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

ATTENTION: MR. R. W. BORCHARDT

SUBJECT: AP600 DESIGN CERTIFICATION TEST PROGRAM OVERVIEW, REVISION 4

Dear Mr. Borchardt:

Enclosed is Revision 4 of the AP600 Design Certification Test Program Overview. This document provides an overview of the AP600 test programs supporting the AP600 Design Certification application. The current revision of the overview matrix incorporates several changes. These changes, as discussed below, reflect test program progress and changes resulting from NRC comments, industry comments and AP600 program priorities.

Following is a summary of the changes incorporated in Revision 4 of the Test Program Overview:

1. The current revision of the document is updated to reflect completion of tests, recent submittals of test documents, and changes to the test program schedules. Included in these changes is the removal of tables identifying test matrices for completed tests. This information is included separately in the submitted test program documents for the completed tests.

2. Revision 3 of the Test Program Overview included all AP600 test programs; both design and Design Certification tests. To focus attention on the Design Certification review of the AP600 design, only Design Certification test programs are addressed in Revision 4. Test program materials that do not directly support Design Certification are still reflected in Table 8 of the Test Program Overview. Similarly, the document title has been changed to the "AP600 Design Certification Test Program Overview" from "AP600 Design and Design Certification Test Program Overview."

3. Revision 3 of the Test Program Overview included a column in Table 3 that identified the reference or scheduled submittal date for test analysis reports. This column was removed from the current revision of the Test Program Overview. It was recognized that test analysis and computer code verification and validation activities were not properly reflected by this single column. Therefore, Westinghouse is currently preparing a companion document to the Test Program Overview that focuses on AP600 computer code V&V activities.

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4. Revision 3 of the Test Program Overview included a listing of test program materials submitted to the NRC. This table (Table 8) has been updated to include materials submitted since the issuance of Revision 3. The table has also been reformatted to facilitate the identification of those materials that support individual test programs.

5. Tables 4 through 7 provide the test matrices for the ongoing test programs (e.g., SPES-2 Integral Systems Tests, OSU Integral Systems Tests, ADS Phase B Tests and Core Makeup Tank tests). These matrices were updated to reflect changes resulting from NRC comments, Industry comments and the reprioritization of the tests. Changes to the ADS Phase B test matrix were discussed with the NRC staff during meetings on January 25, 1994 and February 22, 1994. Changes to the Core Makeup Tank test matrix will be discussed with NRC staff during a meeting scheduled for March 14, 1994. A meeting with NRC staff is currently planned for the end of March to discuss test program issues. The changes to the OSU and SPES-2 test matrices are to be discussed at this meeting. Please note that the current SPES-2 test matrix does not reflect the NRC request, as noted in a November 4, 1993 letter, to include a test that models an SGTR event with ADS actuation. Westinghouse intends to replace the multiple SGTR simulation with the requested event following completion of pre-test analyses. These analyses are necessary to provide assurance that the proposed test is within the capabilities of the SPES-2 test facility.

As this document is intended to facilitate the NRC staff review of the AP600 design, your comments on this document or any other aspect of the AP600 test programs are welcomed. Please contact Brian A. McIntyre on (412) 374-4334 if you have any questions concerning this transmittal.

N. J. Liparulo, Manager
Nuclear Safety & Regulatory Activities

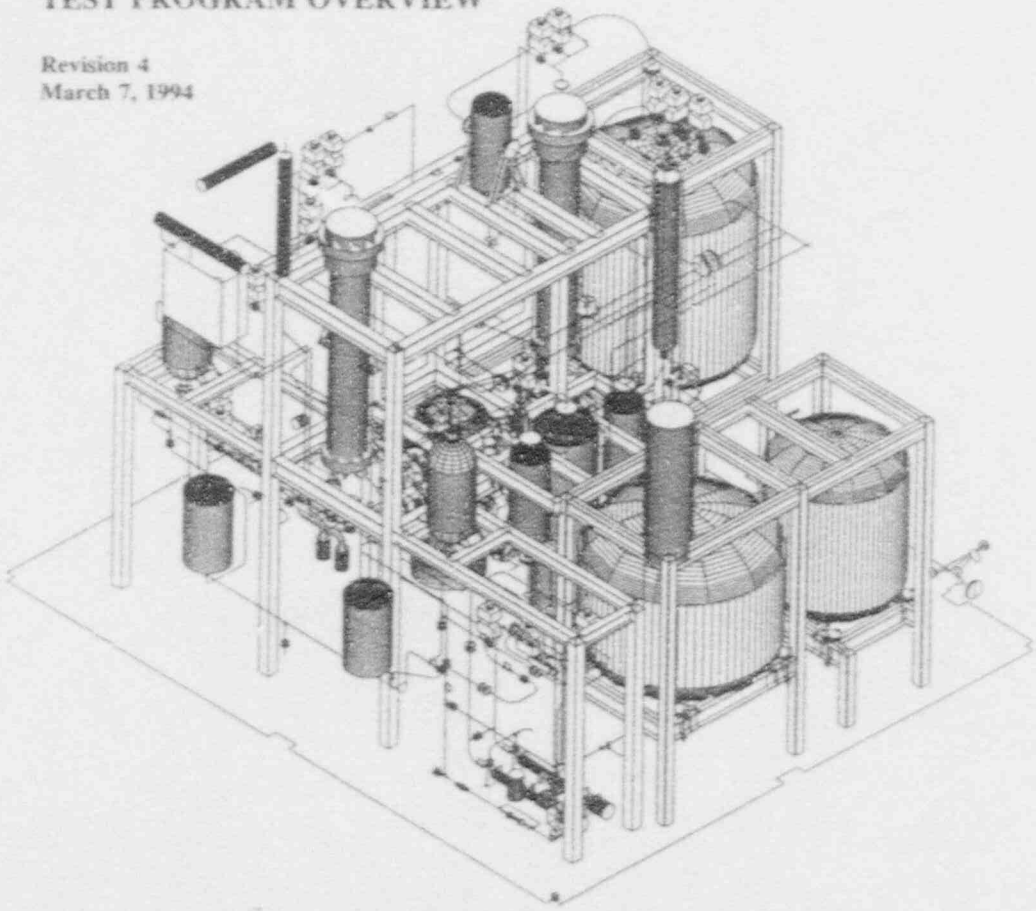
/nja

Enclosure
Attachments

cc: T. Kenyon, NRC (w/o Enclosure)
R. Hasselberg, NRC (10 copies of Enclosure)
B. A. McIntyre, Westinghouse

AP600 DESIGN CERTIFICATION TEST PROGRAM OVERVIEW

Revision 4
March 7, 1994



AP600 Low Pressure Integral System Test Isometric

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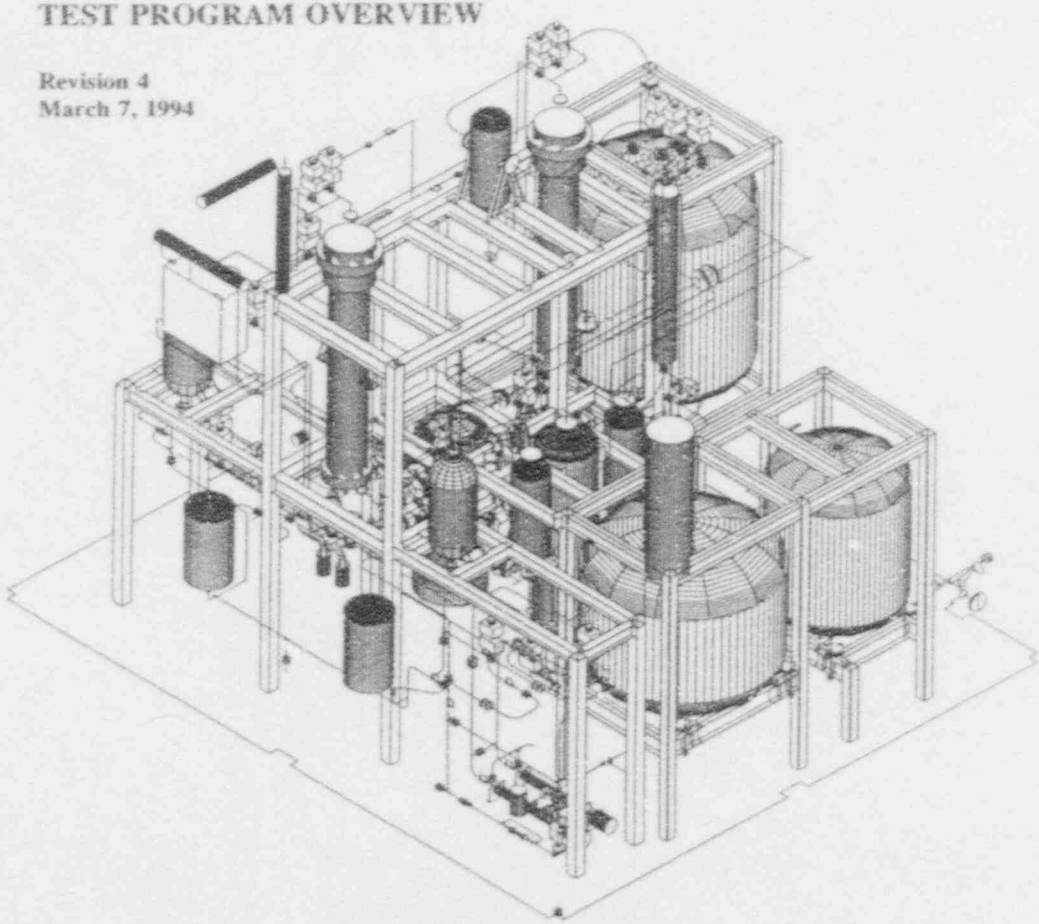
AP600 DESIGN CERTIFICATION TEST PROGRAM OVERVIEW

Revision 4
March 7, 1994



AP600 Low Pressure Integral System Test Isometric

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AP600 DESIGN CERTIFICATION TEST PROGRAM OVERVIEW

AP600 TEST PROGRAMS: TABLE 1 - TEST PROGRAM OVERVIEW (PART 1)

Tests No.	TEST DESCRIPTION	FACILITY LOCATION	SCALE	CATEGORY	TESTING STATUS	TEST PURPOSE	ADDITIONAL INFORMATION OBTAINED (Optional)	Item No.
PASSIVE CONTAINMENT COOLING SYSTEM TESTS IN SUPPORT OF AP600 DESIGN								
1	Air Flow Path Delta P Test	W Science & Technology Center - Churchill, PA	1:6 linear	Basic Research	Completed	Obtain pressure drop data through the downcomer and annulus		1
2	Water Film Formation Test	W Science & Technology Center - Churchill, PA	N/A	Basic Research	Completed	Confirm wettability of coated steel surface		2
3	Heated Plate Test	W Science & Technology Center - Churchill, PA	N/A	Basic Research	Completed	Confirm Passive Containment Cooling System heat transfer capability		3
4	Stench Wind Tunnel Experiment	W Science & Technology Center - Churchill, PA	1:120 linear	Basic Research	Completed	Assess effects of wind on shield building design (inlet/outlet location)		4
5	Condensation Tests - Bare surface upward	University of Wisconsin - Madison, WI	N/A	Basic Research	Completed	Comparison with past separate effects tests		5
6	Condensation Tests - Bare surface downward	University of Wisconsin - Madison, WI	N/A	Basic Research	Completed	Obtain heat transfer coefficients with downward facing surfaces		6
7	Condensation Tests - Painted surface down	University of Wisconsin - Madison, WI	N/A	Basic Research	Completed	Obtain the effect of AP600 paint on heat transfer performance		7
8	Condensation Tests - Light noncondensibles	University of Wisconsin - Madison, WI	N/A	Basic Research	Completed	Obtain the effect of light noncondensibles on heat transfer performance		8
9	Condensation Tests - Stagnation Flow Conditions	University of Wisconsin - Madison, WI	N/A	Basic Research	Completed	Obtain the heat transfer performance under stagnant flow conditions		9
10	Condensation Tests - Stagnation/light noncondensibles	University of Wisconsin - Madison, WI	N/A	Basic Research	Completed	Obtain the heat transfer performance under stagnant flow conditions in the presence of light noncondensibles		10
11	Condensation Tests - 2D condensation	University of Wisconsin - Madison, WI	N/A	Basic Research	In Progress	Measure condensation heat transfer coefficient using 2D test model	Investigate effect of non-condensibles on heat transfer coefficient and visualize flow field	11
PASSIVE CONTAINMENT COOLING SYSTEM TESTS IN SUPPORT OF AP600 DESIGN CERTIFICATION								
12	Integral (small scale) Tests - Phase I (Feasibility)	W Science & Technology Center - Churchill, PA	1:3 height 1:40 diameter	Safety Related	Completed	Determine feasibility of water enhanced containment cooling system	Investigate external cooling impact from air velocity, air humidity, temperature and water film flow rates	12
13	Integral (small scale) Tests - Phase 2A (Extension Tests)	W Science & Technology Center - Churchill, PA	1:3 height 1:40 diameter	Safety Related	Completed	Demonstrate operation of Passive Containment Cooling System (PCS) over increased range of operating conditions. Confirm PCS internal and external heat transfer capabilities (with 1:1 scale cooling air annulus at controlled air temperature & humidity)	Investigate effect of various annulus widths and uniform steam distributions. Obtain data on water film behavior on external surface over long vertical heat transfer surface.	13
14	Integral (small scale) Tests - Phase 2B (Continuation Tests)	W Science & Technology Center - Churchill, PA	1:3 height 1:40 diameter	Safety Related	Completed	Demonstrate operation of Passive Containment Cooling System with prototypic steam injection		14
15	1/8th Scale Heat Transfer Test - Phase 1 (Baseline)	W Science & Technology Center - Churchill, PA	~1:8 linear	Safety Related	Completed	Obtain heat transfer data for WGOTHIC computer code validation with internal intervals		15
16	1/8th Scale Heat Transfer Test - Phase 2 (Confirmatory)	W Science & Technology Center - Churchill, PA	~1:8 linear	Safety Related	Completed	Obtain heat transfer data for WGOTHIC computer code validation	Investigate effect of non-condensibles on PCS heat removal capability and internal temperature distributions	16
17	Water Distribution System Test - Phase 1 (208 Diameter)	W Waltz Mill Site - Madison, PA	1:1	Safety Related	Completed	Investigate performance of passive containment cooling system center water delivery/distribution device	Assess containment water coverage at top of dome	17
18	Water Distribution System Test - Phase 2 (1/8th Sector)	W Waltz Mill Site - Madison, PA	1:1	Safety Related	Completed	Measure containment water coverage using distribution system	Obtain film thickness measurements	18
19	Water Distribution System Test - Phase 3 (1/8th sector with selected distribution system)	W Waltz Mill Site - Madison, PA	1:1	Safety Related	Completed	Measure containment water coverage using selected design distribution system	Obtain film thickness measurements	19
20	Wind Tunnel Test - Phase 1	Univ. of Western Ontario - London, Ontario	~1:100 linear	Safety Related	Completed	Investigate wind sensitivity of shield building design	Assess effects of site structures on wind loading	20
21	Wind Tunnel Test - Phase 2	Univ. of Western Ontario - London, Ontario	~1:100 linear	Safety Related	Completed	Assess wind loads on containment baffle	Compare wind effects w & w/o internal flow path	21
22	Wind Tunnel Test - Phase 4A	CNRC Wind Tunnel - Ottawa, Canada	1:30 linear	Safety Related	Completed	Verify Phase 1 & 2 test results at higher Reynolds numbers	Confirm baffle tornado loads	22
23	Wind Tunnel Test Phase 4B	Univ. of Western Ontario - London, Ontario	1:500 linear	Safety Related	Completed	Investigate site topography effects on air flow through PCS annulus	Investigate effects of large structures on air flow through PCS annulus	23

Westinghouse Electric Corporation
Revision 4, March 7, 1994

AP600 DESIGN CERTIFICATION TEST PROGRAM OVERVIEW

AP600 TEST PROGRAMS: TABLE 1 - TEST PROGRAM OVERVIEW (PART 1)

Item No.	TEST DESCRIPTION	FACILITY LOCATION	SCALE	CATEGORY	TESTING STATUS	TEST PURPOSE	ADDITIONAL INFORMATION OBTAINED (Optional)	Item No.
PASSIVE CORE COOLING SYSTEM TESTS IN SUPPORT OF AP600 DESIGN CERTIFICATION								
24	PRHR Heat Exchanger Test - Phase 1	W Science & Technology Center - Churchill, PA	1:1 height	Safety Related	Completed	Determine thermal performance of the PRHR heat exchanger tubes	Assess water mixing in the IRWST and the effects of mixing on heat transfer rates and steaming	24
25	PRHR Heat Exchanger Test - Phase 2	W Science & Technology Center - Churchill, PA	1:1 height	Safety Related	Completed	Expand the range of test conditions to more fully define a PRHR heat transfer correlation	Determine the impact of lower initial tank water level on steaming	25
26	Automatic Depressurization System Test - Phase A (sparger)	ENEA (VAPORE facility) - Canaccio, Italy	1:1	Safety Related	Completed	Obtain sparger performance data; measure loads imposed on quench tank for use in confirming IRWST design	Obtain thermal hydraulic data for computer code validation	26
27	Automatic Depressurization Systems Test - Phase B	ENEA (VAPORE facility) - Casaccia, Italy	1:1	Safety Related	Planned	Obtain valve performance data; Piping, structure loads/responses with both 1φ and 2φ flow	Obtain thermal-hydraulic data for computer code validation	27
28	Core Makeup Tank Test	W Waltz Mill Site - Madison, PA	~1:6 diameter ~1:2 height	Safety Related	In Progress	Obtain thermal-hydraulic data for computer code validation	Confirm adequacy of CMT level instrumentation	28
29	ONBR Tests	Columbia University - New York, NY	1:1	Safety Related	Completed	Obtain DNB data at low flow conditions	Obtain data on fuel assembly flow mixing grids at design flow conditions	29
30	Low Pressure 1/4 Height Integral Systems Tests	Oregon State University - Corvallis, OR	1:4 height 1:192 volume	Safety Related	Planned	Obtain thermal-hydraulic data for computer code validation	Investigate long term cooling behavior	30
31	Full Pressure Full Height Integral Systems Tests	SIET (SPES-2 Facility) - Piacenza, Italy	1:1 height 1:395 volume	Safety Related	In Progress	Obtain thermal-hydraulic data for computer code validation	Investigate systems interactions during high pressure transients	31

AP600 DESIGN CERTIFICATION TEST PROGRAM OVERVIEW

AP600 TEST PROGRAMS: TABLE 2 - TEST PROGRAM OVERVIEW (PART 2)

Item No.	TEST NAME	TEST SCHEDULE			NRC WITNESS OF KEY TESTS				Item No.
		Start	End	SCHEDULE	MATRIX	TEST NAME/NO.	DESCRIPTION	WEEK OF	
PASSIVE CONTAINMENT COOLING SYSTEM TESTS IN SUPPORT OF AP600 DESIGN									
1	Air Flow Path Delta P Test	January 1988	February 1988	Completed	N/A	N/A	N/A	N/A	1
2	Water Film Formation Test	February 1988	March 1988	Completed	N/A	N/A	N/A	N/A	2
3	Heated Plate Test	April 1988	June 1988	Completed	N/A	N/A	N/A	N/A	3
4	Bench Wind Tunnel Experiment	August 1988	September 1988	Completed	N/A	N/A	N/A	N/A	4
5	Condensation Tests - Bare surface upward	September 1988	December 1988	Completed	N/A	N/A	N/A	N/A	5
6	Condensation Tests - Bare surface downward	September 1989	December 1989	Completed	N/A	N/A	N/A	N/A	6
7	Condensation Tests - Painted surface downward	September 1990	December 1990	Completed	N/A	N/A	N/A	N/A	7
8	Condensation Tests - Light noncondensibles	September 1991	December 1991	Completed	N/A	N/A	N/A	N/A	8
9	Condensation Tests - Stagnation flow conditions	September 1992	March 1993	Completed	N/A	N/A	N/A	N/A	9
10	Condensation Tests - Stagnation/Light noncondensibles	March 1993	July 1993	Completed	N/A	N/A	N/A	N/A	10
11	Condensation Tests - 2D Condensation	January 1994	April 1994	In Progress	N/A	N/A	N/A	N/A	11
PASSIVE CONTAINMENT COOLING SYSTEM TESTS IN SUPPORT OF AP600 DESIGN CERTIFICATION									
12	Integral (small scale) Tests - Phase 1 (Feasibility)	May 1989	October 1989	Completed	N/A	N/A	N/A	N/A	12
13	Integral (small scale) Tests - Phase 2A (Extension Tests)	January 1990	June 1990	Completed	N/A	N/A	N/A	N/A	13
14	Integral (small scale) Tests - Phase 2B (Continuation Tests)	June 1992	August 1992	Completed	N/A	N/A	N/A	N/A	14
15	1/8th Scale Heat Transfer Test - Phase 1 (Baseline)	February 1992	June 1992	Completed	N/A	N/A	N/A	N/A	15
16	1/8th Scale Heat Transfer Test - Phase 2 (Confirmatory)	June 1993	September 1993	Completed	N/A	N/A	N/A	N/A	16
17	Water Distribution System Test - Phase 1 (20ft Diameter)	June 1991	August 1991	Completed	N/A	N/A	N/A	N/A	17
18	Water Distribution System Test - Phase 2 (1/8th Sector)	September 1991	February 1992	Completed	N/A	N/A	N/A	N/A	18
19	Water Distribution System Test - Phase 3	September 1993	September 1993	Completed	N/A	N/A	N/A	N/A	19
20	Wind Tunnel Test - Phase 1	June 1991	August 1991	Completed	N/A	N/A	N/A	N/A	20
21	Wind Tunnel Test - Phase 2	February 1992	March 1992	Completed	N/A	N/A	N/A	N/A	21
22	Wind Tunnel Test - Phase 4A	June 1993	August 1993	Completed	N/A	N/A	N/A	N/A	22
23	Wind Tunnel Test Phase 4B	September 1993	September 1993	Completed	N/A	N/A	N/A	N/A	23
PASSIVE CORE COOLING SYSTEM TESTS IN SUPPORT OF AP600 DESIGN CERTIFICATION									
24	PRHR Heat Exchanger Test - Phase 1	November 1989	January 1990	Completed	N/A	N/A	N/A	N/A	24
25	PRHR Heat Exchanger Test - Phase 2	July 1990	November 1990	Completed	N/A	N/A	N/A	N/A	25
26	Automatic Depressurization System Test - Phase A (spargers)	June 1992	November 1992	Completed	N/A	N/A	N/A	N/A	26
27	Automatic Depressurization Systems Test - Phase B	June 1994	October 1994	Chart 1	Table 4	210	Saturated water blowdown from 2250 psig, maximum flow	9/5/94	27
28	Core Makeup Tank Test	February 1994	September 1994	Chart *	Table 5	403	Hot CMT draindown during depressurization	8/29/94	28
29	ONBR Tests	June 1993	February 1994	Completed	N/A	N/A	N/A	N/A	29
30	Low Pressure 1/4 Height Integral Systems Tests	July 1994	March 1995	Chart 1	Table 6	SB12	SBLOCA - DEG CVI line break	9/5/94	30
31	Full Pressure Full Height Integral Systems Tests	February 1994	December 1994	Chart 1	Table 7	1 11	SBLOCA - -1in. Cold Leg Break Steam Generator Tube Rupture	5/16/94 12/5/94	31

AP600 DESIGN CERTIFICATION TEST PROGRAM OVERVIEW

AP600 TEST PROGRAMS: TABLE 3 - TEST PROGRAM OVERVIEW (PART 3)

Item No.	TEST DESCRIPTION	REVIEW MEETINGS	TEST DOCUMENTS								Item No.
			Test Matrix	Scaling Report	Test Specification	Operating Procedures *	Facility Description Report	Quick Look Reports	Final Test Report	Other Relevant Information	
PASSIVE CONTAINMENT COOLING SYSTEM TESTS IN SUPPORT OF AP600 DESIGN										* - FACILITY OPERATING PROCEDURES ARE MAINTAINED IN WESTINGHOUSE FILES AND ARE AVAILABLE FOR REVIEW.	
1	Air Flow Path Delta P Test	-	N/A	N/A	N/A	N/A	WCAP-13328	N/A	WCAP-13328	WCAP-13330	1
2	Water Film Formation Test	-	N/A	N/A	N/A	N/A	WCAP-13884	N/A	WCAP-13884	WCAP-13330	2
3	Heated Plate Test	-	N/A	N/A	N/A	N/A	WCAP-12665	N/A	WCAP-12665	WCAP-13330, WCAP-13246	3
4	Bench Wind Tunnel Experiment	-	N/A	N/A	N/A	N/A	4/94	N/A	4/94	WCAP-13330	4
5	Condensation Tests - Bare surface upward	-	Reference 5.3	N/A	N/A	N/A	Reference 5.3	N/A	Reference 5.3	WCAP-13244	5
6	Condensation Tests - Bare surface downward	-	Reference 6.3	N/A	N/A	N/A	Reference 6.3	N/A	Reference 6.3	WCAP-13246	6
7	Condensation Tests - Painted surface downward	-	WCAP-13307	N/A	N/A	N/A	WCAP-13307	N/A	WCAP-13307	WCAP-13246	7
8	Condensation Tests - Light noncondensibles	-	Reference 8.2	N/A	N/A	N/A	Reference 8.2	N/A	Reference 8.2		8
9	Condensation Tests - Stagnation flow conditions	-	3/94	N/A	N/A	N/A	3/94	N/A	3/94		9
10	Condensation Tests - Stagnation/light noncondensibles	-	3/94	N/A	N/A	N/A	3/94	None	3/94		10
11	Condensation Tests - 2D condensation	-	8/94	N/A	N/A	N/A	8/94	None	8/94		11
PASSIVE CONTAINMENT COOLING SYSTEM TESTS IN SUPPORT OF AP600 DESIGN CERTIFICATION											
12	Integral (small scale) Tests - Phase 1 (Feasibility)	-	WCAP-12667, Rev. 1	N/A	N/A	Completed	WCAP-12667, Rev. 1	N/A	WCAP-12667, Rev 1	WCAP-13330, WCAP-13246	12
13	Integral (small scale) Tests - Phase 2A (Extension Tests)	-	Presentation Mat'l from 3/17/92 meeting w/ NRC	N/A	WCAP-13315	Completed	8/94	None	8/94	WCAP-13246	13
14	Integral (small scale) Tests - Phase 2B (Continuation Tests)	-	Presentation Mat'l from 3/17/92 meeting w/ NRC	N/A	WCAP-13315	Completed	8/94	None	8/94	WCAP-13246	14
15	1/8th Scale Heat Transfer Test - Phase 1 (Baseline)	-	WCAP-13566	WCAP-13246	WCAP-13267	Completed	8/94	None	WCAP-13566	WCAP-13725, WCAP-13246	15
16	1/8th Scale Heat Transfer Test - Phase 2 (Confirmatory)	3/23-24/93 2/23-24/94	W Letter ET-NRC-93-3845	WCAP-13246	WCAP-13267	Completed	8/94	11/93-4/94	8/94	WCAP-13566	16
17	Water Distribution System Test - Phase 1 (2/8th Diameter)	-	WCAP-13292	N/A	WCAP-13292	Completed	WCAP-13292	None	WCAP-13353	WCAP-13246	17
18	Water Distribution System Test - Phase 2 (1/8th Sector)	-	WCAP-13292	N/A	WCAP-13292	Completed	WCAP-13292	None	WCAP-13292	WCAP-13246	18
19	Water Distribution System Test - Phase 3	-	WCAP-13816	N/A	WCAP-13816	Completed	WCAP-13292	None	WCAP-13960	WCAP-13353, WCAP-13292	19
20	Wind Tunnel Test - Phase 1	-	WCAP-13294	WCAP-13294	WCAP-13318	Completed	WCAP-13294	None	WCAP-13294	WCAP-13246	20
21	Wind Tunnel Test - Phase 2	-	WCAP-13323	WCAP-13323 WCAP-13294	WCAP-13318	Completed	WCAP-13323	None	WCAP-13323	WCAP-13294, WCAP-13246	21
22	Wind Tunnel Test - Phase 4A	-	WCAP-13756	4/94	WCAP-13318	Completed	4/94	None	4/94	WCAP-13294, WCAP-13323	22
23	Wind Tunnel Test Phase 4B	-	5/94	5/94	WCAP-13318	Completed	5/94	None	5/94	WCAP-13294, WCAP-13323	23

AP600 DESIGN CERTIFICATION TEST PROGRAM OVERVIEW

AP600 TEST PROGRAMS: TABLE 3 - TEST PROGRAM OVERVIEW (PART 3)

Item No.	TEST DESCRIPTION	REVIEW MEETINGS	TEST DOCUMENTS								Item No.
			Test Matrix	Scaling Report	Test Specification	Operating Procedures *	Facility Description Report	Quick Look Reports	Final Test Report	Other Relevant Information	
PASSIVE SAFETY SYSTEMS TESTS IN SUPPORT OF AP600 DESIGN CERTIFICATION						* -FACILITY OPERATING PROCEDURES ARE MAINTAINED IN WESTINGHOUSE FILES AND ARE AVAILABLE FOR REVIEW					
24	PRHR Heat Exchanger Test - Phase 1	-	WCAP-12666	N/A	N/A	Completed	WCAP-12666	N/A	WCAP-12666		24
25	PRHR Heat Exchanger Test - Phase 2	-	WCAP-12980	N/A	WCAP-13948	Completed	WCAP-12980	N/A	WCAP-12980		25
26	Automatic Depressurization System Test - Phase A (Sparger)	5/26-27/93	WCAP-13342	N/A	WCAP-13342	Completed	4/94	N/A	4/94		26
27	Automatic Depressurization Systems Test - Phase B	5/26-27/93 2/25/94	Table 4	N/A	WCAP-13342 To be revised 4/94	5/94	3/95	None	3/95		27
28	Core Makeup Tank Test	2/25/93 3/14/94	Table 5	WCAP-13963	WCAP-13345, Revision 2	Series 100-300 Complete Series 400-600 4/94	5/94	4/94-10/94	11/94		28
29	DNBR Tests	-	N/A	N/A	WCAP-12488	Completed	6/94	None	6/94		29
30	Low Pressure 1/4 Height Integral Systems Tests	12/9/92 9/20-21/93	Table 6	5/94	WCAP-13234	4/94-6/94	6/95	6/94-4/95	6/95		30
31	Full Pressure Full Height Integral Systems Tests	12/10/92	Table 7	WCAP-13277	W letter ET-NRC-92-3776, WCAP to be issued 4/94	12/93 - 5/94	5/94	4/94-1/95	3/95		31

AP600 DESIGN AND DESIGN CERTIFICATION TEST PROGRAM OVERVIEW

TABLE 4 - MATRIX TESTS, AUTOMATIC DEPRESSURIZATION SYSTEM TEST, PHASE B

TEST CATEGORY	TEST NO.	DESCRIPTION
Category 2 Matrix Tests	110	Saturated Steam from top of supply tank, Stage 1 open, ~2250 to 400 psig. Maximum flow resistance simulated. Obtain single phase T/H data.
	120	Saturated Steam from top of supply tank, Stages 1 and 2 open, ~800 to 100 psig. Maximum flow resistance simulated. Obtain single phase T/H data.
	130	Saturated Steam from top of supply tank, Stages 1 and 3 open, ~500 to 50 psig. Maximum flow resistance simulated. Obtain single phase T/H data.
	140	Saturated Steam from top of supply tank, Stages 1, 2 and 3 open, ~500 to 50 psig. Maximum flow resistance simulated. Obtain single phase T/H data.
	210	Saturated Water from bottom of supply tank, Stage 1 open, ~2250 to 400 psig. Maximum flow resistance simulated. 12-inch gate valve positioned to obtain a range of two-phase T/H data.
	220	Saturated Water from bottom of supply tank, Stages 1 and 2 open, ~1200 to 100 psig. Maximum flow resistance simulated. 12-inch gate valve positioned to obtain a range of two-phase T/H data.
	230	Saturated Water from bottom of supply tank, Stages 1 and 3 open, ~500 to 50 psig. Maximum flow resistance simulated. 12-inch gate valve positioned to obtain a range of two-phase T/H data.
	240	Saturated Water from bottom of supply tank, Stages 1, 2 and 3 open, ~500 to 50 psig. Maximum flow resistance simulated. 12-inch gate valve positioned to obtain a range of two-phase T/H data.
	250	Saturated Water from bottom of supply tank, Stage 2 open (inadvertent opening at full power), ~2235 psig. Maximum flow resistance simulated. 12-inch gate valve positioned to obtain a range of two-phase T/H data.
	310	Saturated water from bottom of supply tank, Stages 1, 2 and 3 open, ~500 to 50 psig. Quench tank water initially at 212°F. Minimum flow resistance simulated. Maximum flow/minimum quality for max loads on sparger and quench tank.
	320	Saturated water from bottom of supply tank, Stages 1, 2 and 3 open, ~500 to 50 psig. Quench tank water at ambient. Minimum flow resistance simulated. Maximum flow/minimum quality for max loads on sparger and quench tank.
	330	Saturated water from bottom of supply tank, Stages 1and 2 open, ~1200 to [illegible] psig. Quench tank water initially at 212°F. Minimum flow resistance simulated. Maximum flow/minimum quality for max loads on sparger and quench tank.
	340	Saturated water from bottom of supply tank, Stage 2 open, ~2235 psig. Quench tank water initially at 212°F. Minimum flow resistance simulated. Maximum flow/minimum quality for max loads on sparger and quench tank.

TABLE 5 - MATRIX TESTS, CORE MAKEUP TANK TEST

TEST CATEGORY	TEST NO.	TEST TYPE	CMT DRAIN RATE	STEAM SUPPLY PRESSURE (S), PSIG	COMMENTS
Category 1 Matrix Tests	101-105	CMT wall condensation with and without noncondensable gases	N/A - CMT drain rate based on steam condensation rate and drain capability	10/135/665/1065/2235, with subsequent depressurization	CMT initially contains no water, and is evacuated (no air).
	106-108			10	CMT initially evacuated and then pressurized with air or N_2 to 236, 1.13 and 2.13 psia, respectively.
	109-111			1065	CMT initially evacuated and then pressurized with helium to 62, 146, and 296 psia, respectively.
	201-2:3	CMT Wall and Water Surface Condensation	N/A - CMT level fixed. Water drained from CMT via simulated path to match steam condensation	10/135/1065/2235, with subsequent depressurization	CMT initially 90% and 75% full. CMT level control used to maintain fixed CMT level.
	209-211			10/135/1065, 20 subsequent depressurization	CMT initially 50% and 25% full. CMT level control used to maintain fixed CMT level.
	301-312	CMT drawdown at constant pressure	6/11/16/Max	10/135/1065	Low resistance steam supply line no. 2 utilized, drain rate controlled by discharge line resistance.
	313-318		Flow rate controlled by steam supply line no. 1 resistance, (3 ft/gpm^2).	1065/2235	Low resistance steam supply line no. 2 utilized, drain rate controlled by discharge line resistance.
Category 2 Matrix Tests	401-402	CMT drawdown during depressurization	Discharge line resistance for 6/16 gpm.	1065 followed by depressurization to 20.	Low resistance steam supply line no. 2 utilized, drain rate controlled by discharge line resistance.
	403-404		Drain rate controlled by steam supply line no. 1 resistance.	2235 followed by depressurization to 20.	Discharge line resistance set to provide 6/16 gpm gravity drain rate at atmospheric pressure.
	501-502	Natural circulation followed by drawdown and depressurization.	Discharge line resistance set for 6/16 gpm drain rate.	1065 followed by depressurization to 20.	Steam supply line no. 1 is closed. Reservoir water level at "H" level. Reservoir water temperature initially 145°F. Steam supply line no. 2 is opened to initiate natural circulation until one-fifth of CMT heated. Reservoir water level is reduced to initiate drawdown. The steam supply is isolated and the water/steam reservoir is vented when the CMT is drained to 97 inches.
	503-504				Repeat with natural circulation until one-half of CMT heated.
	505-506				Repeat with natural circulation until CMT is completely heated.
	601-606	CMT activation with both steam lines, with and without noncondensible gas.	Discharge line resistance set for 6/16 gpm. Steam supply line no. 1 resistance set to be 3 ft/gpm^2.	1835 - constant	Reservoir water level "H". Reservoir water temperature initially 145°F. Steam supply line no. 1 is open. Both steam supply line no. 2 and CMT discharge lines opened simultaneously. Performed with steam, and with 146 and 296 psig of He initially in CMT side of steam supply line no. 2.
	607-612			1065 - constant	

AP600 DESIGN AND DESIGN CERTIFICATION TEST PROGRAM OVERVIEW

TABLE 6 - MATRIX TESTS, LOW PRESSURE 1/4 HEIGHT INTEGRAL SYSTEMS TEST (OSU)

TEST CATEGORY	TEST NAME	DESCRIPTION
Cold Pre-Operational Tests	C01	Core makeup tank gravity drain
	C02	Accumulator tank drain
	C03	In-containment refueling water storage tank drain
	C04	Chemical and Volume Control System pump flow vs. pressure
	C05	Normal residual heat removal system pump flow vs. pressure
	C06	Steam generator feed flow versus pressure
	C07	ADS 1-3 Line Flow Test
	C08	ADS 4 Line Flow Test
	C09	RNS Injection Flow Test
Hot Pre-Operational Tests	HS01	Reactor Coolant Forced Circulation Loop Flow Test
	HS02	Reactor Coolant Natural Circulation Loop Flow Test
	HS03	Reactor Power Calorimetric
	HS04	Ambient Heat Loss Determination
	HS05	PRHR Loss Determination
	HS06	Steam Generator Performance Test
	HS07	Reactor Coolant System Heatup/Cooldown Test
Category 1 Matrix Tests	SB1	2-inch cold leg break, bottom of pipe, loop A with continuation into long-term cooling mode
	SB4	2-inch cold leg break, bottom of pipe, loop A
	SB10	Double-ended guillotine break of cold leg balance line, vertical loop, loop A with continuation into long term cooling
	SB12	Double-ended guillotine break of direct vessel injection line
	SB13	2-inch break of direct vessel injection line
	SB16	Double-ended guillotine break of pressurizer/core makeup tank balance line, between check valve/core makeup tank, loop A, with continuation into long term cooling
Category 2 Matrix Tests	SB5	2-inch cold leg break, top of pipe, loop A
	SB6	1-inch cold leg break, bottom of pipe, loop A, with continuation into long term cooling
	SB7	2-inch cold leg small break, bottom of pipe, loop A
	SB8	2-inch break on cold leg balance line, vertical loop, loop A
	SB11	Double-ended guillotine break of direct vessel injection line with continuation into long term cooling
	SB14	Inadvertent ADS, stage 1 open, with continuation into long term cooling
	SB15	2-inch hot leg break, bottom of pipe, loop A
	SB19	CVT dP - Condensate to IRWST
	LB01	Large CLB, Higher Decay Heat during long term cooling

AP600 DESIGN AND DESIGN CERTIFICATION TEST PROGRAM OVERVIEW

TABLE 7 - MATRIX TESTS, FULL PRESSURE FULL HEIGHT INTEGRAL SYSTEMS TEST (SPES-2)

TEST CATEGORY	TEST NUMBER	DESCRIPTION
Cold Shakedown Tests	C-01	Single phase flow through the pressurizer surge line, 4 flow rates
	C-02A,B	Single phase flow through the pressurizer to core makeup tank balance lines, 4 flow rates per balance line
	C-03A,B	Single phase flow through the cold leg to core makeup tank balance lines, 4 flow rates per balance line
	C-04A,B	Core makeup tank draindown using cold leg to core makeup tank balance line
	C-05A,B	Core makeup tank gravity draindown using pressurizer to core makeup tank balance line
	C-06A,B	Safety Injection Accumulator blowdown
	C-07A,B	In-containment refueling water storage tank gravity draindown, three water levels
	C-08	Chemical and Volume Control System, Normal Residual Heat Removal System and Startup Feedwater System pump flow rate verification
	C-09	Operation of primary system with 2 reactor coolant pumps running
	C-10A,B	Operation of primary system with 1 reactor coolant pump running
	C-11	Facility volume measurement
Hot shakedown tests	H-01	Facility heated and held at five constant temperatures
	H-02	Starting from nominal conditions, power will be shut off and steam generators isolated
	H-03	Facility operated at normal full pressure, temperature and power
	H-04	Facility transitioned from full power operating conditions to hot shutdown natural circulation mode of operation
	H-05	Core makeup tank draindown using pressurizer to core makeup tank balance line
	H-06	Low pressure, safety system actuation using the automatic depressurization system with core makeup tank draindown and accumulator delivery
	H-07	Full power, full pressure safety system actuation initiated by the opening of the first stage of the automatic depressurization system
Category 1 Matrix Tests	3	2-inch cold leg break with non-safety systems off
	1	1-inch cold leg break with non-safety systems off
	4	2-inch cold leg break with non-safety systems on
	5	2-inch direct vessel injection line break with non-safety systems off
	6	Double-ended guillotine break of the direct vessel injection line with non-safety systems off
	7	2-inch break of cold leg to core makeup tank balance line with non-safety systems off
	8	Double-ended guillotine break of cold leg to core makeup tank balance line with non-safety systems off
	9	Design basis steam generator tube rupture with non-safety systems on and operator action to isolate steam generator
Category 2 Matrix Tests	10	Design basis steam generator tube rupture with non-safety systems on and no operator action
	11	Beyond design basis steam generator tube rupture with non-safety systems on and no operator action
	12	Large steamline break

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TABLE 9 - TEST PROGRAM REFERENCES (SUMMARY OF WESTINGHOUSE AP600 TEST PROGRAM RELATED MATERIALS TRANSMITTED TO NRC)

	DESCRIPTION	PROPRIETARY	TRANSMITTAL LETTER	DATE	ADDRESSEE
TEST PROGRAM GENERAL					
0.1	Response to November 14, 1991 Request for Information Regarding AP600 Test Program	Yes	ET-NRC-91-3650, NPP-APSL-91-0266	12 16 91	Murley
0.2	Response to January 15, 1992 Request for Information Regarding the AP600 Passive Containment Cooling System Tests	Yes	ET-NRC-91-3656, NPP-APSL-92-0013	1 22 92	Murley
0.3	Responses to "AP600 Design Issues to be Resolved by High Pressure, Full-Height Integral Testing"	Yes	ET-NRC-92-3663, NSRA-APSL-92-0037	2 14 92	Crutchfield
0.4	Presentation Material from February 25, 1992 Westinghouse NRC Meeting on AP600 Testing	Yes	ET-NRC-92-3664, NSRA-APSL-92-0047	2 24 92	Murley
0.5	Response to November 14, 1991 Request for Additional Information Regarding AP600 Test Program	No	ET-NRC-92-3666, NSRA-APSL-92-0048	2 24 92	Hasselbring
0.6	Presentation Material from March 3, 1992 ACRS Meeting on AP600 Testing	Yes	ET-NRC-92-3671, NSRA-APSL-92-0053	3 4 92	Murley
0.7	Presentation Material from June 1, 1992, AP600 Meeting on Integral Systems Testing	Yes	ET-NRC-92-3713, NSRA-APSL-92-0130	6 25 92	Murley
0.8	Presentation Material from June 23, 1992 AP600 ACRS Testing Presentation	Yes	ET-NRC-92-3716, NSRA-APSL-92-0133	6 30 92	Murley
0.9	NRC Request for Additional Information Regarding the AP600 Testing Program	Yes	ET-NRC-92-3750, NSRA-APSL-92-0189	9 14 92	Murley
0.10	AP600 Testing to Support Design Certification	No	ET-NRC-92-3754, NSRA-APSL-92-0200	10 5 92	Ward
0.11	AP600 Testing Schedule	No	ET-NRC-92-3768, NSRA-APSL-92-0239	11 5 92	Murley
0.12	Presentation Material from December 14, 1992 Westinghouse NRC Meeting on AP600 Testing	Yes	ET-NRC-92-3783, NSRA-APSL-92-0264	12 14 92	Murley
0.13	Westinghouse Response to NRC Request for Additional Information on the AP600 Testing Program dated July 21, 1992	No	ET-NRC-93-3799, NSRA-APSL-93-0010	1 19 93	Murley
0.14	Updated Testing Schedules for the AP600 Testing Program	No	ET-NRC-93-3800, NSRA-APSL-93-0011	1 19 93	Murley
0.15	Westinghouse Response to NRC Request for Additional Information on the AP600 Testing Program dated September 1, 1992	No	ET-NRC-93-3796, NSRA-APSL-93-0009	1 19 93	Murley
0.16	Test Schedule for AP600 Automatic Depressurization System Test - Phase B	No	ET-NRC-93-3811, NSRA-APSL-93-0026	2 2 93	Borchardt
0.17	Presentation Material from the March 9-10, 1993 Meeting on the AP600 Testing Program	No	ET-NRC-93-3834, NSRA-APSL-93-0065	3 9 93	Borchardt
0.18	Material in Support of March 23-24, 1992 Westinghouse/NRC Meeting on Containment Tests for AP600 (Test Spec additions, Test Matrix, Schedule)	Yes	ET-NRC-93-3841, NSRA-APSL-93-0076	3 16 93	Borchardt
0.19	Draft AP600 Test/Witness Matrix	No	ET-NRC-93-3848, NSRA-APSL-93-0093	3 23 93	Borchardt
0.20	Presentation Material from the March 23-24, 1993 Meeting on the AP600 Containment Test Program	Yes	ET-NRC-93-3845, NSRA-APSL-93-0090	3 24 93	Borchardt
0.21	Updated Testing Schedules for the AP600 Testing Program	No	ET-NRC-93-3855, NSRA-APSL-93-0109	4 13 93	Borchardt
0.22	Background Materials in Preparation for the July 22-23 Meeting of ACRS Subcommittee on TH Phenomena	No	ET-NRC-93-3911, NSRA-APSL-93-0224	6 28 93	Boshnoff
0.23	Presentation Materials from the June 18, 1993 Meeting on the AP600 Testing Program	No	ET-NRC-93-3910, NSRA-APSL-93-0223	6 28 93	Borchardt
0.24	AP600 Design and Design Certification Test Program Overview, Revision 2	No	ET-NRC-93-3919, NSRA-APSL-93-0233	7 7 93	Borchardt
0.25	General Outline for Quick Look Data Reports on AP600 Tests	No	ET-NRC-93-3946, NSRA-APSL-93-0305	8 16 93	Borchardt
0.26	AP600 Design and Design Certification Test Program Overview, Revision 3	No	ET-NRC-93-3947, NSRA-APSL-93-0306	8 18 93	Borchardt
0.27	Outline for AP600 Code Validation Process Steps Incorporating NRC Request for Single Blind Test Predictions	No	ET-NRC-93-3976, NSRA-APSL-93-0360	9 27 93	Borchardt
0.28	Presentation Materials from the December 10, 1993 Meeting on AP600 Test Program Issues	Yes	ET-NRC-93-4029, NSRA-APSL-93-0492	12 16 93	Borchardt
1. Air Flow Delta P Test					
1.1	WCAP-13328, "Tests of Air Flow for Cooling the AP600 Reactor Containment, Rev. 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
1.2	WCAP-13329, "Tests of Air Flow for Cooling the AP600 Reactor Containment, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
1.3	WCAP-13330, "Natural Convection Cooling of AP600 Containment, Rev. 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
1.4	WCAP-13331, "Natural Convection Cooling of AP600 Containment, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley

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TABLE 8 - TEST PROGRAM REFERENCES (SUMMARY OF WESTINGHOUSE AP600 TEST PROGRAM RELATED MATERIALS TRANSMITTED TO NRC)

	DESCRIPTION	PROPRIETARY	TRANSMITTAL LETTER	DATE	ADDRESSEE
2. Water Film Formation Test					
2.1	WCAP-13330, "Natural Convection Cooling of AP600 Containment, Rev. 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
2.2	WCAP-13331, "Natural Convection Cooling of AP600 Containment, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
2.3	WCAP-13884, "Water Film Formation on AP600 Reactor Containment Surface", Revision 0	Yes	NTD-NRC-94-4056, DCP/NRC0002	2 2 94	Borchardt
2.4	WCAP-13885, "Water Film Formation on AP600 Reactor Containment Surface", Revision 0	No	NTD-NRC-94-4056, DCP/NRC0002	2 2 94	Borchardt
3. Heated Plate Test					
3.1	WCAP-12965, "Test of Heat Transfer and Water Film Evaporation on a Heated Plate Simulating Cooling of the AP600 Reactor Containment"	Yes	NS-NRC-90-3525, NPAP-APSL-90-0045	7 16 90	Donatoll
3.2	WCAP-12965, "Tests of Heat Transfer and Water Film Evaporation on a Heated Plate Simulating Cooling of the AP600 Reactor Containment, Rev. 1"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
3.3	WCAP-13341, "Tests of Heat Transfer and Water Film Evaporation on a Heated Plate Simulating Cooling of the AP600 Reactor Containment, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
3.4	WCAP-13330, "Natural Convection Cooling of AP600 Containment, Rev. 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
3.5	WCAP-13331, "Natural Convection Cooling of AP600 Containment, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
3.6	WCAP-13246, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	Yes	ET-NRC-92-3726	7 31 92	Murley
3.7	WCAP-13412, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	No	ET-NRC-92-3726	7 31 92	Murley
4. Bench Wind Tunnel Experiment					
4.1	WCAP-13330, "Natural Convection Cooling of AP600 Containment, Rev. 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
4.2	WCAP-13331, "Natural Convection Cooling of AP600 Containment, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
5. Condensation Tests - Bare Surface Upward					
5.1	WCAP-13246, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	Yes	ET-NRC-92-3726	7 31 92	Murley
5.2	WCAP-13412, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	No	ET-NRC-92-3726	7 31 92	Murley
5.3	References for Basic Research Tests on Condensation Performed in Support of the AP600 Design	No	ET-NRC-93-3945, NSRA-APSL-93-0304	8 16 93	Borchardt
5.4	J.J. Barry, "Effects of Interfacial Structure on Film Condensation," PhD Thesis (1987)	No	ET-NRC-93-3945, NSRA-APSL-93-0304	8 16 93	Borchardt
6. Condensation Tests - Bare Surface Downward					
6.1	WCAP-13246, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	Yes	ET-NRC-92-3726	7 31 92	Murley
6.2	WCAP-13412, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	No	ET-NRC-92-3726	7 31 92	Murley
6.3	References for Basic Research Tests on Condensation Performed in Support of the AP600 Design	No	ET-NRC-93-3945, NSRA-APSL-93-0304	8 16 93	Borchardt
7. Condensation Tests - Painted Surface Downward					
7.1	WCAP-13307, "Condensation In the Presence Of A Noncondensable Gas - Experimental Investigation"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
7.2	WCAP-13308, "Condensation In the Presence Of A Noncondensable Gas - Experimental Investigation"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
7.3	WCAP-13412, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	No	ET-NRC-92-3726	7 31 92	Murley
7.4	WCAP-13246, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	Yes	ET-NRC-92-3726	7 31 92	Murley
8. Condensation Tests - Light Noncondensibles					
8.1	References for Basic Research Tests on Condensation Performed in Support of the AP600 Design	No	ET-NRC-93-3945, NSRA-APSL-93-0304	8 16 93	Borchardt
8.2	A. P. Peterstaine, "Condensation in the Presence of Noncondensible Gas: Effect of Helium Concentration," 1993, University of Wisconsin Thesis	No	ET-NRC-93-4014, NSRA-APSL-93-0448	11 12 93	Borchardt
8.3	I. K. Huhtiniemi, "Condensation in the Presence of Noncondensible Gas: The Effect of Surface Orientation," Prelim Thesis (1990)	No	ET-NRC-93-3945, NSRA-APSL-93-0304	8 16 93	Borchardt
8.4	I. K. Huhtiniemi, "Condensation in the Presence of Noncondensible Gas: The Effect of Surface Orientation," Prelim Thesis (1990)	Yes	ET-NRC-93-3945, NSRA-APSL-93-0304	8 16 93	Borchardt

AP600 DESIGN CERTIFICATION TEST PROGRAM OVERVIEW

TABLE 9 - TEST PROGRAM REFERENCES (SUMMARY OF WESTINGHOUSE AP600 TEST PROGRAM RELATED MATERIALS TRANSMITTED TO NRC)

	DESCRIPTION	PROPRIETARY	TRANSMITTAL LETTER	DATE	ADDRESSEE
9. Condensation Tests - Stagnation Flow Conditions					
9.1	References for Basic Research Tests on Condensation Performed in Support of the AP600 Design	No	ET-NRC-93-3945, NSRA-APSL-93-0304	8 16 93	Borchardt
10. Condensation Tests - Stagnation/Light Noncondensibles					
10.1	References for Basic Research Tests on Condensation Performed in Support of the AP600 Design	No	ET-NRC-93-3945, NSRA-APSL-93-0304	8 16 93	Borchardt
11. Condensation Tests - 2D Condensation					
11.1	References for Basic Research Tests on Condensation Performed in Support of the AP600 Design	No	ET-NRC-93-3945, NSRA-APSL-93-0304	8 16 93	Borchardt
12. Integral (small scale) TestCo - Phase 1 (Feasibility)					
12.1	WCAP-12667, "Test of Heat Transfer and Water Film Evaporation From a Simulated Containment To Demonstrate the AP600 Passive Containment Cooling System"	Yes	NS-NRC-90-3515, NPAP-APSL-90-0048	7 16 90	Donatelli
12.2	WCAP-13350, "Natural Convection Cooling of AP600 Containment, Rev. 0"	Yes	ET-NRC-92-3685, NSRA-APSL-92-0094	4 30 92	Murley
12.3	WCAP-13351, "Natural Convection Cooling of AP600 Containment, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
12.4	WCAP-13349, "Tests of Heat Transfer and Water Film Evaporation from a Simulated Containment to Demonstrate the AP600 Passive Containment Cooling System, Rev. 0"	No	ET-NRC-92-3686, NSRA-APSL-92-0094	4 30 92	Murley
12.5	WCAP-12667, "Tests of Heat Transfer and Water Film Evaporation from a Simulated Containment to Demonstrate the AP600 Passive Containment Cooling System, Rev. 1"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
12.6	WCAP-13412, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	No	ET-NRC-92-3726	7 31 92	Murley
12.7	WCAP-13246, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	Yes	ET-NRC-92-3726	7 31 92	Murley
13. Integral (small scale) Tests - Phase 2A (Extension Tests)					
13.1	WCAP-13316, "Integral Containment Cooling Test Extension - Test Specification, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
13.2	WCAP-13315, "Integral Containment Cooling Test Extension - Test Specification, Rev. 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
13.3	WCAP-13412, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	No	ET-NRC-92-3726	7 31 92	Murley
13.4	WCAP-13246, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	Yes	ET-NRC-92-3726	7 31 92	Murley
14. Integral (small scale) Tests - Phase 2 (Continuation Tests)					
14.1	WCAP-13315, "Integral Containment Cooling Test Extension - Test Specification, Rev. 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
14.2	WCAP-13316, "Integral Containment Cooling Test Extension - Test Specification, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
14.3	WCAP-13246, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	Yes	ET-NRC-92-3726	7 31 92	Murley
14.4	WCAP-13412, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	No	ET-NRC-92-3726	7 31 92	Murley
15. 1/8th Scale Heat Transfer Tests - Phase 1 (Baseline)					
15.1	WCAP-13267, "Test Specification: Large Scale Passive Containment Cooling Test, Rev. 1"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
15.2	WCAP-13268, "Test Specification" Large Scale Passive Containment Cooling Test, Rev. 1"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
15.3	WCAP-13246, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	Yes	ET-NRC-92-3726	7 31 92	Murley
15.4	WCAP-13412, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	No	ET-NRC-92-3726	7 31 92	Murley
15.5	WCAP-13566, "AP600 1/8th Large Scale Passive Containment Cooling System Heat Transfer Test Baseline Data Report," Rev. 0	Yes	ET-NRC-93-3801, NSRA-APSL-93-0012	1 25 93	Murley
15.6	WCAP-13567, "AP600 1/8th Large Scale Passive Containment Cooling System Heat Transfer Test Baseline Data Report," Rev. 0	No	ET-NRC-93-3801, NSRA-APSL-93-0012	1 25 93	Murley

TABLE 8 - TEST PROGRAM REFERENCES (SUMMARY OF WESTINGHOUSE AP600 TEST PROGRAM RELATED MATERIALS TRANSMITTED TO NRC)

	DESCRIPTION	PROPRIETARY	TRANSMITTAL LETTER	DATE	ADDRESSEE
16. 1/8th Scale Heat Transfer Test - Phase 2 (Confirmatory)					
16.1	WCAP-13267, "Test Specification: Large Scale Passive Containment Cooling Test, Rev. 1"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
16.2	WCAP-13268, "Test Specification" Large Scale Passive Containment Cooling Test, Rev. 1"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
16.3	Phase 2 Large Scale Test Matrix Rationale: Information in Support of Request for Additional Information on the AP600 Design (RAI 440.12)	Yes	ET-NRC-93-3961, NSRA-APSL-93-0334	9 23 93	Borchardt
16.4	Quick Look Data Report for AP600 PCCS Large Scale Phase 2 Tests: Constant Pressure Tests (Tests 202.3 and 203.3)	Yes	ET-NRC-93-3981, NSRA-APSL-93-0340	10 4 93	Borchardt
16.5	Facility "as-built" Drawings for AP600 PCCS Large Scale Test Facility	Yes	ET-NRC-93-3983, NSRA-APSL-93-0381	10 8 93	Borchardt
16.6	Quick Look Data Report for AP600 PCCS Large Scale Phase 2 Tests: Tests 212.1 and 213.1	Yes	ET-NRC-93-3991, NSRA-APSL-93-0394	10 15 93	Borchardt
16.7	Heat Sink Data for AP600 PCCS Large Scale Phase 2 Test Facility	Yes	ET-NRC-93-3997, NSRA-APSL-93-0405	10 21 93	Borchardt
16.8	Proposed Initial Conditions Data and Forcing Functions for Large Scale Phase 2 Test 220.1	No	ET-NRC-93-3998, NSRA-APSL-93-0406	10 22 93	Borchardt
16.9	Quick Look Data Report for AP600 PCCS Large Scale Phase 2 Tests: Tests 214.1 and 215.1	Yes	ET-NRC-93-4006, NSRA-APSL-93-0421	10 29 93	Borchardt
16.10	Quick Look Data Report for AP600 PCCS Large Scale Phase 2 Tests: Tests 217.1 and 218.1	Yes	ET-NRC-93-4012, NSRA-APSL-93-0446	11 12 93	Borchardt
16.11	Test Description Package for AP600 PCCS Large Scale Phase 2 Test: Test 220.1	Yes	ET-NRC-93-4030, NSRA-APSL-93-0495	12 29 93	Borchardt
16.12	Quick Look Data Report for AP600 PCCS Large Scale Phase 2 Tests: Test 216.1	Yes	ET-NRC-94-4035, NSRA-APSL-94-0002	1 18 94	Borchardt
16.13	Quick Look Data Report for AP600 PCCS Large Scale Phase 2 Tests: Test 219.1	Yes	NTD-NRC-94-4050, SAL/NRC0037	1 28 94	Borchardt
16.14	Quick Look Data Report for AP600 PCCS Large Scale Phase 2 Tests: Test 221.1	Yes	NTD-NRC-94-4062, DCP/NRC0004	2 11 94	Borchardt
16.15	Presentation Materials from the February 23-24, 1994 Meeting on AP600 PCCS Tests and Analysis	Yes	NTD-NRC-94-4067, DCP/NRC0009	2 23 94	Borchardt
17. Water Distribution System Test - Phase 1 (2Dl Diameter)					
17.1	WCAP-13353, "Passive Containment Cooling System Water Distribution Phase 1 Test Data Report, Rev. 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
17.2	WCAP-13354, "Passive Containment Cooling System Water Distribution Phase 1 Test Data Report, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
17.3	WCAP-13291, "Passive Containment Cooling System Water Distribution Test, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
17.4	WCAP-13290, "Passive Containment Cooling System Water Distribution Test, Rev. 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
17.5	WCAP-13293, "Construction/Test Plan For the Passive Containment Cooling System Test Articles, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
17.6	WCAP-13292, "Construction/Test Plan For the Passive Containment Cooling System Test Articles, Rev. 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
17.7	WCAP-13412, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	No	ET-NRC-92-3726	7 31 92	Murley
17.8	WCAP-13246, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	Yes	ET-NRC-92-3726	7 31 92	Murley
18. Water Distribution System Test - Phase 2 (1/8th Sector)					
18.1	WCAP-13291, "Passive Containment Cooling System Water Distribution Test, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
18.2	WCAP-13297, "PCS Water Distribution Test Phase II Test Data Report"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
18.3	WCAP-13296, "PCS Water Distribution Test Phase II Test Data Report"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
18.4	WCAP-13290, "Passive Containment Cooling System Water Distribution Test, Rev. 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
18.5	WCAP-13293, "Construction/Test Plan For the Passive Containment Cooling System Test Articles, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
18.6	WCAP-13292, "Construction/Test Plan For the Passive Containment Cooling System Test Articles, Rev. 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
18.7	WCAP-13246, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	Yes	ET-NRC-92-3726	7 31 92	Murley
18.8	WCAP-13412, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	No	ET-NRC-92-3726	7 31 92	Murley

TABLE 8 - TEST PROGRAM REFERENCES (SUMMARY OF WESTINGHOUSE AP600 TEST PROGRAM RELATED MATERIALS TRANSMITTED TO NRC)

	DESCRIPTION	PROPRIETARY	TRANSMITTAL LETTER	DATE	ADDRESSEE
19. Water Distribution System Test - Phase 3					
19.1	WCAP-13292, "Construction/Test Plan For the Passive Containment Cooling System Test Articles, Rev. 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
19.2	WCAP-13293, "Construction/Test Plan For the Passive Containment Cooling System Test Articles, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
19.3	WCAP-13816, "Phase 3 Passive Containment Cooling System Water Distribution Test"	Yes	ET-NRC-93-3952, NSRA-APSL-93-0318	8 19 93	Borchardt
19.4	WCAP-13817, "Phase 3 Passive Containment Cooling System Water Distribution Test"	No	ET-NRC-93-3952, NSRA-APSL-93-0318	8 19 93	Borchardt
19.5	WCAP-13960, "PCS Water Distribution Phase 3 Test Data Report," Revision 0	Yes	NTD-NRC-94-4056, DCP/NRC0002	2 2 94	Borchardt
19.6	WCAP-13961, "PCS Water Distribution Phase 3 Test Data Report," Revision 0	No	NTD-NRC-94-4056, DCP/NRC0002	2 2 94	Borchardt
20. Wind Tunnel Test - Phase 1					
20.1	WCAP-13[illegible]1, "Phase I Wind Tunnel Testing For the Westinghouse AP600 Reactor"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
20.2	WCAP-[illegible]295, "Phase I Wind Tunnel Testing For the Westinghouse AP600 Reactor"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
20.3	WCAP-13316, "Passive Containment Cooling System Wind Tunnel Test Specification, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
20.4	WCAP-13412, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	No	ET-NRC-92-3726	7 31 92	Murley
20.5	WCAP-13246, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	Yes	ET-NRC-92-3726	7 31 92	Murley
21. Wind Tunnel Test - Phase 2					
21.1	WCAP-13318, "Passive Containment Cooling System Wind Tunnel Test Specification, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
21.2	WCAP-13412, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	No	ET-NRC-92-3726	7 31 92	Murley
21.3	WCAP-13246, "Westinghouse-GOTHIC: A Computer Code For Analyses of Thermal Hydraulic Transients for Nuclear Plant Containments & Auxiliary Buildings"	Yes	ET-NRC-92-3726	7 31 92	Murley
21.4	WCAP-13323, Rev. 0, "Phase II Wind Tunnel Testing for the Westinghouse AP600 Reactor"	[illegible]	ET-NRC-92-3753, NSRA-APSL-92-0198	10 2 92	Murley
21.5	WCAP-13324, Rev. 0, "Phase II Wind Tunnel Testing for the Westinghouse AP600 Reactor"	[illegible]	ET-NRC-92-3753, NSRA-APSL-92-0198	10 2 92	Murley
22. Wind Tunnel Test - Phase 4A					
22.1	WCAP-13318, "Passive Containment Cooling System Wind Tunnel Test Specification, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
22.2	WCAP-13757, "Wind Tunnel Phase 4A Test Plan, Investigation of the High Reynolds Number Behavior of the Westinghouse AP600 System,"	No	ET-NRC-93-3926, NSRA-APSL-93-0250	7 15 93	Borchardt
22.3	WCAP-13758, "Wind Tunnel Phase 4A Test Plan, Investigation of the High Reynolds Number Behavior of the Westinghouse AP600 System,"	Yes	ET-NRC-93-3926, NSRA-APSL-93-0250	7 15 93	Borchardt
23. Wind Tunnel Test - Phase 4B					
23.1	WCAP-13318, "Passive Containment Cooling System Wind Tunnel Test Specification, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
24. PRHR Heat Exchanger Test - Phase 1					
24.1	WCAP-12668, "AP600 Passive Residual Heat Removal Heat Exchanger Test, Test Report"	Yes	NS-NRC-90-3525, NPAP-APSL-90-0048	7 16 90	Donatell
25. PRHR Heat Exchanger Test - Phase 2					
25.1	WCAP-13368, "Passive RHR Heat Exchanger Test Extension, Rev. 0"	Yes	ET-NRC-92-3730, NSRA-APSL-92-0161	8 7 92	Murley
25.2	WCAP-13369, "Passive RHR Heat Exchanger Test Extension, Rev. 0"	No	ET-NRC-92-3730, NSRA-APSL-92-0161	8 7 92	Murley
25.3	WCAP-13579, "AP600 Passive Residual Heat Exchanger Test Final Report"	No	ET-NRC-92-3779, NSRA-APSL-92-0259	12 15 92	Murley
25.4	WCAP-12980, Rev. 1, "AP600 Passive Residual Heat Exchanger Test Final Report"	Yes	ET-NRC-92-3779, NSRA-APSL-92-0259	12 15 92	Murley

TABLE 6 . PROGRAM REFERENCES (SUMMARY OF WESTINGHOUSE AP600 TEST PROGRAM RELATED MATERIALS TRANSMITTED TO NRC)

	DESCRIPTION	PROPRIETARY	TRANSMITTAL LETTER	DATE	ADDRESSEE
26. Automatic Depressurization System Test - Phase A (Sparger)					
26.1	WCAP-13343, "AP600 Automatic Depressurization System Test, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
26.2	WCAP-13342, "AP600 Automatic Depressurization System Test, Rev 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
26.3	Presentation Material from the April 20, 1993 Meeting on the AP600 ADS Tests at the VAPORE Facility	Yes	ET-NRC-93-3877, NSRA-APSL-93-0159	5 3 93	Borchardt
26.4	Presentation Material from the May 4, 1993 Meeting to discuss the AP600 ADS Phase A Test Results	Yes	ET-NRC-93-3879, NSRA-APSL-93-0166	5 5 93	Borchardt
26.5	Presentation Materials from the May 26-27, 1993 Meeting on the AP600 ADS Tests	Yes	ET-NRC-93-3881, NSRA-APSL-93-0197	6 1 93	Borchardt
27. Automatic Depressurization System Test - Phase B					
27.1	WCAP-13343, "AP600 Automatic Depressurization System Test, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
27.2	WCAP-13342, "AP600 Automatic Depressurization System Test, Rev 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
27.3	Presentation Material from the April 20, 1993 Meeting on the AP600 ADS Tests at the VAPORE Facility	Yes	ET-NRC-93-3877, NSRA-APSL-93-0159	5 3 93	Borchardt
27.4	AP600 Automatic Depressurization System Phase B Test Matrix, Revision 1	Yes	ET-NRC-93-3885, NSRA-APSL-93-0171	5 11 93	Borchardt
27.5	Preliminary Facility Design Drawings for the AP600 ADS Phase B Tests	Yes	ET-NRC-93-3893, NSRA-APSL-93-0189	5 24 93	Borchardt
27.6	Presentation Materials from the May 26-27, 1993 Meeting on the AP600 ADS Tests	Yes	ET-NRC-93-3881, NSRA-APSL-93-0197	6 1 93	Borchardt
27.7	AP600 Automatic Depressurization System Phase B Test Matrix, Revision 1A	Yes	ET-NRC-93-3881, NSRA-APSL-93-[illegible]	6 1 93	Borchardt
27.8	Presentation Materials from the January 25, 1994 Meeting on AP600 ADS Design Certification Test Plans	Yes	NTD-NRC-94-4050, NSRA-APSL-94-0030	1 25 94	Borchardt
28. Core Makeup Tank Test					
28.1	WCAP-13345, "AP600 Core Make-Up Tank Test Specification, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
28.2	Material in Support of February 25, 1993 Westinghouse/NRC Meeting on CMT Tests for AP600 (Test Matrix, Instrument List, Drawings)	Yes	ET-NRC-93-3823, NSRA-APSL-93-0042	2 18 93	Borchardt
28.3	Presentation Material from the February 25, 1993 Westinghouse/NRC meeting on the AP600 CMT Tests	Yes	ET-NRC-93-3829, NSRA-APSL-93-0053	2 25 93	Borchardt
28.4	Transmittal of Drawing of Steam Distributer for AP600 Core Makeup Tank Test	Yes	ET-NRC-93-3944, NSRA-APSL-93-0303	8 16 93	Borchardt
28.5	WCAP-13345, "AP600 Core Makeup Tank Test Specification", Revision 2	No	NTD-NRC-94-4068, DCP/NRC0010	2 22 94	Borchardt
28.6	WCAP-13963, "Scaling Logic for the Core Makeup Tank Test," Revision 0	Yes	NTD-NRC-94-4068, DCP/NRC0010	2 22 94	Borchardt
28.7	WCAP-13975, "Scaling Logic for the Core Makeup Tank Test," Revision 0	No	NTD-NRC-94-4068, DCP/NRC0010	2 22 94	Borchardt
29. DNBR Tests					
29.1	WCAP-12488, "Westinghouse Fuel Criteria Evaluation Process"	Yes	NS-NRC-90-3482	4 2 90	Wilson
29.2	Test Matrix for AP600 Departure from Nucleate Boiling Tests	Yes	ET-NRC-93-3984, NSRA-APSL-93-0385	10 8 93	Borchardt

AP600 DESIGN CERTIFICATION TEST PROGRAM OVERVIEW

TABLE 8 - TEST PROGRAM REFERENCES (SUMMARY OF WESTINGHOUSE AP600 TEST PROGRAM RELATED MATERIALS TRANSMITTED TO NRC)

	DESCRIPTION	PROPRIETARY	TRANSMITTAL LETTER	DATE	ADDRESSEE
30. Low Pressure 1/4 Height Integral Systems Tests					
30.1	Scaling Report on Glass Model of the AP600	No	NPAP-APSL-91-0095	3 5 91	Sharon
30.2	WCAP-13254, "AP600 Long Term Cooling Test Specification, Rev. 0	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4 30 92	Murley
30.3	WCAP-13283, "AP600 Long Term Cooling Test Specification, Rev. 0"	No	ET-NRC-92-3658, NSRA-APSL-92-0094	4 30 92	Murley
30.4	Draft Scaling Analysis for the OSU AP600 Integral Systems Test	Yes	ET-NRC-92-3715, NSRA-APSL-92-0132	7 7 92	Murley
30.5	Material in Support of Westinghouse/NRC Meeting on OSU Test Program for AP600 (Test Schedule, Draft Scaling Report, Test Specification Report, Updated Instrumentation List, Test Matrix and Facility Design Drawings)	Yes	ET-NRC-92-3775, NSRA-APSL-92-0250	11 24 92	Murley
30.6	Presentation Material from December 9-10, 1992 Westinghouse/NRC Meetings on AP600 Test Program	Yes	ET-NRC-92-3785, NSRA-APSL-92-0268	12 17 92	Murley
30.7	Component and Piping Drawing for the AP600 Long Term Cooling Tests	Yes	ET-NRC-93-3830, NSRA-APSL-93-0062	3 3 93	Borchardt
30.8	WCAP-13283 Revision 1, "Long Term Cooling Test,"	No	ET-NRC-93-3843, NSRA-APSL-93-0160	5 11 93	Borchardt
30.9	WCAP-13234 Revision 1, "Long Term Cooling Test,"	Yes	ET-NRC-93-3869, NSRA-APSL-93-0189	5 11 93	Borchardt
30.10	Response to INEL Requests for Information regarding OSU Long Term Cooling Test Facility (Requests dated April 14, 1993 and May 12, 1993)	Yes	ET-NRC-93-3901, NSRA-APSL-93-206	6 10 93	Borchardt
30.11	RELAP5/MOD3 Input File Notebook for OSU/AP600 Components	Yes	ET-NRC-93-3932, NSRA-APSL-93-0273	7 27 93	Wilson
30.12	Draft Scaling Analysis for the OSU AP600 Integral System and Long Term Cooling Test Facility	Yes	ET-NRC-93-3933, NSRA-APSL-93-0274	7 28 93	Wilson
30.13	Facility Drawings and Piping and Instrumentation Diagrams for the AP600 Long Term Cooling Test Facility at Oregon State University	Yes	ET-NRC-93-3969, NSRA-APSL-93-0350	9 17 93	Borchardt
30.14	Presentation Materials from the September 20, 1993 Meeting on AP600 Low Pressure Integral Systems Tests at Oregon State University	Yes	ET-NRC-93-3993, NSRA-APSL-93-0401	10 15 93	Borchardt
30.15	Draft Scaling Analysis for the AP600 Core Makeup Tank Separate Effects Tests	Yes	ET-NRC-93-4031, NSRA-APSL-93-0497	12 20 93	Borchardt
31. Full Pressure Full Height Integral Systems Tests					
31.1	WCAP-13277, "Scaling Design and Verification of SPES-2, the Italian Experimental Facility Simulator of the AP600 Plant"	Yes	ET-NRC-92-3685, NSRA-APSL-92-0082	4 3 92	Murley
31.2	WCAP-13278, "Scaling Design and Verification of SPES-2, the Italian Experimental Facility Simulator of the AP600 Plant"	No	ET-NRC-92-3685, NSRA-APSL-92-0082	4 3 92	Murley
31.3	NRC Request for Additional Information Related to SPES-2 Test Facility	Yes	ET-NRC-92-3749, NSRA-APSL-92-0188	9 14 92	Murley
31.4	Material in Support of Westinghouse/NRC Meeting on SPES Test Program for AP600 (Test Schedule, Draft Scaling Report, Draft Test Specification)	Yes	ET-NRC-92-3776, NSRA-APSL-92-0251	11 24 92	Murley
31.5	Presentation Material from December 9-10, 1992 Westinghouse/NRC Meetings on AP600 Test Program	Yes	ET-NRC-92-3785, NSRA-APSL-92-0268	12 17 92	Murley
31.6	Component and Piping Drawings for the SPES-2 Facility	Yes	ET-NRC-93-3825, NSRA-APSL-93-0046	2 25 93	Borchardt
31.7	Presentation Material from the April 22, 1993 Meeting on the AP600 Integral Systems Tests at SPES-2 Facility	Yes	ET-NRC-93-3877, NSRA-APSL-93-0159	5 3 93	Borchardt
31.8	WCAP-13278 Revision 1, "Scaling, Design, and Verification of SPES-2, The Italian Experimental of the AP600; Scaling Update"	No	ET-NRC-93-3883, NSRA-APSL-93-0169	5 11 93	Borchardt
31.9	WCAP-13277 Revision 1, "Scaling, Design, and Verification of SPES-2, The Italian Experimental of the AP600; Scaling Update"	Yes	ET-NRC-93-3883, NSRA-APSL-93-0169	5 11 93	Borchardt
31.10	SPES-1 Pump Characterization, SIET NT/54	No	ET-NRC-93-3943, NSRA-APSL-93-0300	8 12 93	Borchardt
31.11	Response to INEL Request for SPES-2 Information/Clarification MGO-29-93	No	ET-NRC-93-3943, NSRA-APSL-93-0300	8 12 93	Borchardt
31.12	SPES-1 System Description, SIET NT/52	No	ET-NRC-93-3943, NSRA-APSL-93-0300	8 12 93	Borchardt
31.13	Information on Test Conditions for AP600 Testing Performed at the SPES-2 Test Facility	Yes	NTD-NRC-94-4070, DCP/NRC0012	3 [illegible]	Borchardt

AP600 DESIGN CERTIFICATION TEST PROGRAM OVERVIEW

TABLE 6 - TEST PROGRAM REFERENCES (SUMMARY OF WESTINGHOUSE AP600 TEST PROGRAM RELATED MATERIALS TRANSMITTED TO NRC)

	DESCRIPTION	PROPRIETARY	TRANSMITTAL LETTER	DATE	ADDRESSEE
32. Other Tests					
32.1	WCAP-12668, "AP600 High Inertia Rotor Testing - Phase I, Test Report"	Yes	NS-NRC-90-3525, NPAP-APSL-90-R048	7.16.90	Donaldi
32.2	WCAP-13299, "RCP Air Model Test Report, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.3	WCAP-12648, "AP600 Incore Instrumentation System Electromagnetic Interference Test Report, Rev. 1"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.4	WCAP-13352, "Studies of Hydraulic Phenomena in the Reactor Vessel Lower Plenum Region - Test Report, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.5	WCAP-13305, Studies of Hydraulic Phenomena in Reactor Lower Plenum Region - Test Plan"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.6	WCAP-13298, "RCP Air Model Test Report, Rev. 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.7	WCAP-13322, "AP600 Incore Instrumentation System Electromagnetic Interference Test Report, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.8	WCAP-13312, "Journal Bearing Test - Task 2 Test Specification"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.9	WCAP-13313, "Journal Bearing Test - Task Plan For the DOE Phase II High Inertia Rotor Test Program"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.10	WCAP-13326, "AP600 High Inertia Rotor Testing Phase 2 Report, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.11	WCAP-12668, "AP600 High Inertia Rotor Testing Phase 1 Test Report, Rev. 1"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.12	WCAP-13319, "AP600 High Inertia Rotor Testing Phase 2 Report, Rev. 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.13	WCAP-13258, "Passive Core Cooling System Check Valve Test Specification, Rev. 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.14	WCAP-13264, "Test Plan For the Passive Core Cooling System Check Valve Test, Rev. 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.15	WCAP-13314, "Journal Bearing Test - Task Plan For the DOE Phase II High Inertia Rotor Test Program"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.16	WCAP-13287, "AP600 Passive Core Cooling System Check Valve Test Final Report, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.17	WCAP-13285, "Test Plan For the Passive Core Cooling System Check Valve Test, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.18	WCAP-13321, "AP600 High Inertia Rotor Testing Phase 1 Report, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.19	WCAP-13286, "AP600 Passive Core Cooling System Check Valve Test Final Report, Rev. 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.20	WCAP-13289, "Passive Core Cooling System Check Valve Test Specification, Rev. 0"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.21	WCAP-13310, "Journal Bearing Test - Task 1 Test Specification"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.22	WCAP-13351, "Studies of Hydraulic Phenomena in the Reactor Vessel Lower Plenum Region - Test Report, Rev. 0"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.23	WCAP-13306, "Studies of Hydraulic Phenomena in Reactor Vessel Lower Plenum Region - Test Plan"	No	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.24	WCAP-13309, "Journal Bearing Test - Task 1 Test Specification"	Yes	ET-NRC-92-3688, NSRA-APSL-92-0094	4.30.92	Murley
32.25	WCAP-13487, Rev. 0, "High Inertia Rotor Phase 3, Task 1 Test Report"	Yes	ET-NRC-92-3753, NSRA-APSL-92-0198	10.2.92	Murley
32.26	WCAP-13488, "High Inertia Rotor Phase 3, Task 1 Test Report"	No	ET-NRC-92-3753, NSRA-APSL-92-0198	10.2.92	Murley
32.27	WCAP-13560, "Advanced Plant Check Valve Study", Rev. 0	No	ET-NRC-93-3801, NSRA-APSL-93-0012	1.25.93	Murley
32.28	WCAP-13743, "Heavy Water Reactor Facility Project Phase 1 AP600 Small Scale Passive Containment Cooling System Test 'Dry' Test Results Applicable to the HWRF Project NPR-RPT 91-0021"	No	ET-NRC-93-3903, NSRA-APSL-93-0208	6.14.93	Borchardt
32.29	WCAP-13742, "Heavy Water Reactor Facility Project Phase 1 AP600 Small Scale Passive Containment Cooling System Test 'Dry' Test Results Applicable to the HWRF Project NPR-RPT 91-0021"	Yes	ET-NRC-93-3903, NSRA-APSL-93-0208	6.14.93	Borchardt
32.30	WCAP-13726, "Heavy Water Reactor Facility (HWRF) Large Scale Passive Containment Cooling System Baseline Test Data Report HWRF-92-004," Revision 1	No	ET-NRC-93-3903, NSRA-APSL-93-0208	6.14.93	Borchardt
32.31	WCAP-13728, "Heavy Water Reactor Facility (HWRF) Small Scale Containment Cooling System Test Final Report HWRF-RPT-92-003, Revision 1	No	ET-NRC-93-3903, NSRA-APSL-93-0208	6.14.93	Borchardt
32.32	WCAP-13733, "Heavy Water Reactor Facility (HWRF) Small Scale Containment Cooling Test Preliminary Series 2 Test Results HWRF-RPT-92-001	No	ET-NRC-93-3903, NSRA-APSL-93-0208	6.14.93	Borchardt
32.33	WCAP-13725, "Heavy Water Reactor Facility (HWRF) Large Scale Passive Containment Cooling System Baseline Test Data Report HWRF-RPT-92-004," Revision 1	Yes	ET-NRC-93-3903, NSRA-APSL-93-0208	6.14.93	Borchardt
32.34	WCAP-13727, "Heavy Water Reactor Facility (HWRF) Small Scale Containment Cooling System Test Final Report HWRF-RPT-92-003, Revision 1	Yes	ET-NRC-93-3903, NSRA-APSL-93-0208	6.14.93	Borchardt

TABLE 8 - TEST PROGRAM REFERENCES (SUMMARY OF WESTINGHOUSE AP600 TEST PROGRAM RELATED MATERIALS TRANSMITTED TO NRC)

	DESCRIPTION	PROPRIETARY	TRANSMITTAL LETTER	DATE	ADDRESSEE
32.35	WCAP-13732, "Heavy Water Reactor Facility (HWRF) Small Scale Containment Cooling Test Preliminary Series 2 Test Results HWRF-RPT-92-001	Yes	ET-NRC-93-3903, NSRA-APSL-93-0206	6 14 93	Borchardt
32.36	WCAP-13758, "High Inertia Rotor Test Phase 3 Report," June, 1990	Yes	ET-NRC-93-3918, NSRA-APSL-93-0238	7 7 93	Borchardt
32.37	WCAP-13759, "High Inertia Rotor Test Phase 3 Report," June, 1990	No	ET-NRC-93-3918, NSRA-APSL-93-0238	7 7 93	Borchardt
32.38	WCAP-13415, "High Inertia Rotor Test 3 Task 1, Test Specification,"	No	ET-NRC-93-3926, NSRA-APSL-93-0250	7 15 93	Borchardt
32.39	WCAP-13413, "RCP Hydraulic Flow Test Prospectus,"	Yes	ET-NRC-93-3926, NSRA-APSL-93-0250	7 15 93	Borchardt
32.40	WCAP-13420, "High Inertia Rotor Test Phase 3 Test Plan,"	No	ET-NRC-93-3926, NSRA-APSL-93-0250	7 15 93	Borchardt
32.41	WCAP-13419, "High Inertia Rotor Test Phase 3 Test Plan,"	Yes	ET-NRC-93-3926, NSRA-APSL-93-0250	7 15 93	Borchardt
32.42	WCAP-13414, "RCP Hydraulic Flow Test Prospectus,"	No	ET-NRC-93-3926, NSRA-APSL-93-0250	7 15 93	Borchardt
32.43	M. H. Kim, "Modelling of Condensation Heat Transfer in a Reactor Containment," PhD Thesis (1985)	No	ET-NRC-93-3945, NSRA-APSL-93-0304	8 16 93	Borchardt
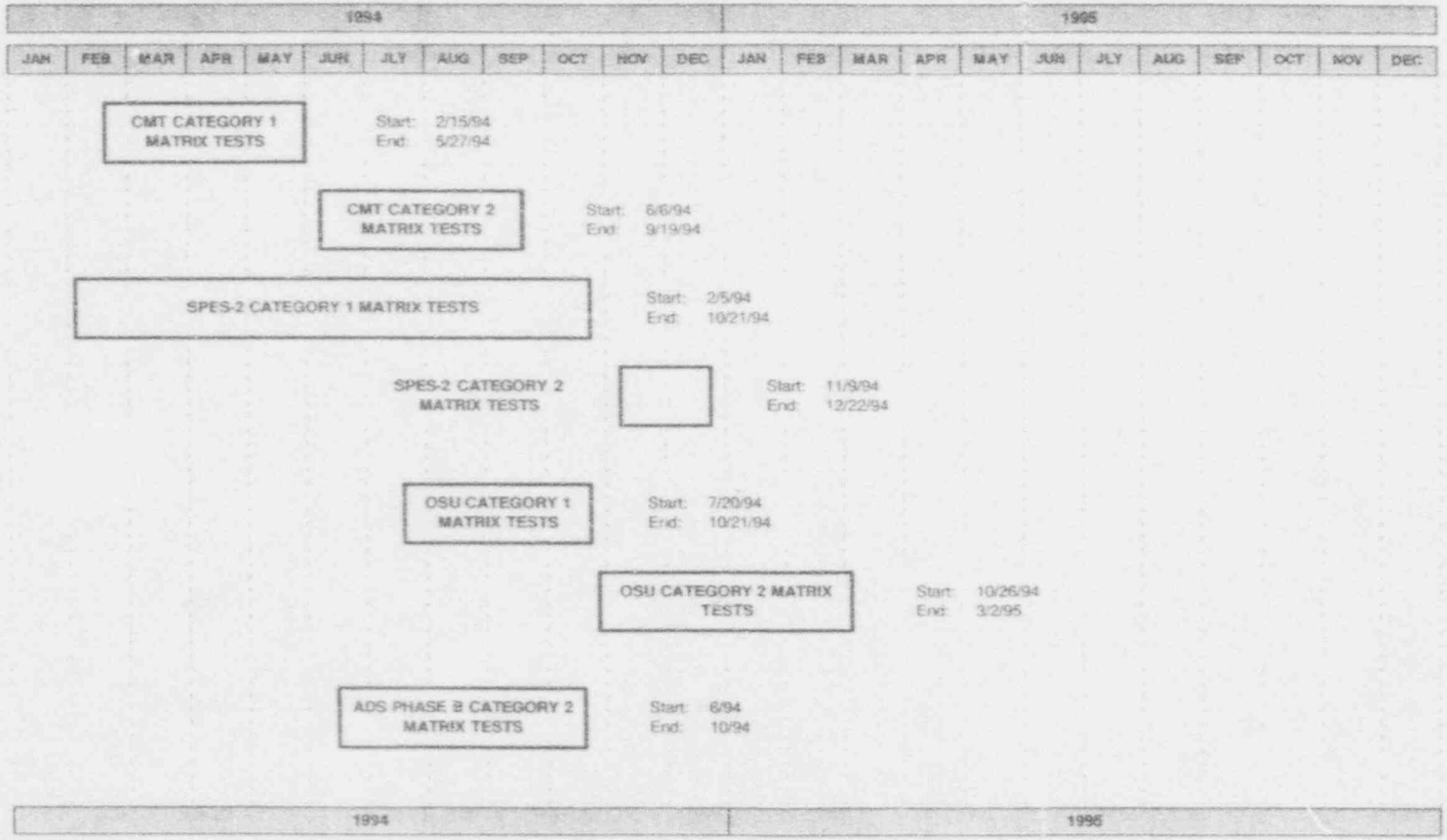
CHART 1
AP600 DESIGN CERTIFICATION TEST SCHEDULE