady state, a window is analyzed to verify the adequacy of the WCOBRA/TRAC code for this portion of the transient. The WCOBRA/TRAC window-mode approach is also used for the final validation report as well as for the plant SSAR calculations.

The windows selected reflect the times when the core cooling has minimal margin and include the following:

- Late IRWST injection phase when the injection fluid temperature increases and the driving head is reduced
- Sump injection when the sump temperature is high

For these situations, the window-mode calculations have been made for the OSU transients to compare the WCOBRA/TRAC predictions with the OSU data. Initial conditions for the calculation were obtained from the data. However, when the WCOBRA/TRAC code initiates the calculation, the code experiences a transient as the mass distribution, which was initially assumed, is redistributed and the flows are initiated. Therefore, the WCOBRA/TRAC calculation must be performed for approximately three times the primary system time constant so that the WCOBRA/TRAC calculated flows and mass distributions reach a quasi-steady state similar to the tests. The calculational times used for the WCOBRA/TRAC window-mode calculations were approximately 1,000 seconds long for each window. At the end of the window time, the WCOBRA/TRAC calculation had reached a quasi-steady-state condition and the results could be compared to the experiments.

To validate the WCOBRA/TRAC code for the LTC transient, the following four OSU tests were examined:

- SB01 – 2-in. cold leg break test. This is the reference test. The break becomes submerged in this test as the sump fills.

- SB10 – double-ended CMT balance line break test. This simulates a complete failure of an 8-inch balance line. The break location is above the flood-up level, so that venting through the break can occur.

- SB12 – double-ended DVI line break test. This simulates the complete failure of an 8-inch injection line. Sump injection is achieved earlier in time when the core decay power is still high; hence, steaming rates are large.

- SB23 – simulated 1/2-in. break at the bottom of cold leg 3. This small-break test has the largest heatup of the IRWST due to the PRHR heat transfer and the ADS1–3. Therefore, the IRWST injection temperature is the highest.

These tests capture the thermal-hydraulic phenomena of interest for small breaks and LTC and are suitable to validate the performance of WCOBRA/TRAC.

1.5 References

1-1. WCAP-14124, Volume I and Volume II, *AP600 Low Pressure Integral Systems Test at Oregon State University, Facility Description Report*, July 1994.

1-2. Dumsday, C. L., Carter, M., Copper, M. H., Lau, L. K., Loftus, M. J., Nayyar, V. K., Tupper, R. B., and Willis, J. W., WCAP-14252, Volumes 1-4, *AP600 Low Pressure Integral Systems Test at Oregon State University, Final Data Report*, May 1995.

1-3. Andreychek, T. S., Chismar, S. A., Delose, F., Fanto, S. V., Fittante, R. L., Frepoli, C., Friend, M. T., Haberstroh, R. C., Hochreiter, L. E., Morrison, W. R., Ogrinsh, M., Peters, F. E., Wright, R. F., and Yeh, H. C., WCAP-14292, Rev. 1, *AP600 Low Pressure Integral Systems Tests at Oregon State University, Test Analysis Report*, September 1995.

1-4. Bajorek, S. M., Hochreiter, L. E., Young, M. Y., Dederer, S. I., Nissley, M. E., Tsai, C. K., Yeh, H. C., Chow, S. K., Takeuchi, K., Cunningham, J. P., and Stucker, D. L., WCAP-12945P, Vols. 1-5, *Code Qualification Document for Best Estimate LOCA Analysis*, June 1992.

1-5. Chow, S. K., Grela, I., Ward, P., Frepoli, C., Petkov, N., and Hochreiter, L. E., *WCOBRA/TRAC OSU Long-Term Cooling Preliminary Validation Report*, LTCT-GSR-003, August 1995.

1-6. WCAP-14270, "AP600 Low-Pressure Integral Systems Test at Oregon State University, Facility Scaling Report," Revision 0, January, 1995.

1-7. WCAP-14727, "AP600 Scaling and PIRT Closure Report," Revision 1, July, 1997.

[redacted]

Question 440.727 (OITS - 5793)

WCAP-14776 does not identify nor reference the relationship of the OSU experiments to the AP600. In particular, no arguments are presented that justify the parameter ranges (temperature, flows, pressure, etc.) are representative of the corresponding parameters to be used in the AP600. Please document the OSU relationship including applicable parameter ranges.

Response:

The relationship between the OSU experiments and the AP600 is presented in references 440.727-(1) and 440.727-(2). Reference 440.727-(1) provides a scaling analysis of the OSU test facility, including a comparison of the ideal and as-built facility dimensions. Reference 440.727-(2) documents the process used to assure that the AP600 test program has provided sufficient, high-quality data to support code validation. This includes a PIRT/Scaling Summary for the OSU test facility. These references will be added to WCAP-14776,

References:

440.727-(1)	WCAP-14270, "AP600 Low-Pressure Integral Systems Test at Oregon State University, Facility Scaling Report," Revision 0, January, 1995.
440.727-(2)	WCAP-14727, "AP600 Scaling and PIRT Closure Report," Revision 1, July, 1997.

SSAR Revision: NONE

[redacted]

RAI 440.728:

WCAP-14776 states that WCOBRA/TRAC (LBLOCA version) and NOTRUMP will be used to specify the initial conditions (ICs) for the large and small break LOCAs respectively, followed by the analysis of the long term cooling (LTC) phase using WCOBRA/TRAC (LTC version). However, there is no identification of the ICs resulting from a LBLOCA. Please complete the analysis with the presentation of the ICs resulting from a LBLOCA and the qualification of WCOBRA/TRAC to analyze the LTC for these ICs.

Response:

The initial conditions of the LBLOCA LTC calculations reported in AP600 SSAR subsections 15.6.5.4C.3.2 and 3 are based upon the extended DECLG calculation performed using the WCOBRA/TRAC large break LOCA model and reported in SSAR subsection 15.6.5.4C-1; Reference 440.728-1 justifies the use of the more detailed large break WCOBRA/TRAC nodalization for this portion of the transient. The validation of WCOBRA/TRAC for long-term cooling analyses of the AP600 in Reference 440.728-2 has shown that the predicted results are independent of the ICs assumed; rather, the results are determined by the boundary conditions of core power, IRWST and sump water levels and temperatures, and steam generator secondary conditions which are specified.

As discussed in SSAR subsection 15.6.5.4C.2.1.A, the extended large break LOCA calculation bounds the ECCS performance at the beginning of IRWST injection. The initial conditions for the WCOBRA/TRAC LTC analysis of SSAR subsection 15.6.5.4C.3.2 are as follows:

Reactor vessel downcomer/lower plenum - filled with liquid to the cold leg elevation and totally void above that elevation: liquid temperature equals 170F below the hot leg elevation, 240F above there to the cold leg elevation

Core - covered with a liquid mixture

Upper plenum/upper head - 50% void fraction a[illegible]ration up to the hot leg elevation, totally void at higher elevations

Hot legs, cold legs, surge line, pressurizer, RCPs - totally void

Steam generators - totally void on the primary side

In the SSAR subsection 15.6.5.4C.3.3 analysis, the above initial conditions are modified as follows consistent with the gutters operable scenario:

The downcomer is filled with liquid to the top of the core active fuel

The temperature of the liquid present in the downcomer equals 192F

[redacted]

The above values differ little from the small break LOCA WCOBRA/TRAC SSAR analysis initial conditions. The reason that ICs for LBLOCA window mode analyses are similar to those of small break sizes for AP600 LTC calculations is because the actuation of the automatic depressurization system (ADS) creates large openings which cause the thermal-hydraulic performance of all LOCA breaks to become similar in the long term. Furthermore, the LBLOCA ICs correspond well to the ICs with which WCOBRA/TRAC was qualified in the Reference 440.728-2 studies. The components initiated as totally void were modeled in that way in the Reference 440.728-2 case analyses. Within the cases reported in that reference, the downcomer was initiated totally full to the cold leg elevation in the Section 2.1 analysis of Appendix A, and initiated at a level slightly above the core top elevation in the Section 5 analyses. The upper plenum was modeled at IC void fractions from 0.3 to 1.0 in various cases of Reference 440.728-2, and the core was initially covered with liquid in all cases. Recalling again that Reference 440.728-2 has established that the LTC performance is NOT dependent upon the WCOBRA/TRAC initial conditions at the start of a window, the range of ICs associated with the AP600 LBLOCA SSAR transients has been suitably qualified by the Reference 440.728-2 simulations.

In the long-term cooling phase of an AP600 LOCA event, the break effects are not among the more important phenomena of interest. As reflected in the LTC PIRT in Table 1-1 of Reference 440.728-2, break flow is ranked as being of Medium importance during IRWST injection and Low importance during sump injection. The injection parameters (DVI line pressure drop, sump/IRWST driving head) and the ADS path vent parameters (ADS Stage 4 flow, hot leg behavior) are the HIGH ranked parameters which dominate LTC transient flow behavior. The break conditions postulated are not of primary importance during the LTC phase.

Test SB21 at the Oregon State University test facility simulated a relatively large cold leg break during IRWST and sump injection. In comparing the test results of SB21 during the long-term cooling phase with those of the other OSU tests, similar behavior is observed for the downcomer/core masses and the DVI line injection from the available water source. A detailed examination of the trends among these parameters as a function of break size over the range of the OSU tests has been performed by comparing Test SB21 with SB23, the smallest size break test performed.

The Matrix Test 21 and Test 23 results (Reference 440.728-3) for the important mass and DVI inlet flow parameters were compared at the times corresponding to (1) the end of IRWST injection and (2) once sump injection is established. At the end of IRWST injection during SB21 (9000-11000 seconds) the total DVI flow is approximately)0.85 lbm/sec)^{a,c}; at the comparable time of 15000-17000 seconds for SB23, the total DVI flow is also approximately (0.85 lbm/sec)^{a,c}. The downcomer and core masses are also in good agreement between SB21 and SB23. Over these time periods, Test SB21 has (414 lbm)^{a,c} in the downcomer vs. (418 lbm)^{a,c} for SB23, and Test SB21 has (160 lbm)^{a,c} in the core vs. (153 lbm)^{a,c} for SB23. Therefore, the largest and smallest breaks in the range of cold leg break tests performed show similar LTC IRWST phase performance.

Likewise, during the equilibrium sump injection (12000-14500 seconds in SB21, 18000-20500 in SB23) the same independence from break size exists between the largest and smallest OSU loop break tests. The SB21 total DVI injection flow is approximately (0.60 lbm/sec)^{a,c}; in the SB23 comparable time span, the total DVI flow is approximately (0.65 lbm/sec)^{a,c}. The downcomer and core masses are also in good agreement between SB21 and SB23 during these time periods: (412 lbm vs. 414 lbm)^{a,c} in the downcomer, (153 lbm vs. 151 lbm)^{a,c} in the core.

[redacted]

The close agreement between SB21 and SB23 results validates that LOCA break size is not important relative to the most important long-term cooling ECCS performance parameters.

In conclusion, it has been shown that the initial conditions input to a window mode WCOBRA/TRAC analysis do not determine the outcome of the calculation; the boundary conditions specified determine the outcome. The Reference 440.728-2 simulation matrix qualifies WCOBRA/TRAC for the long-term cooling analysis of any postulated LOCA break in the AP600, since by the time in the LOCA event that the LTC analyses are performed, large break LOCAs exhibit similar conditions and similar phenomena to the smaller break sizes.

References:

440.728-1 Response to RAI 440.729, Westinghouse Electric Corporation, October 1997.

440.728-2 Garner, D. C. et. al., "WCOBRA/TRAC OSU Long-Term Cooling Final Validation Report," WCAP-14776 Revision 2, Proprietary, May 1997.

440-728-3 Andreychek, T.S. et al., "AP600 Low-Pressure Integral Systems Test at Oregon State University Test Analysis Report," WCAP-14292, Proprietary, September 1995.

SSAR Revision: NONE

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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.

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jml

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