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**EXPERIMENT DATA REPORT
FOR 1-1/2-LOOP SEMISCALE SYSTEM
ISOTHERMAL TESTS 1001, 1002, AND 1003**

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ABSTRACT

Recorded test data are presented for Tests 1001, 1002, and 1003 of the isothermal portion of the Semiscale Blowdown and Emergency Core Cooling (ECC) Project. Although the major emphasis in the isothermal blowdown experiments was on ECC delivery, these first tests were conducted without injection of simulated ECC in order to establish the baseline system behavior and to determine the effects of lower plenum geometry and heat transfer characteristics. 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 1001, 1002, and 1003 for use by others and for support of subsequent interpretative reports and analyses.

SUMMARY

Tests 1001, 1002, and 1003 were the first tests 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 were conducted without simulated ECC injection to establish baseline system behavior and to determine the effects of lower plenum geometry and heat transfer characteristics. 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; and a pressure suppression system with header and pressure suppression tank.

Each of the three tests was initiated from isothermal conditions of about 2250 psig and 575°F by a simulated instantaneous large cold leg pipe break. Test 1001 provided data for establishing the reference system hydraulic behavior during sudden decompression. Test 1002 provided data for establishing the effects of the lower plenum heat transfer characteristics on the water remaining in the lower plenum following blowdown. Test 1003 provided data for establishing the effect on the water remaining in the lower plenum of altering the lower plenum geometry. For Test 1003, the length-to-diameter ratio of the lower plenum was 1.2:1 as compared with 2.8:1 for Tests 1001 and 1002.

In general, instrumentation used in Tests 1001, 1002, and 1003 functioned as intended and data loss was minimal. Of more than 400 measurements attempted during these three tests, more than 90% 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 1001, 1002, AND 1003

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 was on ECC delivery. However, Tests 1001, 1002, and 1003, the first series of tests in the isothermal test program, were conducted without simulated ECC injection to establish baseline system behavior and to determine the effects of lower plenum geometry and heat transfer characteristics. The tests were initiated from isothermal conditions of about 2250 psig and 575°F by an instantaneous large cold leg break. The length-to-diameter ratio of the lower plenum of the 1-1/2-loop semiscale vessel is somewhat larger than the ratio for a typical PWR. In order to establish baseline data for integral system effects, Test 1001 was conducted with the lower plenum of the standard semiscale geometry (length-to-diameter ratio of 2.8:1) and insulated with a thermal shield. Test 1002 was conducted with the lower plenum of the standard geometry ($L/D = 2.8:1$) but with no thermal insulation to investigate the effects of increased lower plenum heat transfer. Test 1003 was conducted to investigate the effects of varied lower plenum geometry ($L/D = 1.2:1$, with thermal shield installed). The results of these tests together with those from other tests in the isothermal program are expected to provide the following: (a) a significant contribution to the existing coupled-effects data base for development and evaluation of LOCA analytical methods, (b) a basis for determining the applicability of the steady state countercurrent flow results obtained from separate-effects tests in the semiscale program (transparent vessel tests and steady state tests) for predicting blowdown behavior, and (c) a data base, including both separate-effects and coupled-effects results for countercurrent flow, for use with data from larger scale separate effects experiments (AEC-industry cooperative programs) to establish the effect of physical scaling.

The test configuration and conditions for Tests 1001, 1002, and 1003 are summarized briefly as follows:

Test 1001

- (1) Initial isothermal conditions were about 2260 psig and 578°F.
- (2) The downcomer gap size was 0.5 inch.
- (3) The standard (long) lower plenum configuration ($L/D = 2.8:1$) was used with the thermal shield installed.
- (4) The 100% break area nozzles were used.

Test 1002

- (1) Initial isothermal conditions were about 2262 psig and 579°F.
- (2) The downcomer gap size was 0.5 inch.
- (3) The standard (long) lower plenum configuration ($L/D = 2.8:1$) was used but without the thermal shield installed.
- (4) The 100% break area nozzles were used.

Test 1003

- (1) Initial isothermal conditions were about 2245 psig and 582°F.
- (2) The downcomer gap size was 0.5 inch.
- (3) The short lower plenum configuration ($L/D = 2.8:1$) was used with the thermal shield installed.
- (4) 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 1001, 1002, and 1003. 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 1001, 1002, AND 1003

The system configuration, initial test conditions, and events and conditions following blowdown initiation that are specific to Tests 1001, 1002, and 1003 are presented.

1. SYSTEM CONFIGURATION

The 1-1/2-loop isothermal semiscale system used for Tests 1001, 1002, and 1003 consisted of a pressure vessel with internals; an operating loop with steam generator, pump, and pressurizer; a blowdown loop with a simulated steam generator, a simulated pump, and two rupture assemblies; and a pressure suppression system with a suppression tank and a header.

For Tests 1001 and 1002, 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 Test 1003, the short lower plenum ($L/D = 1.2:1$) was used; the volumes of the short lower plenum and the standard lower plenum are the same. For Tests 1001 and 1003, the lower plenum was thermally insulated with a thermal shield, which consists of a thermal sleeve and the bottom thermal liner plate. A vessel downcomer filler piece was used to provide a 0.5-inch downcomer gap for the three 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.

Sprays were used during Tests 1001 and 1002 as a means of controlling the pressure in the pressure suppression tank. A 3-inch Schedule 40 flanged nozzle (with blind flange installed) in the top of the pressure suppression tank provided access to the spray equipment.

For Tests 1002 and 1003, two 1-1/2-inch vacuum breaker valves were provided to prevent suction of water up the downcomer after completion of blowdown. Performance of this system was marginal, and in Test 1001 the vacuum-breaker valves were replaced by three 1-1/2-inch check valves^[a].

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.

[a] Tests 1001, 1002, and 1003 were conducted in reverse order.

TABLE I

CONDITIONS AT BLOWDOWN INITIATION (t = 0 seconds)

Condition	Test 1001	Test 1002	Test 1003
Core outlet temperature (°F)	575	579	582
System flow rate (gpm)	170	173	172
System pressure at vessel outlet (psig)	2260	2260	2245
Pump differential pressure (psid)	37.5	38.0	38.0
Suppression tank water level (in.)	46	46	68
Suppression tank water temperature (°F)	183	195	150
Suppression tank water pressure (psig)	13.5	12.7	Atmospheric
Suppression spray water temperature (°F)	Not used	~70	~70
Pressurizer water volume (ft ³)	Not available	0.73	0.59
Suppression tank water level after blowdown (in.)	92	54	86
Suppression tank water pressure after blowdown (psig)	48 ^[a]	46 ^[b]	23 ^[b]

[a] At 22 sec after blowdown initiation.

[b] At 30 sec after blowdown initiation.

TABLE II
WATER CHEMISTRY PRIOR TO BLOWDOWN

	<u>Test 1001</u>	<u>Test 1002</u>	<u>Test 1003</u>
pH	6.3	8.0	5.6
Chlorides (ppm)	0.22	0.73	6.8
Conductivity (μmhos)	22	36	115
Suspended solids (ppm)	0.8	9.2	<1.0
H ₂ (cc/l)	0.7	4.7	0.4
O ₂ (cc/l)	<0.1	59.0	0.8
N ₂ (cc/l)	4.5	267.4	4.3
A (cc/l)	Not recorded	2.9	<0.1
CO ₂ (cc/l)	0.8	0.1	5.1
Total Gas (cc/l)	6.0	334.0	10.7

3. EVENTS FOLLOWING RUPTURE

The sequence of events as recorded following rupture is as follows:

	<u>Time after Rupture</u> <u>(seconds, except as noted)</u>		
	<u>Test</u> <u>1001</u>	<u>Test</u> <u>1002</u>	<u>Test</u> <u>1003</u>
Pump power off	150	~50	~50
Pressure suppression spray initiated ^[a]	—	~58.75	~60
Pressure suppression spray terminated (sec)	—	~240	~240
Lower plenum drained of water	~17 min	6 to 7 min	~6 min

[a] Spray rate was 1.2 gpm for Test 1002 and 1.0 gpm for Test 1003; sprays were not used for Test 1001.

III. DATA PRESENTATION

The data from semiscale isothermal Tests 1001, 1002, and 1003 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 III provide supporting information for interpretation of the data graphs shown in Figures 5 through 165. Figures 1 through 4 show the locations of all measurements in the isothermal system. Table III groups the measurements taken during the tests 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 some instances 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 the three 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.

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

8

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

ANC-R-2281

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°	32.38		.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	DENSITY	.687
231			9.88		.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	DENSITY	.687
235			30.38		.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		
276				IN LOWER HEAD	DENSITY

Fig. 4 Pressure vessel -- isometric showing instrumentat

Item	Description
1	Vessel
2	Main Core Barrel Assembly
3	Downcomer Filter, 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 Filter 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 Strip
21	Downcomer Filter, 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 Case Support Bracket (rotated to 180°) (D-275V)

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

△ Item Number

○ Type of Measurement
 45° Rotational Location
 Location
 Distance from Upper Flange Face

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

TABLE III
DATA PRESENTATION FOR ISOTHERMAL TESTS 1001, 1002, AND 1003

TABLE III DATA PRESENTATION FOR ISOTHERMAL TESTS 1001, 1002, AND 1003				
Measurement [a]	Location [b]	Range [c,d]	Figure [d]	Comment [d]
FLUID TEMPERATURE				
<u>Operating Loop</u>		33-650°F	5 - 7	Chromel-Alumel thermocouples; estimated accuracy to within $\pm 7^\circ\text{F}$.
TF-1	Hot leg, Spool 1			
TF-15	Pump suction, Spool 15			TF-15 failed during Test 1003
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, a shielded thermocouple, failed during Test 1001 and was not used during Tests 1002 and 1003
<u>Blowdown Loop</u>		33-650°F	8 - 10	
TF-50	Cold leg, Spool 50			
TF-51	Cold leg downstream of vessel-side nozzle			
TF-61	Hot leg, downstream of nozzle			TF-61 was not used during Test 1001 and failed during Test 1003
TF-70	Hot leg, Spool 70			
TF-76	Cold leg, Spool 76			TF-76 failed during Test 1003
<u>Pressure Suppression System</u>			11 - 13	
TF-83	Header near downcomer entrance (1 inch from ID of header on bottom)	33-650°F		
TF-86-1	Suppression vessel, Station 86-1	33-300°F		TF-86-1 was not used during Test 1001
TF-86-2	Suppression vessel, Station 86-2	33-300°F		TF-86-2 was used only during Test 1002
TF-86-3	Suppression vessel, Station 86-3	33-300°F		TF-86-3 was not used during Test 1003
TF-86-4	Suppression vessel, Station 86-4	33-300°F		TF-86-4 was not used during Test 1003
TF-88	Suppression vessel vapor chamber, 2 inches from tank wall	33-650°F		
RB-86-6	Suppression vessel water, Station 86-6	0-1000°F		RB-86-6 is a resistance bulb fluid temperature detector
<u>Lower Plenum (Vertical Thermocouple Rack)</u>		33-650°F	14 - 16	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			
TF-260-4	4-inch level from inside bottom of lower head			TF-260-4 failed during Test 1003
TF-260-6	6-inch level from inside bottom of lower head			
TF-260-8	8-inch level from inside bottom of lower head			
TF-260-10	10-inch level from inside bottom of lower head			TF-260-10 failed during Test 1003
TF-260-12	12-inch level from inside bottom of lower head			TF-260-12 failed during Test 1003
TF-260-14	14-inch level from inside bottom of lower head			TF-260-14 failed during Test 1003
TF-260-16	16-inch level from inside bottom of lower head			TF-260-16 failed during Test 1003
TF-260-18	18-inch level from inside bottom of lower head			
<u>Downcomer Gap</u>		33-650°F	17 - 19	
TF-47D-180	~ 48 inches, 180° , extending 1/8 inch into fluid from vessel wall side			
TF-48C-180	~ 48 inches, 180° , extending 1/8 inch into fluid from core barrel			
TF-48D-0	~ 48 inches, 0° , extending 1/8 inch into fluid from vessel wall side			
TF-78D-0	~ 78 inches, 0°			
TF-78D-180	~ 78 inches, 180°			
TF-95D-45	~ 95 inches, 45°			
TF-95D-225	~ 95 inches, 225°			
<u>Outlet Plenum</u>		33-650°F	17 - 19	
TF-211	32.4 inches, 45°			TF-211 failed during Test 1003
TF-274	28.38 inches, 315°			TF-274 failed during Test 1003
METAL TEMPERATURE				
<u>Core Barrel</u>		33-650°F	20 - 22	Chromel-Alumel thermocouples; estimated accuracy to within $\pm 7^\circ\text{F}$
TM-47C-0	~ 47 inches, 0° , 1/8 inch from OD			
TM-47C-180	~ 47 inches, 180° , 1/8 inch from OD			TM-47C-180 was used only during Test 1001
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-77C-180 failed during Test 1001
TM-94C-45	~ 95 inches, 45° , 1/8 inch from OD			
TM-94C-16-45	~ 95 inches, 45° , 1/16 inch from ID			
<u>Downcomer Filler</u>		33-650°F	23 - 25	
TM-48D-0	~ 48 inches, 0° , 1/16 inch from ID			
TM-48D-180	~ 48 inches, 180° , 1/16 inch from ID			TM-48D-180 was used only during Test 1001
TM-63D-45	~ 63 inches, 45° , 1/16 inch from ID			
TM-63D-225	~ 63 inches, 225° , 1/8 inch from OD			TM-63D-225 was used only during Test 1001
TM-78D-0	~ 78 inches, 0° , 1/16 inch from ID			

TABLE III (contd.)

DATA PRESENTATION FOR ISOTHERMAL TESTS 1001, 1002, AND 1003

TABLE III (contd.)

DATA PRESENTATION FOR ISOTHERMAL TESTS 1001, 1002, AND 1003

Measurement [a]	Location [b]	Range [c,d]	Figure [d]	Comment [d]
TM-78D-180	~78 inches, 100°, 1/16 inch from ID			TM-78D-180 was used only during Test 1001
TM-95D-45	~95 inches, 45°, 1/16 inch from ID			TM-95D-45 failed during Test 1002
TM-95D-225	~95 inches, 225°, 1/16 inch from ID			TM-95D-225 was used only during Test 1001
TM-116D-45	~116 inches, 45°, 1/16 inch from ID			TM-116D-45 was used only during Test 1001
TM-116D-225	~116 inches, 225°, 1/16 inch from ID			
<u>Vessel Wall</u>		33-650°F		
TM-95V-45	~95 inches, 45°, 1/2 inch from OD		26 - 28	
TM-95D-45	~95 inches, 45°, 1/16 inch from ID		26,28	TM-95D-45 failed during Test 1002
TM-205-S	~15 inches, 5°, vessel exterior		30,32	TM-205-S was used only during Test 1003
TM-205-18	~15 inches, 5°, 1/8 inch from ID		30,32	TM-205-18 was used only during Test 1003
TM-205-316	~15 inches, 5°, 3/16 inch from ID		30,32	TM-205-316 was used only during Test 1003
TM-210-S	~33 inches, 5°, vessel exterior		29,30,31	TM-210-S was not used during Test 1001
TM-210-18	~33 inches, 5°, 1/8 inch from ID		29,30,31	TM-210-18 was not used during Test 1001
TM-210-316	~33 inches, 5°, 3/16 inch from ID		29,30,31	TM-210-316 was not used during Test 1001
TM-250-S	~106 inches, 195°, vessel exterior		30,32	TM-250-S failed during Test 1002, and was not used during Test 1001
TM-250-18	~106 inches, 195°, 1/8 inch from ID		30,32	TM-250-18 failed during Test 1002, and was not used during Test 1001
TM-250-316	~106 inches, 195°, 3/16 inch from ID		30,32	TM-250-316 failed during Test 1002, and was not used during Test 1001
<u>Lower Plenum Vessel Wall</u>		33-650°F	33,35	
TM-LH-276	In lower plenum head			TM-LH-276 was not used during Test 1003
TM-LF-IDL	4.9 inches below lower plenum upper Grayloc flange face, 270° from cold leg centerline, 1/16 inch from ID of filler piece			TM-LF-IDL was not used during Test 1003
TM-LF-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-LF-IDU was not used during Test 1003
TM-LF-VOD	On vessel OD 5.0 inches above lower plenum upper Grayloc flange face, 270° from cold leg centerline			
<u>Operating Loop</u>		33-650°F		
TM-1B	Hot leg, Spool 1, 1/8 inch from ID (bottom)		36	TM-1B failed during Test 1003
TM-1I	Hot leg, Spool 1, 1/8 inch from ID (top)		36	TM-1I failed during Tests 1002 and 1003
TM-19B	Cold leg, Spool 19, 1/8 inch from ID (bottom)		38,39	TM-19B failed during Test 1003
TM-19H	Cold leg, Spool 19, 1/8 inch from ID (middle)		38,39,40	
TM-19I	Cold leg, Spool 19, 1/8 inch from ID (top)		38,39,40	
TM-19M	Cold leg, Spool 19, 1/4 inch from ID (top)		38,39,40	
TM-19S	Cold leg, Spool 19, outside surface (top)		38,40	TM-19S failed during Test 1002
TM-22B	Cold leg, Spool 22, 1/8 inch from ID (bottom)		41,42,43	
TM-22H	Cold leg, Spool 22, 1/8 inch from ID (middle)		41,42,43	
TM-22I	Cold leg, Spool 22, 1/8 inch from ID (top)		42	TM-22I was not used during Test 1001 and failed during Test 1003
TM-22M	Cold leg, Spool 22, 1/4 inch from ID (top)		41,42,43	
TM-22S	Cold leg, Spool 22, outside surface (top)		41,42,43	TM-22S malfunctioned for 10 sec after the start of blowdown during Test 1001. Data for Test 1001 are questionable.
<u>Pressure Suppression System</u>				
TM-83	Header, on surface near first elbow			TM-83 failed during Test 1001, and was not used during Tests 1002 and 1003
TM-PSH-EL	Header, on surface near first elbow		44	TM-PSH-EL was not used during Tests 1002 and 1003
<u>MOMENTUM FLUX</u>				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. The data as presented show magnitude only; direction can be determined from the mass flow rate data.
<u>Operating Loop</u>		+100 to +2.0 x 10 ⁴ lb/ft-sec ²		
FD-1	Hot leg, Spool 1		45,46,47	
FD-5	Hot leg, Spool 5		45,46,47	
FD-15	Pump suction, Spool 15		48,49,50	
FD-19	Pump discharge, Spool 19		48,49,51	
FD-22	Cold leg, Spool 22		48,49,50	
<u>Blowdown Loop</u>				
FD-50	Cold leg, Spool 50	+430 to +5.0 x 10 ⁴ lb/ft-sec ²	52,53,55	
FD-70	Hot leg, Spool 70	+500 to +6.0 x 10 ⁴ lb/ft-sec ²	52,53,54	
FD-76	Cold leg, Spool 76	+500 to +6.0 x 10 ⁴ lb/ft-sec ²	52,53,54	
<u>Pressure Suppression System</u>				
FD-83	Header near downcomer			Not reported; system was not calibrated.

TABLE III (contd.)

DATA PRESENTATION FOR ISOTHERMAL TESTS 1001, 1002, AND 1003

TABLE III (contd.)				
DATA PRESENTATION FOR ISOTHERMAL TESTS 1001, 1002, AND 1003				
Measurement ^[a]	Location ^[b]	Range ^[c,d]	Figure ^[d]	Comment ^[d]
<u>Vessel Downcomer Gap</u>				
FD-212	49.88 inches, 135°			Not reported; system was not calibrated. Detectors were used only during Test 1002
FD-239	47.88 inches, 225°			
FD-253	119.23 inches, 225°			
FD-270	94.43 inches, 180°			
<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	56 - 58	
VOLUMETRIC FLOW RATE				
<u>Operating Loop</u>		+40 to +800 gpm	59 - 61	Obtained by turbine flowmeters
FT-1	Hot leg, Spool 1			FT-1 failed during Test 1002
FT-19	Pump discharge, Spool 19			FT-19 failed during Tests 1001, 1002, and 1003
FT-22	Hot leg, Spool 70			
<u>Blowdown Loop</u>				
FT-70	Hot leg, Spool 70	+20 to +500 gpm	62,63	FT-70 failed during Test 1003
<u>Core Barrel Inlet</u>				
FT-C-1	110 inches from upper vessel flange face	+40 to +300 gpm	64,65	FT-C-1 failed during Test 1002
<u>Pressurizer</u>				
FT-41	Outlet, Spool 41	+8 to +200 gpm	66,67	FT-41 failed during Test 1002
FLUID VELOCITY				
<u>Vessel Downcomer Gap</u>		+1 to +10 ft/sec	68	
FT-212	49.88 inches, 135°			FT-212 was not used during Tests 1002 and 1003
FT-239	47.88 inches, 225°			FT-239 was not used during Tests 1002 and 1003
FT-253	119.23 inches, 225°			FT-253 was not used during Tests 1002 and 1003
FT-270	94.43 inches, 180°			FT-270 was not used during Tests 1002 and 1003
MASS FLOW RATE				
<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		Mass flow rate obtained by combining density (gamma attenuation technique) with volumetric flow rate (turbine flowmeters) or with momentum flux (drag disc)
FD-1 D-1V			69,70,71	
FT-1 D-1V	Hot leg, Spool 1		69,71	FT-1 failed during Test 1002
FD-19 D-19V			72,73,74	
FT-19 D-19V	Pump discharge, Spool 19			FT-19 failed during Tests 1001, 1002, and 1003
FD-22 D-22V			75,76,77	
FT-22 D-22V	Cold leg, Spool 22		75,76,77	
FD-5 D-5V	Hot leg, Spool 5		78,79,80	
FD-15 D-15V	Pump suction, Spool 15		78,79,80	
<u>Blowdown Loop</u>				
		Momentum flux: +500 to $\pm 6.0 \times 10^4$ lb/ft-sec ² or +430 to 5.0×10^4 lb/ft-sec ² volumetric flow: +40 +300 gpm density: 0.05 to 62.4 lbm/ft ³		
FD-70 D-70V			81,82,83	
FT-70 D-70V	Hot leg, Spool 70		81,82	FT-70 failed during Test 1003
FD-50 D-50V			84,85,86	
FD-76 D-76V	Cold leg, Spool 76		84,85,86	
<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°		87,88,89	FT-C-1 failed during Test 1002
FT-C-1 D-225H	FT-C-1: 110.0 inches		87,89	
DENSITY, FLUID				
<u>Operating Loop</u>		0.05 to 62.4 lbm/ ft ³		Obtained by gamma attenuation technique (densitometer).
D-1V	Hot leg, Spool 1		90,91,92	
D-5V	Hot leg, Spool 5		90,91,92	
D-15V	Pump suction, Spool 15		93,94,95	
D-19V	Pump discharge, Spool 19		93,94,95	
D-22H			96	D-22H failed during Test 1002, and was not used during Test 1003
D-22V	Cold leg, Spool 22		96,97,98	

TABLE III (cont.)
DATA PRESENTATION FOR ISOTHERMAL TESTS 1001, 1002, AND 1003

Measurement [a]	Location [b]	Range [c,d]	Figure [d]	Comment [d]
Blowdown Loop				
D-50V	Cold leg, Spool 50		99 - 101	
n-70V	Hot leg, Spool 70			
D-76V	Cold leg, Spool 76			
Vessel				
D-225H	Core barrel inlet 110.0 inches, 0°		102 - 104	
D-228H	Lower plenum 122.4 inches, 0°			
D-275V	Lower plenum 114.5 inches, 315°		105 - 107	D-228H was not used during Test 1003 Gamma beam diagonally across lower plenum D-275V failed during Test 1001
Pressure Suppression Header				
D-83V	Heat suppression tank downcomer			
Operating Loop				
P-1	Hot leg, Spool 1	0-3000 psig	108 - 110	
P-10	Steam generator entrance, Spool 10			
P-15	Pump suction, Spool 15			
P-19	Pump discharge, Spool 19			
P-22	Cold leg, Spool 22			
P-40	Pressurizer outlet, Spool 40			
Blowdown Loop				
P6-HN2	Simulated pump side, nozzle throat,			
P-50	Cold leg, Spool 50			
P-51	Cold leg, downstream of vessel-side			
P-61	nozzle, Station 51			
P-62	Downstream of hot leg nozzle, Station 61			
P-62	Pump side, rupture assembly inner disc			
P-70	cavity, Spool 62			
P-70	Hot leg, Spool 70			
P-76	Cold leg, Spool 76			
Vessel				
P-207	Outlet plenum, 28.4 inches, 30°		114 - 116	
P-255	Lower plenum, 121.3 inches, 240°			
Pressure Suppression System				
P-53	Blowdown loop cold leg, Spool 53	0-1000 psig	117 - 120	
P-77	Blowdown loop cold leg, simulated pump side,	0-100 psig		
P-77	inlet to pressure suppression header, Spool			
P-89	Vapor chamber of pressure suppression	0-200 psig		
P-80	Pressure suppression header between elbows	0-100 psig		
P-83	Pressure suppression chamber downcomer	0-290 psig		
Outlet Plenum				
P-1FF-HI (LOFT Pressure Transducer)	Hot leg stub in outlet plenum		121, 122	P-1FF-HI failed during Test 1003
Differential Pressure				
Operating Loop				
DP-22-1	Across pressure vessel, operating loop cold	450.0 psig	123	
DP-1-5	Hot leg, Spool 1 to Spool 5	40.72 psig for Test 1001 45.0 psig for Test 1002 40.8 psig for Test 1003	124	
DP-3-5	Hot leg, Spool 3 to Spool 5	40.72 psig for Test 1002 40.8 psig for Test 1003	125	DP-3-5 was not used during Test 1001
DP-5-13	Across steam generator, Spool 5 to Spool 13	450.0 psig Test 1003 410.8 psig for Test 1002	126	
DP-8-13	Pump suction orifice, Spool 8 to Spool 13	48.8 psig	127	
DP-13-15	Spool 13 to Spool 15	43.6 psig	128	
DP-19-15	Across pump, Spool 19 to Spool 15	450.0 psig	129	
DP-19-15L	Across pump, Spool 19 to Spool 15	41.8 psig	130	
DP-19-22	Spool 19 to Spool 22	418.0 psig	131	
DP-22-255	Cold leg to lower plenum, Spool 22 to Station 255	410.8 psig	132	
Obtained by Norwood strain gage type transducers accurate to within $\pm 1\%$ of full scale.				
P-53 failed during Test 1002 and was not used during Test 1003.				
P-77 failed during Test 1002. During Tests 1001 and 1003 the detector diaphragm was damaged and data are questionable				
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.				

TABLE III (contd.)

DATA PRESENTATION FOR ISOTHERMAL TESTS 1001, 1002, AND 1003

TABLE III (contd.) DATA PRESENTATION FOR ISOTHERMAL TESTS 1001, 1002, AND 1003				
Measurement [a]	Location [b]	Range [c,d]	Figure [d]	Comment [d]
<u>Vessel</u>				
DP-255-207	Vessel lower plenum to vessel upper plenum, Station 255 to Station 207	+50.0 psid for Tests 1001 and 1002 +10.8 psid for Test 1003	133	DP-255-207 failed during Test 1003
<u>Downcomer</u>				
DP-213-246	Station 213 to Station 246	+1.8 psid	134	
DP-246-249	Station 246 to Station 249	+1.8 psid	135	
DP-249-255	Station 249 to Station 255	+0.72 psid	136	
<u>Lower Plenum</u>				
DP-261-255	Station 261 to Station 255	+0.72 psid	137	
<u>Core</u>				
DP-LOFT	Lower plenum to upper plenum of vessel	+200.0 psid	138	
<u>Blowdown Loop</u>				
DP-207-70	Vessel upper plenum to blowdown hot leg, Station 207 to Spool 70	+3.6 psid for Tests 1001 and 1002 +100.0 psid for Test 1003	139	DP-207-70 failed during Test 1003
DP-264-50	Vessel inlet annulus to blowdown loop cold leg, Station 264 to Spool 50	+100.0 psid	140	
DP-52-62	Across rupture discs, Spool 52 to Spool 62	+500.0 psid		DP-52-62 was not used during Tests 1001 and 1002 and failed during Tests 1003
DP-76-61	Across hot leg nozzle, Spool 76 to Station 61	+500.0 psid	141	
DP-76-HN2	Spool 76 to hot leg nozzle downstream throat (Port 2)	+1500.0 psid	142	DP-76-HN2 data are presented with sign reversed
DP-96-76	Across simulated pump, Spool 96 to Spool 76	+100.0 psid for Tests 1001 and 1002 +50.0 psid for Test 1003	143	DP-96-76 failed during Test 1002
DP-70-96	Across simulated steam generator, Spool 70 to Spool 96	+50.0 psid	144	
DP5-HN2-HN4	Vessel side, downstream nozzle throat (Port 2) to downstream nozzle expansion section (Port 4)	+1000.0 psid	145	
DP6-HN2-HN4	Simulated pump side, downstream nozzle throat (Port 2) to downstream nozzle expansion section (Port 4)	+1000.0 psid +200.0 psid for Test 1003	146	DP6-HN2-HN4 signal conditioning system saturated for the first 14 sec during Test 1003. The magnitude of data above 200 psid is questionable for Test 1003.
DP-HN4-61	Across hot leg nozzle outlet, downstream nozzle expansion section (Port 4) to Station 61	+18.0 psid for Tests 1001 and 1002 +200.0 psid for Test 1003	147	DP-HN4-61 signal conditioning system saturated for the first 16 sec during Test 1001 and during the period between 13 and 17 sec during Test 1002. Data beyond the range limits are questionable
<u>Pressure Suppression System</u>				
DP-207-89	Vessel upper plenum to vapor chamber of pressure suppression tank	+500.0 psid	148	
DP-81-83	Header to downcomer entrance	+10.8 psid for Tests 1001 and 1002 +18.0 psid for Test 1003	149	
DP-83-85	Downcomer entrance to downcomer exit	+10.8 psid	150	
DP-83-89	Downcomer entrance to vapor chamber of pressure suppression tank	+50.0 psid	151	
DP-85-89	Downcomer exit to vapor chamber of pressure suppression tank	+18.0 psid	152	DP-85-89 was not used during Test 1001
<u>LIQUID LEVEL</u>				
<u>Lower Plenum</u>				
LL-LFTA-259	Port 259			Liquid level in lower plenum is indicated by density measurements D-228H and D-275V and by differential pressure measurement DP-261-255
LL-LFTD-259				System not calibrated, data not digitized.
<u>Pressure Suppression System</u>				
LL-PSS	Suppression tank	3.64 psid	153	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. LL-PSS failed during Tests 1002 and 1003
<u>PUMP CHARACTERISTICS</u>				
Operating loop pump				
<u>Pump Speed</u>				
PS-RPM		--	154 - 156	
<u>Pump Power</u>				
PW-PMP		--	157 - 159	
<u>Pump Torque</u>				
T-PMP		--	160 - 162	

TABLE III (contd.)

DATA PRESENTATION FOR ISOTHERMAL TESTS 1001, 1002, AND 1003

TABLE III (contd.)				
DATA PRESENTATION FOR ISOTHERMAL TESTS 1001, 1002, AND 1003				
Measurement ^[a]	Location ^[b]	Range ^[c,d]	Figure ^[d]	Comment ^[d]
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			
DISPLACEMENT				
				System not calibrated, data useful only for relative motion indication.
<u>Pressure Suppression System</u>			163 - 164	
LDT-PSH	Header first elbow (horizontal deflection)			
LDT-PSV	Beneath suppression vessel (vessel vertical deflection)			

[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 three figures are indicated the first applies to Test 1001, the second to Test 1002, and the third to Test 1003.

Fig. 5 Fluid temperatures in operating loop -- Test 1001.

Fig. 6 Fluid temperatures in operating loop -- Test 1002.

Fig. 7 Fluid temperatures in operating loop -- Test 1003.

Fig. 8 Fluid temperatures in blowdown loop -- Test 1001.

Fig. 9 Fluid temperatures in blowdown loop -- Test 1002.

Fig. 10 Fluid temperatures in blowdown loop -- Test 1003.

Fig. 11 Fluid temperatures in pressure suppression system -- Test 1001.

Fig. 12 Fluid temperatures in pressure suppression system -- Test 1002.

Fig. 13 Fluid temperatures in pressure suppression system -- Test 1003.

Fig. 14 Fluid temperatures in lower plenum at thermocouple rack -- Test 1001.

Fig. 15 Fluid temperatures in lower plenum at thermocouple rack -- Test 1002.

Fig. 16 Fluid temperatures in lower plenum at thermocouple rack -- Test 1003.

Fig. 17 Fluid temperatures in downcomer gap and outlet plenum -- Test 1001.

Fig. 18 Fluid temperatures in downcomer gap and outlet plenum -- Test 1002.

Fig. 19 Fluid temperatures in downcomer gap -- Test 1003.

Fig. 20 Metal temperatures in core barrel -- Test 1001.

Fig. 21 Metal temperatures in core barrel -- Test 1002.

Fig. 22 Metal temperatures in core barrel -- Test 1003.

Fig. 23 Metal temperatures in downcomer filler -- Test 1001.

Fig. 24 Metal temperatures in downcomer filler -- Test 1002.

Fig. 25 Metal temperatures in downcomer filler -- Test 1003.

Fig. 26 Metal temperatures in vessel wall 95 inches from vessel upper flange face -- Test 1001.

Fig. 27 Metal temperatures in vessel wall 95 inches from vessel upper flange face -- Test 1002.

Fig. 28 Metal temperatures in vessel wall 95 inches from vessel upper flange face -- Test 1003.

Fig. 29 Metal temperatures in vessel wall -- Test 1002.

Fig. 30 Metal temperatures in vessel wall -- Test 1003.

Fig. 31 Metal temperatures in vessel wall -- Test 1003 (separation of Figure 30 for TM-210-S, TM-210-18, and TM-210-316).

Fig. 32 Metal temperatures in vessel wall -- Test 1003 (separation of Figure 30 for TM-205-S, TM-205-18, TM-205-316, TM-250-S, TM-250-18, and TM-250-316).

Fig. 33 Metal temperatures in lower plenum vessel wall -- Test 1001.

Fig. 34 Metal temperatures in lower plenum vessel wall -- Test 1002.

Fig. 35 Metal temperatures in lower plenum vessel wall -- Test 1003.

Fig. 36 Metal temperatures in operating loop hot leg Spool 1 -- Test 1001.

Fig. 37 Metal temperatures in operating loop hot leg Spool 1 -- Test 1002.

Fig. 38 Metal temperatures in operating loop cold leg Spool 19 -- Test 1001.

Fig. 39 Metal temperatures in operating loop cold leg Spool 19 -- Test 1002.

Fig. 40 Metal temperatures in operating loop cold leg Spool 19 -- Test 1003.

Fig. 41 Metal temperatures in operating loop cold leg Spool 22 -- Test 1001.

Fig. 42 Metal temperatures in operating loop cold leg Spool 22 -- Test 1002.

Fig. 43 Metal temperatures in operating loop cold leg Spool 22 -- Test 1003.

Fig. 44 Metal temperatures in pressure suppression system -- Test 1001.

Fig. 45 Momentum flux from drag discs in operating loop hot leg -- Test 1001.

Fig. 46 Momentum flux from drag discs in operating loop hot leg -- Test 1002.

Fig. 47 Momentum flux from drag discs in operating loop hot leg -- Test 1003.

Fig. 48 Momentum flux from drag discs in operating loop cold leg -- Test 1001.

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Fig. 49 Momentum flux from drag discs in operating loop cold leg -- Test 1002.

Fig. 50 Momentum flux from drag discs in operating loop cold leg -- Test 1003 (FD-15 and FD-22).

Fig. 51 Momentum flux from drag discs in operating loop cold leg -- Test 1003 (FD-19).

Fig. 52 Momentum flux from drag discs in blowdown loop -- Test 1001.

Fig. 53 Momentum flux from drag discs in blowdown loop -- Test 1002.

Fig. 54 Momentum flux from drag discs in blowdown loop -- Test 1003 (FD-70 and FD-76).

Fig. 55 Momentum flux from drag discs in blowdown loop -- Test 1003 (FD-50).

Fig. 56 Momentum flux from drag discs at core barrel inlet -- Test 1001.

Fig. 57 Momentum flux from drag discs at core barrel inlet -- Test 1002.

Fig. 58 Momentum flux from drag discs at core barrel inlet -- Test 1003.

Fig. 59 Volumetric flow rate from turbine meters in operating loop -- Test 1001.

Fig. 60 Volumetric flow rate from turbine meters in operating loop -- Test 1002.

Fig. 61 Volumetric flow rate from turbine meters in operating loop -- Test 1003.

Fig. 62 Volumetric flow rate from turbine meter in blowdown loop hot leg -- Test 1001.

Fig. 63 Volumetric flow rate from turbine meter in blowdown loop hot leg -- Test 1002.

Fig. 64 Volumetric flow rate from turbine meter at core barrel inlet -- Test 1001.

Fig. 65 Volumetric flow rate from turbine meter at core barrel inlet -- Test 1003.

Fig. 66 Volumetric flow rate from turbine meter at pressurizer outlet -- Test 1001.

Fig. 67 Volumetric flow rate from turbine meter at pressurizer outlet -- Test 1003.

Fig. 68 Fluid velocity from turbine meters in downcomer gap -- Test 1001.

Fig. 69 Mass flow rate in operating loop hot leg Spool 1 -- Test 1001.

Fig. 70 Mass flow rate in operating loop hot leg Spool 1 -- Test 1002.

Fig. 71 Mass flow rate in operating loop hot leg Spool 1 -- Test 1003.

Fig. 72 Mass flow rate in operating loop at pump discharge (Spool 19) -- Test 1001.

Fig. 73 Mass flow rate in operating loop at pump discharge (Spool 19) -- Test 1002.

Fig. 74 Mass flow rate in operating loop at pump discharge (Spool 19) -- Test 1003.

Fig. 75 Mass flow rate in operating loop cold leg Spool 22 -- Test 1001.

Fig. 76 Mass flow rate in operating loop cold leg Spool 22 -- Test 1002.

Fig. 77 Mass flow rate in operating loop cold leg Spool 22 -- Test 1003.

Fig. 78 Mass flow rate in operating loop Spools 5 and 15 -- Test 1001.

Fig. 79 Mass flow rate in operating loop Spools 5 and 15 -- Test 1002.

Fig. 80 Mass flow rate in operating loop Spools 5 and 15 -- Test 1003.

Fig. 81 Mass flow rate in blowdown loop Spool 70 -- Test 1001.

Fig. 82 Mass flow rate in blowdown loop Spool 70 -- Test 1002.

Fig. 83 Mass flow rate in blowdown loop Spool 70 -- Test 1003.

Fig. 84 Mass flow rate in blowdown loop Spools 50 and 76 -- Test 1001.

Fig. 85 Mass flow rate in blowdown loop Spools 50 and 76 -- Test 1002.

Fig. 86 Mass flow rate in blowdown loop Spools 50 and 76 -- Test 1003.

Fig. 87 Mass flow rate at core barrel inlet -- Test 1001.

Fig. 88 Mass flow rate at core barrel inlet -- Test 1002.

Fig. 89 Mass flow rate at core barrel inlet -- Test 1003.

Fig. 90 Fluid density in operating loop hot leg -- Test 1001.

Fig. 91 Fluid density in operating loop hot leg -- Test 1002.

Fig. 92 Fluid density in operating loop hot leg -- Test 1003.

Fig. 93 Fluid density at operating loop pump inlet and outlet -- Test 1001.

Fig. 94 Fluid density at operating loop pump inlet and outlet -- Test 1002.

Fig. 95 Fluid density at operating loop pump inlet and outlet -- Test 1003.

Fig. 96 Fluid density in operating loop cold leg -- Test 1001.

Fig. 97 Fluid density in operating loop cold leg -- Test 1002.

Fig. 98 Fluid density in operating loop cold leg -- Test 1003.

Fig. 99 Fluid density in blowdown loop -- Test 1001.

Fig. 100 Fluid density in blowdown loop -- Test 1002.

Fig. 101 Fluid density in blowdown loop -- Test 1003.

Fig. 102 Fluid density in vessel -- Test 1001.

Fig. 103 Fluid density in vessel -- Test 1002.

Fig. 104 Fluid density in vessel -- Test 1003.

Fig. 105 Fluid density in pressure suppression header -- Test 1001.

Fig. 106 Fluid density in pressure suppression header -- Test 1002.

Fig. 107 Fluid density in pressure suppression header -- Test 1003.

Fig. 108 Pressure in operating loop -- Test 1001.

Fig. 109 Pressure in operating loop -- Test 1002.

Fig. 110 Pressure in operating loop -- Test 1003.

Fig. 111 Pressure in blowdown loop -- Test 1001.

Fig. 112 Pressure in blowdown loop -- Test 1002.

Fig. 113 Pressure in blowdown loop -- Test 1003.

Fig. 114 Pressure in vessel -- Test 1001.

Fig. 115 Pressure in vessel -- Test 1002.

Fig. 116 Pressure in vessel -- Test 1003.

Fig. 117 Pressure in pressure suppression system -- Test 1001.

Fig. 118 Pressure in pressure suppression system -- Test 1002.

Fig. 119 Pressure in pressure suppression system -- Test 1003 (P-80 and P-83).

Fig. 120 Pressure in pressure suppression system -- Test 1003 (P-77 and P-89).

Fig. 121 Pressure at hot leg stub in upper plenum (LOFT free field pressure transducer) -- Test 1001.

Fig. 122 Pressure at hot leg stub in upper plenum (LOFT free field pressure transducer) -- Test 1002.

Fig. 123 Differential pressure across operating loop (DP-22-1) -- Tests 1001, 1002, and 1003.

Fig. 124 Differential pressure, operating loop hot leg (DP-1-5) -- Tests 1001, 1002, and 1003.

Fig. 125 Differential pressure, operating loop hot leg (DP-3-5) -- Tests 1002 and 1003.

Fig. 126 Differential pressure across steam generator (DP-5-13) -- Tests 1001, 1002, and 1003.

Fig. 127 Differential pressure across pump suction orifice (DP-8-13) -- Tests 1001, 1002, and 1003.

Fig. 128 Differential pressure across operating loop pump inlet (DP-13-15) -- Test 1001.

Fig. 129 Differential pressure across operating loop pump (DP-19-15) -- Tests 1001, 1002, and 1003.

Fig. 130 Differential pressure across operating loop pump, low range (DP-19-15L) -- Tests 1001, 1002, and 1003.

Fig. 131 Differential pressure across operating loop cold leg (DP-19-22) -- Tests 1001, 1002, and 1003.

Fig. 132 Differential pressure between cold leg and lower plenum (DP-22-255) -- Tests 1001, 1002, and 1003.

Fig. 133 Differential pressure across core (DP-255-207) -- Tests 1001 and 1002.

Fig. 134 Differential pressure across upper portion of downcomer (DP-213-246) -- Tests 1001, 1002, and 1003.

Fig. 135 Differential pressure across middle portion of downcomer (DP-246-249) -- Tests 1001, 1002, and 1003.

Fig. 136 Differential pressure across lower portion of downcomer (DP-249-255) -- Tests 1001, 1002, and 1003.

Fig. 137 Differential pressure across lower plenum (DP-261-255) -- Tests 1001, 1002, and 1003.

Fig. 138 Differential pressure across vessel (DP-LOFT) -- Tests 1001, 1002, and 1003.

Fig. 139 Differential pressure between vessel upper plenum and blowdown loop hot leg (DP-207-70) -- Tests 1001 and 1002.

Fig. 140 Differential pressure between vessel inlet annulus and blowdown loop cold leg (DP-264-50) -- Tests 1001, 1002, and 1003.

Fig. 141 Differential pressure across blowdown loop hot leg nozzle (DP-76-61) -- Tests 1001, 1002, and 1003.

Fig. 142 Differential pressure between simulated pump and throat of blowdown loop hot leg nozzle (DP-76-HN2) -- Tests 1001, 1002, and 1003.

Fig. 143 Differential pressure across simulated pump (DP-96-76) -- Tests 1001 and 1003.

Fig. 144 Differential pressure across simulated steam generator (DP-70-96) -- Tests 1001, 1002, and 1003.

Fig. 145 Differential pressure across blowdown loop cold leg nozzle diverging section (DP5-HN2-HN4) -- Tests 1001, 1002, and 1003.

Fig. 146 Differential pressure across blowdown loop hot leg nozzle diverging section (DP6-HN2-HN4) -- Tests 1001, 1002, and 1003.

Fig. 147 Differential pressure across blowdown loop hot leg nozzle, Station 61 (DP-HN4-61) -- Tests 1001, 1002, and 1003.

Fig. 148 Differential pressure between vessel upper plenum and pressure suppression tank vapor chamber (DP-207-89) -- Tests 1001, 1002, and 1003.

Fig. 149 Differential pressure between pressure suppression header and pressure suppression tank vapor chamber (DP-81-89) -- Tests 1001, 1002, and 1003.

Fig. 150 Differential pressure between pressure suppression tank downcomer entrance and exit (DP-83-85) -- Tests 1001, 1002, and 1003.

Fig. 151 Differential pressure between pressure suppression tank downcomer entrance and pressure suppression tank vapor chamber (DP-83-89) -- Tests 1001, 1002, and 1003.

Fig. 152 Differential pressure between pressure suppression tank downcomer exit and pressure suppression tank vapor chamber (DP-85-89) -- Tests 1001, 1002, and 1003.

Fig. 153 Liquid level in pressure suppression tank -- Test 1001.

Fig. 154 Pump speed -- Test 1001.

Fig. 155 Pump speed -- Test 1002.

Fig. 156 Pump speed -- Test 1003.

Fig. 157 Pump power -- Test 1001.

Fig. 158 Pump power -- Test 1002.

Fig. 159 Pump power -- Test 1003.

Fig. 160 Pump torque -- Test 1001.

Fig. 161 Pump torque -- Test 1002.

Fig. 162 Pump torque -- Test 1003.

Fig. 163 Displacement of pressure suppression header -- Test 1001.

Fig. 164 Displacement of pressure suppression header -- Test 1002.

Fig. 165 Displacement of pressure suppression header -- Test 1003.

IV. REFERENCE

1. S. A. Naff and P. A. Pinson, *1-1/2-Loop Semiscale Isothermal Test Program – Program and System Description in Support of Experiment Data Reports*, ANCR-1143 (February 1974).