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EXPERIMENT DATA REPORT
FOR 1-1/2-LOOP SEMISCALE SYSTEM
ISOTHERMAL TESTS 1004 AND 1006

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MASTER

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ABSTRACT

Recorded test data are presented for Tests 1004 and 1006 of the isothermal portion of the Semiscale Blowdown and Emergency Core Cooling (ECC) Project. These data represent the results of the first tests in the isothermal test series in which simulated ECC injection during blowdown was investigated. The data, presented in the form of composite graphs in engineering units, have been analyzed only to the extent necessary to assure that they are reasonable and correct. The intent of this report is to make available the uninterpreted data from Tests 1004 and 1006 for use by others and for support of subsequent interpretative reports and analyses.

SUMMARY

Tests 1004 and 1006 were performed in the isothermal portion of the Semiscale Blowdown and Emergency Core Cooling (ECC) Project conducted by Aerojet Nuclear Company for the Atomic Energy Commission. These decompression tests are the first tests in the isothermal test series in which simulated ECC injection during blowdown was investigated. The experimental system consisted of a pressure vessel with simulated reactor internals; an operating loop with pump, steam generator, and pressurizer; a blowdown loop with a simulated pump, a simulated steam generator, and rupture assemblies; a pressure suppression system with header and pressure suppression tank; and a simulated ECC system with accumulators and injection pumps.

Tests 1004 and 1006 were initiated from isothermal conditions of about 2250 psig and 575°F by a simulated instantaneous large cold leg pipe break. Test 1004 provided data for use in determining system hydraulic response to ECC injection into the blowdown loop at 600 psig and into the lower plenum at 200 psig. Test 1006 provided data for use in determining system hydraulic response to ECC injection into both the operating and blowdown loops at 600 psig.

In general, instrumentation used in Tests 1004 and 1006 functioned as intended and data loss was minimal. Of the 365 measurements attempted during these two tests, 340 were accomplished. The data appear to be satisfactory for subsequent analysis.

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EXPERIMENT DATA REPORT FOR 1-1/2-LOOP

SEMISCALE SYSTEM ISOTHERMAL TESTS 1004 AND 1006

I. INTRODUCTION

The isothermal blowdown test program is part of the Semiscale Blowdown and Emergency Core Cooling (ECC) Project conducted by Aerojet Nuclear Company. The project is part of an overall AEC-sponsored research and development program directed at (a) quantifying the physical processes controlling system behavior during a postulated loss-of-coolant accident (LOCA) in a pressurized water reactor (PWR), and (b) providing an experimental data base for assessing reactor safety evaluation models.

The 1-1/2-loop semiscale system in which the isothermal test program was conducted includes both an intact operating loop and a broken, or blowdown, loop. The operating loop simulates three unbroken loops of a PWR, and the blowdown loop simulates one broken loop of a PWR. Relative to previous experimental systems, the 1-1/2-loop semiscale system provides a source of more representative coupled-system response data from which to obtain a correspondingly more comprehensive understanding of the thermal and hydraulic processes during an LOCA.

The major emphasis in the isothermal blowdown experiments is on ECC delivery. Tests 1004 and 1006 were the first tests in the isothermal series in which simulated ECC was injected. These tests were conducted to determine the effects of ECC delivery at different locations and pressures and to provide data for comparison with results of other semiscale experiments involving ECC delivery. Specifically, Test 1004 was conducted to determine (a) effects on core and downcomer flow and system decompression of coolant mixing in the lower plenum of the pressure vessel, (b) effects on break flow of coolant injection at the simulated pump side of the break, and (c) effects of heat transfer in the vessel lower plenum and downcomer. Test 1006 was conducted to determine (a) the capability of delivering ECC from an injection location in the operating loop cold leg through the downcomer annulus to the lower plenum and (b) the effects on core flow of ECC injection into the cold leg of the operating and blowdown loops.

The test configuration and conditions for Tests 1004 and 1006 are summarized briefly as follows.

Test 1004

- (1) Initial isothermal conditions were about 2250 psig and 575°F.
- (2) ECC injection into the lower plenum was initiated at a primary system pressure of ~ 200 psig and into the blowdown loop at a primary system pressure of ~ 600 psig.

- (a) Lower plenum injection flow was 22.5 gpm average.
- (b) Blowdown loop injection flow was 6.5 gpm average.
- (3) The downcomer gap size was 0.5 inch.
- (4) The standard (long) lower plenum configuration ($L/D = 2.8:1$) was used with the thermal shield installed.
- (5) The 100% break area nozzles were used.

Test 1006

- (1) Initial isothermal conditions were about 2250 psig and 575°F.
- (2) ECC injection into the cold leg of both loops was initiated at a primary system pressure of ~ 600 psig.
 - (a) Operating loop injection flow was ~ 32.0 gpm average.
 - (b) Blowdown loop injection flow was ~ 12.5 gpm average.
- (3) The downcomer gap size was 0.5 inch.
- (4) The standard (long) lower plenum configuration ($L/D = 2.8:1$) was used with the thermal shield installed.
- (5) The 100% break area nozzles were used.

The purpose of this report is to present the test data in an uninterpreted, but readily usable, form for use by the nuclear community in advance of detailed analysis and interpretation. Section II briefly describes the system configuration, initial test conditions, and events and conditions following initiation of blowdown that are applicable to Tests 1004 and 1006. Section III presents the data graphs and provides comments and supporting information necessary for interpretation of the data. Reference 1 is recommended as an additional source of information regarding the isothermal experimental system and program; test conditions and procedures; instrument locations, nomenclature, and accuracies; and methods of obtaining and processing the data.

II. SYSTEM AND CONDITIONS FOR TESTS 1004 AND 1006

The system configuration, initial test conditions, and events and conditions following blowdown initiation that are specific to Tests 1004 and 1006 are presented.

1. SYSTEM CONFIGURATION

The 1-1/2-loop isothermal semiscale system used for Tests 1004 and 1006 consisted of a pressure vessel with internals; an operating loop with a steam generator, pump, and pressurizer; a blowdown loop with a simulated steam generator, a simulated pump, and two rupture assemblies; a pressure suppression system with a suppression tank and a header; and a simulated ECC system with accumulators and injection pumps.

For Tests 1004 and 1006, the standard lower plenum ($L/D = 2.8:1$) was used. This plenum consists of the standard (long) lower head and the downcomer filler extension. For both tests, the lower plenum was thermally insulated with the thermal shield, which consists of the thermal sleeve and the bottom thermal liner plate. A vessel downcomer filler piece was used to provide a 0.5-inch downcomer gap for both tests. The system was subjected to a double-ended offset cold leg break by means of two rupture disc assemblies each employing 100% break area nozzles.

The simulated ECC injection system was used for both tests. This system consisted of an accumulator subsystem and a pump injection subsystem in both the operating loop and the blowdown loop. For Test 1004, the ECC accumulators supplied sufficient ECC to the lower plenum and to the simulated pump side of the break in the cold leg of the blowdown loop. For Test 1006, both accumulators and pumps were required to supply ECC to the cold leg of the operating and blowdown loops.

2. INITIAL TEST CONDITIONS

Conditions in the semiscale system at initiation of blowdown and the primary system water chemistry prior to blowdown are given in Tables I and II, respectively.

TABLE I
CONDITIONS AT BLOWDOWN INITIATION

Conditions	Test 1004	Test 1006
Core outlet temperature (°F)	578	578
System flow rate (gpm)	170	171
System pressure at vessel outlet (psig)	2235	2250
Pump differential pressure (psid)	40	39
Suppression tank water level (in.)	47.5	48
Suppression tank water temperature (°F)	191	190
Suppression tank pressure (psig)	16.5	16.5
Pressurizer water volume (ft ³)	0.55	0.52
Operating loop accumulator pressure (psig)	~1850	~580
Blowdown loop accumulator pressure (psig)	~640	~630

TABLE II
WATER CHEMISTRY PRIOR TO BLOWDOWN

Conditions	Test 1004	Test 1006
pH	9.5	8.9
Chlorides (ppm)	<0.09	0.073
Conductivity (μmhos)	37.3	22.4
Suspended solids (ppm)	0.5	1.8
H ₂ (cc/l)	0.01	0.05
O ₂ (cc/l)	38.6	17.9
N ₂ (cc/l)	153.8	70.6
CO ₂ (cc/l)	0.06	0.04
Total gas (cc/l)	194.3	89.4

3. EVENTS AND CONDITIONS FOLLOWING BLOWDOWN INITIATION

The sequence of events following blowdown initiation is presented in Table III. After coolant injection was terminated and blowdown was over, the lower plenum was found to contain 1.8 gal of water after Test 1004 and 2.8 gal of water after Test 1006.

TABLE III

SEQUENCE OF EVENTS FOLLOWING BLOWDOWN INITIATION

Event	<u>Time After Rupture (sec)</u>	
	<u>Test 1004</u>	<u>Test 1006</u>
Blowdown loop ECC injection from blowdown loop ECC accumulator starts	12.5	12.5
Lower plenum ECC injection from operating loop ECC accumulator starts	~21.5	
Operating loop ECC injection from operating loop ECC accumulator starts		14.5
Lower plenum ECC flow from operating loop ECC accumulator stops	~27	
Operating loop ECC injection from operating loop ECC accumulator stops		35
Blowdown loop ECC flow from blowdown loop ECC accumulator stops	~28	35
Operating loop ECC injection pump flow starts		35
Blowdown loop ECC injection pump flow starts		35
Blowdown loop ECC injection pump flow stops		103
Operating loop ECC injection pump flow stops		104

III. DATA PRESENTATION

The data from semiscale isothermal Tests 1004 and 1006 are presented with brief comment. Processing and analysis have been performed only to the extent necessary to obtain appropriate engineering units and to assure that the data are reasonable and correct. In all cases, in converting transducer output to engineering units, a homogeneous fluid was assumed. Further interpretation and analysis should consider that sudden decompression processes such as those occurring in the isothermal tests may have subjected the measurement devices to nonhomogeneous fluid conditions.

Figures 1 through 4 and Table IV provide supporting information for interpretation of the data graphs shown in Figures 5 through 121. Figures 1 through 4 show the locations of all measurements in the isothermal system. Table IV groups the measurements taken during Tests 1004 and 1006 according to measurement type; identifies the specific measurements, their locations, and the range over which the data are considered valid; provides brief comments regarding the data; and references the measurements and comments to the corresponding figure on which the data are presented. The data are presented in the form of composite graphs to facilitate comparison of a given variable at several locations during a single test or a given variable during both tests. Zero seconds on all graphs is the time of blowdown initiation.

Reference 1 provides more detailed information regarding the isothermal experimental system and program; test conditions and procedures; instrument locations, nomenclature, and accuracies; and methods of obtaining and processing the data.

Encircled Letter Symbols Denote Measurement Types

Number Suffixes or Encircled Numbers Alone Identify System Locations (pipe spools, vessel ports, stations)

Fig. 1 1-1/2-loop semiscale system and instrumentation -- isometric.

Item	Description
1	Vessel
2	Main Core Barrel Assembly
3	Downcomer Filler, 1/2-in. Annulus
4	Inner Core Barrel Assembly
5	Flow Mixer Box Assembly
6	Turbine Meter (FT - C-1)
7	Mixer Plate and Inlet Plate Assembly
8	Short Bottom Head
9	10-in. Head Weldment, Top
10	Heater Rod Assembly
11	Mixer Box Cover
12	Downcomer Filler Extension
13	4-in. Top Head
14	Heater Element Lock Nut
15	Turbine Meter Cover
16	Thermal Shield
17	Inner Barrel Spacer Rings (typ)
18	Standard Head
19	Set Screw (core centering pin) (typ)
20	Heater Grounding Strap
21	Downcomer Filler, 1-in. Annulus(not shown)
22	Core Inlet
23	Dowel Pin
24	Grayloc Seal Ring, 4-in.
25	Grayloc Clamp and Bolts, 4-in.
26	Grayloc Seal Ring, 10-in.
27	Grayloc Clamp and Bolts, 10-in.
28	Scintillator Shielding Cask Support-Bracket (rotated to 180°) (D-275V)

All Vessel Instrumentation Rotated to 0° or 180° for Clarity

△ — Item Number

TM 94C 45°
 — Type of Measurement
 — Rotational Location
 — Location
 — Distance from Upper Flange Face

ANC-R-2188

Fig. 3 Pressure vessel -- cross-sectional view showing instrumentation.

Encircled Letter Symbols Denote Measurement Types

Number Suffixes or Encircled Numbers Alone Identify System Locations (vessel ports, stations)

Degrees Indicate Clockwise Orientation Around Vessel as Viewed from Vessel Top with 0° at Centerline of Operating Loop Inlet Cold Leg Nozzle

Nozzles Receding from View Plane are Omitted for Clarity

Pressure Vessel Instruments not Installed in Ports are Shown on ANC-R-2188

PENETRATION CODE	SIZE (IN.)	ANGULAR LOCATION FROM COLD LEG (CLOCKWISE)	DISTANCE FROM TOP FACE OF VESSEL (IN.)	PRIMARY USAGE	VESSEL WALL PENETRATION DIAMETER (IN.)
200	3/4 NPT	150°	7.88		.750
201	3/4 NPT	30°	7.13		.750
202	1/2 NPT	0°	5.00		.703
203			9.88	DENSITY, SOURCE	.500
204	1/2 NPT	45°	11.88		.560
205	1/4 NPT	5°	14.88		.250
206	1/2 NPT	0°	25.38		.750
207	3/4 NPT	30°	28.38		.750
208	3/4 NPT	150°	28.38		.750
209			30.38	DENSITY, SOURCE	.500
210	1/4 NPT	5°	32.88		.250
211	1/2 NPT	45°	32.88		.560
212	1 NPT	135°	49.88		1.000
213	1/4 NPT	40°	47.88		.750
214	3/4 NPT	315°	55.62	DOWNCOMER SUPPORT	
215	3/4 NPT	75°	55.62	DOWNCOMER SUPPORT	
216	3/4-16-UNF	45°	49.88		.687
217	1/4 NPT	135°	81.859		.250
218	1/4 NPT	75°	81.859		.250
219	1/4 NPT	15°	81.859		.250
220	1/4 NPT	135°	105.859		.250
221	1/4 NPT	75°	105.859		.250
222	1/4 NPT	15°	105.859		.250
223	3/4 NPT	135°	109.989		.750
224	3/4 NPT	315°	109.989		.750
225	1-1/4 NPT	0°	109.989	DENSITY	1.438
226	1 NPT	45°	116.989	TURBINE PROBE	1.000
227	1 NPT	45°	121.297	FILL LINE	1.000
228	1-1/4 NPT	0°	122.370		1.500
229	1 NPT	315°	121.297		1.000
230	3/4-16-UNF	225°	7.13		.687
231			9.88	DENSITY	.3125
232	1/4 NPT	125°	14.88		.250
233	1/4 NPT	245°	14.88		.250
234	3/4-16-UNF	225°	28.38		.687
235			30.38	DENSITY	.3125
236	1/4 NPT	125°	32.38		.250
237	1/4 NPT	230°	32.88		.250
238	1/4 NPT	330°	47.88		.250
239	1 NPT	225°	47.88	ECC	1.000
240	1/4 NPT	165°	47.88		.250
241	1/4 NPT	270°	47.88		.250
242	3/4 NPT	270°	49.88		.750
243	3/4 NPT	195°	55.62	DOWNCOMER SUPPORT	
244	1/2 NPT	225°	59.562		.500
245	1/4 NPT	315°	81.859		.250
246	1/4 NPT	255°	81.859		.250
247	1/4 NPT	195°	81.859		.250
248	1/4 NPT	315°	105.859		.250
249	1/4 NPT	255°	105.859		.250
250	1/4 NPT	135°	105.859		.250
251	1-1/4 NPT	180°	110.010	DENSITY	1.438
252	1 NPT	315°	116.989	TURBINE PROBE	1.000
253	1 NPT	225°	119.234		1.000
254	1 NPT	135°	119.234	ECC	1.000
255	3/4 NPT	240°	121.297		.750
256	3/4 NPT	120°	122.672		.750
257	1/4 NPT	80°	47.88		.250
258	3/4-16-UNF			IN LOWER HEAD	.687
259	1/2 NPT			IN LOWER HEAD	.703
260	3/4 NPT			IN LOWER HEAD	.921
261	3/4 NPT			IN LOWER HEAD	.921
262	3/4 NPT			IN LOWER HEAD	.921
263	1 NPT			IN LOWER HEAD	.921
264	1/4 NPT	45°	39.88		.840
265	1/2 NPT	45°	37.88		.540
266	1/2 NPT	299°	37.88		.840
267	1/4 NPT	299°	39.88		.540
268	1 NPT	0°	94.43		
269	1 NPT	90°	94.43		
270	1 NPT	180°	94.43		
271	1 NPT	0°	65.63		
272	1-1/4 NPT	180°	122.37		1.500
273	1-1/4 NPT	315°	7.88		1.500
274	1-1/4 NPT	315°	28.38		1.500
275			114.50	DENSITY	

Fig. 4 Pressure vessel -- isometric showing instrumentation.

TABLE IV

DATA PRESENTATION FOR ISOTHERMAL TESTS 1004 AND 1006

Measurement ^[a]	Location ^[b]	Range ^[c,d]	Figure ^[d]	Comment ^[d]
FLUID TEMPERATURE				
Chromel-Alumel thermocouples; estimated accuracy to within $\pm 7^{\circ}\text{F}$.				
<u>Operating Loop</u>		33-650°F	5, 6	
TF-1	Hot leg, Spool 1			
TF-15	Pump suction, Spool 15			
TF-19	Pump discharge, Spool 19			
TF-22	Cold leg, Spool 22			
TF-40	Pressurizer outlet, Spool 40			
TS-3	Hot leg, Spool 3			TS-3 is a shielded thermocouple
TS-20	Cold leg, Spool 20			TS-20 is a shielded thermocouple
<u>Blowdown Loop</u>		33-650°F		
TF-50	Cold leg, Spool 50		7, 8	
TF-51	Cold leg downstream of vessel-side nozzle		7, 8	
TF-70	Hot leg, Spool 70		7, 8	
TF-76	Cold leg, Spool 76		8	TF-76 failed during Test 1004
TF-96	Simulated steam generator discharge, Spool 96		8	TF-96 was not used during Test 1004
<u>Pressure Suppression System</u>				
TF-83	Header near downcomer entrance (1 inch from ID of header on bottom)	33-650°F	9	TF-83 failed during Test 1006
TF-86-3	Suppression vessel, Station 86-3	33-300°F	9, 10	
TF-86-4	Suppression vessel, Station 86-4	33-300°F	9, 10	
TF-88	Suppression vessel vapor chamber, 2 inches from tank wall	33-650°F	9, 10	
RB-86-6	Suppression vessel water, Station 86-6	0-1000°F	9, 10	RB-86-6 is a resistance bulb fluid temperature detector
<u>Lower Plenum (Vertical Thermocouple Rack)</u>		33-650°F		
Nine thermocouples spaced at 2-inch intervals upward from ~1.75 inches above bottom of the lower head				
TF-260-2	2-inch level from inside bottom of lower head		11, 13	TF-260-2 failed during Test 1006
TF-260-4	4-inch level from inside bottom of lower head		11, 14	TF-260-4 data for Test 1006 could not be digitized
TF-260-6	6-inch level from inside bottom of lower head		11, 13	TF-260-6 failed during Test 1006
TF-260-8	8-inch level from inside bottom of lower head		11, 12, 14	
TF-260-10	10-inch level from inside bottom of lower head		11, 12, 13	
TF-260-12	12-inch level from inside bottom of lower head		11, 12, 14	
TF-260-14	14-inch level from inside bottom of lower head		11, 12, 13	
TF-260-16	16-inch level from inside bottom of lower head		11, 12, 14	
TF-260-18	18-inch level from inside bottom of lower head		11, 12, 13	
<u>Downcomer Gap</u>		33-650°F		
TF-47D-180	~48 inches, 180°, extending 1/8 inch into fluid from vessel wall side		15, 17	TF-47D-180 failed during Test 1006
TF-48C-180	~48 inches, 180°, extending 1/8 inch into fluid from core barrel		15, 16, 17, 18	
TF-48D-0	~48 inches, 0°, extending 1/8 inch into fluid from vessel wall side		15, 16, 17, 19	
TF-78D-0	~78 inches, 0°		15, 16, 17, 19	
TF-78D-180	~78 inches, 180°		15, 16, 17, 18	
TF-95D-225	~95 inches, 225°		15, 16, 17, 19	
<u>Outlet Plenum</u>		33-650°F		
TF-211	32.4 inches, 45°		15, 16, 17, 18	
TF-274	28.38 inches, 315°		15, 16, 17, 19	
<u>ECC System</u>		33-300°F		
TF-ECC-BLA	In line from blowdown loop ECC injection accumulator		20, 21	
TF-ECC-LPA	In line from operating loop ECC injection accumulator to lower plenum		20	TF-ECC-LPA was not used during Test 1006
TF-ECC-OLA	In line from operating loop ECC injection accumulator		21	TF-ECC-OLA was not used during Test 1004
METAL TEMPERATURE				
Chromel-Alumel thermocouples; estimated accuracy to within $\pm 7^{\circ}\text{F}$				
<u>Core Barrel</u>		33-650°F	22, 23	
TM-47C-0	~47 inches, 0°, 1/8 inch from OD			
TM-47C-180	~47 inches, 180°, 1/8 inch from OD			
TM-62C-45	~62 inches, 45°, 1/8 inch from OD			
TM-77C-0	~77 inches, 0°, 1/8 inch from OD			
TM-77C-180	~77 inches, 180°, 1/8 inch from OD			
TM-94C-45	~95 inches, 45°, 1/8 inch from OD			
TM-94C-16-45	~95 inches, 45°, 1/16 inch from ID			

TABLE IV (contd.)

DATA PRESENTATION FOR ISOTHERMAL TESTS 1004 AND 1006

Measurement ^[a]	Location ^[b]	Range ^[c,d]	Figure ^[d]	Comment ^[d]
<u>Downcomer Filler</u>				
TM-48D-0	~48 inches, 0°, 1/16 inch from ID	33-650°F	24, 25	
TM-48D-180	~48 inches, 180°, 1/16 inch from ID		25	TM-48D-180 failed during Test 1004
TM-63D-45	~63 inches, 45°, 1/16 inch from ID		24, 25	
TM-63D-225	~63 inches, 225°, 1/8 inch from OD		25	TM-63D-225 failed during Test 1004
TM-78D-0	~78 inches, 0°, 1/16 inch from ID		24	TM-78D-0 could not be digitized for Test 1006
TM-78D-180	~78 inches, 180°, 1/16 inch from ID		24, 25	
TM-95D-45	~95 inches, 45°, 1/16 inch from ID		24, 25, 26, 27	
TM-95D-225	~95 inches, 225°, 1/16 inch from ID		24, 25	
TM-116D-45	~116 inches, 45°, 1/16 inch from ID		24	TM-116D-45 failed during Test 1006
TM-116D-225	~116 inches, 225°, 1/16 inch from ID		24, 25	
<u>Vessel Wall</u>				
TM-95V-45	~95 inches, 45°, 1/2 inch from OD	33-650°F	26, 27	
TM-95D-45	~95 inches, 45°, 1/16 inch from ID		24, 25, 26, 27	
<u>Lower Plenum Vessel Wall</u>				
TM-LH-276	In lower plenum head	33-650°F	28, 29	
TM-LP-IDL	4.9 inches below lower plenum upper Grayloc flange face, 270° from cold leg centerline, 1/16 inch from ID of filler piece		28, 29	
TM-LP-IDU	5.0 inches above lower plenum upper Grayloc flange face, 270° from cold leg centerline, 1/16 inch from ID of filler piece			TM-LP-IDU failed during Tests 1004 and 1006
TM-LP-VOD	On vessel OD 5.0 inches above lower plenum upper Grayloc flange face, 270° from cold leg centerline		28, 29	
<u>Operating Loop</u>				
TM-1B	Hot leg, Spool 1, 1/8 inch from ID (bottom)	33-650°F	30, 31	
TM-1I	Hot leg, Spool 1, 1/8 inch from ID (top)		30, 31	TM-1I is low during both tests and data are considered questionable
TM-19I	Cold leg, Spool 19, 1/8 inch ID (top)		32, 33	
TM-19M	Cold leg, Spool 19, 1/4 inch from ID (top)		32, 33	
TM-19S	Cold leg, Spool 19, outside surface (top)		32, 33	
TM-19B	Cold leg, Spool 19, 1/8 inch from ID (bottom)		33	TM-19B failed during Test 1004
TM-19H	Cold leg, Spool 19, 1/8 inch from ID (middle)		32, 33	
TM-22B	Cold leg, Spool 22, 1/8 inch from ID (bottom)		34, 35	
TM-22H	Cold leg, Spool 22, 1/8 inch from ID (middle)		34, 35	
TM-22M	Cold leg, Spool 22, 1/4 inch from ID (top)		34, 35	
TM-22S	Cold leg, Spool 22, outside surface (top)		34	TM-22S for Test 1006 could not be corrected
<u>Blowdown Loop</u>				
TM-96	Simulated pump suction, Spool 96, 1/16 inch from ID	33-650°F	36	TM-96 data not taken during Test 1004
<u>Pressure Suppression System</u>				
TM-83	Header, on surface near first elbow			TM-83 data not taken during Test 1006; data available for Test 1004, but not presented.
TM-PSH-EL	Header, on surface near first elbow			TM-PSH-EL data not taken during Test 1006; data available for Test 1004, but not presented
MOMENTUM FLUX				
Obtained by drag discs which, through a strain gage network, measure force exerted by moving fluid stream. Fluid force is relatable to momentum flux through calibration curve.				
<u>Operating Loop</u>				
		± 100 to $\pm 7.0 \times 10^4$ lb/ft-sec ²		
FD-1	Hot leg, Spool 1		37, 38	
FD-5	Hot leg, Spool 5		37, 38	
FD-15	Pump suction, Spool 15		39, 40	
FD-19	Pump discharge, Spool 19		39, 40	
FD-22	Cold leg, Spool 22		39, 40	
<u>Blowdown Loop</u>				
FD-50	Cold leg, Spool 50	± 430 to $\pm 5.0 \times 10^4$ lb/ft-sec ²	41, 42	
FD-70	Hot leg, Spool 70	± 500 to $\pm 6.0 \times 10^4$ lb/ft-sec ²	41, 42	
FD-76	Cold leg, Spool 76	± 500 to $\pm 6.0 \times 10^4$ lb/ft-sec ²	41, 42	
<u>Pressure Suppression System</u>				
FD-83	Header near downcomer			Not reported; system was not calibrated.
<u>Core Barrel Inlet</u>				
FD-224	110 inches, 315° (target centered in gap)	± 140 to $\pm 3.0 \times 10^4$ lb/ft-sec ²	43	FD-224 failed during Test 1006
VOLUMETRIC FLOW RATE				
Obtained by turbine flowmeters				
<u>Operating Loop</u>				
		± 40 to ± 800 gpm	44, 45	
FT-1	Hot leg, Spool 1			
FT-19	Pump discharge, Spool 19			FT-19 operated in a unidirectional mode due to failure of a pickup coil.
FT-22	Cold leg, Spool 22			

TABLE IV (contd.)

DATA PRESENTATION FOR ISOTHERMAL TESTS 1004 AND 1006

Measurement ^[a]	Location ^[b]	Range ^[c,d]	Figure ^[d]	Comment ^[d]
<u>Blowdown Loop</u>				
FT-70	Hot leg, Spool 70	± 20 to ± 500 gpm	46	FT-70 failed during Test 1004. FT-70 bearings appear to have been dragging at start of Test 1006
<u>Core Barrel Inlet</u>				
FT-C-1	110 inches from upper vessel flange face	± 40 to ± 300 gpm	47, 48	FT-C-1 detector capability exceeded at 300 gpm above which data are considered invalid
<u>Pressurizer</u>				
FT-41	Outlet, Spool 41	± 8 to ± 200 gpm	49	
<u>ECC System</u>				
FT-ECC-OLA	In ECC line from operating loop ECC injection accumulator	± 4.0 to ± 50 gpm	51	FT-ECC-OLA not used during Test 1004
FT-ECC-OLP	In ECC line from operating loop ECC injection pump	± 4.0 to ± 100 gpm	51	FT-ECC-OLP not used during Test 1004
FT-ECC-BLP	In line from blowdown loop ECC injection pump	± 2.5 to ± 20 gpm	51	FT-ECC-BLP not used during Test 1004
FT-ECC-LPA	In line from operating loop ECC injection accumulator to lower plenum	± 4.0 to ± 50 gpm	50	FT-ECC-LPA not used during Test 1006
FT-ECC-BLA	In line from blowdown loop ECC injection accumulator	± 4.0 to ± 50 gpm	50, 51	
<u>FLUID VELOCITY</u>				
<u>Vessel Downcomer Gap</u>		± 1 to ± 10 ft/sec		Obtained by turbine flowmeters
FT-212	49.88 inches, 135°			FT-212 failed during both tests
FT-239	47.88 inches, 225°		52, 53	FT-239 detector capability exceeded at 22 ft/sec during Test 1006.
FT-253	119.23 inches, 225°			FT-253 failed during Test 1004. FT-253 data for Test 1006 indicate excessive flow prior to blowdown; calibration data were not available for correction
FT-270	94.43 inches, 180°			FT-270 failed during both tests
<u>MASS FLOW RATE</u>				
<u>Operating Loop</u>		Momentum flux: ± 100 to $\pm 2.0 \times 10^4$ lb/ft-sec ² volumetric flow: ± 40 to ± 800 gpm density: 0.05 to 62.4 lbm/ft ³		
FD-1 D-1V			54, 55	
FT-1 D-1V	Hot leg, Spool 1		54	FT-1 failed during Test 1006.
FD-19 D-19V			56, 57	
FT-19 D-19V	Pump discharge, Spool 19		56, 57	
FD-22 D-22V			58, 59	
FT-22 D-22V	Cold leg, Spool 22		58, 59	
FD-5 D-5V	Hot leg, Spool 5		60, 61	
FD-15 D-15V	Pump suction, Spool 15		60, 61	
<u>Blowdown Loop</u>		Momentum flux: ± 500 to $\pm 5.0 \times 10^4$ lb/ft-sec ² volumetric flow: ± 40 to ± 300 gpm density: 0.05 to 62.4 lbm/ft ³		
FD-70 D-70V			62, 63	
FT-70 D-70V	Hot leg, Spool 70		63	FT-70 failed during Test 1004
FD-50 D-50V	Cold leg, Spool 50		64, 65	
FD-76 D-76V	Cold leg, Spool 76		64, 65	
<u>Core Barrel Inlet</u>		Momentum flux: ± 140 to $\pm 3.0 \times 10^4$ lb/ft-sec ² volumetric flow: ± 40 to ± 300 gpm density: 0.5 to 62.4 lbm/ft ³		
FD-224 D-225H	D-225H: 110.0 inches, 0° FD-224: 110.0 inches, 315°		66	FD-224 failed during Test 1006
FT-C-1 D-225H	FT-C-1: 110.0 inches		66, 67	
<u>DENSITY, FLUID</u>				
<u>Operating Loop</u>		0.05 to 62.4 lbm/ft ³		Obtained by gamma attenuation technique (densitometer).
D-1V	Hot leg, Spool 1		68, 69	
D-5V	Hot leg, Spool 5		68, 69	
D-15V	Pump suction, Spool 15		70, 71	
D-19V	Pump discharge, Spool 19		70, 71	
D-22H				
D-22V	Cold leg, Spool 22		72, 73	
<u>Blowdown Loop</u>			74, 75	
D-50V	Cold leg, Spool 50			
D-70V	Hot Leg, Spool 70			Fluctuations in densities starting at about 20 sec are due to ECC flow during Test 1006
D-76V	Cold leg, Spool 76			

TABLE IV (contd.)

DATA PRESENTATION FOR ISOTHERMAL TESTS 1004 AND 1006

Measurement ^[a]	Location ^[b]	Range ^[c,d]	Figure ^[d]	Comment ^[d]
<u>Vessel</u>			76, 77	
D-225H	Core barrel inlet 110.0 inches, 0°			
D-228H	Lower plenum 122.4 inches, 0°			
D-275V	Lower plenum 114.5 inches, 315°			Gamma beam diagonally across lower plenum
<u>Pressure Suppression Header</u>			78	
D-83V	Near suppression tank downcomer			
<u>PRESSURE</u>				Obtained by Norwood strain gage type transducers accurate to within $\pm 1\%$ of full scale.
<u>Operating Loop</u>		0-3000 psig	79, 80	
P-1	Hot leg, Spool 1			
P-15	Pump suction, Spool 15			
P-19	Pump discharge, Spool 19			
P-40	Pressurizer outlet, Spool 40			
<u>Blowdown Loop</u>		60-3000 psig	81, 82	
P6-HN2	Simulated pump side, nozzle throat, Port 2			
P-50	Cold leg, Spool 50			
P-51	Cold leg, downstream of vessel-side nozzle, Station 51			
P-61	Downstream of hot leg nozzle, Station 61			
P-62	Pump side, rupture assembly inner disc cavity, Spool 62			
P-70	Hot leg, Spool 70			
P-76	Cold leg, Spool 76			
<u>Vessel</u>		60-3000 psig	83, 84	
P-207	Outlet plenum, 28.4 inches, 30°			
P-255	Lower plenum, 121.3 inches, 240°			
<u>Pressure Suppression System</u>			85, 86	
P-53	Blowdown loop cold leg, Spool 53	0-1000 psig		
P-81	Pressure suppression header, Spool 81	0-200 psig		
P-89	Vapor chamber of pressure suppression vessel	0-200 psig		
<u>Outlet Plenum</u>			87	
P-LFF-HL (LOFT Pressure Transducer)	Hot leg stub in outlet plenum			
<u>ECC, Accumulator</u>		0-3000 psig		
P-P-ECC-OLA	Blowdown loop ECC accumulator		88, 89	
P-ECC-OLA	Operating loop ECC accumulator		89	P-ECC-OLA not used during Test 1004
P-ECC-LPA	Lower plenum ECC accumulator		88	P-ECC-LPA not used during Test 1006
<u>DIFFERENTIAL PRESSURE</u>				Obtained by differential pressure transducers accurate to within $\pm 1\%$ of full range. Transducers zeroed under ambient liquid-full system conditions. Initial conditions shown in the data are the result of flow-induced pressure gradients and density changes from ambient to operating conditions.
<u>Operating Loop</u>				
DP-22-1	Across pressure vessel, operating loop cold leg to hot leg, Spool 22 to Spool 1	± 28.9 psid	90	
DP-1-5	Hot leg, Spool 1 to Spool 5	± 0.72 psid	91	
DP-5-13	Across steam generator, Spool 5 to Spool 13	± 28.9 psid	92	
DP-8-13	Pump suction orifice, Spool 8 to Spool 13	± 10.8 psid	93	
DP-13-15	Spool 13 to Spool 15	± 3.6 psid	94	DP-13-15 failed during Test 1004
DP-19-15	Across pump, Spool 19 to Spool 15	± 50.0 psid	95	
DP-19-15L	Across pump, Spool 19 to Spool 15	± 3.6 psid	96	
DP-19-22	Spool 19 to Spool 22	± 10.8 psid	97	
DP-22-255	Cold leg to lower plenum, Spool 22 to Station 255	± 10.8 psid	98	
<u>Vessel</u>				
DP-255-207	Vessel lower plenum to vessel upper plenum, Station 255 to Station 207	± 18.0 psid	99	
<u>Downcomer</u>				
DP-213-246	Station 213 to Station 246	± 1.8 psid	100	
DP-246-249	Station 246 to Station 249	± 1.8 psid	101	
DP-249-255	Station 249 to Station 255	± 0.72 psid	102	
<u>Lower Plenum</u>				
DP-261-255	Station 261 to Station 255	± 0.72	103	
<u>Core</u>				
DP-LOFT	Lower plenum to upper plenum of vessel	± 50.0	104	
<u>Blowdown Loop</u>				
DP-207-70	Vessel upper plenum to blowdown loop hot leg, Station 207 to Spool 70	± 3.6 psid	105	
DP-264-50	Vessel inlet annulus to blowdown loop cold leg, Station 264 to Spool 50	± 18.0 psid	106	DP-264-50 failed during Test 1004
DP-52-62	Across rupture discs, Spool 52 to Spool 62	± 500.0 psid	107	

TABLE IV (contd.)

DATA PRESENTATION FOR ISOTHERMAL TESTS 1004 AND 1006

Measurement [a]	Location [b]	Range [c,d]	Figure [d]	Comment [d]
DP-76-61	Across hot leg nozzle, Spool 76 to Station 61	±1000.0 psid	108	DP-76-61 failed during Test 1004
DP-76-HN2	Spool 76 to hot leg nozzle downstream throat (Port 2)	±500.0 psid	109	
DP-96-76	Across simulated pump, Spool 96 to Spool 76	±100.0 psid	110	
DP-70-96	Across simulated steam generator, Spool 70 to Spool 96	±100.0 psid	111	
DP5-HN2-HN4	Vessel side, downstream nozzle throat (Port 2) to downstream nozzle expansion section (Port 4)	±1000.0 psid	112	
DP6-HN2-HN4	Simulated pump side, downstream nozzle throat (Port 2) to downstream nozzle expansion section (Port 4)	±1000.0 psid	113	
DP-HN4-61	Across hot leg nozzle outlet, downstream nozzle expansion section (Port 4) to Station 61	±10.0 psid	114	
<u>Pressure Suppression System</u>				
DP-707-89	Vessel upper plenum to vapor chamber of pressure suppression tank	±500.0 psid	115	
DP-81-89	Header to tank vapor chamber	±50.0 psid	116	
DP-81-85	Header to downcomer entrance	±10.8 psid	117	
LIQUID LEVEL				Liquid level in lower plenum is indicated by density measurements D-228H and D-275V and by differential pressure measurement DP-261-255
<u>Lower Plenum</u>				System not calibrated, data not digitized.
LL-LFTA-259	Port 259			
LL-LFTD-259				
<u>Pressure Suppression System</u>				
LL-PSS	Suppression tank	3.64 psid	118	Obtained by differential pressure cell having one leg connected to a standpipe and the other leg attached to a port in the bottom of the pressure suppression tank
PUMP CHARACTERISTICS				
<u>Pump Speed</u>				
PS-RPM	Operating loop pump	--	119	
<u>Pump Power</u>				
PW-PMP		--	120	
<u>Pump Torque</u>				
T-PMP		--	121	
TIME OF BREAK				Data not presented; measurement established time of rupture as indicated by t=0 seconds on all data plots
<u>Blowdown Loop</u>				
BW-52	Cold leg, vessel side			
BW-62	Cold leg, simulated pump side			
FLOW DIRECTION				
<u>Downcomer Gap</u>				
S-271	65.6 inches, 0°, Station 271			Not taken for Test 1004; data of no value for Test 1006.
DISPLACEMENT				System not calibrated, data useful only for relative motion indication.
<u>Pressure Suppression System</u>				
LDT-PSH	Header first elbow (horizontal deflection)			
LDT-PSV	Beneath suppression vessel (vessel vertical deflection)			
STRAIN				No calibration step available; data signal extremely low.
<u>Pressure Suppression System</u>				
SGI-PSH-HL-0	Header, outside first elbow at impingement from cold leg, simulated pump side, 0°			
SGI-PSH-HL-60	Header, outside first elbow at impingement from cold leg, simulated pump side, 60°			
SGI-PSH-HL-120	Header, outside first elbow at impingement from cold leg, simulated pump side, 120°			
SGT-PSH-HL	On top of header near first elbow			

[a] Measurement nomenclature is defined in Reference 1.

[b] Measurement locations are shown in Figures 1 through 4.

[c] The range indicated is that over which the measurement is considered valid.

[d] Ranges, figure numbers, and comments apply to all measurements within a category unless indicated otherwise. The figure numbers correspond to the data plots presented. In general, where two figures are indicated the first applies to Test 1004 and the second to Test 1006.

Fig. 5 Fluid temperatures in operating loop -- Test 1004.

Fig. 6 Fluid temperatures in operating loop -- Test 1006.

Fig. 7 Fluid temperatures in blowdown loop -- Test 1004.

Fig. 8 Fluid temperatures in blowdown loop -- Test 1006.

Fig. 9 Fluid temperatures in pressure suppression system -- Test 1004.

Fig. 10 Fluid temperatures in pressure suppression system -- Test 1006.

Fig. 11 Fluid temperatures in lower plenum at thermocouple rack -- Test 1004.

Fig. 12 Fluid temperatures in lower plenum at thermocouple rack -- Test 1006.

Fig. 13 Fluid temperatures in lower plenum at thermocouple rack -- Test 1004 (expansion of Figure 11 data for the 2-, 6-, 10-, 14-, and 18-inch levels).

Fig. 14 Fluid temperatures in lower plenum at thermocouple rack -- Test 1004 (expansion of Figure 11 data for the 4-, 8-, 12-, and 16-inch levels).

Fig. 15 Fluid temperatures in downcomer gap and outlet plenum -- Test 1004.

Fig. 16 Fluid temperatures in downcomer gap and outlet plenum -- Test 1006.

Fig. 17 Fluid temperatures in downcomer gap and outlet plenum -- Test 1004 (expansion of Figure 15).

Fig. 18 Fluid temperatures in downcomer gap and outlet plenum -- Test 1006 (expansion of Figure 16 for TF-48C-180, TF-78D-180, and TF-211).

Fig. 19 Fluid temperatures in downcomer gap and outlet plenum -- Test 1006 (expansion of Figure 16 for TF-48D-0, TF-78D-0, TF-95D-225, and TF-274).

Fig. 20 Fluid temperatures in ECC lines from blowdown loop accumulator tank and lower plenum accumulator tank -- Test 1004.

Fig. 21 Fluid temperatures in ECC lines from blowdown loop accumulator tank and lower plenum accumulator tank -- Test 1006.

Fig. 22 Metal temperatures in core barrel -- Test 1004.

Fig. 23 Metal temperatures in core barrel -- Test 1006.

Fig. 24 Metal temperatures in downcomer filler -- Test 1004.

Fig. 25 Metal temperatures in downcomer filler -- Test 1006.

Fig. 26 Metal temperatures in vessel wall 95 inches from vessel upper flange face -- Test 1004.

Fig. 27 Metal temperatures in vessel wall 95 inches from vessel upper flange face -- Test 1006.

Fig. 28 Metal temperatures in lower plenum vessel wall -- Test 1004.

Fig. 29 Metal temperatures in lower plenum vessel wall -- Test 1006.

Fig. 30 Metal temperatures in operating loop hot leg Spool 1 -- Test 1004.

Fig. 31 Metal temperatures in operating loop hot leg Spool 1 -- Test 1006.

Fig. 32 Metal temperatures in operating loop cold leg Spool 19 -- Test 1004.

Fig. 33 Metal temperatures in operating loop cold leg Spool 19 -- Test 1006.

Fig. 34 Metal temperatures in operating loop cold leg Spool 22 -- Test 1004.

Fig. 35 Metal temperatures in operating loop cold leg Spool 22 -- Test 1006.

Fig. 36 Metal temperatures in blowdown loop -- Test 1006.

Fig. 37 Momentum flux from drag discs in operating loop hot leg -- Test 1004.

Fig. 38 Momentum flux from drag discs in operating loop hot leg -- Test 1006.

Fig. 39 Momentum flux from drag discs in operating loop cold leg -- Test 1004.

Fig. 40 Momentum flux from drag discs in operating loop cold leg -- Test 1006.

Fig. 41 Momentum flux from drag discs in blowdown loop -- Test 1004.

Fig. 42 Momentum flux from drag discs in blowdown loop -- Test 1006.

Fig. 43 Momentum flux from drag discs at core barrel inlet -- Test 1004.

Fig. 44 Volumetric flow rate from turbine meters in operating loop -- Test 1004.

Fig. 45 Volumetric flow rate from turbine meters in operating loop -- Test 1006.

Fig. 46 Volumetric flow rate from turbine meter in blowdown loop hot leg -- Test 1006.

Fig. 47 Volumetric flow rate from turbine meter at core barrel inlet -- Test 1004.

Fig. 48 Volumetric flow rate from turbine meter at core barrel inlet -- Test 1006.

Fig. 49 Volumetric flow rate from turbine meter at pressurizer outlet -- Tests 1004 and 1006.

Fig. 50 Volumetric flow rate from ECC accumulator tanks (turbine meters) -- Test 1004.

Fig. 51 Volumetric flow rate from ECC accumulator tanks and ECC injection pumps in operating and blowdown loops (turbine meters) -- Test 1006.

Fig. 52 Fluid velocity from turbine meter in downcomer gap -- Test 1004.

Fig. 53 Fluid velocity from turbine meter in downcomer gap -- Test 1006.

Fig. 54 Mass flow rate in operating loop hot leg Spool 1 -- Test 1004.

Fig. 55 Mass flow rate in operating loop hot leg Spool 1 -- Test 1006.

Fig. 56 Mass flow rate in operating loop at pump discharge (Spool 19) -- Test 1004.

Fig. 57 Mass flow rate in operating loop at pump discharge (Spool 19) -- Test 1006.

Fig. 58 Mass flow rate in operating loop cold leg Spool 22 -- Test 1004.

Fig. 59 Mass flow rate in operating loop cold leg Spool 22 -- Test 1006.

Fig. 60 Mass flow rate in operating loop Spools 5 and 15 -- Test 1004.

Fig. 61 Mass flow rate in operating loop Spools 5 and 15 -- Test 1006.

Fig. 62 Mass flow rate in blowdown loop Spool 70 -- Test 1004.

Fig. 63 Mass flow rate in blowdown loop Spool 70 -- Test 1006.

Fig. 64 Mass flow rate in blowdown loop Spools 50 and 76 -- Test 1004.

Fig. 65 Mass flow rate in blowdown loop Spools 50 and 76 -- Test 1006.

Fig. 66 Mass flow rate at core barrel inlet -- Test 1004.

Fig. 67 Mass flow rate at core barrel inlet -- Test 1006.

Fig. 68 Fluid density in operating loop hot leg -- Test 1004.

Fig. 69 Fluid density in operating loop hot leg -- Test 1006.

Fig. 70 Fluid density at operating loop pump inlet and outlet -- Test 1004.

Fig. 71 Fluid density at operating loop pump inlet and outlet -- Test 1006.

Fig. 72 Fluid density in operating loop cold leg -- Test 1004.

Fig. 73 Fluid density in operating loop cold leg -- Test 1006.

Fig. 74 Fluid density in blowdown loop -- Test 1004.

Fig. 75 Fluid density in blowdown loop -- Test 1006.

Fig. 76 Fluid density in vessel -- Test 1004.

Fig. 77 Fluid density in vessel -- Test 1006.

Fig. 78 Fluid density in pressure suppression header -- Tests 1004 and 1006.

Fig. 79 Pressure in operating loop -- Test 1004.

Fig. 80 Pressure in operating loop -- Test 1006.

Fig. 81 Pressure in blowdown loop -- Test 1004.

Fig. 82 Pressure in blowdown loop -- Test 1006.

Fig. 83 Pressure in vessel -- Test 1004.

Fig. 84 Pressure in vessel -- Test 1006.

Fig. 85 Pressure in pressure suppression system -- Test 1004.

Fig. 86 Pressure in pressure suppression system -- Test 1006.

Fig. 87 Pressure at hot leg stub in upper plenum (LOFT free field pressure transducer) -- Tests 1004 and 1006.

Fig. 88 Pressure of ECC in accumulators -- Test 1004.

Fig. 89 Pressure of ECC in accumulators -- Test 1006.

Fig. 90 Differential pressure across operating loop (DP-22-1) -- Tests 1004 and 1006.

Fig. 91 Differential pressure, operating loop hot leg (DP-1-5) -- Tests 1004 and 1006.

Fig. 92 Differential pressure across steam generator (DP-5-13) -- Tests 1004 and 1006.

Fig. 93 Differential pressure across pump suction orifice (DP-8-13) -- Tests 1004 and 1006.

Fig. 94 Differential pressure across operating loop pump inlet (DP-13-15) -- Test 1006.

Fig. 95 Differential pressure across operating loop pump (DP-19-15) -- Tests 1004 and 1006.

Fig. 96 Differential pressure across operating loop pump, low range (DP-19-15L) -- Tests 1004 and 1006.

Fig. 97 Differential pressure across operating loop cold leg (DP-19-22)
 -- Tests 1004 and 1006.

Fig. 98 Differential pressure between cold leg and lower plenum (DP-22-255)
 -- Tests 1004 and 1006.

Fig. 99 Differential pressure across core (DP-255-207) -- Tests 1004 and 1006.

Fig. 100 Differential pressure across upper portion of downcomer (DP-213-246) -- Tests 1004 and 1006.

Fig. 101 Differential pressure across middle portion of downcomer (DP-246-249) -- Tests 1004 and 1006.

Fig. 102 Differential pressure across lower portion of downcomer (DP-249-255) -- Tests 1004 and 1006.

Fig. 103 Differential pressure across lower plenum (DP-261-255) -- Tests 1004 and 1006.

Fig. 104 Differential pressure across vessel (DP-LOFT) -- Tests 1004 and 1006.

Fig. 105 Differential pressure between vessel upper plenum and blowdown loop hot leg (DP-207-70) -- Tests 1004 and 1006.

Fig. 106 Differential pressure between vessel inlet annulus and blowdown loop cold leg (DP-264-50) -- Test 1006.

Fig. 107 Differential pressure between inner disc cavities (DP-52-62) -- Tests 1004 and 1006.

Fig. 108 Differential pressure across blowdown loop hot leg nozzle (DP-76-61) -- Test 1006.

Fig. 109 Differential pressure between simulated pump and throat of blowdown loop hot leg nozzle (DP-76-HN2) -- Tests 1004 and 1006.

Fig. 110 Differential pressure across simulated pump (DP-96-76) -- Tests 1004 and 1006.

Fig. 111 Differential pressure across simulated steam generator (DP-70-96) -- Tests 1004 and 1006.

Fig. 112 Differential pressure across blowdown loop cold leg nozzle diverging section (DP5-HN2-HN4) -- Tests 1004 and 1006.

Fig. 113 Differential pressure across blowdown loop hot leg nozzle diverging section (DP6-HN2-HN4) -- Tests 1004 and 1006.

Fig. 114 Differential pressure across blowdown loop hot leg nozzle, Station 61 (DP-HN4-61) -- Tests 1004 and 1006.

Fig. 115 Differential pressure between vessel upper plenum and pressure suppression tank vapor chamber (DP-207-89) -- Tests 1004 and 1006.

Fig. 116 Differential pressure between pressure suppression header and pressure suppression tank vapor chamber (DP-81-89) -- Tests 1004 and 1006.

Fig. 117 Differential pressure between pressure suppression header and pressure suppression tank downcomer entrance (DP-81-85) -- Tests 1004 and 1006.

Fig. 118 Liquid level in pressure suppression tank -- Tests 1004 and 1006.

Fig. 119 Pump speed -- Tests 1004 and 1006.

Fig. 120 Pump power -- Tests 1004 and 1006.

Fig. 121 Pump torque -- Tests 1004 and 1006.

IV. REFERENCE

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