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EXPERIMENT DATA REPORT FOR SEMISCALE MOD-1 TEST S-01-6

(ISOTHERMAL BLOWDOWN WITH 60 40-ROD HEATER CORE)

H. S. Crapo
M. F. Jensen
K. E. Sackett

Aerojet Nuclear Company

IDAHO NATIONAL ENGINEERING LABORATORY

Idaho Falls, Idaho — 83401

DATE PUBLISHED - SEPTEMBER 1975

PREPARED FOR THE

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TEST S-01-6

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by

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ABSTRACT

Recorded test data are presented for Test S-01-6 of the Semiscale Mod-1 isothermal blowdown test series. Test S-01-6 is one of several Semiscale Mod-1 experiments which are counterparts of the LOFT nonnuclear experiments. System hardware is representative of the LOFT design with the design based on volumetric scaling methods and with initial conditions duplicating those identified for LOFT nonnuclear tests.

Test S-01-6 was conducted with an inactive 40-rod core in place of the orificed core simulator used on previous isothermal tests. The test was initiated at isothermal conditions of 2,263 psia and 541°F by a simulated offset shear of the cold leg broken loop piping. During system depressurization, coolant was injected into the cold leg of the operating loop to simulate emergency core cooling (ECC).

The purpose of this report is to make available the uninterpreted data from Test S-01-6 and to provide the reference material needed for future data analysis and test results reporting activities. The data, presented in the form of graphs in engineering units, have been analyzed only to the extent necessary to assure that they are reasonable and consistent.

SUMMARY

Test S-01-6 was performed as part of the Semiscale Mod-1 portion of the Semiscale Program conducted by Aerojet Nuclear Company for the United States Government. This test was part of the Semiscale Mod-1 tests (Test Series 1) performed with hardware configuration and test parameters selected to yield a system response that simulates the Loss-of-Fluid Test (LOFT) system response during the LOFT nonnuclear blowdown experiments. Test S-01-6 utilized a pressure vessel with internals; an intact loop with active pump, steam generator, and pressurizer; a broken loop with simulated pump, simulated steam generator, and rupture assemblies; a pressure suppression system with header and pressure suppression tank; and a coolant injection system with low-pressure injection pumps, high-pressure injection pumps, and accumulators. The 40-rod electrically heated Mod-1 core was in place for Test S-01-6, although its function in this test was entirely passive, with the thermal energy for heatup supplied by the bypass heaters.

The test objective for Test S-01-6 was the determination of the effects on system response of decreased core volume and distributed flow resistance resulting from the use of the 40-rod Mod-1 core in place of the core simulator used on previous tests. Test S-01-6 was conducted from initial conditions of 2,263 psia and 541°F by a simulated full size (200%) double-ended offset shear of the cold leg broken loop piping. The instantaneous offset shear of the broken loop cold leg piping was simulated by simultaneous actuation (within 10 milliseconds) of the rupture assemblies.

During blowdown, coolant was injected into the cold leg of the intact loop with two high-pressure injection system (HPIS) pumps, a pressurized accumulator, and one low-pressure injection system (LPIS) pump.

In general, instrumentation used in Test S-01-6 functioned as intended (of 202 measurements attempted, 195 produced usable data). Data loss during Test S-01-6 was sufficiently low so that the test was considered to have been conducted successfully.

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EXPERIMENT DATA REPORT FOR SEMISCALE MOD-1
TEST S-01-6
(Isothermal Blowdown with 40-Rod Heater Core)

I. INTRODUCTION

The Semiscale Mod-1 experiments represent the current phase of the Semiscale Program conducted by Aerojet Nuclear Company for the United States Government. The program, which is sponsored by the Nuclear Regulatory Commission through the Energy Research and Development Administration, is part of the overall program designed to investigate the response of a water-cooled nuclear reactor system to a hypothesized loss-of-coolant accident (LOCA). The underlying objectives of the Semiscale Program are to quantify the physical processes controlling system behavior during an LOCA and to provide an experimental data base for assessing reactor safety evaluation models. The Semiscale Mod-1 Program has the further objective of providing support to other experimental programs in the form of instrumentation assessment, optimization of test series, selection of test parameters, and evaluation of test results.

Test S-01-6 was conducted in the Semiscale Mod-1 system as part of a series of tests (Test Series 1) to provide data for comparison of the isothermal blowdown response of the Semiscale system with that of the Loss-of-Fluid Test (LOFT) system. The Semiscale Mod-1 experimental configuration for this test utilized hardware components selected to produce a system performance which simulates LOFT system performance during the LOFT nonnuclear tests. A 40-rod electrical heater core was used in place of the core simulator used in previous tests. The core was not heated for Test S-01-6.

Test S-01-6 employed a low intact loop flow resistance and used a steam generator set up in the hot standby condition, similar to the configuration used in Test S-01-4. The low intact loop flow resistance was scaled from the LOFT system. The pipe break configuration simulated a full size (200%) double-ended break in the cold leg broken loop piping and was conducted with ECC injection into the cold leg of the intact loop during blowdown. High-pressure injection was initiated at 1 second before rupture. Water was also injected from a pressurized accumulator at an initial pressure of 620 psia with flow starting at 23 seconds after the initiation of blowdown. The low-pressure injection pump was started at 31 seconds after initiation of blowdown at a system pressure of 300 psia.

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 describes the Mod-1 system, the test procedures and conditions, and the sequence of test events. Section III presents the data graphs and provides comments and supporting information necessary for interpretation of the data. A description of the overall Semiscale program and test series, a detailed description of the Mod-1 Semiscale system, and the measurement and data processing techniques and uncertainties can be found in Appendices A, B, and C of Reference 1.

II. SYSTEM, PROCEDURES, CONDITIONS, AND EVENTS FOR TEST S-01-6

The following system configuration, procedures, initial test conditions, and events are specific to Test S-01-6.

1. SYSTEM CONFIGURATION AND TEST PROCEDURES

The Semiscale Mod-1 system used for Test S-01-6 consisted of a pressure vessel with internals; an operating loop with steam generator, pump, and pressurizer; a blowdown loop with simulated steam generator, simulated pump, and two rupture assemblies; a coolant injection system with accumulators and both high- and low-pressure injection pumps, and a pressure suppression system with a suppression tank and header. The Semiscale Mod-1 experimental system is described in detail in Appendix B of Reference 1.

For Test S-01-6, the operating loop steam generator was maintained in the hot standby condition, in which the steam generator secondary side was valved off and the steam generator primary tubes were completely covered with water (at isothermal system temperature) when blowdown occurred. The system was heated to isothermal conditions with heaters in the bypass lines between the broken and unbroken loops.

In preparation for Test S-01-6, the system was filled with treated demineralized water and vented at strategic points to assure a liquid full system. Prior to warmup, the system was pressurized to check for leakage. Warmup to initial test conditions was accomplished with heaters located in the bypass lines which served to allow circulation through the broken loop. During warmup, the purification and sampling system were valved into the primary system to maintain water chemistry requirements and to provide a water sample at system conditions for subsequent analysis. These systems were valved out just prior to initiation of blowdown. At $100^{o}F$ temperature intervals during warmup, detector readings were sampled to allow the integrity of the measurement instrumentation and the operability of the data acquisition system to be checked.

Prior to initiation of blowdown, initial test conditions were held for 30 minutes to establish equilibrium in the system. At the end of this period, all auxiliary systems, including the bypass lines, were isolated to prevent blowdown through those systems.

The system was successfully subjected to a simulated double-ended cold leg pipe break through two blowdown nozzles each having a 100% break area (0.00262 ft^2). The effluent was ejected from the primary system into the pressure suppression system. Pressure to operate the rupture assemblies and initiate blowdown was taken from an accumulator system filled with water and pressurized to 2,250 psig with gaseous nitrogen. Immediately following initiation of blowdown (0.02 seconds after initiation of blowdown), these lines were again isolated. Power to the primary coolant circulating pump was cut off at blowdown to allow the pump to coast down to a speed of 1,600 rpm. This speed was then maintained throughout the remainder of the test. A flywheel was mounted on the pump motor shaft to provide a simulation of the predicted coastdown of the LOFT pumps.

The coolant injection system was used for injection into the cold leg of the intact loop during blowdown. Coolant injection from the HPIS pumps started at 1 second before the initiation of blowdown and continued throughout the test. Injection was started from the accumulator at a system pressure of 620 psia beginning approximately 23 seconds after initiation of blowdown and continued for approximately 27 seconds, until the water supply was depleted, allowing the pressurization gas to exhaust into the cold leg of the intact loop. Injection from the LPIS pump was initiated at a system pressure of 300 psia and continued throughout the test.

2. INITIAL TEST CONDITIONS AND SEQUENCE OF EVENTS

Conditions in the Semiscale Mod-1 system at initiation of blowdown are given in Tables I and II, the primary system water chemistry prior to blowdown is given in Table III, and the sequence of events relative to rupture is given in Table IV.

TABLE I

CONDITIONS AT BLOWDOWN INITIATION

	Measured[a]	Specified
System Fluid Temperature (intact loop, vessel outlet, RBU-2)[b]	541°F	540°F ± 2°F
System Pressure (vessel upper plenum)	2,288 psia[c]	2,263 ± 25 psia
Intact Loop Cold Leg Flow	173 gpm	173 ± 2 gpm
Intact Loop Accumulator Pressure	620 psia[d]	613 ± 5 psia
Temperature of Injected Coolant	73°F	85°F[e]
Intact Loop Accumulator Water Volume	1.08 ft^3[f]	1.63 ft^3[e]
Intact Loop Accumlator Gas Volume	1.66 ft^3	1.11 ft^3[e]
Pressurizer Water Level	19.5 in.[g] (0.567 ft^3)	28 ± 2 in.
Steam Generator Secondary Steam Dome Pressure	970 psia	976 ± 40 psia
Steam Generator Liquid Level (from bottom of tube sheet)	123 in.	123 ± 2 in.
Pressure Suppression Tank Water Level	65.4 in.	65.4 in.[e]
Pressure Suppression Tank Pressure	32.0 psia	32.0 psia[e]
Pressure Suppression Tank Water Temperature	67°F	ambient
Leak Rate	<0.2 gpm	2 gpm maximum

[a] Measured initial conditions which did not meet the specified initial conditions were considered acceptable for analysis purposes within the test objectives.

[b] Upper plenum temperature was specified but was not recorded.

[c] Upper plenum pressure measurement appeared to be slightly high compared to other measurements; Heise gauge showed 2,263 psia at blowdown.

[d] Accumulator pressure after filling injection line at t=3 seconds.

[e] Tolerance not specified.

[f] The volume measurement system malfunctioned. Reported volumes are estimates from the flowmeter data obtained during blowdown.

[g] Pressurizer level control did not account for heating of the sense lines to the differential pressure cell. Indicated level was 28.5 in.

TABLE II

PRIMARY COOLANT TEMPERATURE DISTRIBUTION AT RUPTURE

	Detector	Temperature (°F)
Vessel Lower Plenum (lower portion)	TFV-LP-7-1/2	536
Vessel Lower Plenum (upper portion)	TFV-LP-27-1/2	542
Hot Leg, Intact Loop (near vessel)	RBU-2	541
Hot Leg, Intact Loop (104 in. from vessel center)	TFU-5	540
Hot Leg, Intact Loop (near steam generator)	TSU-6	536
Cold Leg, Intact Loop	RBU-14A	544
Cold Leg, Broken Loop (near nozzle)	TFB-23	539
Hot Leg, Broken Loop (near vessel)	TFB-30	542
Hot Leg, Broken Loop (near nozzle)	TFB-42	536

TABLE III

WATER CHEMISTRY PRIOR TO BLOWDOWN[a]

pH	10.21
Conductivity (μmho/cm)	9.92
Lithium (ppm)	3.2
Chlorides (ppm)	0.099
Fluorides (ppm)	0.4
Oxygen (ppm)	0.186
Total gas (cc/l)	205.
Residual hydrazine (ppm)	0.064

[a] Water sample taken at a system pressure of 2,250 psig and a system temperature of 540°F

TABLE IV

SEQUENCE OF EVENTS DURING TEST

Event	Time Relative To Rupture (sec)
Heatup Bypass Lines Valved Out of System	-6
Operating Loop ECC Injection from Operating Loop HPIS Starts	-1[a]
Initiation of Blowdown	0
Operating Loop ECC Injection from Operating Loop ECC Accumulator Starts	23
Operating Loop ECC Injection from Operating Loop LPIS Starts	31
Operating Loop ECC Injection from Operating Loop ECC Accumulator Stops	50[b]

[a] HPIS was already operating in the makeup mode when ECC HPIS was initiated.

[b] Water supply depleted; gas flow started.

III. DATA PRESENTATION

The data from Semiscale Mod-1 Test S-01-6 are presented with brief comment. Processing analysis has been performed only to the extent necessary to obtain appropriate engineering units and to assure that the data are reasonable and consistent. 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 during blowdown may have subjected the measurement devices to nonhomogeneous fluid conditions.

The performance of the system during Test S-01-6 was monitored by about 200 detectors. The data obtained were recorded on both digital and analog data acquisition systems. The digital system was used to process the data presented in this report. The analog system was used to provide better resolution capability (needed as input to various data analysis codes) and to provide redundancy.

The data are presented, in many instances, in the form of composite graphs to facilitate comparison of a given variable at several locations. The scales selected for the graphs do not reflect the obtainable resolution of the data (the data processing techniques are described in greater detail in Reference 1).

Figures 1 through 6 and Table V provide supporting information for interpretation of the data graphs shown in Figures 7 through 138. Figures 1 through 6 show the relative locations of all detectors used during the Mod-1 Isothermal series. Table V groups the measurements taken during Test S-01-6 according to measurement type; identifies the specific measurement location and the range of the detector and actual recording range of the data acquisition system; provides brief comments regarding the data; and references the measurements and comments to the corresponding figure. Figures 7 through 138 present all the blowdown data obtained. Time zero on the graphs is the time of rupture initiation.

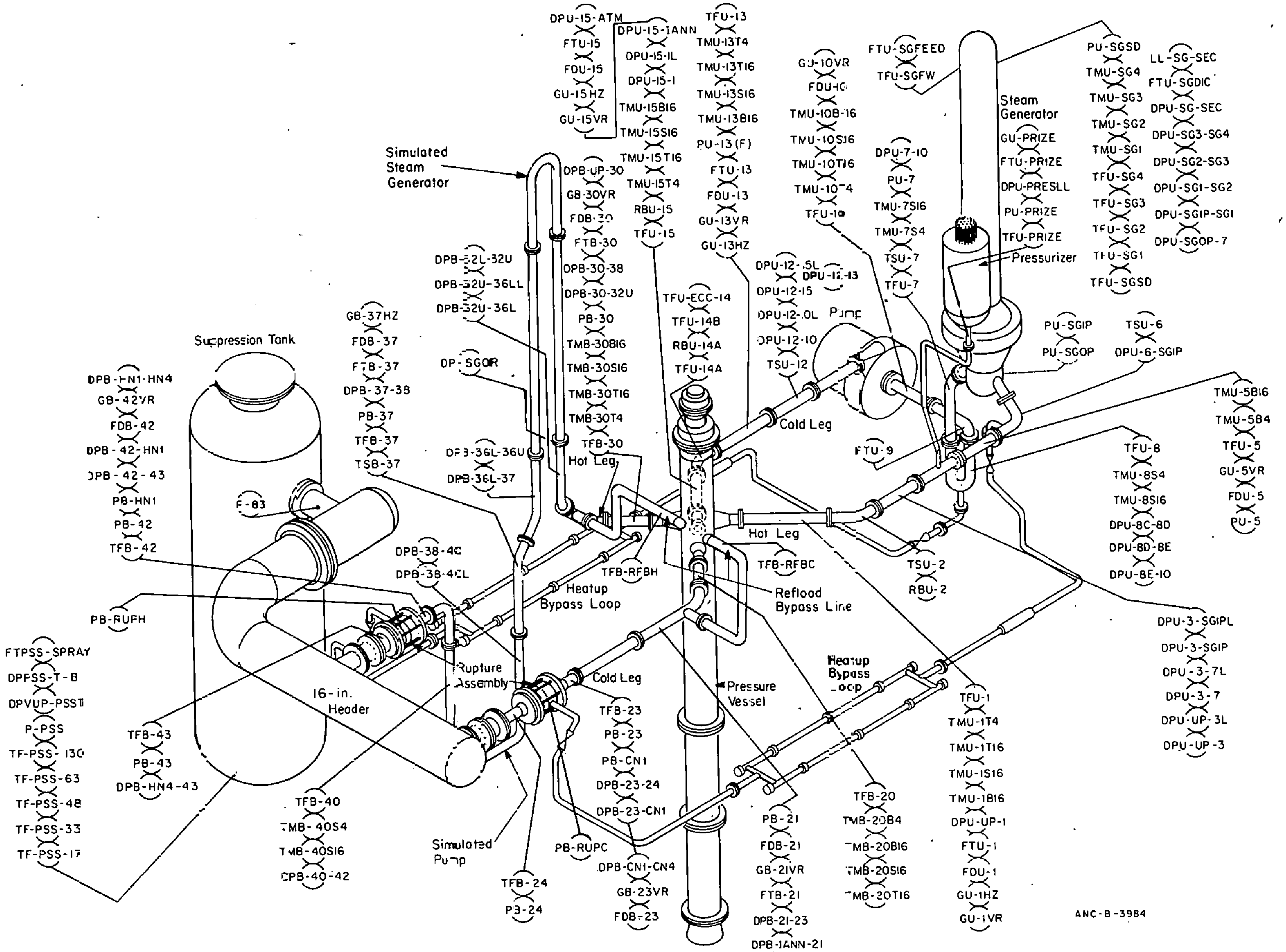

Fig. 1 Semiscale Mod-1 system and instrumentation for cold leg break configuration -- isometric.

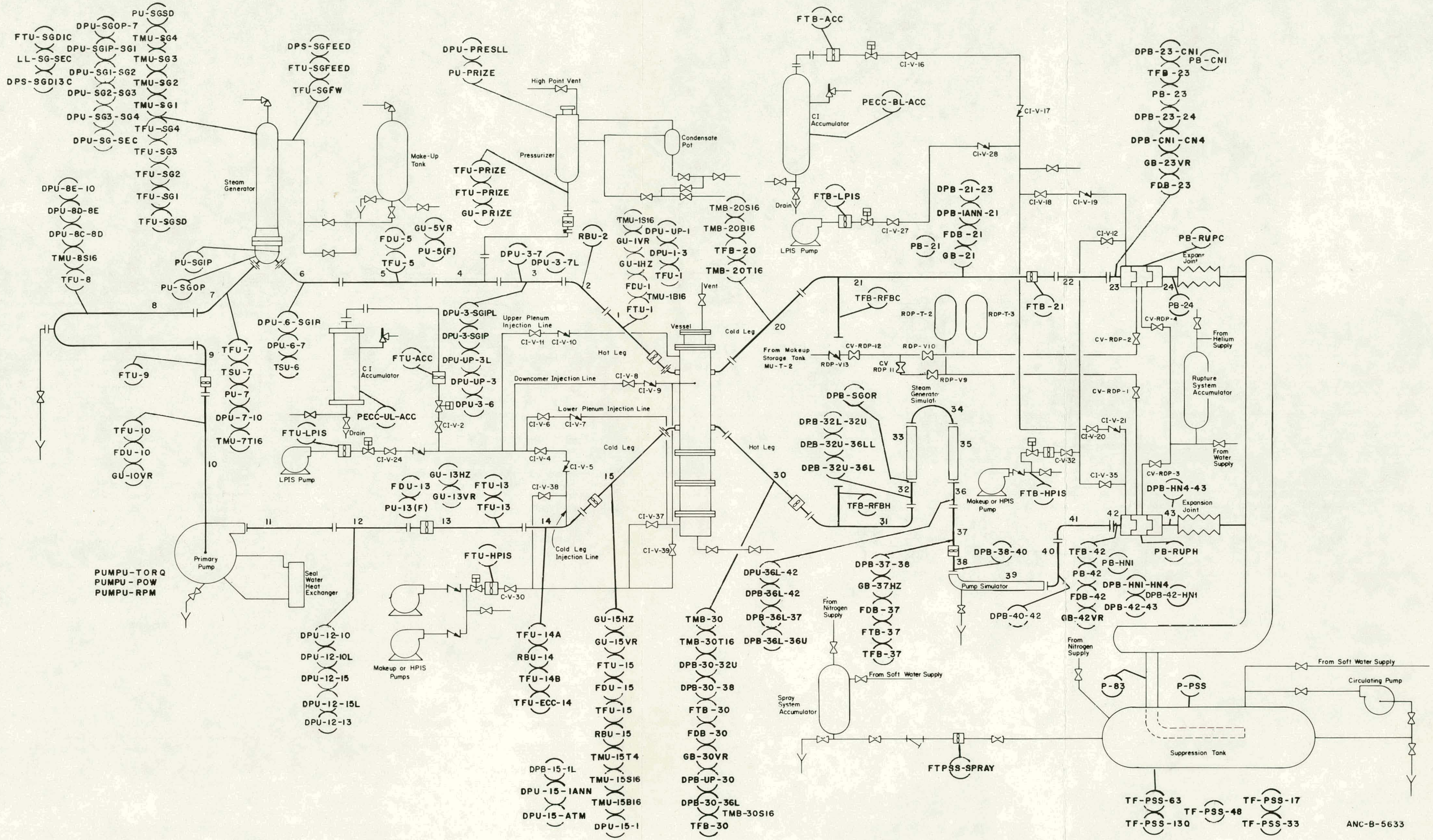

Fig. 2 Semiscale Mod-1 system and instrumentation for cold leg break configuration -- schematic.

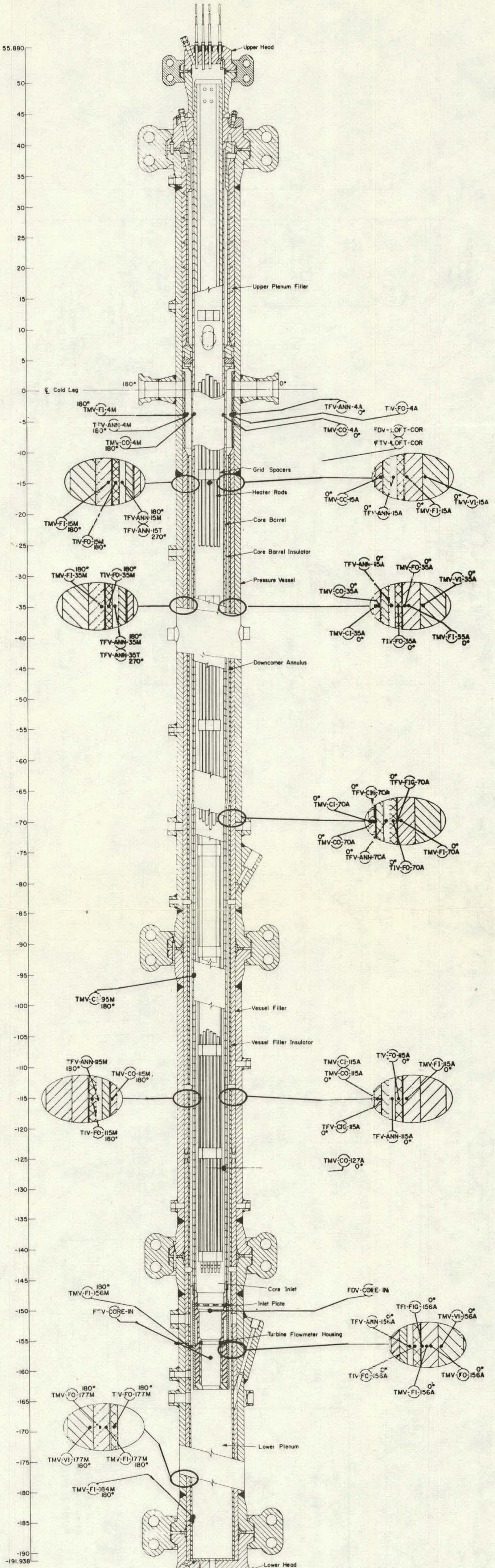

Fig. 3 Semiscale Mod-1 pressure vessel -- cross section showing instrumentation.

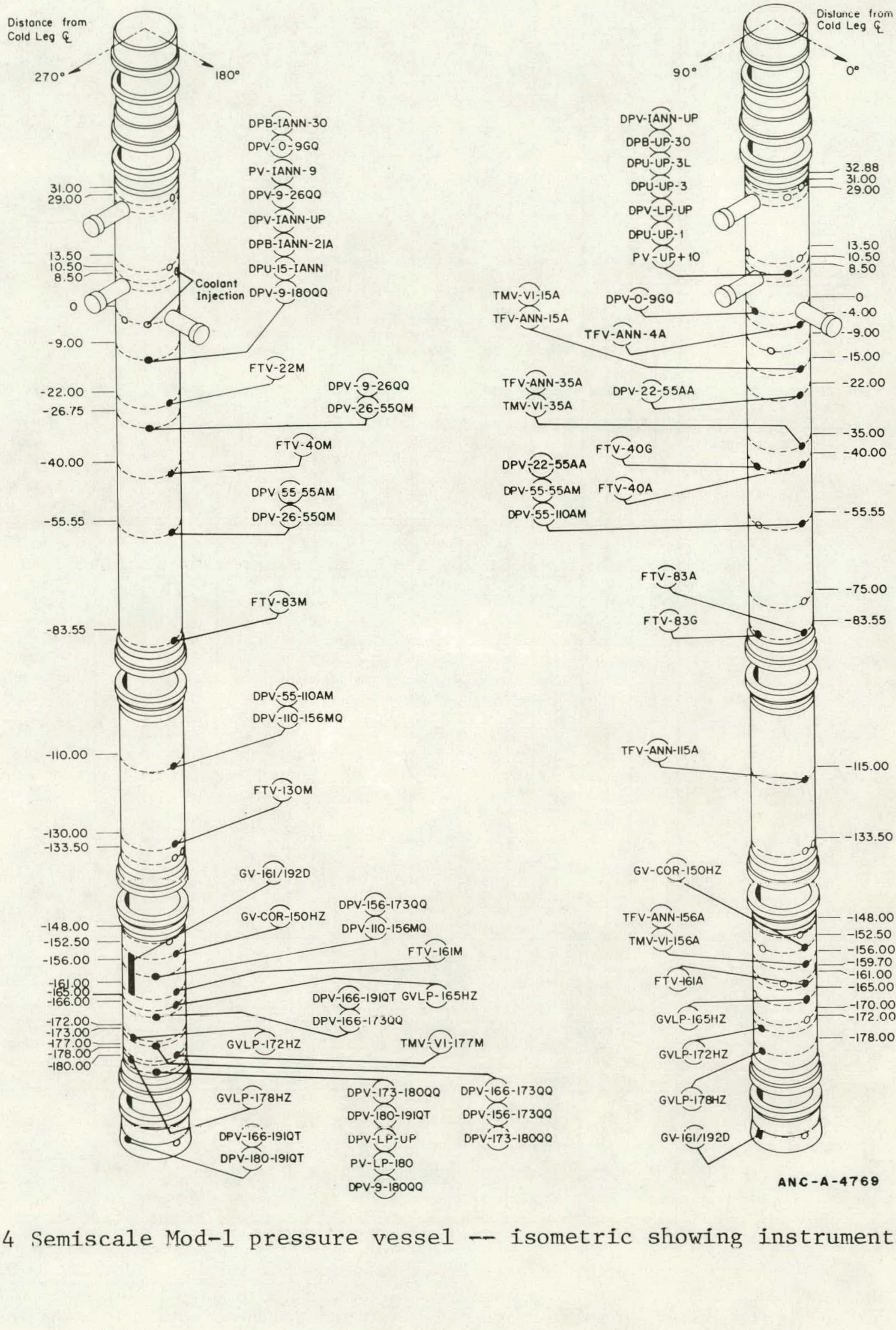

Fig. 4 Semiscale Mod-1 pressure vessel -- isometric showing instrumentation.

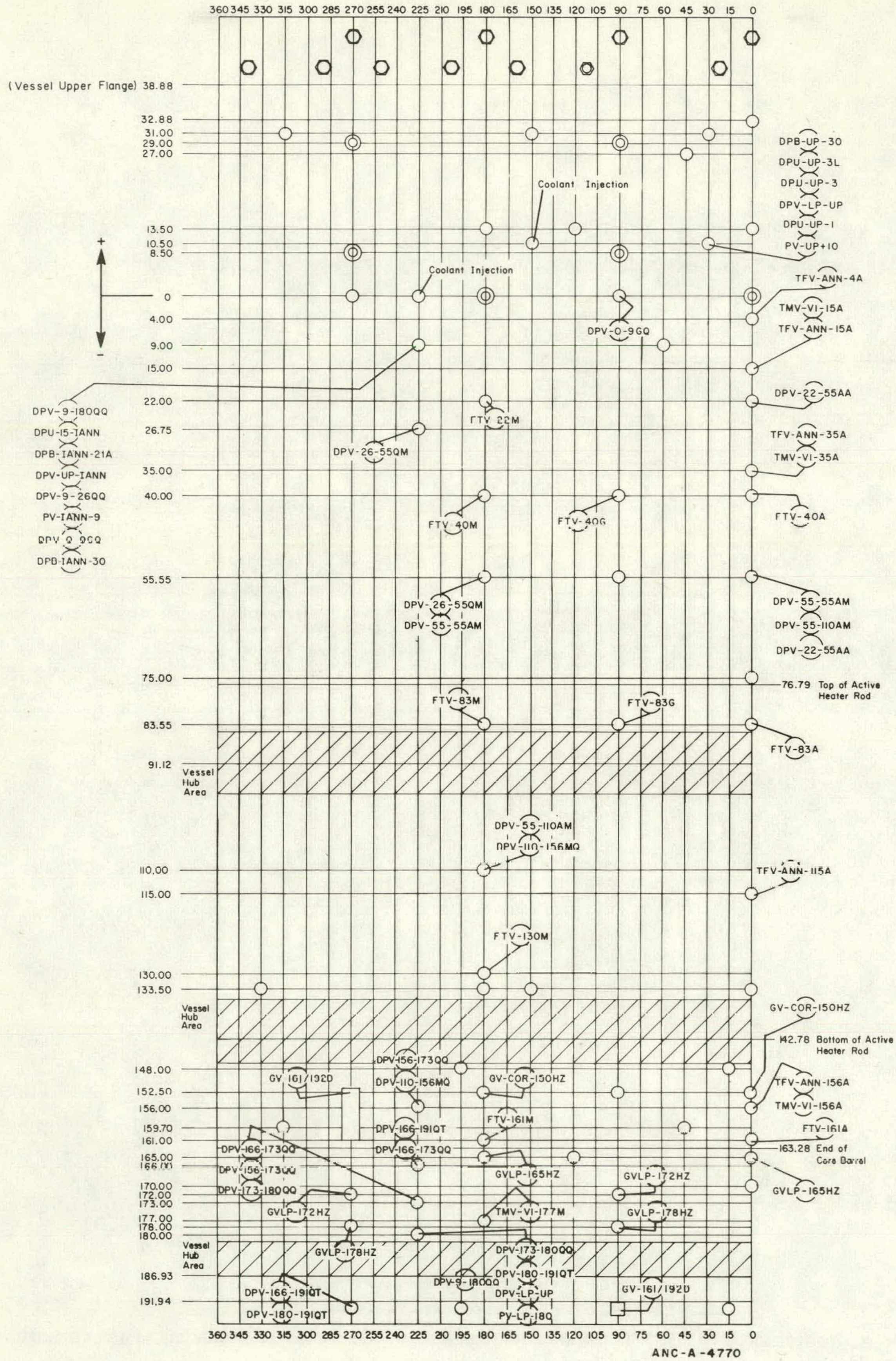

Fig. 5 Semiscale Mod-1 pressure vessel -- penetrations and instrumentation.

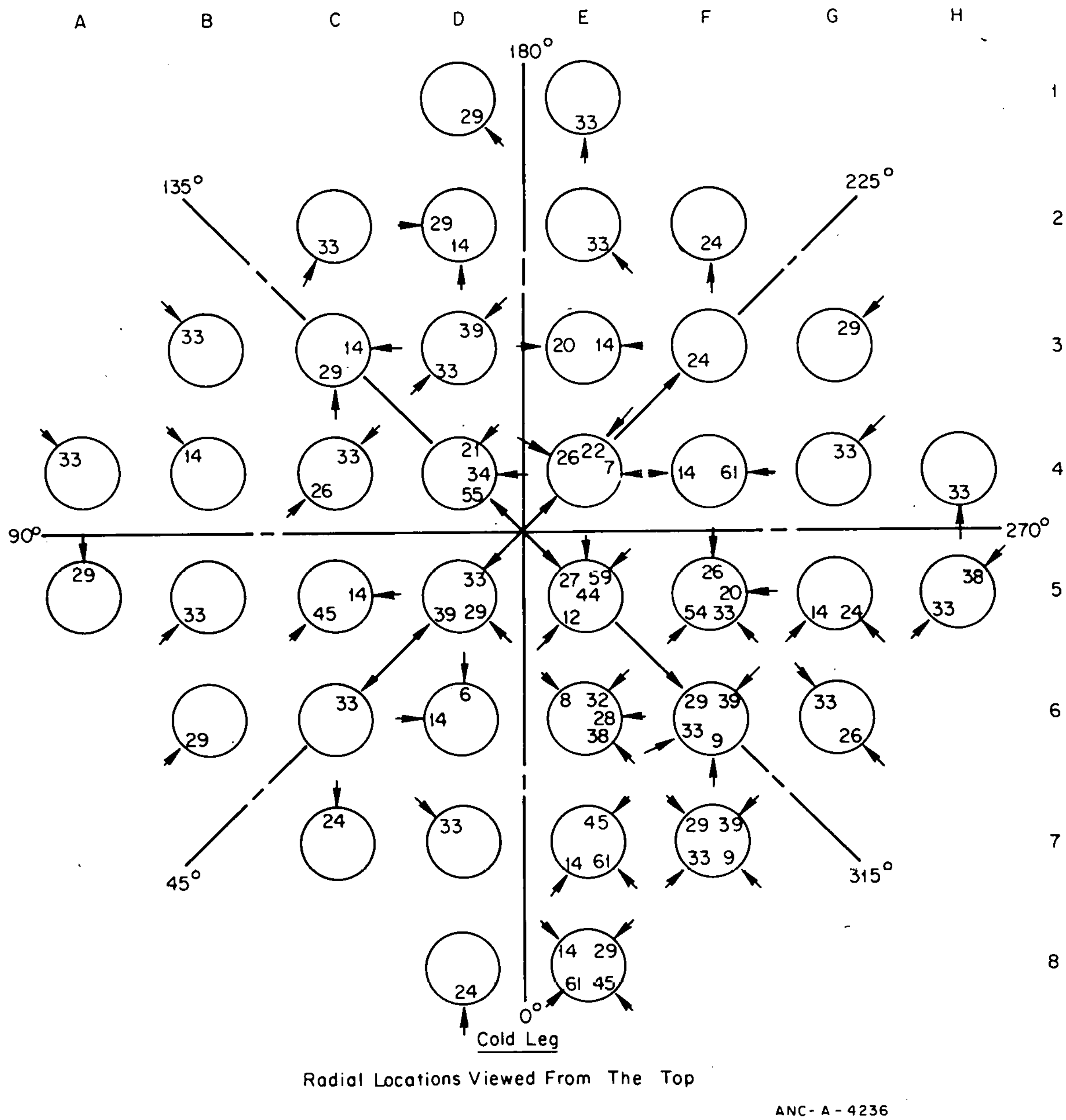

Fig. 6 Semiscale Mod-1 heated core, plan view.

TABLE V

DATA PRESENTATION FOR SEMISCALE MOD-1 TEST S-01-6

Measurement	Location and Comments[a]	Range[a] Detector	Range[a] Data Acquisition System	Figure[a]	Measurement Comments[b]
FLUID TEMPERATURE	Chromel-Alumel thermocouples unless specified otherwise				
Intact Loop		0-2300°F	0-591°F		
RBU-2	Hot leg, Spool 2, 46 in. from vessel center (platinum resistance bulb)	0-1000°F	0-1000°F	7	
TFU-5	Hot leg, Spool 5, 104 in. from vessel center			7	
TSU-6	Hot leg, Spool 6, 114 in. from vessel center (shielded)			7	
TFU-10	Cold leg, Spool 10, 144 in. from vessel center			7	
TFU-13	Cold leg, Spool 13, 51 in. from vessel center			8	
TFU-14B	Cold leg, Spool 14, 39 in. from vessel center, downstream of cold leg injection port			9	
RBU-14A	Cold leg, Spool 14, 43 in. from vessel center, upstream of cold leg injection port (platinum resistance bulb)	0-1000°F	0-1000°F	8	
TFU-15	Cold leg, Spool 15, 16 in. from vessel center			9	
Broken Loop		0-2300°F	0-591°F		
TFB-20	Cold leg, Spool 20, 21 in. from vessel center			10	
TFB-23	Cold leg, Spool 23, 91 in. from vessel center, upstream of vessel-side nozzle			10	
TFB-30	Hot leg, Spool 30, 16 in. from vessel center			10	
TFB-42	Hot leg, Spool 42, 414 in. from vessel center along cold leg, upstream of pump-side nozzle				Failed
TFB-RFBC	Reflood bypass, near end cap, cold-leg side			11	
TFB-RFBH	Reflood bypass, near end cap, hot-leg side			11	
Inlet Annulus	4 in. below cold leg centerline, 0.2 in. from vessel wall, Type J iron-constantan thermocouples	0-1400°F	0-803°F	12	
TFV-ANN-4A	0°				
TFV-ANN-4M	180°				
Downcomer Annulus	Centered in annulus, Type J iron-constantan thermocouples	0-1400°F	0-803°F		
TFV-ANN-15A	15 in. below cold leg centerline, 0°			13	
TFV-ANN-15M	15 in. below cold leg centerline, 180°			13	
TFV-ANN-15T	15 in. below cold leg centerline, 270°			13	
TFV-ANN-35A	35 in. below cold leg centerline, 0°				Thermocouple not connected to reference junction
TFV-ANN-35M	35 in. below cold leg centerline, 180°			14	
TFV-ANN-35T	35 in. below cold leg centerline, 270°			14	
TFV-ANN-70A	70 in. below cold leg centerline, 0°				Thermocouple not connected to reference junction
TFV-ANN-115A	115 in. below cold leg centerline, 0°			15	
TFV-ANN-115M	115 in. below cold leg centerline, 180°			15	
TFV-ANN-156A	156 in. below cold leg centerline, 0°			15	

TABLE V (Contd.)

DATA PRESENTATION FOR SEMISCALE MOD-1 TEST S-01-6

Measurement	Location and Comments[a]	Range[a] Detector	Range[a] Data Acquisition System	Figure[a]	Measurement Comments[b]
FLUID TEMPERATURE (Contd.)					
Lower Plenum	On fluid thermocouple rack, 1 in. from vessel center, 45°	0-2300°F	0-591°F	16	
TFV-LP-1-1/2	1.5 in. from bottom				
TFV-LP-7-1/2	7.5 in. from bottom				
TFV-LP-14-1/2	14.5 in. from bottom				
TFV-LP-21-1/2	21.5 in. from bottom				
TFV-LP-27-1/2	27.5 in. from bottom				
Core Grid Spacer		0-2300°F	0-591°F	17	
Grid Spacer 6	76 in. below cold leg centerline, 1.2 in. above top of heated length				
TFG-6AB-45	Thermocouple in space defined by Columns A and B, Rows 4 and 5				
Grid Spacer 8	109 in. below cold leg centerline at center of heated length				
TFG-8CD-45	Thermocouple in space defined by Columns C and D, Rows 4 and 5				
Grid Spacer 10	143 in. below cold leg centerline at botton of heated length				
TFG-10OD-45	Thermocouple in space defined by Columns C and D, Rows 4 and 5				
Core Barrel Insulation Gap	Type J iron-constantan thermo-couples	0-1400°F	0-803°F	18	
TFV-CIG-70A	70 in. below cold leg centerline, 0°				
TFV-CIG-115A	115 in. below cold leg centerline, 0°				
Vessel Filler - Insulation Gap		0-1400°F	0-803°F	19	
TFV-FIG-70A	70 in. below cold leg centerline, 0°				
TFV-FIG-156A	156 in. below cold leg centerline, 0°				
ECC System		0-2300°F	0-591°F		
TFU-ECC-14	On centerline of ECC line just upstream of junction with Spool 14				Failed
Steam Generator		0-2300°F	0-591°F	20	
TFU-SG1	Secondary side, 12 in. above bottom of tube sheet				
TFU-SG2	Secondary side, 24 in. above bottom of tube sheet				
TFU-SG3	Secondary side, 48 in. above bottom of tube sheet				
TFU-SG4	Secondary side, 96 in. above bottom of tube sheet				
Pressurizer		0-2300°F	0-1017°F	21	
TFU-PRIZE	In surge line, near pressurizer exit, between turbine flowmeter and pres-surizer				
Pressure Suppression System		0-2300°F	0-591°F	22	
TF-PSS-33	33 in. from bottom of tank				
TF-PSS-130	130 in. from bottom of tank				
MATERIAL TEMPERATURE	Chromel-Alumel thermocouples unless specified otherwise	0-2300°F	0-591°F		
Intact Loop					
TMU-1S16	Hot leg, Spool 1, side, 1/16 in. from pipe ID, 29 in. from vessel center			23	
TMU-1B16	Hot leg, Spool 1, bottom, 1/16 in. from pipe ID, 29 in. from vessel center			23	Questionable calibration
TMU-15S16	Cold leg, Spool 15, side, 1/16 in. from pipe ID, 17 in. from vessel center			24	
TMU-15B16	Cold leg, Spool 15, bottom, 1/16 in. from pipe ID, 17 in. from vessel center			24	

TABLE V (Contd.)

DATA PRESENTATION FOR SEMISCALE MOD-1 TEST S-01-6

Measurement	Location and Comments[a]	Range[a] Detector	Range[a] Data Acquisition System	Figure[a]	Measurement Comments[b]
MATERIAL TEMPERATURE (Contd.)					
Broken Loop		0-2300°F	0-591°F		
TMB-20B16	Cold leg, Spool 20, bottom, 1/16 in. from pipe ID, 21 in. from vessel center				
TMB-20S16	Cold leg, Spool 20, side, 1/16 in. from pipe ID, 21 in. from vessel center			25	
TMB-30T16	Hot leg, Spool 30, top, 1/16 in. from pipe ID, 16 in. from vessel center				
Vessel Wall	1/8 in. from vessel ID	0-2300°F	0-591°F	26	
TMV-VI-15A	15 in. below cold leg centerline, 0°				
TMV-VI-35A	35 in. below cold leg centerline, 0°				
TMV-VI-156A	156 in. below cold leg centerline, 0°				
TMV-VI-177M	177 in. below cold leg centerline, 180°				
Vessel Filler	Type J iron-constantan thermocouples	0-1400°F	0-803°F		
TMV-FO-35A	35 in. below cold leg centerline, 0.65 in. from filler ID, 0°			27	
TMV-FO-156A	156 in. below cold leg centerline, 0.65 in. from filler ID, 0°				Failed
TMV-FO-177M	177 in. below cold leg centerline, 0.65 in from filler ID, 180°			27	
TMV-FI-4M	4 in. below cold leg centerline, 1/16 in. from filler ID, 180°			28	
TMV-FI-15A	15 in. below cold leg centerline, 1/16 in. from filler ID, 0°			28	
TMV-FI-15M	15 in. below cold leg centerline, 1/16 in. from filler ID, 180°			28	
TMV-FI-35A	35 in. below cold leg centerline, 1/16 in. from filler ID, 0°			28	
TMV-FI-35M	35 in. below cold leg centerline, 1/16 in. from filler ID, 180°			28	
TMV-FI-70A	70 in. below cold leg centerline, 1/16 in. from filler ID, 0°				Failed
TMV-FI-115A	115 in. below cold leg centerline, 1/16 in. from filler ID, 0°			29	
TMV-FI-156A	156 in. below cold leg centerline, 1/16 in. from filler ID, 0°			29	
TMV-FI-177M	177 in. below cold leg centerline, 1/16 in. from filler ID, 180°			29	
TMV-FI-184M	184 in. below cold leg centerline, 1/16 in. from filler ID, 180°			29	
Vessel Filler Insulator	Outer surface of insulator, Type J iron-constantan thermocouples	0-1400°F	0-803°F		
TIV-FO-4A	4 in. below cold leg centerline, 0°			30	
TIV-FO-35A	35 in. below cold leg centerline, 0°				Thermocouple not connected to reference junction
TIV-FO-35M	35 in. below cold leg centerline, 180°			30	
TIV-FO-70A	70 in. below cold leg centerline, 0°				Thermocouple not connected to reference junction
TIV-FO-115A	115 in. below cold leg centerline, 0°			31	
TIV-FO-115M	115 in. below cold leg centerline, 180°			31	
TIV-FO-156A	156 in. below cold leg centerline, 0°			31	
TIV-FO-177M	177 in. below cold leg centerline, 180°			31	
Lower Plenum	Chromel-Alumel thermocouple	0-2300°F	0-591°F		
TMV-LH	In vessel bottom head, 1/8 in. from inside surface, 2 in. from vessel centerline, 90°				Failed

TABLE V (Contd.)

DATA PRESENTATION FOR SEMISCALE MOD-1 TEST S-01-6

Measurement	Location and Comments[a]	Range[a] Detector	Range[a] Data Acquisition System	Figure[a]	Measurement Comments[b]
MATERIAL TEMPERATURE (Contd.)					
Core Barrel	Type J iron-constantan thermocouples	0-1400°F	0-803°F		
TMV-CO-4A	4 in. below cold leg centerline, in inlet annulus region, 1/16 in. from core barrel OD, 0°			32	
TMV-CO-4M	4 in. below cold leg centerline, in inlet annulus region, 1/16 in. from core barrel OD, 180°			32	
TMV-CO-15A	15 in. below cold leg centerline, 1/16 in. from core barrel OD, 0°			32	
TMV-CO-35A	35 in. below cold leg centerline, 1/16 in. from core barrel OD, 0°			32	
TMV-CO-70A	70 in. below cold leg centerline, 1/16 in. from core barrel OD, 0°			33	
TMV-CO-115A	115 in. below cold leg centerline, 1/16 in. from core barrel OD, 0°			33	
TMV-CO-115M	115 in. below cold leg centerline, 1/16 in. from core barrel OD, 180°			33	
TMV-CO-127A	127 in. below cold leg centerline, 1/16 in. from core barrel OD, 0°			33	
TMV-CI-35A	35 in. below cold leg centerline, 1/16 in. from core barrel ID, 0°			34	
TMV-CI-70A	70 in. below cold leg centerline, 1/16 in. from core barrel ID, 0°			34	
TMV-CI-95M	95 in. below cold leg centerline, 1/16 in. from core barrel ID, 180°			34	
TMV-CI-115A	115 in. below cold leg centerline, 1/16 in. from core barrel ID, 0°			34	
Core Housing Filler	On core housing filler 0.2 in. from outer surface, Type K Chromel-Alumel thermocouple	0-2300°F	0-591°F	35	
TMV-HF-115W	115 in. below cold leg centerline, (315°)				
TMV-HF-138W	138 in. below cold leg centerline, (315°)				
Core Heater Cladding Temperatures		0-2300°F	0-591°F	36	
Low Power Heaters					
TH-A5-45	Heater at Column A Row 5. Thermocouple 45 in. (240°) above bottom of core				
TH-C5-62	Heater at Column C Row 5. Thermocouple 62 in. (75°) above bottom of core				
TH-D6-6 -25	Heater at Column D Row 6. Thermocouples 6 in. (180°) and 25 in. (225°) above bottom of core				
PRESSURE		0-3000 psia			
Intact Loop					
PU-13(F)	Cold leg, Spool 13, 54 in. from vessel center (flush mount)		0-4328 psia	37	
Broken Loop					
PB-23	Cold leg, Spool 23, 92 in. from vessel center, upstream of vessel-side nozzle (tee off DP tap)		0-3415 psia	38	
PB-CN1	Vessel-side nozzle, nozzle throat, 96 in . from vessel center, (tee off DP tap)		0-2511 psia	38	
PB-24	Cold leg, Spool 24, 103 in. from vessel center, downstream of nozzle		0-3344 psia	38	
PB-42	Cold leg, Spool 42, 414 in. from vessel center along hot leg, upstream of pump-side nozzle (tee off DP tap)		0-4784 psia	39	
PB-HN1	Pump-side nozzle, nozzle throat, 419 in. from vessel center along hot leg (tee off DP tap)		0-4299 psia	39	

TABLE V (Contd.)

DATA PRESENTATION FOR SEMISCALE MOD-1 TEST S-01-6

Measurement	Location and Comments[a]	Range[a] Detector	Range[a] Data Acquisition System	Figure[a]	Measurement Comments[b]
PRESSURE (Contd.)					
Vessel				40	
PV-UP+10	In upper plenum, 10 in. above cold leg centerline, mounted on standoff, 30°		0-4606 psia		
PV-LP-180	In upper part of lower plenum, 180 in. below cold leg centerline, mounted on standoff, 225°		0-2452 psia		
PV-IANN-9	In vessel inlet annulus, 9 in. below cold leg centerline, mounted on standoff, 225°		0-4572 psia		
ECC System		0-750 psia	0-707 psia	41	Injection enabling valve opened at t=3 sec, allowing injection line to fill to check valve, lowering accumulator pressure
PECC-UL-ACC	In intact loop accumulator				
Steam Generator			0-1521 psia	42	
PU-SGSD	Secondary side, steam dome				
Pressurizer			0-4758 psia	43	
PU-PRIZE	Steam dome				
Pressure Suppression System				44	
P-PSS	Suppression tank top	0-750 psia	0-309 psia		
P-83	Suppression tank header just down stream from entrance to suppression tank	0-200 psia	0-200 psia		
DIFFERENTIAL PRESSURE	Elevation difference between transducer taps is zero unless otherwise specified				
Intact Loop					
DPU-UP-1	Upper plenum 10.5 in. above cold leg centerline at 30° to hot leg, Spool 1, 31 in. from vessel center, upper plenum tap approximately 2 in. above Spool 1 tap	±100 in. water	±5.0 psid	45	
DPU-UP-3	Upper plenum [illegible] above cold leg centerline at 30° to hot leg, Spool 3, 62 in. from vessel center, upper plenum tap approximately 2 in. above Spool 3 tap	±300 in. water	±15 psid	46	
DPU-3-7	Across steam generator, hot leg, Spool 3, 62 in. from vessel center to cold leg Spool 7, 231 in. from vessel center, Spool 3 tap approximately 18 in. above Spool 7 tap	±500 in. water	±25 psid	47	
DPU-3-SGIP	Across inlet orifice of steam generator: hot leg, Spool 3, 62 in. from vessel center to steam generator inlet plenum, 145 in. from vessel center, Spool 3 tap is 16 in. below SGIP tap	±300 in. water	±15 psid	48	
DPU-SGOP-7	From steam generator outlet plenum, 269 in. from vessel center along cold leg to cold leg Spool 7, 231 in. from vessel center, including orifice, Spool 7 tap is 35 in. below SGOP tap	±500 in. water	±25 psid	49	
DPU-7-10	Steam generator outlet to pump inlet, cold leg Spool 7, 231 in. from vessel center to cold leg Spool 10, 141 in. from vessel center	±50 in. water	±2.5 psid	50	
DPU-8D-8E	In pump trap, cold leg Spool 8, Tap 8D, 184 in. from vessel center to Tap 8E, 174 in. from vessel center, Tap 8D is 10 in. below Tap 8E	+20 in. water	+1.0 psid	51	
DPU-12-10	Pump outlet to pump inlet, cold leg Spool 12, 75 in. from vessel center to cold leg Spool 10, 141 in. from vessel center, Spool 10 tap is 10 in. below Spool 12 tap	±50 psid	±50 psid	52	
DPU-12-10L	Pump outlet to pump inlet, cold leg Spool 12, 75 in. from vessel center to cold leg Spool 10, 141 in. from vessel center, Spool 10 tap is 10 in. below Spool 12 tap (low range)	±100 in. water	±5.0 psid	53	Detector saturated for t<3.5 sec

TABLE V (Contd.)

DATA PRESENTATION FOR SEMISCALE MOD-1 TEST S-01-6

Measurement	Location and Comments[a]	Range[a] Detector	Range[a] Data Acquisition System	Figure[a]	Measurement Comments[b]
DIFFERENTIAL PRESSURE (Contd.)					
Intact Loop (Contd.)					
DPU-12-13	Pump outlet, cold leg Spool 12, 75 in. from vessel center to cold leg Spool 13, 51 in. from vessel center	±20 in. water	±1.0 psid	54	Detector overranged; probably saturated for t<3 sec
DPU-12-15	Across cold leg injection point, cold leg Spool 12, 75 in. from vessel center to cold leg Spool 15, 16 in. from vessel center	±100 in. water	±5.0 psid	55	
DPU-15-1	Cold leg to hot leg, cold leg Spool 15, 16 in. from vessel center to hot leg Spool 1, 31 in. from vessel center, Spool 15 tap is 8.5 in. below Spool 1 tap	±500 in. water	±25 psid	56	
DPU-15-1L	Cold leg to hot leg, cold leg Spool 15, 16 in. from vessel center to hot leg Spool 1, 31 in. from vessel center, Spool 15 tap is 8.5 in. below Spool 1 tap (low range)	±50 in. water	±2.5 psid	57	Detector saturated for t<2 sec
DPU-15-IANN	Cold leg Spool 15, 16 in. from vessel center to inlet annulus 9 in. below cold leg centerline at 225°, Spool 15 tap is 9 in. above inlet annulus tap	±100 in. water	±5.0 psid	58	
DPU-15-ATM	Cold leg Spool 15, 16 in. from vessel center to atmosphere	±500 psid	±500 psid	59	Detector saturated for t<24 sec
DPU-PRESLL	Pressurizer water level, elevation difference between taps is 34 in., lower tap is approximately 3.5 in. above pressurizer exit	±50 in. water	±2.5 psid	60	Data unreliable due to significant heating and subsequent blowdown of sense lines
Broken Loop					
DPB-IANN-21	Vessel inlet annulus, 9 in. below cold leg centerline at 225° to cold leg Spool 21, 49 in. from vessel center, inlet annulus tap, 9 in. below Spool 21 tap	±100 in. water	±5.0 psid	61	
DPB-21-23	Cold leg Spool 21, 49 in. from vessel center to cold leg Spool 23, 92 in. from vessel center	±800 in. water	±40 psid	62	
DPB-23-24	Across vessel-side nozzle, Spool 23, 92 in. from vessel center to Spool 24, 104 in. from vessel center	±1000 psid	±1000 psid	63	
DPB-UP-30	Vessel upper plenum 10.5 in. above cold leg centerline at 30° to hot leg Spool 30, 18 in. from vessel center, tap is 2 in. above Spool 30 tap	±100 in. water	±5.0 psid	64	Detector saturated from t=0 to t=26 sec. End point questionable
DPB-30-38	Across entire simulated steam generator assembly and instrument spool downstream of simulated steam generator, hot leg Spool 30, 18 in. from vessel center to cold leg Spool 38, 305 in. from vessel center along hot leg, Spool 30 is 40 in. above Spool 38	±100 psid	±100 psid	65	
DPB-30-32U	Hot leg Spool 30, 18 in. from vessel center to Spool 32 upper tap, 73 in. from vessel center, Spool 30 tap is 30 in. below Spool 32 upper tap	±50 psid	±50 psid	66	
DPB-32U-36L	Across simulated steam generator orifice assembly, hot leg Spool 32 upper tap, 73 in. from vessel center to Spool 36 lower tap, 242 in. from vessel center, Spool 32 upper tap is 16 in. above Spool 36 lower tap	±50 psid	±50 psid	67	
DPB-36L-37	Across nozzle assembly Spool 36 lower taps, 242 in. from vessel center along hot leg and Spool 37, 282 in. from vessel center along hot leg, Spool 37 is 40 in. below Spool 36 lower tap	±50 psid	±50 psid	68	
DPB-37-38	Across turbine flowmeter and drag disc, cold leg Spool 37, 282 in. from vessel center along hot leg to cold leg Spool 38, 305 in. from vessel center along hot leg, Spool 37 tap is 23 in. above Spool 38 tap	±50 in. water	±2.5 psid	69	Questionable measurement
DPB-38-40	Across simulated pump, cold leg Spool 38, 305 in. from vessel center along hot leg to cold leg Spool 40, 365 in. from vessel center along hot leg	±1000 psid	±1000 psid	70	

TABLE V (Contd.)

DATA PRESENTATION FOR SEMISCALE MOD-1 TEST S-01-6

Measurement	Location and Comments[a]	Range[a] Detector	Range[a] Data Acquisition System	Figure[a]	Measurement Comments[b]
DIFFERENTIAL PRESSURE (Contd.)					
Broken Loop (Contd.)					
DPB-40-42	Across elbow leading to spool upstream of pump-side nozzle, cold leg Spool 40, 365 in. from vessel center along hot leg to Spool 42, 415 in. from vessel center along hot leg, Spool 40 tap is 40 in. below Spool 42 tap	±50 psid	±50 psid	71	
DPB-42-43	Across pump-side nozzle, cold leg Spool 42, 415 in. from vessel center along hot leg to cold leg Spool 43, 427 in. from vessel center along hot leg	±1500 psid	±1500 psid	72	
DPB-43-CSL	Spool 43 upstream of pump-side nozzle, 415 in. from vessel center along hot leg to nozzle throat, 419 in. from vessel center along hot leg	±500 psid	±500 psid	73	
Vessel					
DPU-15-IANN	Intact loop cold leg Spool 15, 16 in. from vessel center to inlet annulus 9 in. below cold leg centerline at 225°, Spool 15 tap is 9 in. above inlet annulus tap	±100 in. water	±5.0 psid	58	
DPB-IANN-21	Vessel inlet annulus, 9 in. below cold leg centerline at 225° to broken loop cold leg, Spool 21, 49 in. from vessel center, inlet annulus tap is 9 in. below Spool 21 tap	±100 in. water	±5.0 psid	61	
DPV-IANN-UP	Inlet annulus, 9 in. below cold leg centerline at 225° to upper plenum, 10.5 in. above cold leg centerline at 30°, elevation difference between taps is 19 in.			74	
DPV-0-9QQ	Inlet annulus cold leg centerline at 90° to 9 in. below cold leg centerline at 225°, elevation difference between taps is 9 in.	±20 in. water	±1.0 psid	75	
DPV-9-26QQ	Inlet annulus, 9 in. below cold leg centerline at 225° to downcomer gap approximately 26 in. below cold leg centerline at 225°, elevation difference between taps is 17 in.	±50 in. water	±2.5 psid	76	
DPV-9-180QQ	Inlet annulus, 9 in. below cold leg centerline at 225° to lower plenum, 180 in. below cold leg centerline at 225°, elevation difference between taps is 171 in.	±300 in. water	±15 psid	77	
DPV-26-55QM	Across part of downcomer, 26 in. (225°) to 55 in. (180°) below centerline of cold leg, elevation difference between taps is 29 in.	±50 in. water	±2.5 psid	78	
DPV-55-110AM	Across part of downcomer, 55 in. (0°) to 110 in. (180°) below cold leg centerline, elevation difference between taps is 55 in.	±100 in. water	±5.0 psid	79	
DPV-110-156MQ	Across part of downcomer, 110 in. (180°) to 156 in. (225°) below cold leg centerline, elevation difference between taps is 46 in.	±100 in. water	±5.0 psid	80	
DPV-156-173QQ	Across downcomer exit, 7 in. above exit to 10 in. below exit, taps at 156 in. (225°) and 173 in. (225°) below cold leg centerline, elevation difference between taps is 17 in.	±20 in. water	±1.0 psid	81	
DPV-173-180QQ	Across part of lower plenum, 173 in. (225°) to 180 in. (225°) below cold leg centerline, elevation difference between taps is 7 in.	±20 in. water	±1.0 psid	82	
DPV-180-191QT	Across part of lower plenum, 180 in. (225°) to 191 in. (270°) below cold leg centerline, elevation difference between taps is 11 in.	±20 in. water	±1.0 psid	83	
DPV-166-191QT	Across lower plenum, 166 in. (225°) to 191 in. (270°) below cold leg centerline, elevation difference between taps is 25 in.	±50 in. water	±2.5 psid	84	
DPV-LP-UP	Lower plenum, 180 in. below cold leg centerline at 225° to upper plenum 10.5 in. above cold leg centerline at 30°, elevation difference between taps is 191 in.	±300 in. water	±15 psid	85	

TABLE V (Contd.)

DATA PRESENTATION FOR SEMISCALE MOD-1 TEST S-01-6

Measurement	Location and Comments[a]	Range[a] Detector	Range[a] Data Acquisition System	Figure[a]	Measurement Comments[b]
DIFFERENTIAL PRESSURE (Contd.)					
Vessel (Contd.)					
DPU-UP-1	Upper plenum, 10.5 in. above cold leg centerline at 30° to intact loop hot leg Spool 1, 31 in. from vessel center, upper plenum tap is approximately 2 in. above Spool 1 tap	±100 in. water	±5.0 psid	45	
DPU-UP-3	Vessel upper plenum, 10.5 in. above cold leg centerline at 30° to intact loop hot leg Spool 3, 62 in. from vessel center, upper plenum tap is approximately 2 in. above Spool 3 tap	±300 in. water	±15 psid	46	
DPB-UP-30	Vessel upper plenum, 10.5 in. above cold leg centerline at 30° to broken loop hot leg Spool 30, 18 in. from vessel center, upper plenum tap is 2 in. above Spool 30 tap	±100 in. water	±5.0 psid	64	
Steam Generator					
DPU-3-SGIP	Across inlet orifice, hot leg Spool 3, 62 in. from vessel center to steam generator inlet plenum, 145 in. from vessel center, Spool 3 tap is 16 in. below SGIP tap	±300 in. water	±15 psid	48	
DPU-SG-SEC	Secondary side, differential pressure taps at 45 and 126 in. above bottom of tube sheet, elevation difference between taps is 81 in.	±100 in. water	±5.0 psid	86	
Pressurizer					
DPU-PRESLL	Pressurizer water level, elevation difference between taps is 34 in., lower tap is approximately 3.5 in. above pressurizer exit	±50 in. water	±2.5 psid	60	
OLUMETRIC FLOW RATE	Turbine flowmeter, bidirectional				
Intact Loop	3-in. Schedule 160 pipe				
FTU-1	Hot leg, Spool 1, 18 in. from vessel center	±20-±400 gpm	±800 gpm	87	
FTU-9	Cold leg, Spool 9, 154 in. from vessel center	±20-±400 gpm	±800 gpm	87	Some flow spikes exceed calibrated range
FTU-13	Cold leg, Spool 13, 64 in. from vessel center	±20-±400 gpm	±800 gpm	88	Some flow spikes exceed calibrated range
FTU-15	Cold leg, Spool 15, 29 in. from vessel center	±10-±200 gpm	±300 gpm	88	
Broken Loop	All measurements bidirectional, Schedule 160 pipe				
FTB-21	Cold leg, Spool 21, 58 in. from vessel center, 3-in. pipe	±20-±400 gpm	±700 gpm	89	Data acquisition system saturated at t=22 to t=24 sec; flow also exceeded calibrated range of detector
FTB-30	Cold leg, Spool 30, 24 in. from vessel center, 3-in. pipe	±20-±400 gpm	±700 gpm	90	
FTB-37	Cold leg, Spool 37, 290 in. from vessel center along hot leg, 2-in. pipe	±10-±200 gpm	±700 gpm	90	Flow exceeded calibrated range of detector
Core					
FTV-CORE-IN	Entrance to core, approximately 158 in. below cold leg centerline	±20-±400 gpm	±400 gpm	91	
ECC System					
FTU-HPIS	In line immediately after HPIS pump for intact loop, 1/2-in. line	0.1-1.0 gpm	1.0 gpm	92	Flow prior to HPIS initiation at t=-1 sec is due to the use of the HPIS pumps in the makeup mode
FTU-LPIS	In line leading from LPIS for intact loop, 1/2-in. line	0.5-10 gpm	10 gpm	93	
FTU-ACC	In line immediately after intact loop accumulator, 1-in. line	4-75 gpm	75 gpm	94	Injection enabling valve opened at t=3 sec, allowing injection line to fill with water from accumulator
Pressurizer	1-1/2-in. turbine				
FTU-PRIZE	Surge line	5-100 gpm	100 gpm	95	

TABLE V (Contd.)

DATA PRESENTATION FOR SEMISCALE MOD-1 TEST S-01-6

Measurement	Location and Comments[a]	Range[a] Detector	Range[a] Data Acquisition System	Figure[a]	Measurement Comments[b]
FLUID VELOCITY	Turbine flowmeter, bidirectional				
Downcomer Gap					
FTV-40A	40 in. below cold leg centerline, 0°	±2.5-±50 ft/sec	±70 ft/sec		
FTV-83H	83 in. below cold leg centerline, 180°	±1.8-±36 ft/sec	±40 ft/sec		
FTV-130H	130 in. below cold leg centerline, 180°	±0.9-±18 ft/sec	±20 ft/sec		Turbine flowmeter stuck for most of the test
MOMENTUM FLUX	Drag-disc bidirectional. Computer conversion of voltage output to momentum flux is unidirectional and therefore shows magnitude only				
Intact Loop	3-in. pipe				
FDU-1	Hot leg, Spool 1, 29 in. from vessel center, target size 0.875 in.	±250-±11,500 lbm/ft-sec^2	±1800 lbm/ft-sec^2	97	
FDU-5	Hot leg, Spool 5, 100 in. from vessel center, target size 1.0 in.	±1-±2000 lbm/ft-sec^2	±1720 lbm/ft-sec^2	98	
FDU-10	Cold leg, Spool 10, 137 in. from vessel center, target size 0.875 in.	±200-±104,000 lbm/ft-sec^2	±22,750 lbm/ft-sec^2	99	
FDU-13	Cold leg, Spool 13, 54 in. from vessel center, target size 0.875 in.	±200-±11,000 lbm/ft-sec^2	±19,950 lbm/ft-sec^2	100	
FDU-15	Cold leg, Spool 15, 19 in. from vessel center, target size 0.875 in.	±200-±11,600 lbm/ft-sec^2	±18,770 lbm/ft-sec^2	101	
Broken Loop					
FDB-21	Cold leg, Spool 21, 53 in. from vessel center, 3-in. pipe, target size 0.406	±200-±70,500 lbm/ft-sec^2	±87,940 lbm/ft-sec^2	102	
FDB-23	Cold leg, Spool 23, 93 in. from vessel center, upstream of vessel-side nozzle, downstream of injection point, 2 in. pipe, target size 0.406 in.	±200-±125,000 lbm/ft-sec^2	±131,340 lbm/ft-sec^2	103	
FDB-30	Hot leg, Spool 30, 71 in. from vessel center, 3-in. pipe, target size 0.656 in.	±200-±60,000 lbm/ft-sec^2	±44,250 lbm/ft-sec^2	104	
FDB-37	Cold leg, Spool 37, 284 in. from vessel center along hot leg, steam generator outlet vertical pipe, 2 in. pipe, target size 0.406 in.	±200-±131,000 lbm/ft-sec^2	±274,200 lbm/ft-sec^2	105	
FDB-42	Cold leg, Spool 42, 416 in. from vessel center along hot leg, upstream of pump-side nozzle, downstream of injection point, 2-in. pipe, target size 0.406 in.	±200-±116,000 lbm/ft-sec^2	±125,320 lbm/ft-sec^2	106	
Vessel					
FDV-CORE-IN	In core flow mixer box, 150 in. below cold leg centerline, target size 0.875 in.	±100-±1000 lbm/ft-sec^2	±1750 lbm/ft-sec^2		Failed
DENSITY					
Intact Loop		0.1-100 lbm/ft^3	0-100 lbm/ft^3		
GU-1VR	Hot leg, Spool 1, 24 in. from vessel center, vertical			107	
GU-1HZ	Hot leg, Spool 1, 26 in. from vessel center, horizontal			107	
GU-5VR	Hot leg, Spool 5, 96 in. from vessel center, vertical			108	
GU-10VR	Cold leg, Spool 10, 141 in. from vessel center, vertical			108	
GU-13VR	Cold leg, Spool 13, 59 in. from vessel center, vertical			109	
GU-15HZ	Cold leg, Spool 15, 20 in. from vessel center, horizontal			110	
GU-15VR	Cold leg, Spool 15, 23 in. from vessel center, vertical			110	

TABLE V (Contd.)

DATA PRESENTATION FOR SEMISCALE MOD-1 TEST S-01-6

Measurement	Location and Comments[a]	Range[a] Detector	Range[a] Data Acquisition System	Figure[a]	Measurement Comments[b]
DENSITY (Contd.)					
Broken Loop		0.1-100 lbm/ft^3	0-100 lbm/ft^3		
GB-21VR	Cold leg, Spool 21, 49 in. from vessel center, vertical			111	
GB-23VR	Cold leg, Spool 23, 92 in. from vessel center, vertical			111	
GB-30VR	Hot leg, Spool 30, 18 in. from vessel center, vertical			112	
GB-37HZ	Cold leg, Spool 37, 279 in. from vessel center along hot leg, across vertical pipe, simulated steam generator discharge			112	
GB-42VR	Cold leg, Spool 42, 415 in. from vessel center along hot leg, vertical			113	
Vessel					
GV-COR-150HZ	Core flow mixer box, 152 in. below cold leg centerline, horizontal, 0-180°			114	
GV-161/192D	Lower plenum 161 in. below cold leg centerline (270°) to 192 in. below cold leg centerline (90°), 31 in. vertical 32.2 in. diagonal			114	
GVLP-165HZ	Upper part of lower plenum, 165 in. below cold leg centerline, 1.724 in. below downcomer exit, horizontal, 0-180°			115	
GVLP-172HZ	Lower plenum, 172 in. below cold leg centerline, 8.729 in. below downcomer exit, horizontal, 90-270°			115	
Pressurizer					
GU-PRIZE	Surge line			116	
MASS FLOW RATE	Mass flow rate obtained by combining density (gamma attenuation technique) with volumetric flow rate (turbine flowmeter) or momentum flux (drag disc)	Range for mass flow is determined from range of individual detectors used in calculation			Discrepancies in mass flow measurements may result from the effects of two phase flow or complex geometries
Intact Loop					
FDU-1 GU-1VR FTU-1 GU-1VR	Hot leg, Spool 1			117 118	
FDU-5 GU-5VR	Hot leg, Spool 5			119	
FTU-9 GU-10VR	Cold leg, Spool 9			120	
FDU-10 GU-10VR	Cold leg, Spool 10			121	
FDU-13 GU-13VR FTU-13 GU-13VR	Cold leg, Spool 13			122 123	
FDU-15 GU-15VR FTU-15 GU-15VR	Cold leg, Spool 15			124 125	
FTU-PRIZE GU-PRIZE	Pressurizer surge line			126	
Broken Loop					
FDB-21 GB-21VR FTB-21 GB-21VR	Cold leg, Spool 21			127 128	
FDB-23 GB-23VR	Cold leg, Spool 23			129	
FDB-30 GB-30VR FTB-30 GB-30VR	Hot leg, Spool 30			130 131	
FDB-37 GB-37HZ FTB-37 GB-37HZ	Cold leg, Spool 37			132 133	
FDB-42 GB-42VR	Cold leg, Spool 42			134	
Vessel					
FTV-CORE-IN GV-COR-150HZ	Entrance to core			135	
FDV-CORE-IN GV-COR-150HZ	Entrance to core				FDV-CORE-IN failed

TABLE V (Contd.)

DATA PRESENTATION FOR SEMISCALE MOD-1 TEST S-01-6

Measurement	Location and Comments[a]	Range[a] Detector	Range[a] Data Acquisition System	Figure[a]	Measurement Comments[b]
PUMP CHARACTERISTICS					
PUMPU-TORQ	Pump torque	0-500 in.-lb	0-500 in.-lb	136	Data acquisition system saturated from t=4 to t=14
PUMPU-POW	Pump motor power		0-25 kW	137	
PUMPU-RPM	Pump speed	0-3600 rpm	0-3600 rpm	138	

[a] Statements at the beginning of a measurement category regarding location and comments, range, and figure apply to all subsequent measurements within the given category unless specified otherwise.

[b] Detectors which were subjected to overrange conditions during portions of the test were capable of withstanding these conditions without change in operating or measuring characteristics when the physical conditions were again within the detector range.

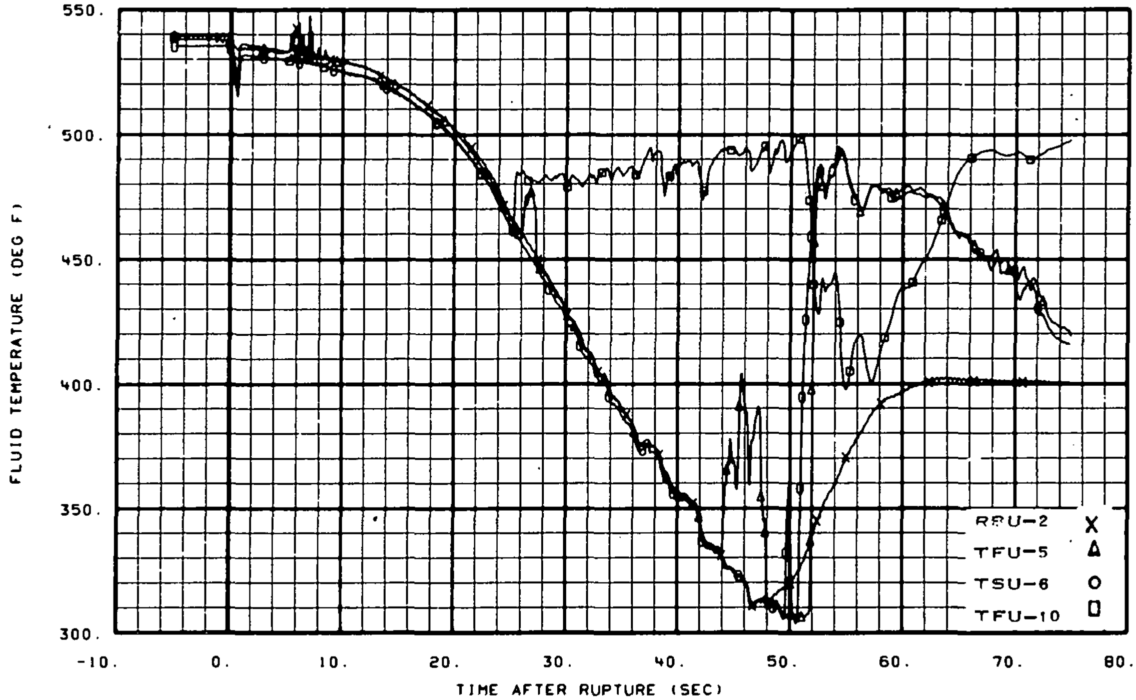

Fig. 7 Fluid temperatures in intact loop (RBU-2, TFU-5, TSU-6, and TFU-10).

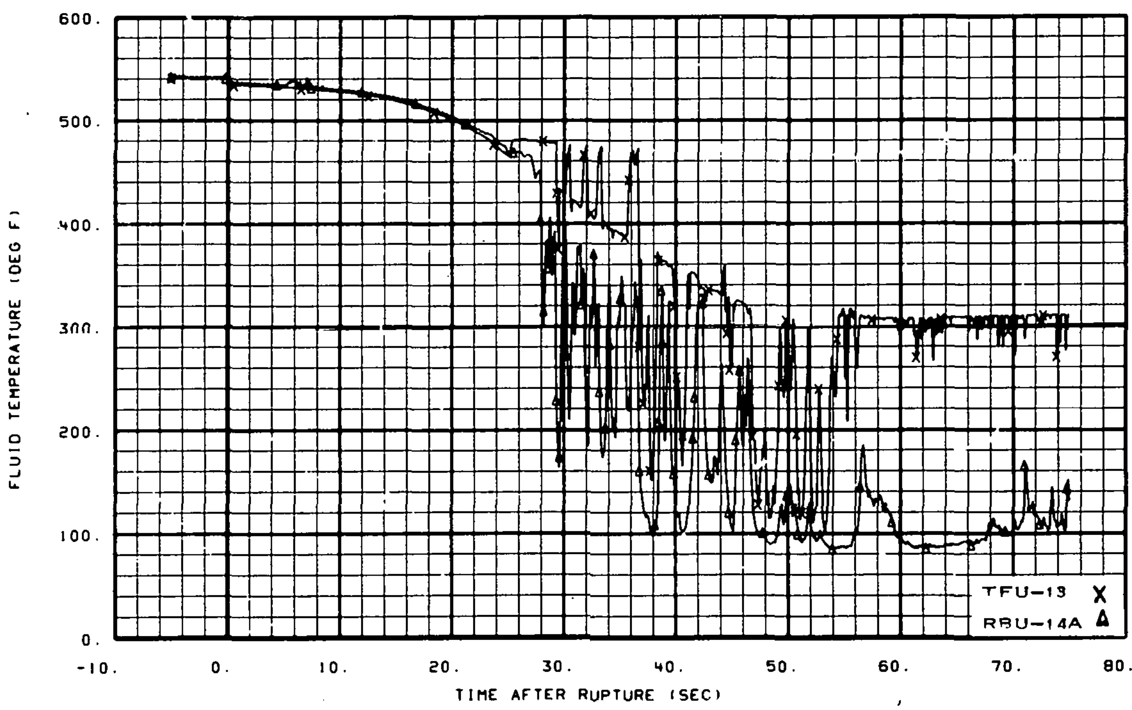

Fig. 8 Fluid temperatures in intact loop (TFU-13 and RBU-14A).

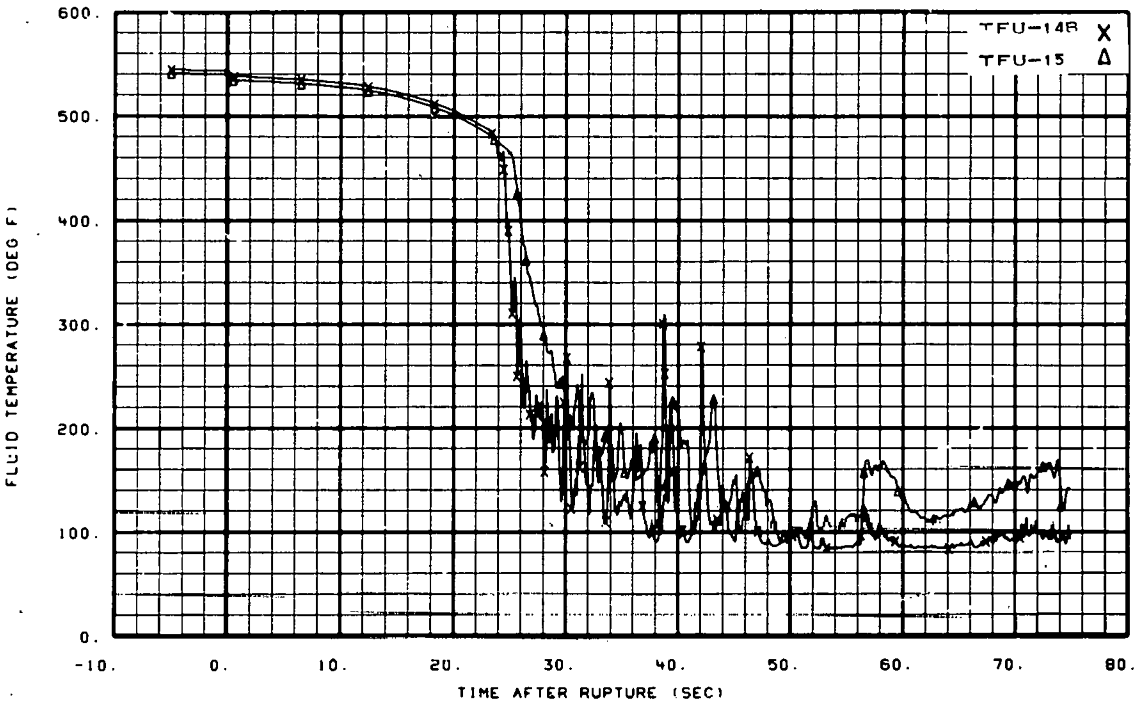

Fig. 9 Fluid temperatures in intact loop (TFU-14B and TFU-15).

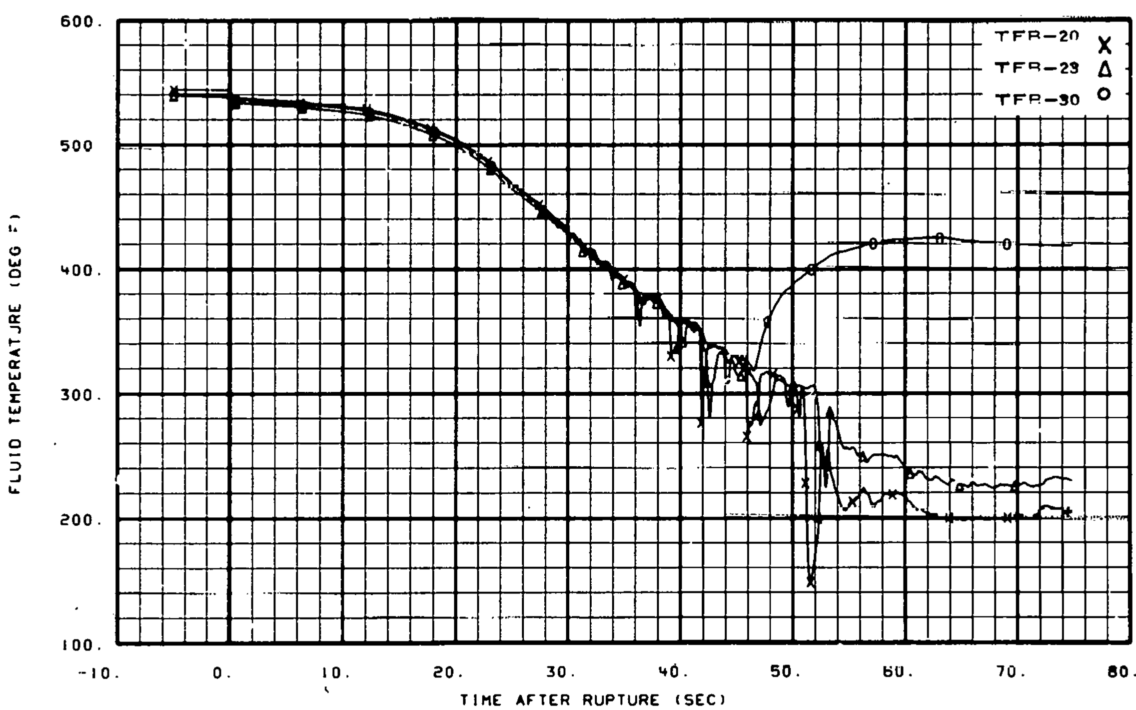

Fig. 10 Fluid temperatures in broken loop.

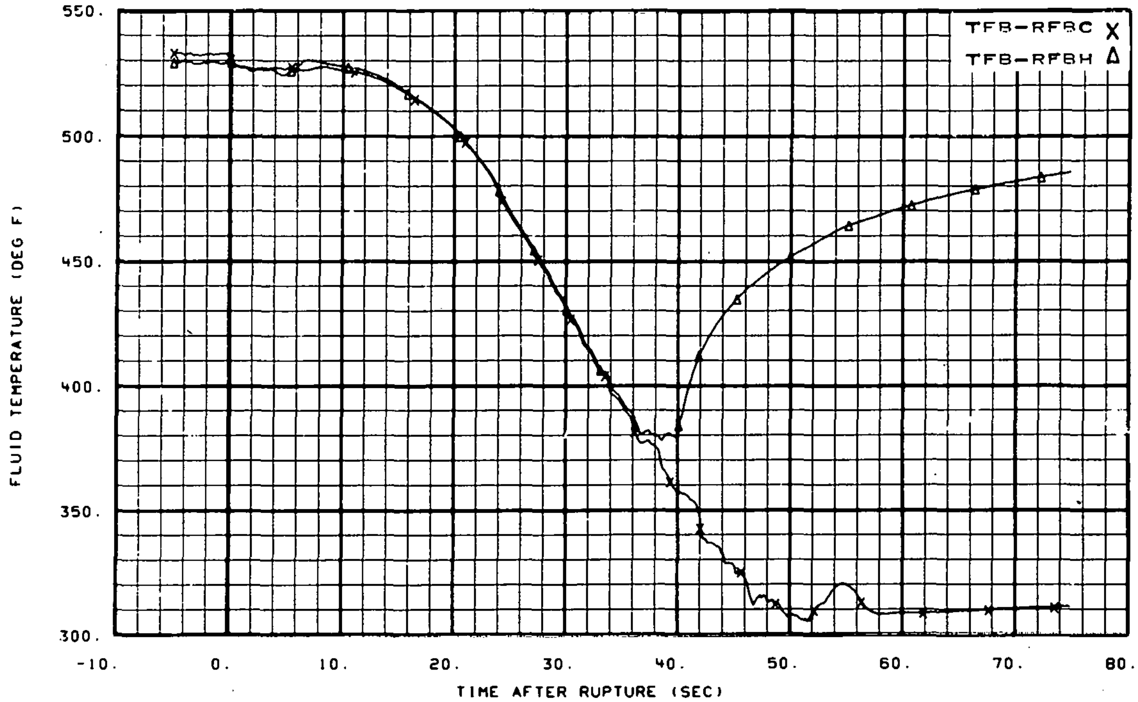

Fig. 11 Fluid temperatures in reflood bypass line.

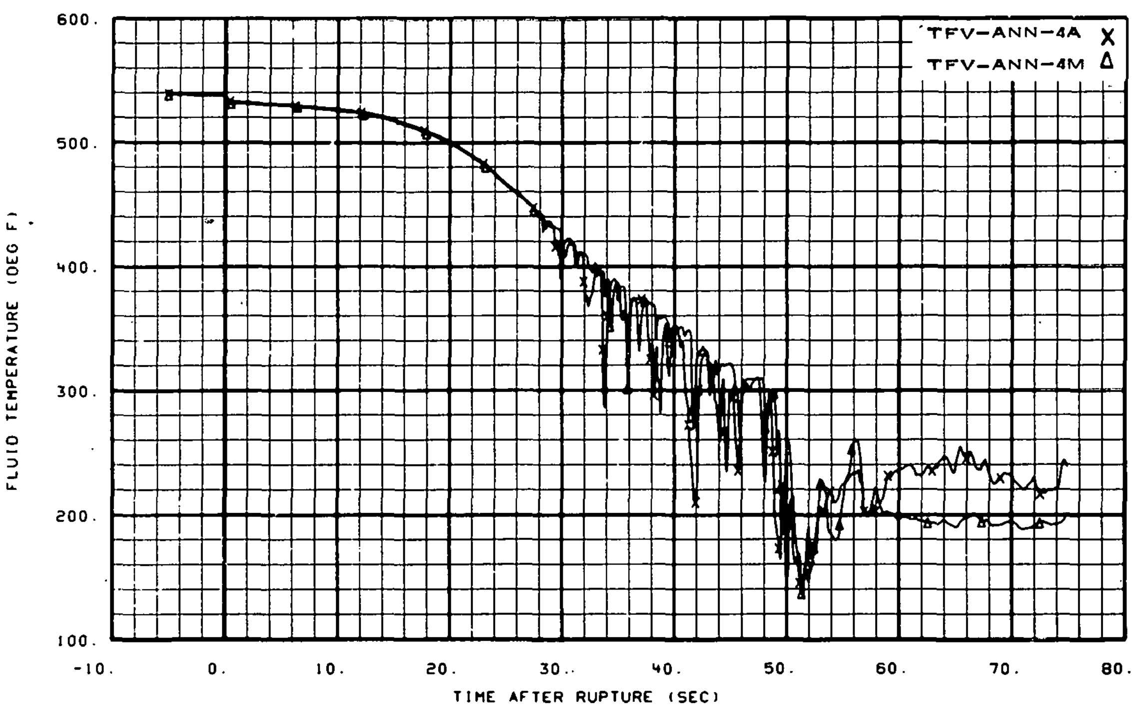

Fig. 12 Fluid temperatures in inlet annulus.

Fig. 13 Fluid temperatures in downcomer annulus (TFV-ANN-15A, TFV-ANN-15M, and TFV-ANN-15T).

Fig. 14 Fluid temperatures in downcomer annulus (TFV-ANN-35M and TFV-ANN-35T).

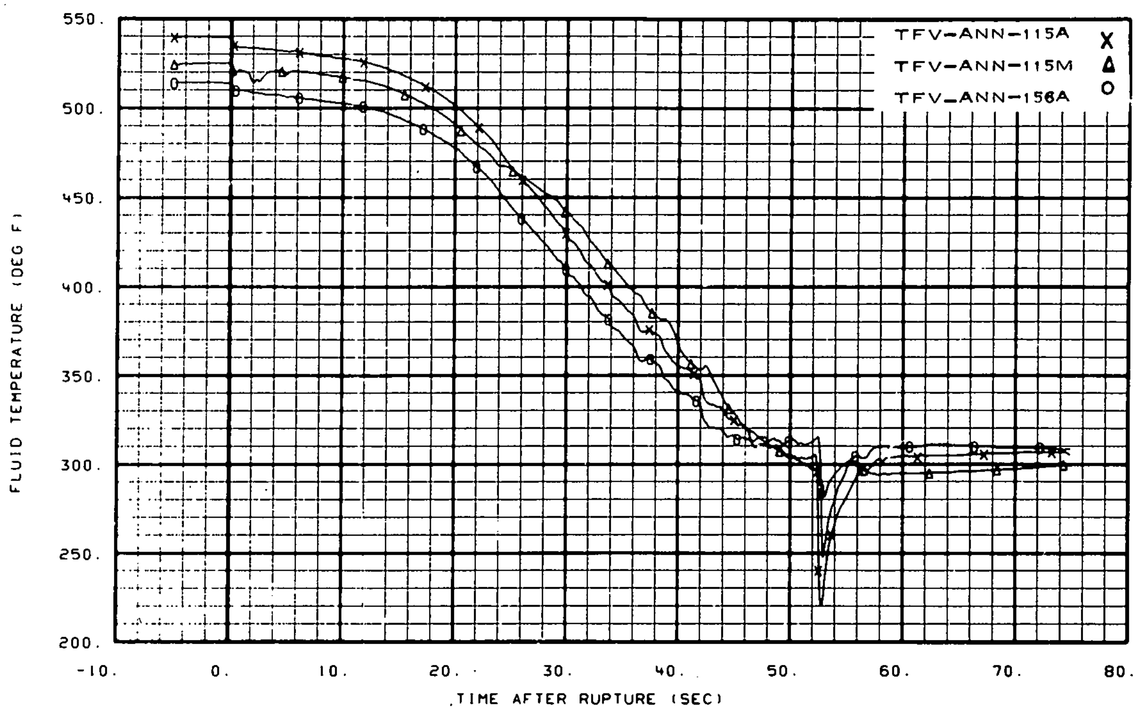

Fig. 15 Fluid temperatures in downcomer annulus (TFV-ANN-115A, TFV-ANN-115M, and TFV-ANN-156A).

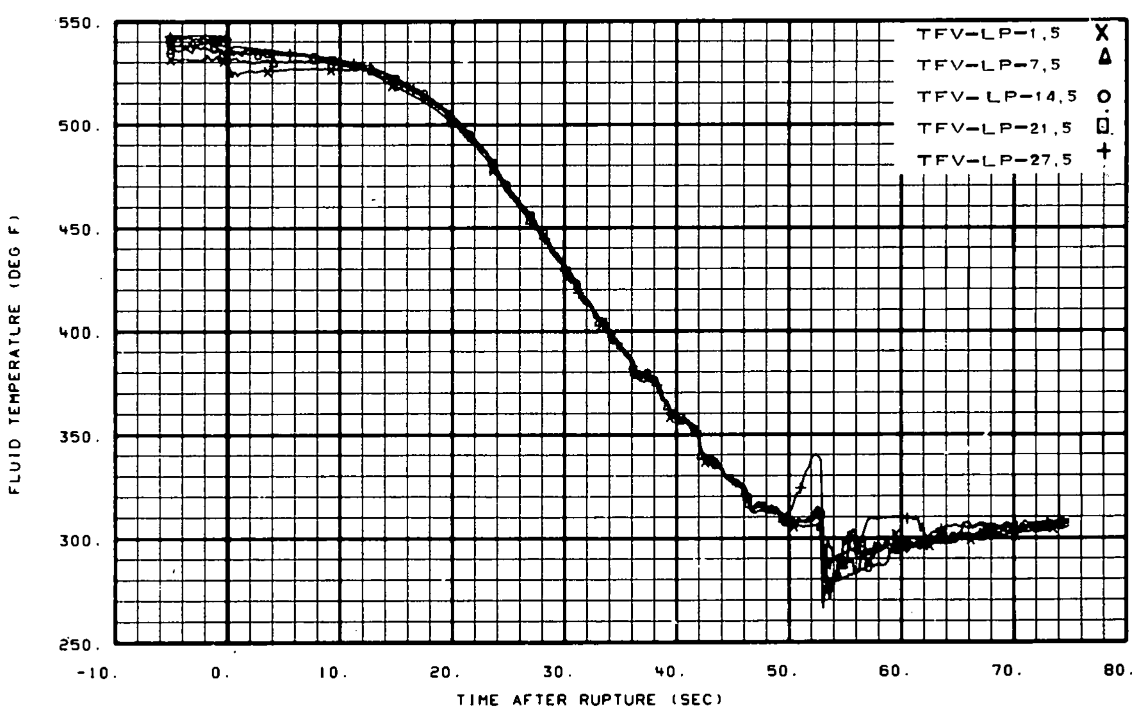

Fig. 16 Fluid temperatures in lower plenum.

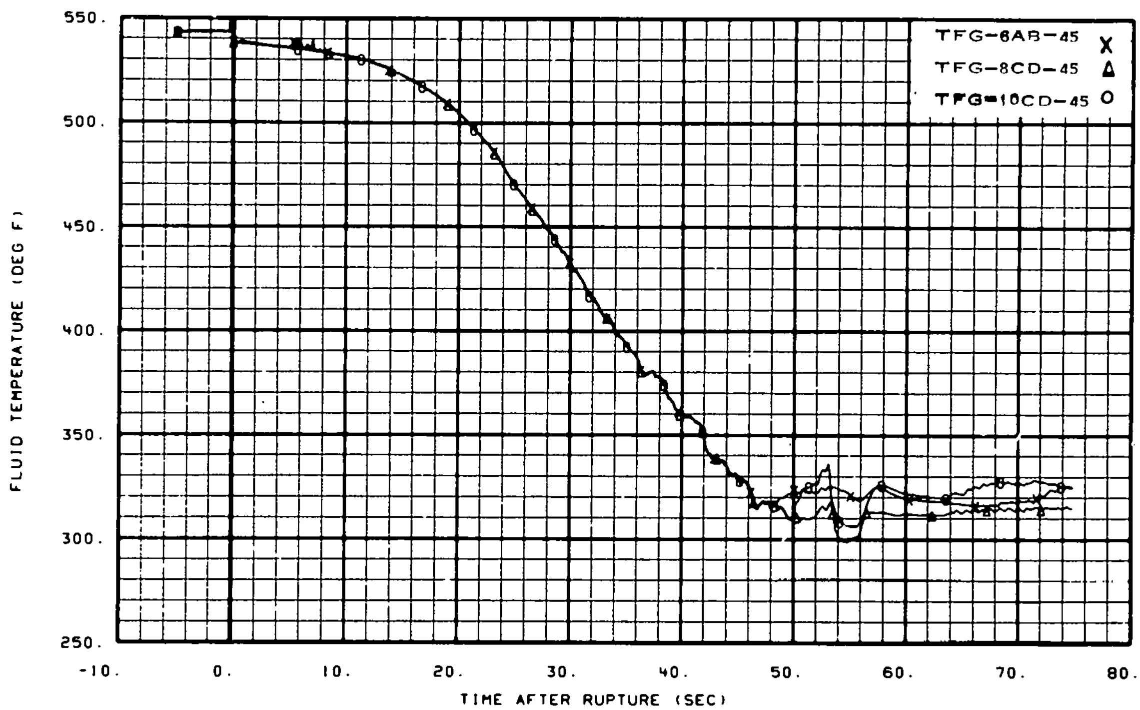

Fig. 17 Fluid temperatures at core grid spacers.

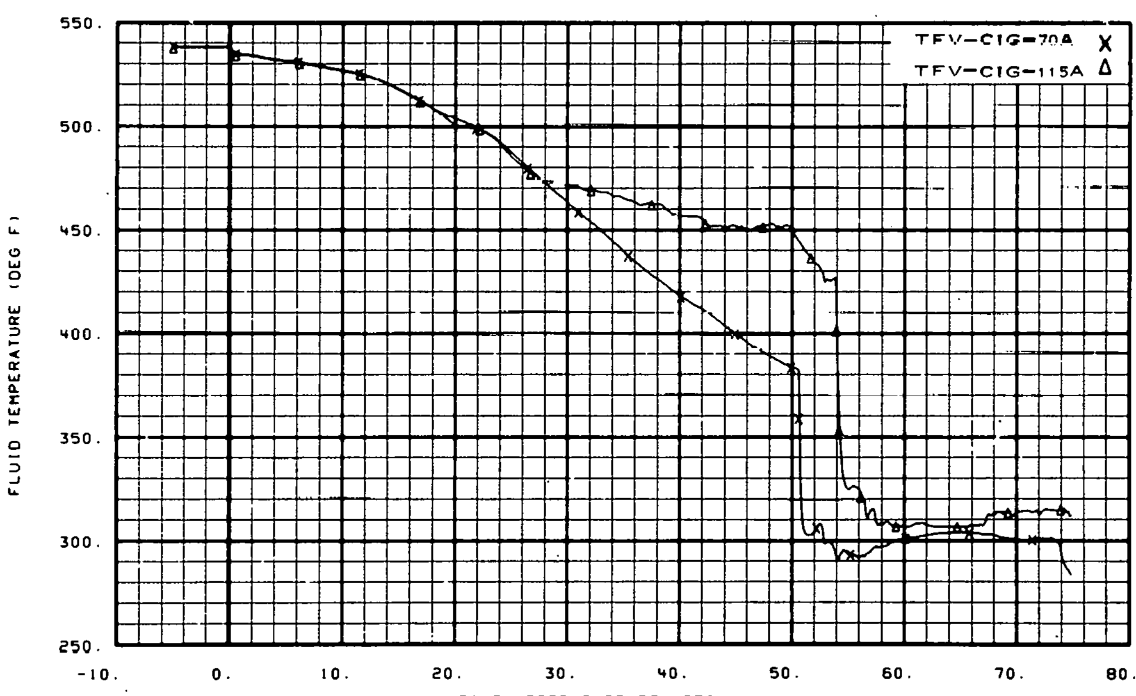

Fig. 18 Fluid temperatures in core barrel insulation gap.

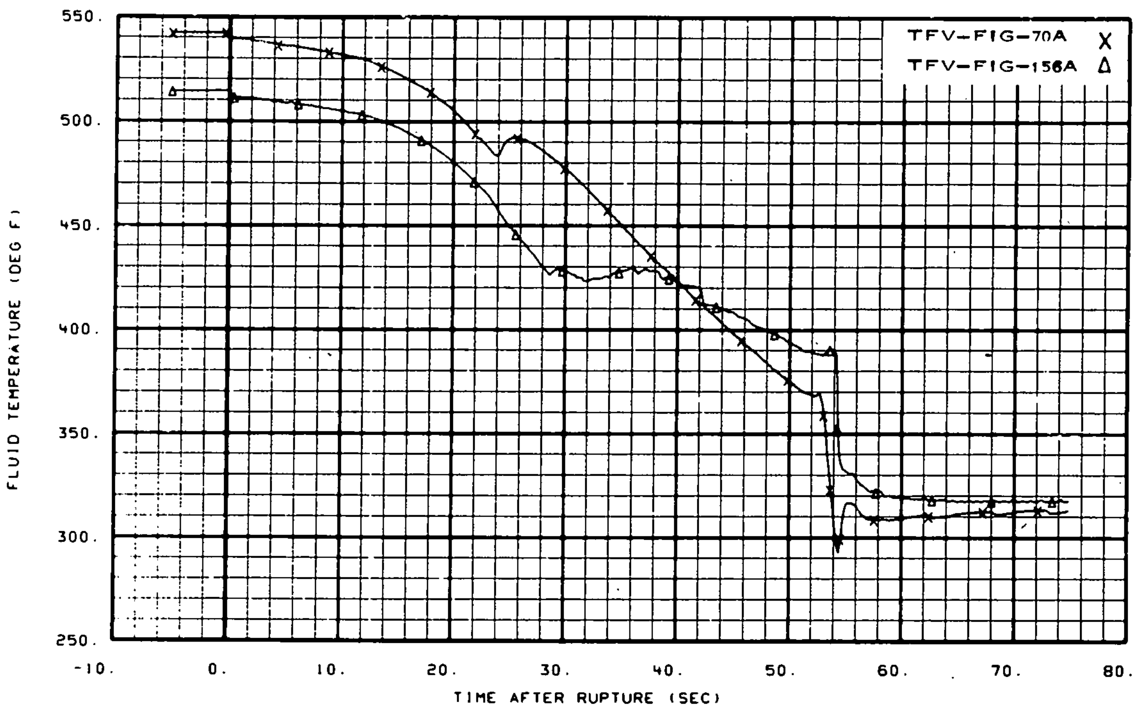

Fig. 19 Fluid temperatures in vessel filler insulation gap.

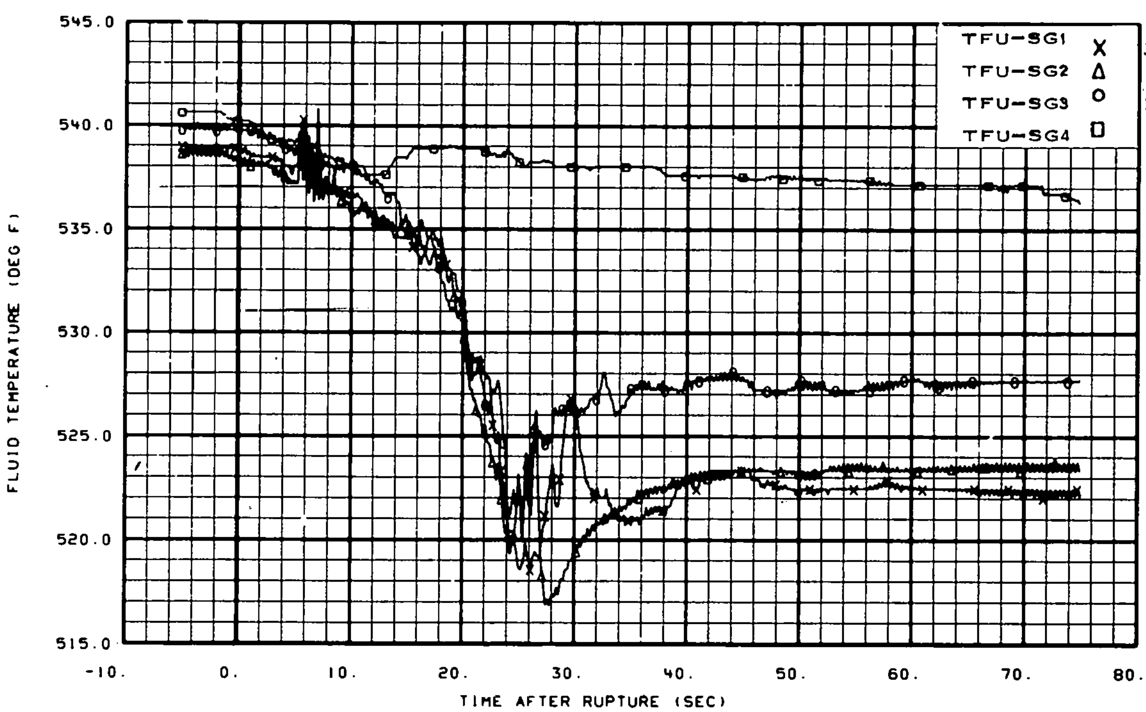

Fig. 20 Fluid temperatures in steam generator.

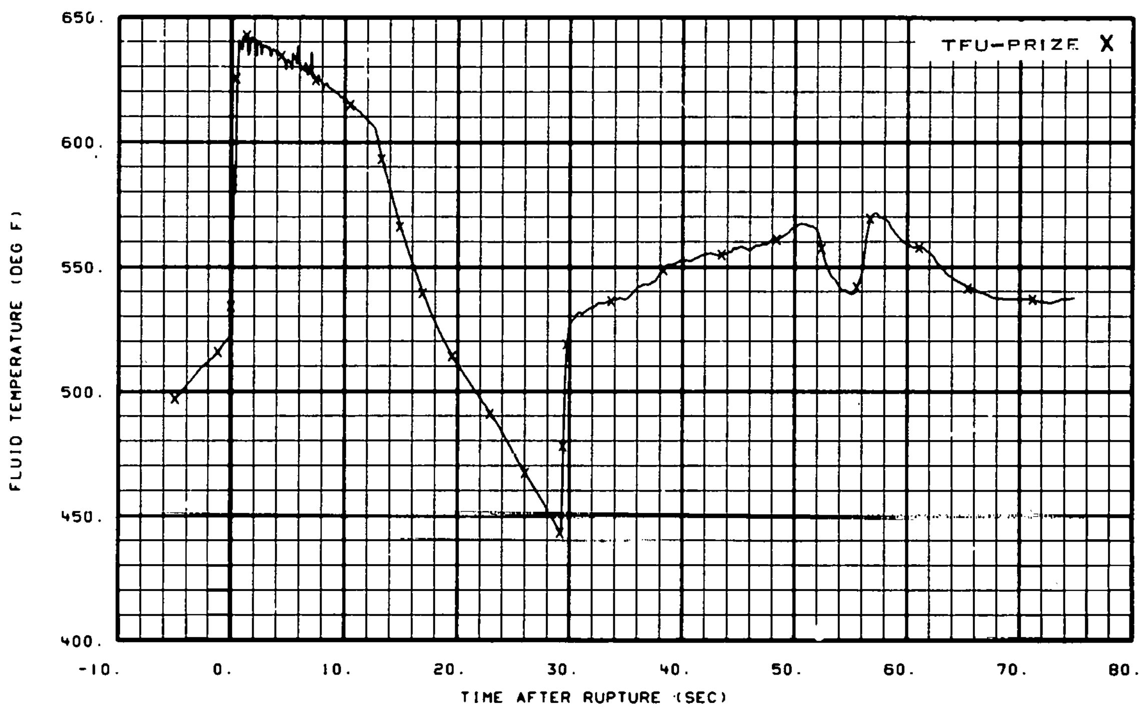

Fig. 21 Fluid temperature in pressurizer surge line.

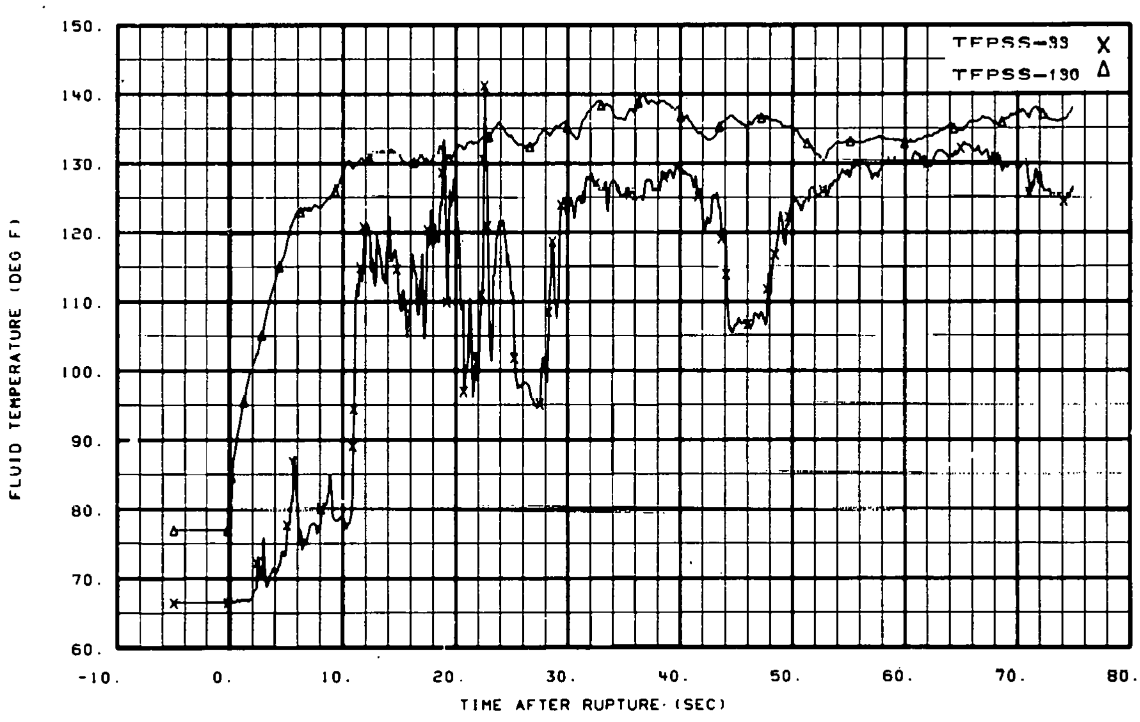

Fig. 22 Fluid temperatures in pressure suppression tank.

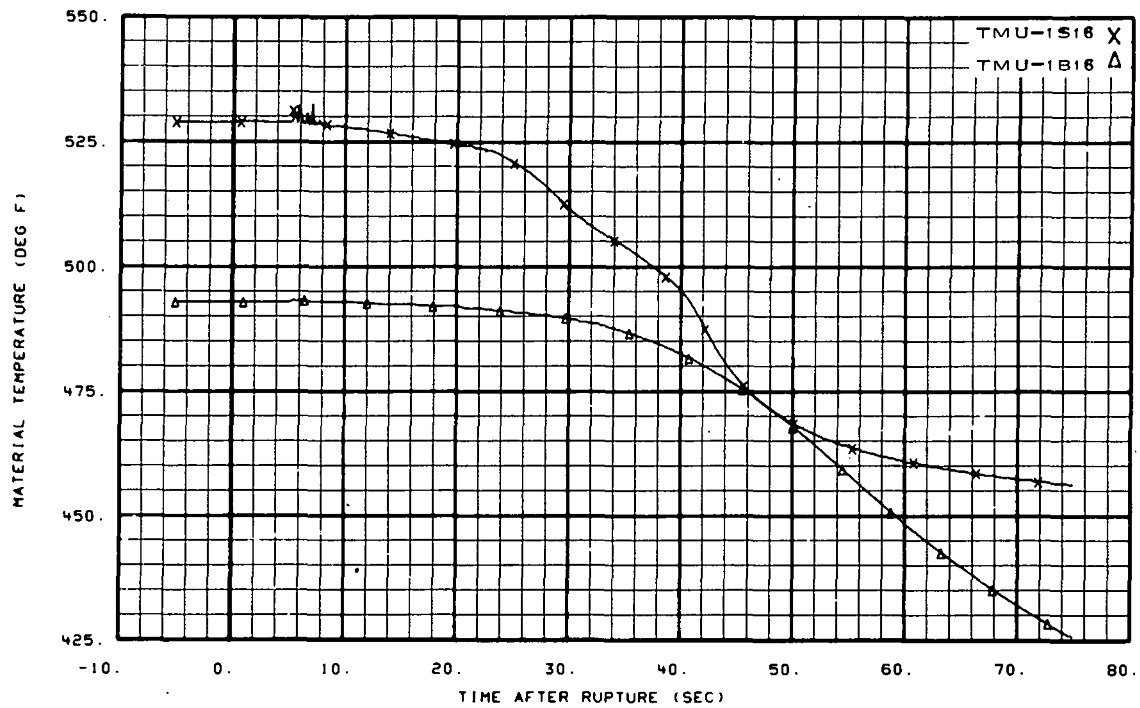

Fig. 23 Material temperatures in intact loop (TMU-1S16 and TMU-1B16).

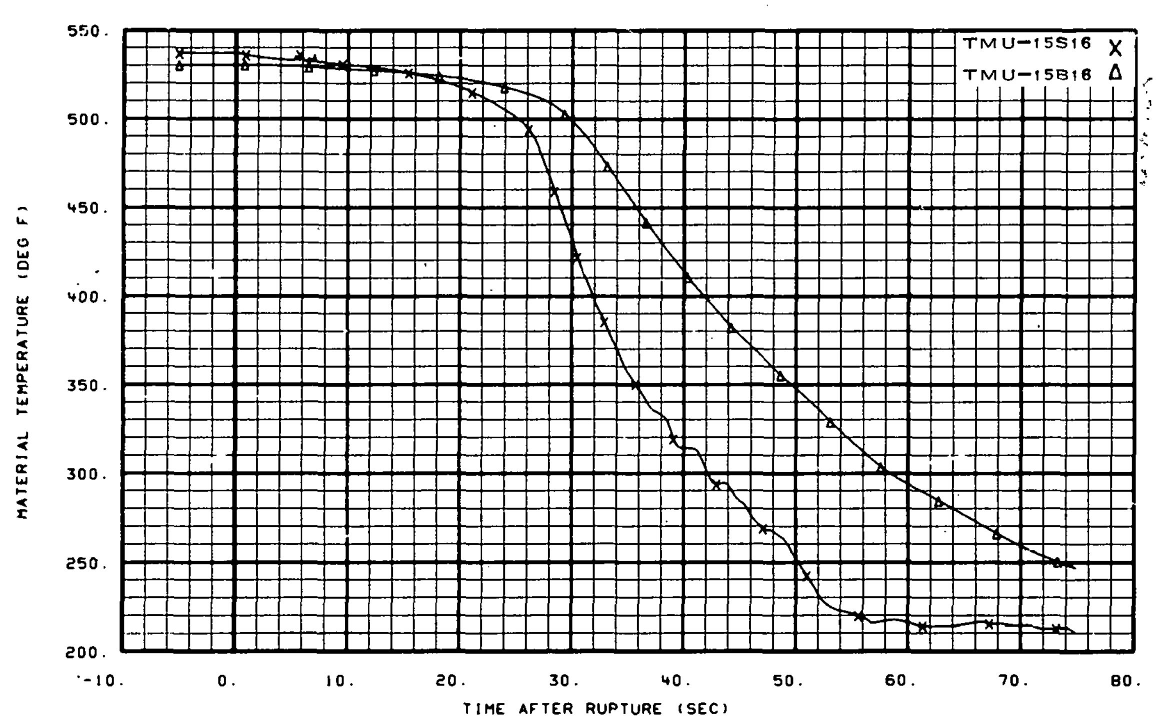

Fig. 24 Material temperatures in intact loop (TMU-15S16 and TMU-15B16).

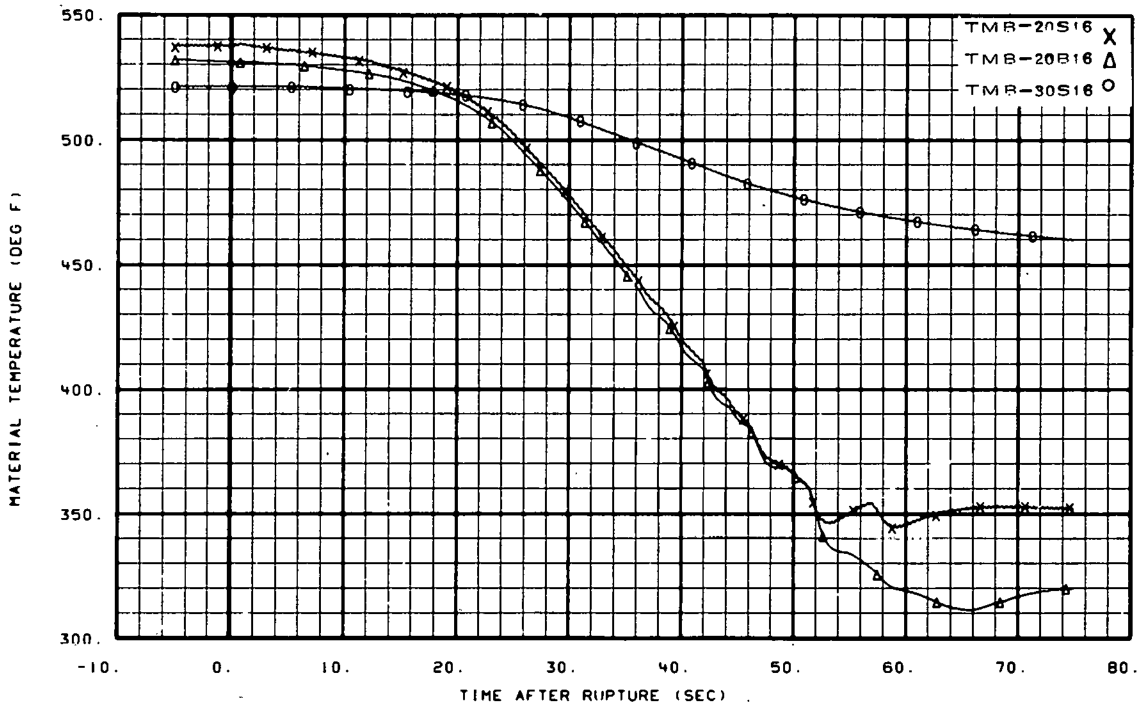

Fig. 25 Material temperatures in broken loop.

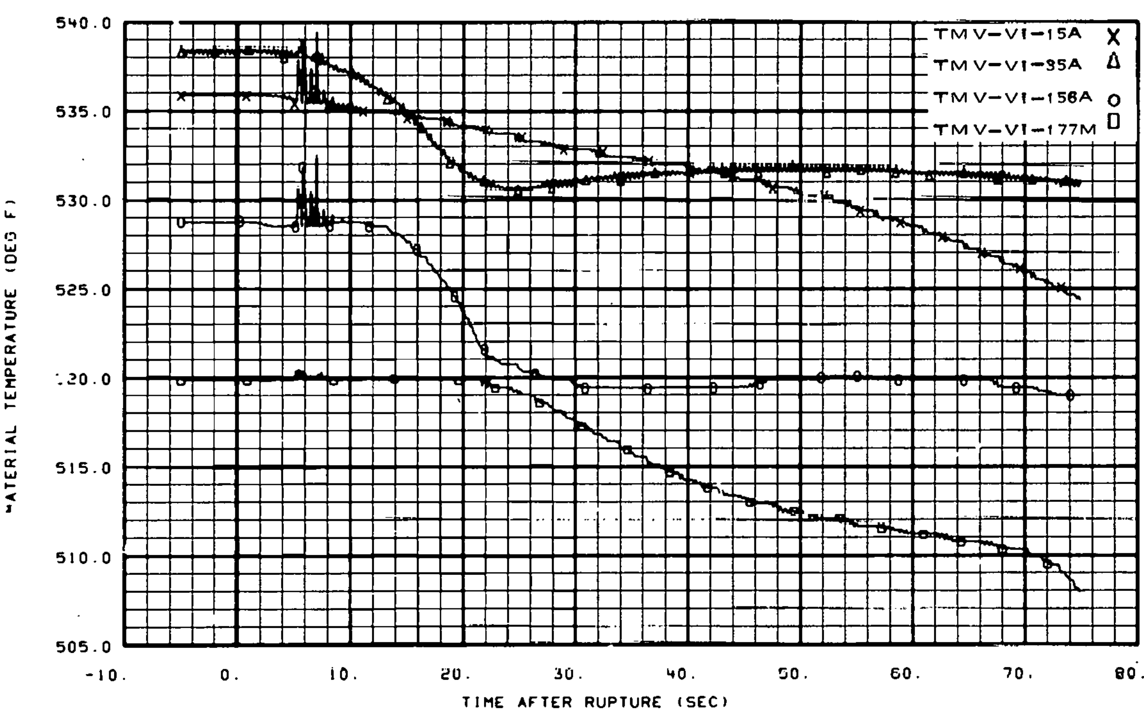

Fig. 26 Material temperatures in vessel wall.

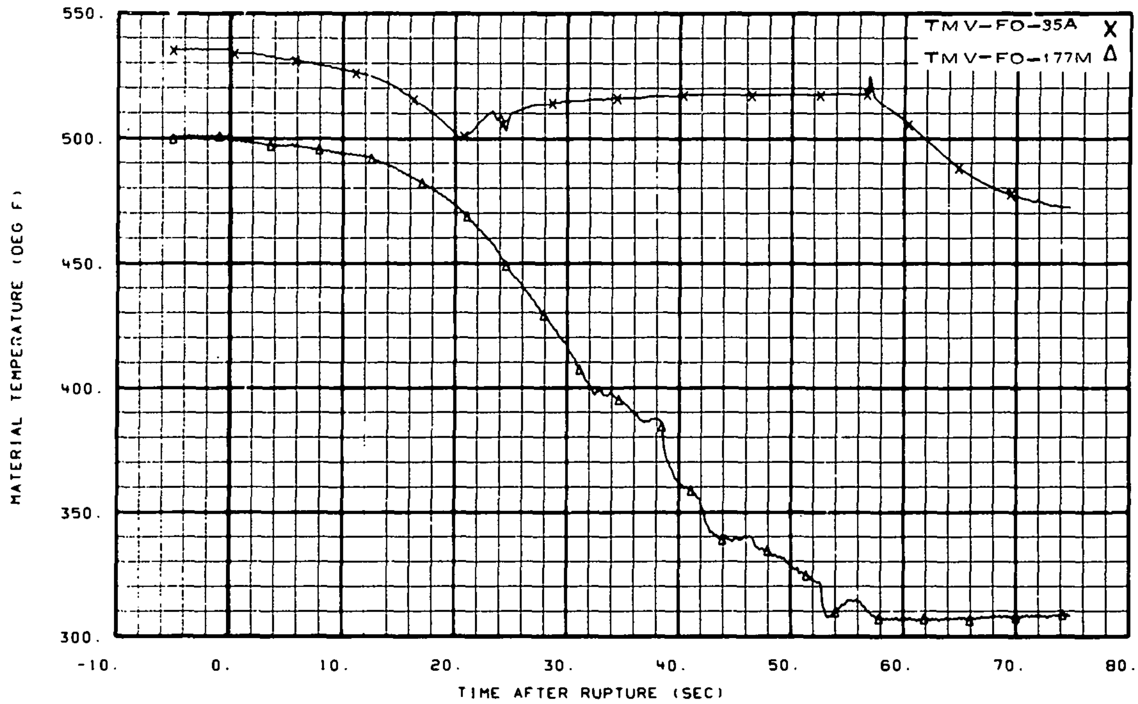

Fig. 27 Material temperatures in vessel filler outside diameter.

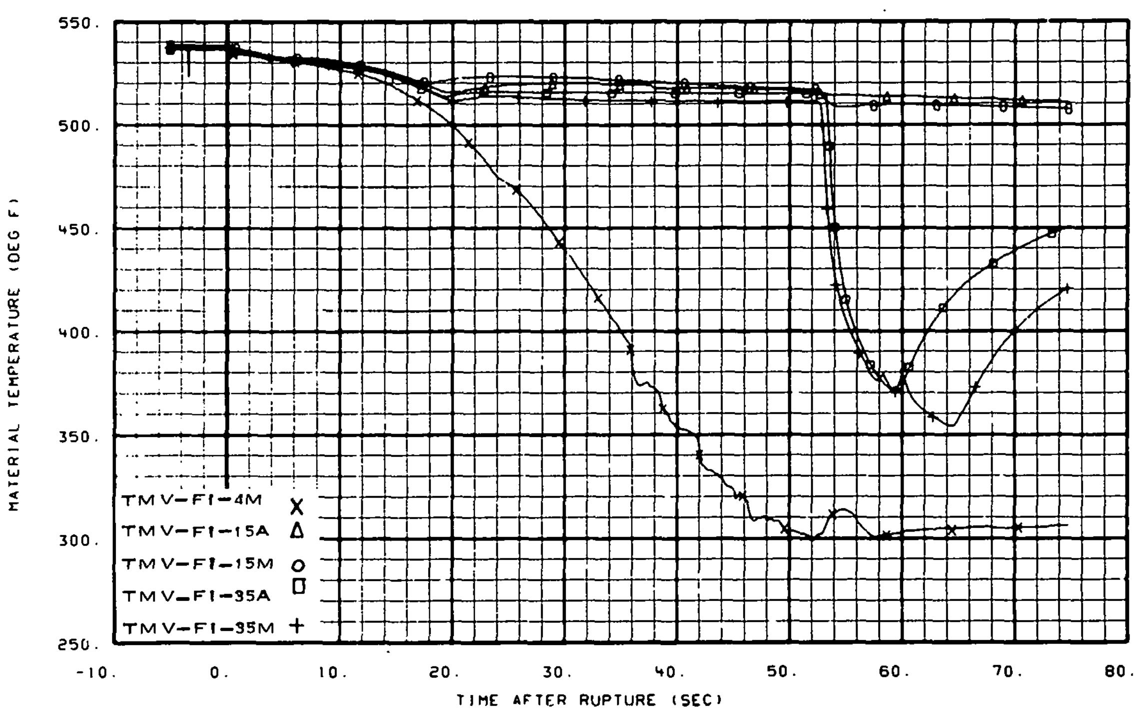

Fig. 28 Material temperatures in vessel filler inside diameter (TMV-FI-4M, TMV-FI-15A, TMV-FI-15M, TMV-FI-35A, and TMV-FI-35M).

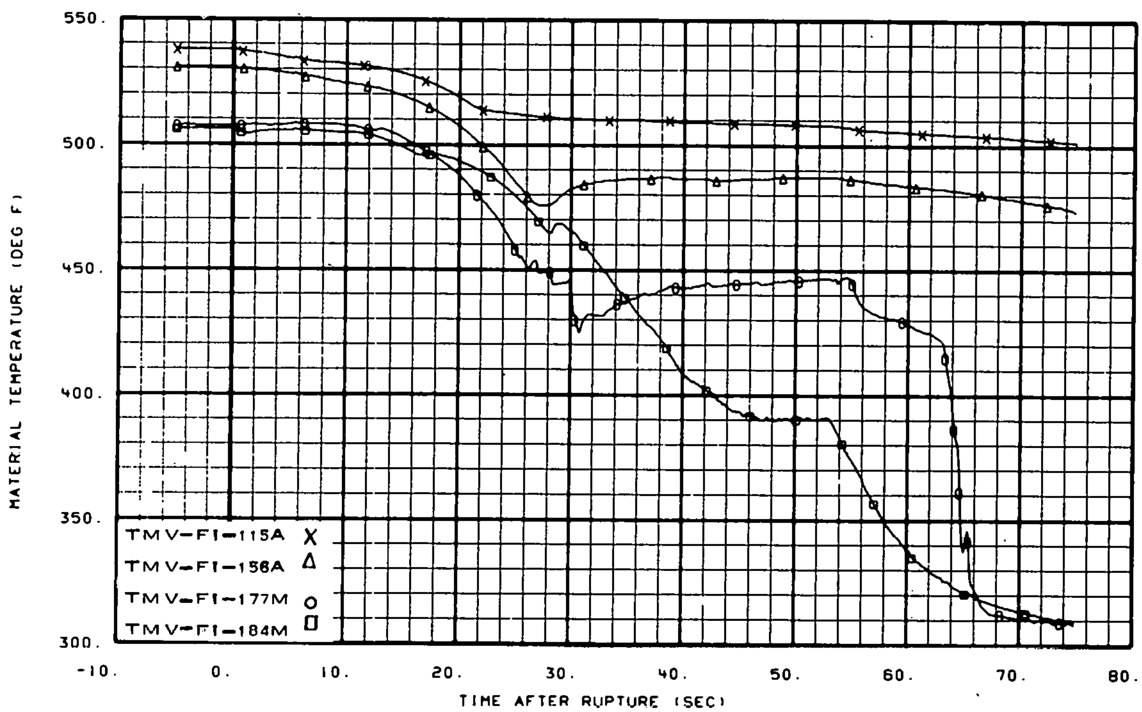

Fig. 29 Material temperatures in vessel filler inside diameter (TMV-FI-115A, TMV-FI-156A, TMV-FI-177M, and TMV-FI-184M).

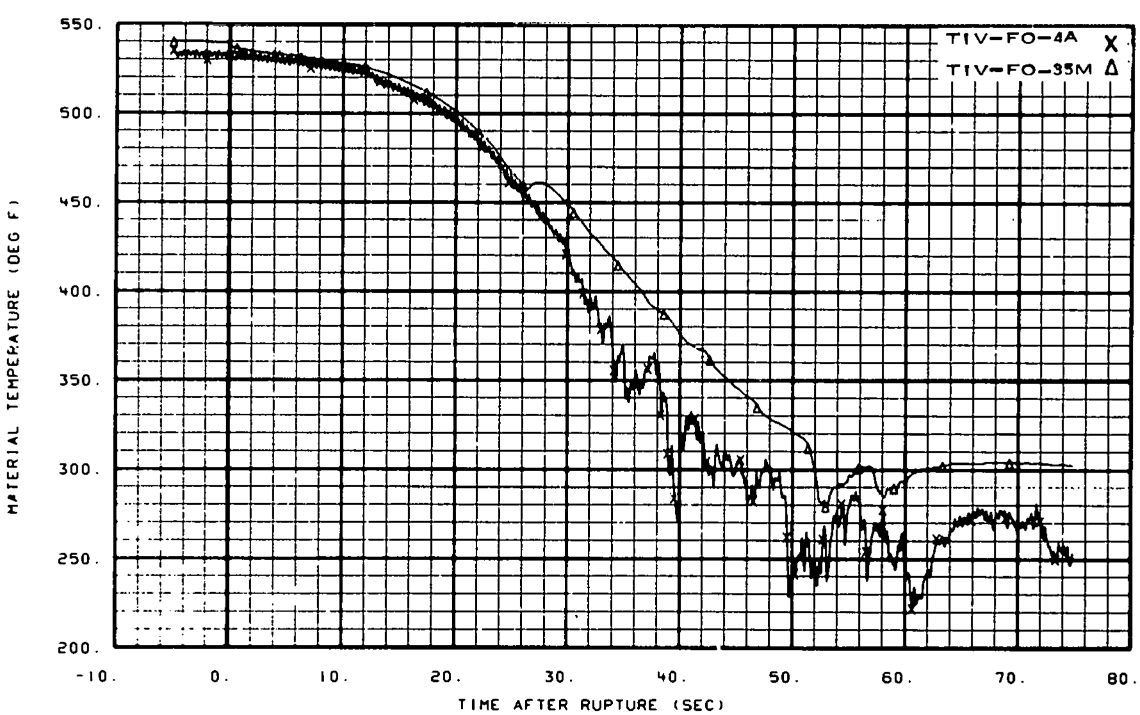

Fig. 30 Material temperatures in vessel filler insulator (TIV-FO-4A and TIV-FO-35M).

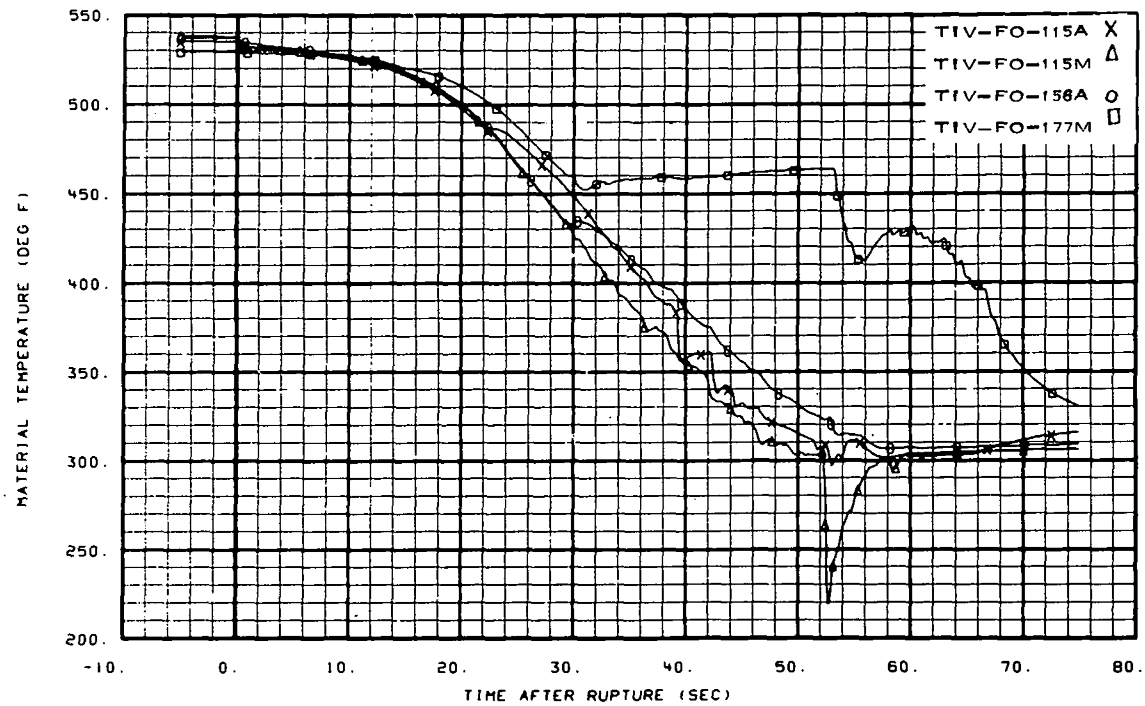

Fig. 31 Material temperatures in vessel filler insulator (TIV-FO-115A, TIV-FO-115M, TIV-FO-156A, and TIV-FO-177M).

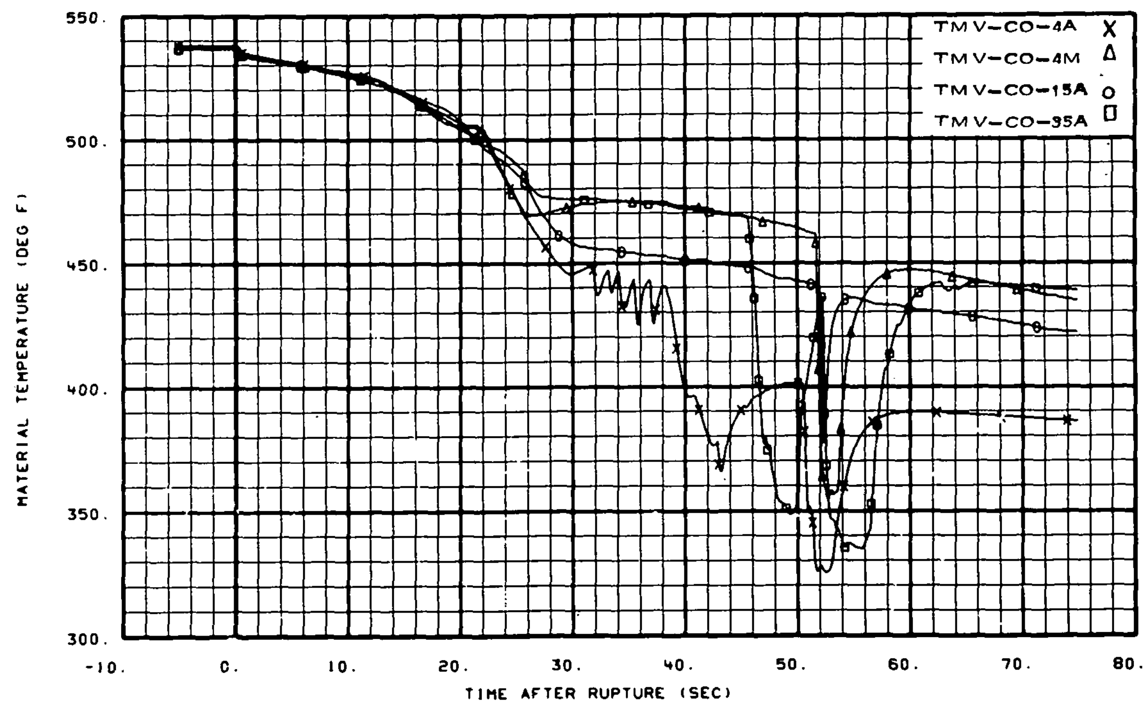

Fig. 32 Material temperatures in core barrel outside diameter (TMV-CO-4A, TMV-CO-4M, TMV-CO-15A, and TMV-CO-35A).

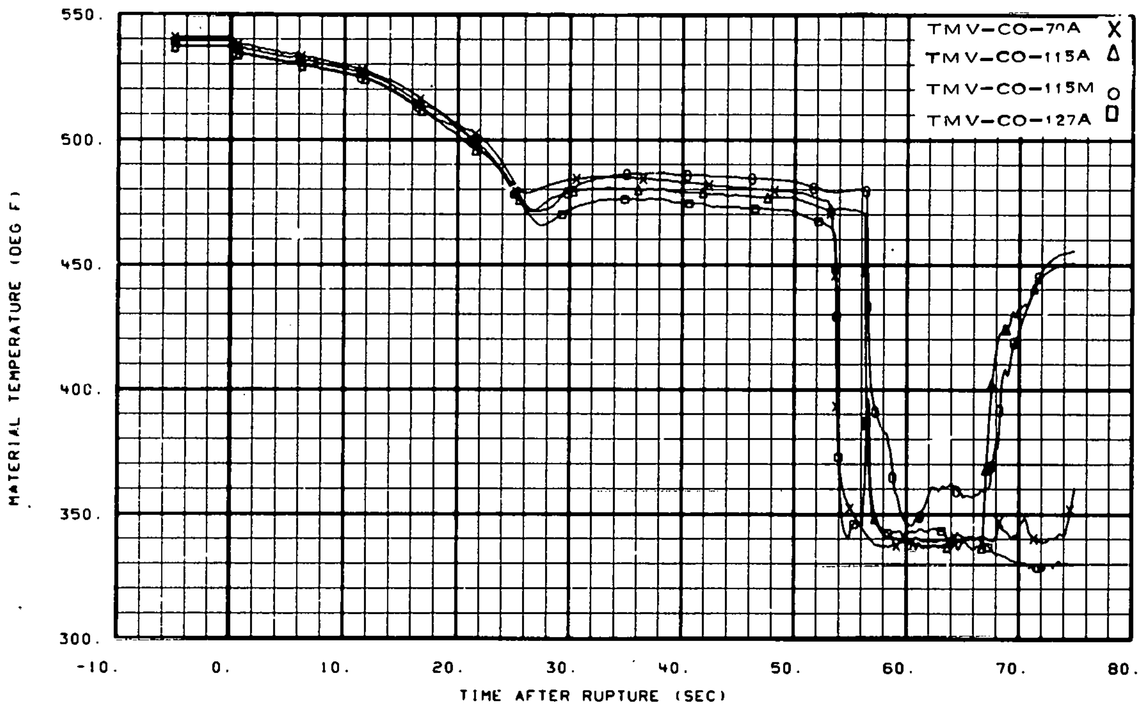

Fig. 33 Material temperatures in core barrel outside diameter (TMV-CO-70A, TMV-CO-115A, TMV-CO-115M, and TMV-CO-127A).

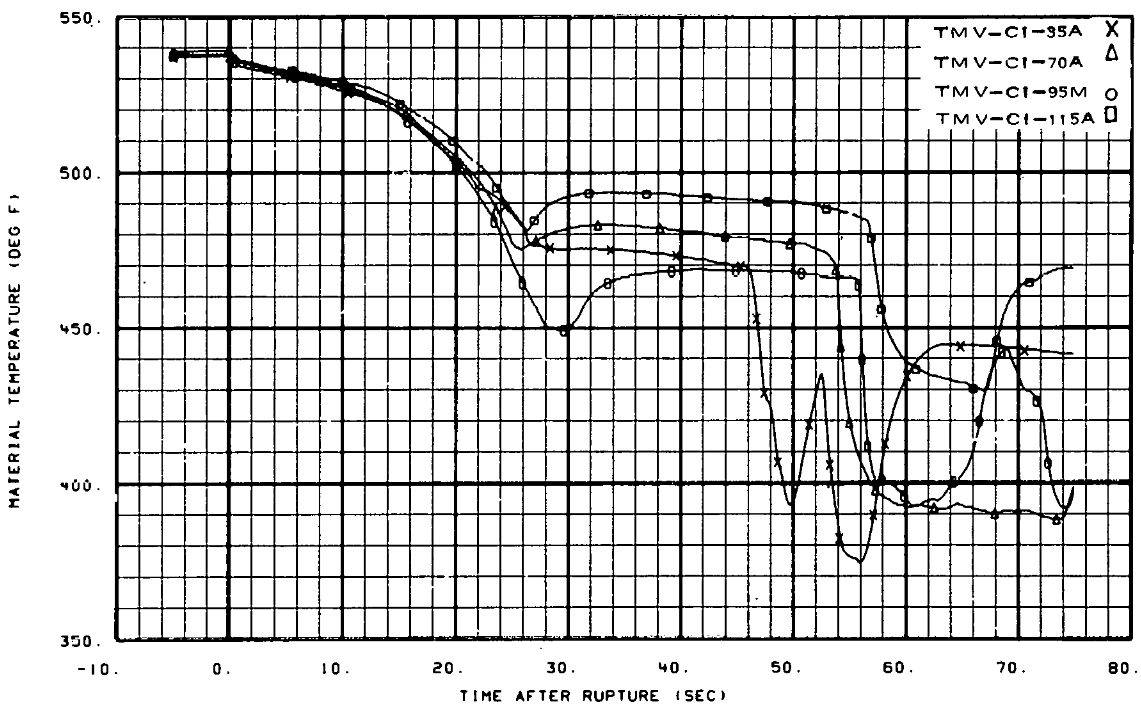

Fig. 34 Material temperatures in core barrel inside diameter.

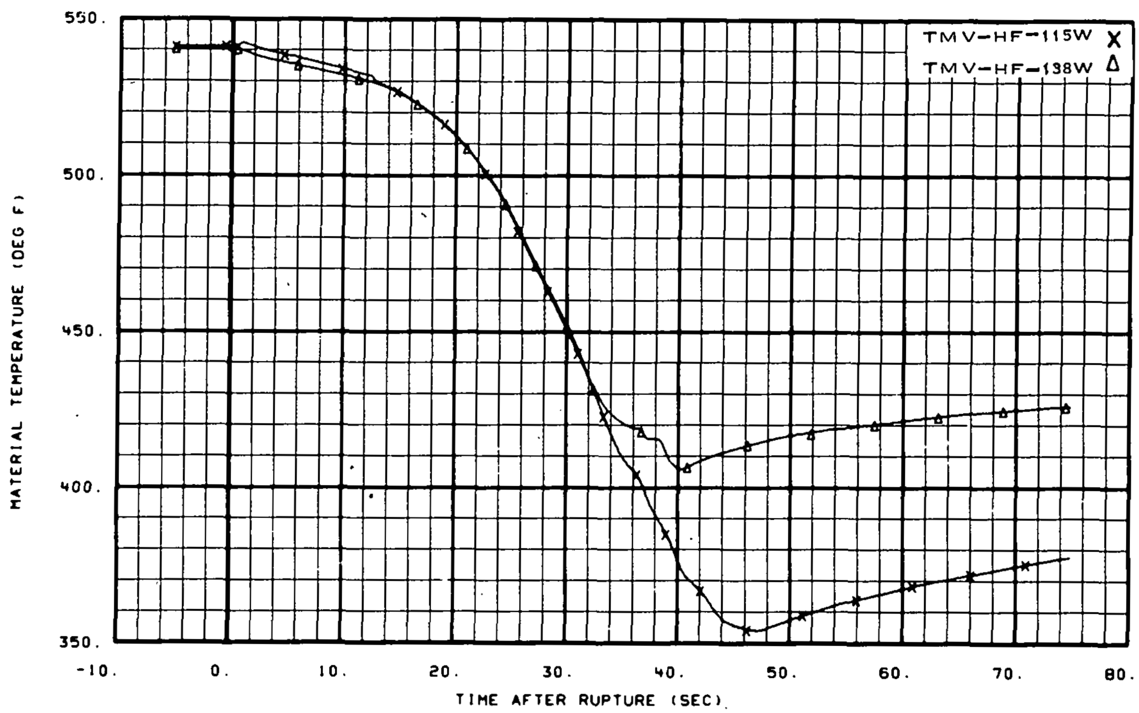

Fig. 35 Material temperatures in core housing filler.

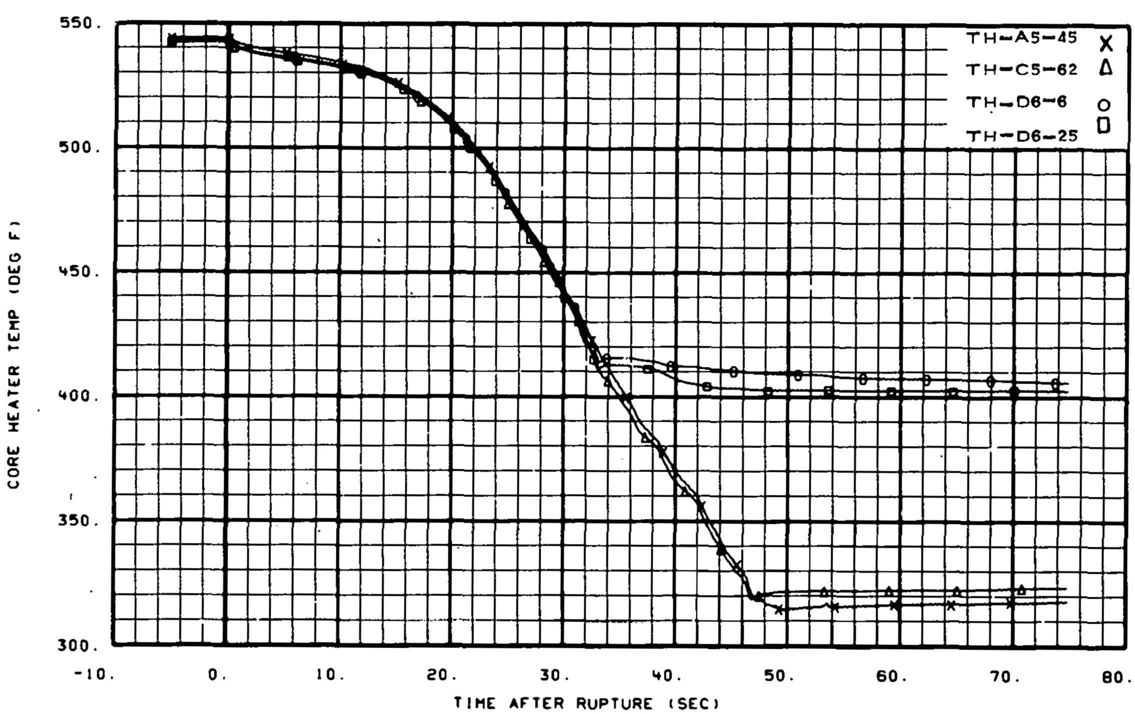

Fig. 36 Material temperatures in core heater cladding.

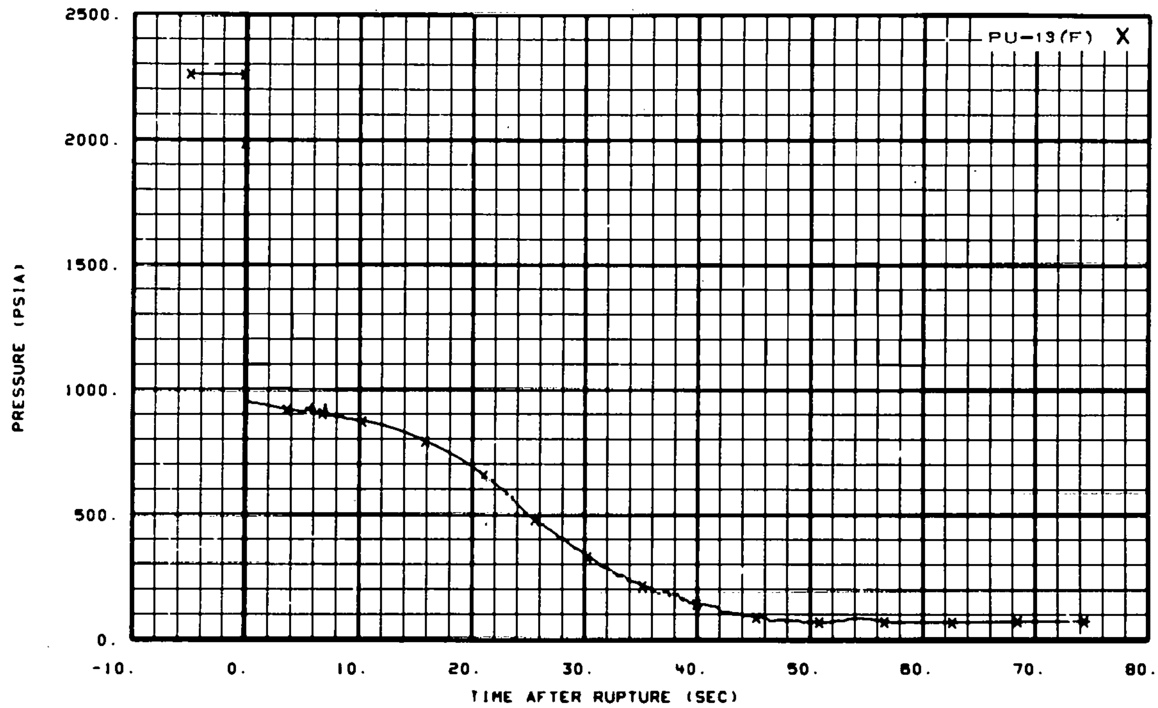

Fig. 37 Pressure in intact loop.

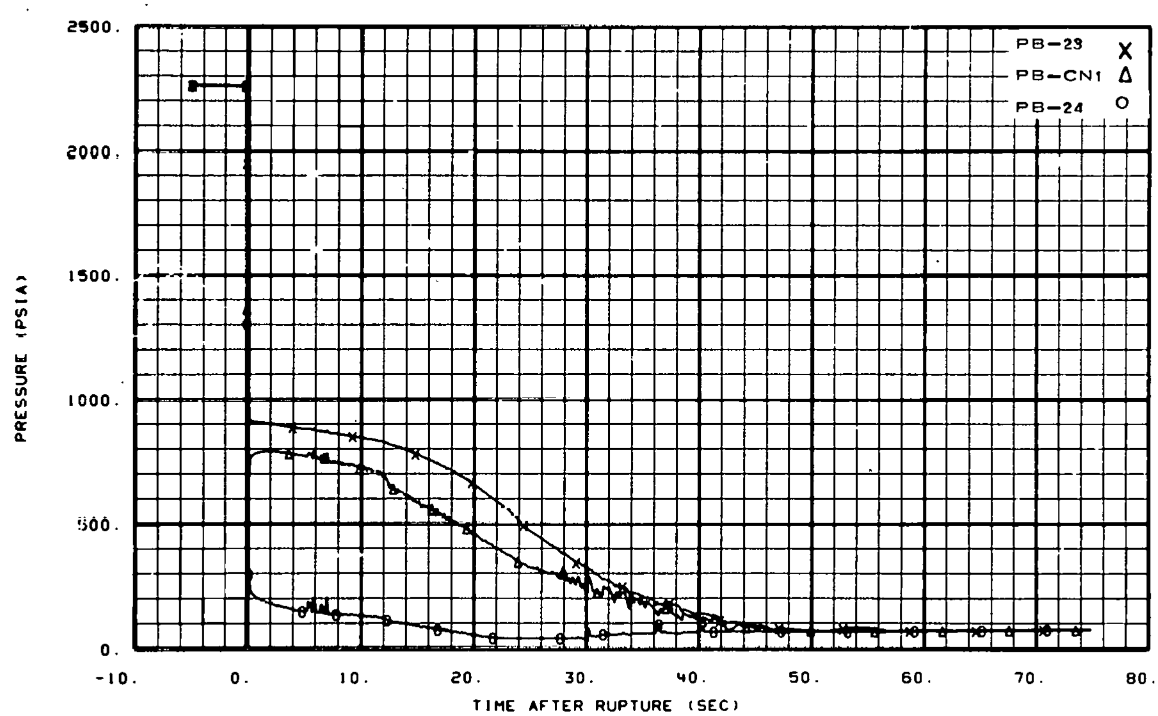

Fig. 38 Pressures in broken loop vessel side of break.

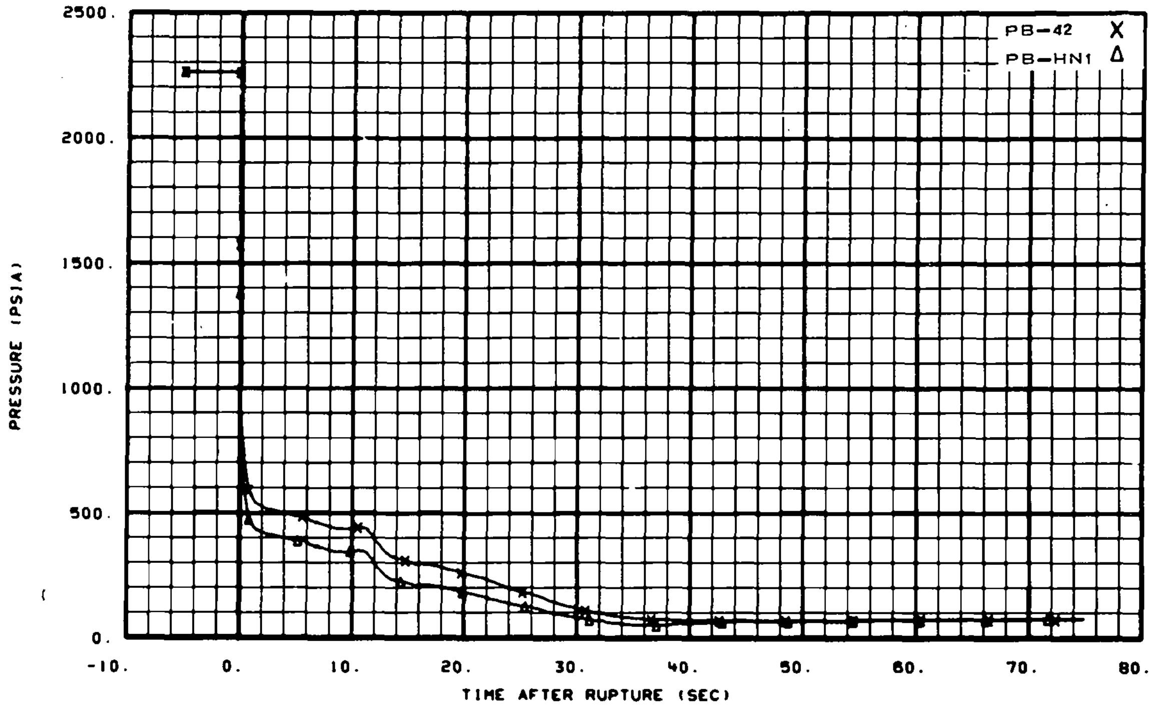

Fig. 39 Pressures in broken loop pump side of break.

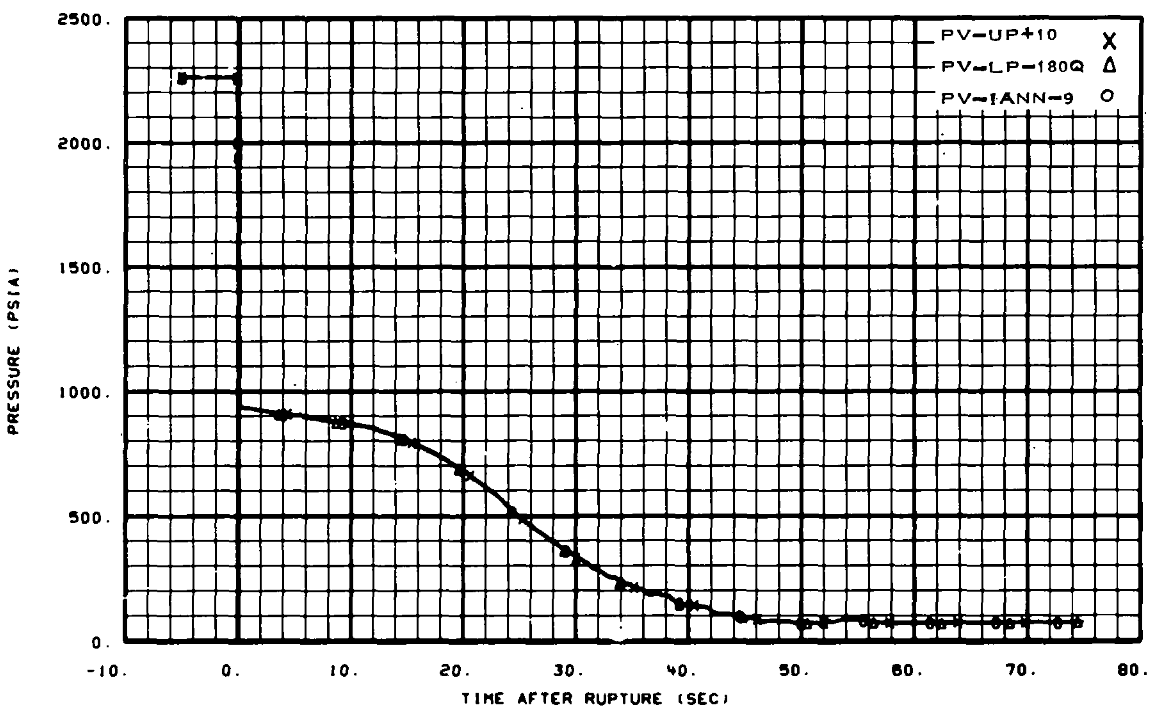

Fig. 40 Pressures in vessel.

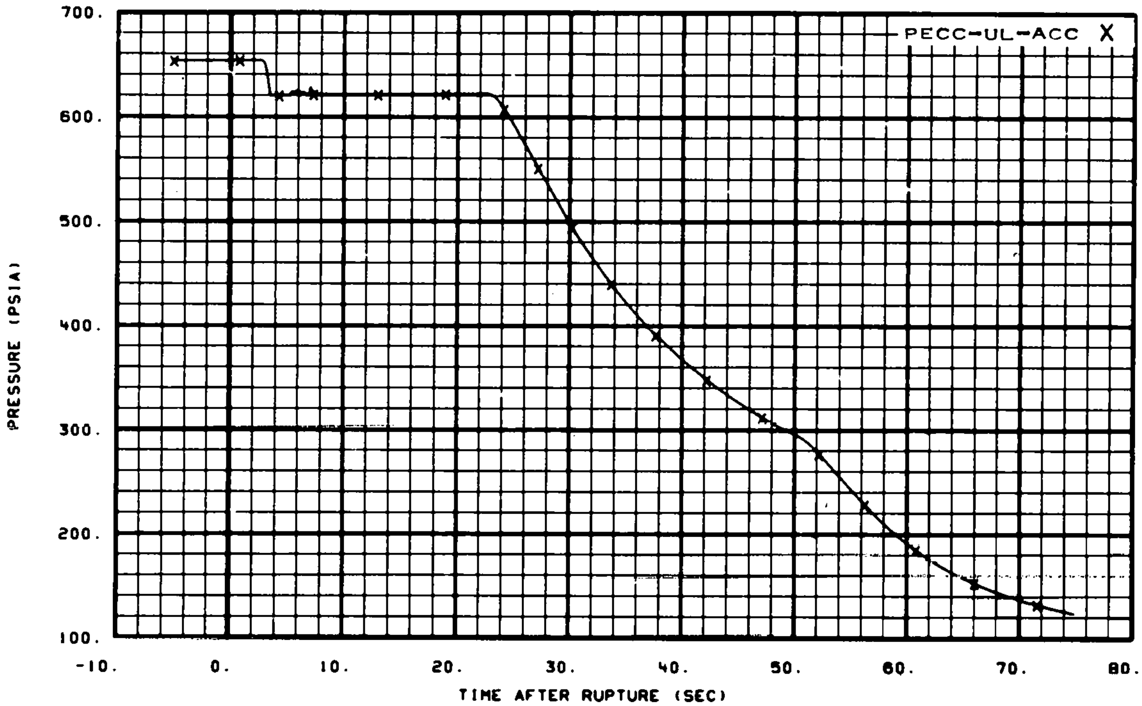

Fig. 41 Pressure in intact loop ECC accumulator.

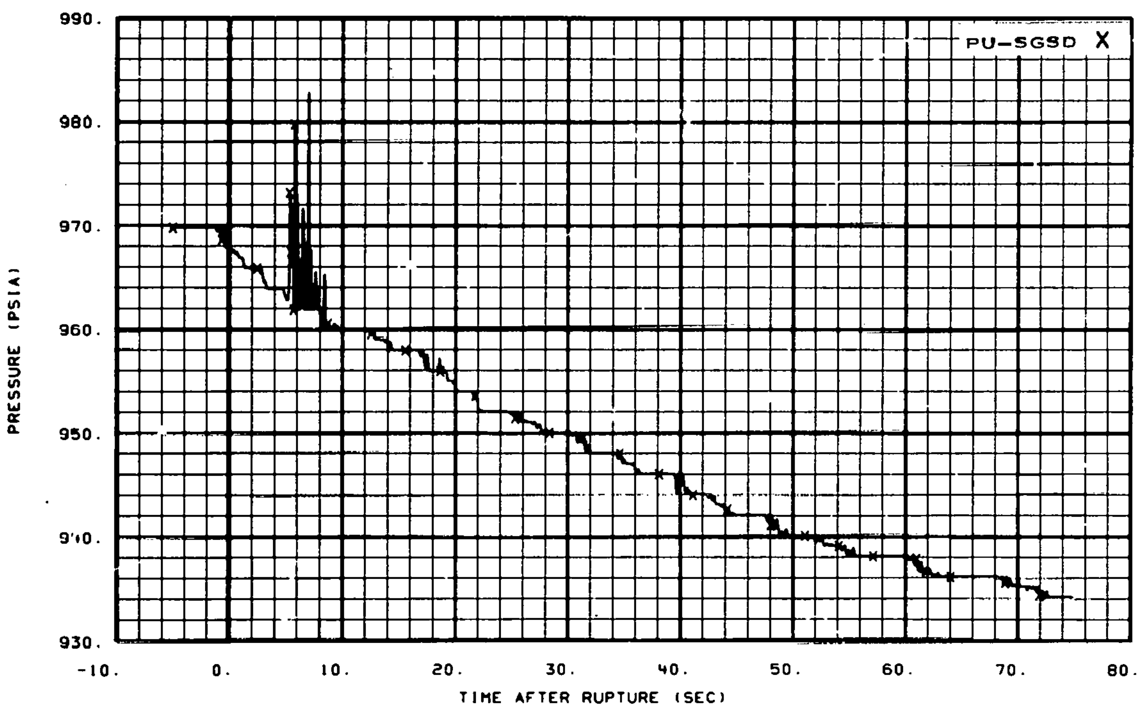

Fig. 42 Pressure in steam generator secondary.

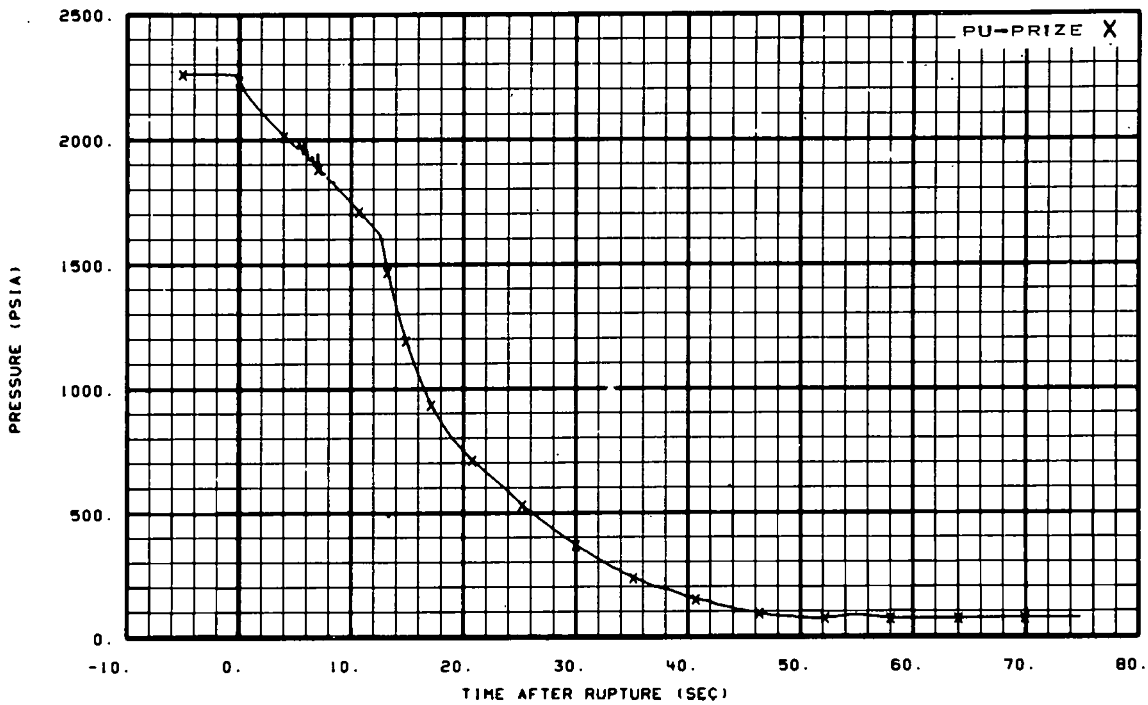

Fig. 43 Pressure in pressurizer.

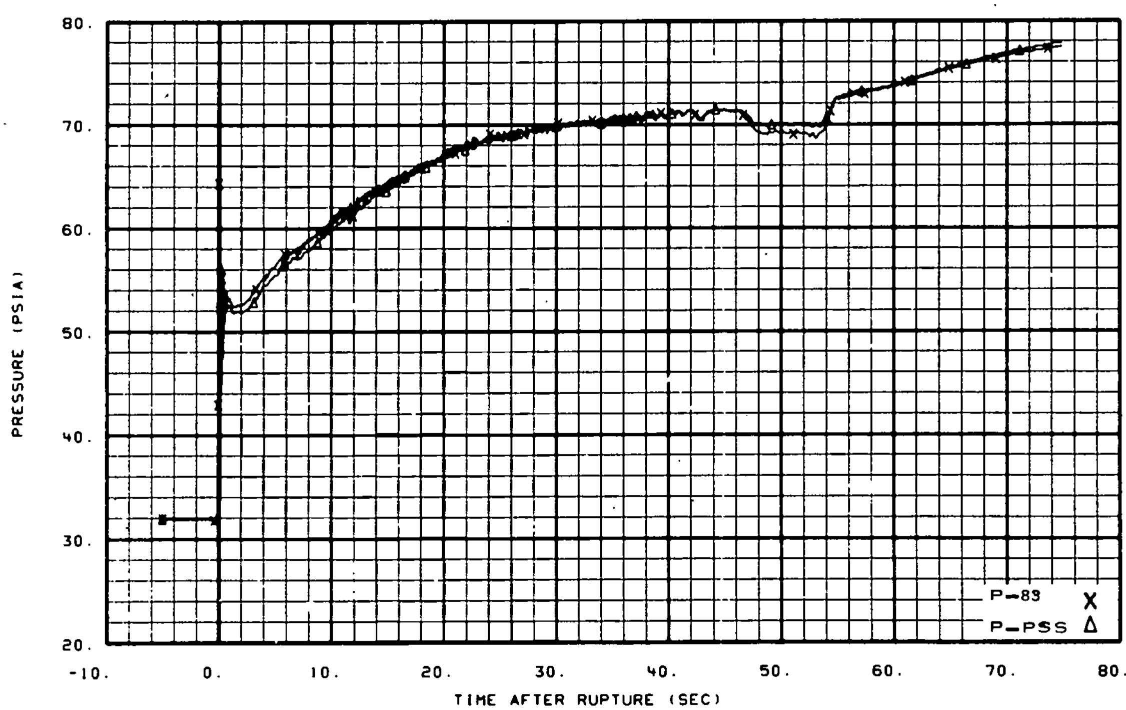

Fig. 44 Pressures in pressure suppression system.

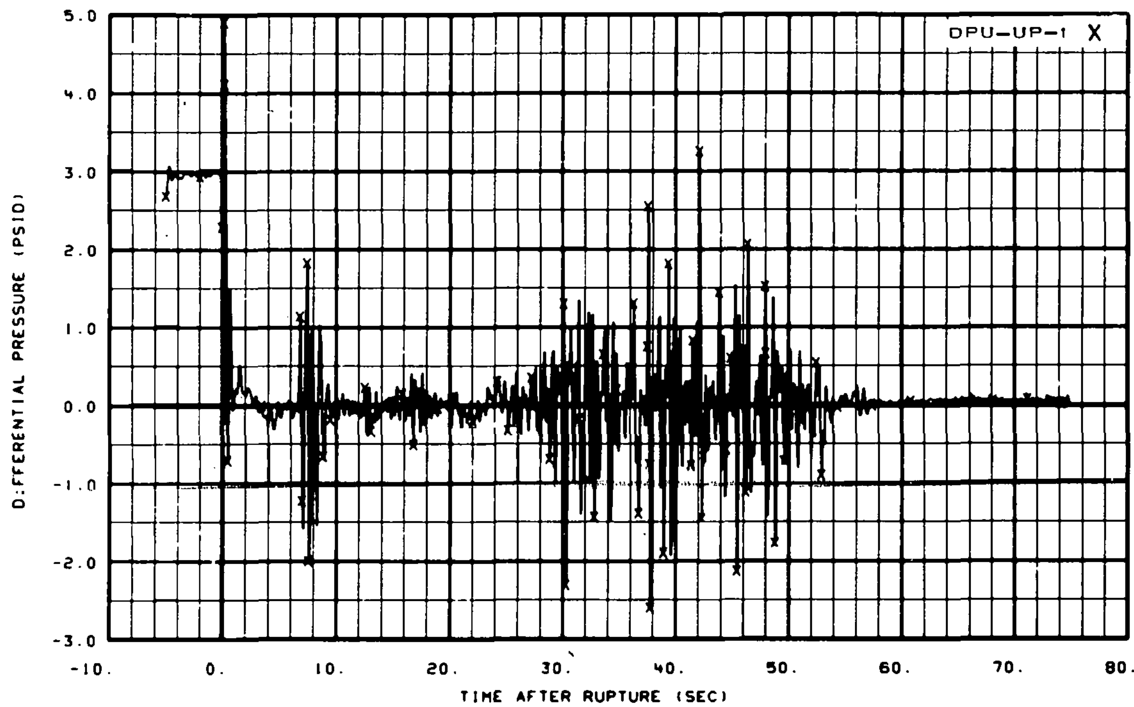

Fig. 45 Differential pressure in intact loop (upper plenum to Spool 1).

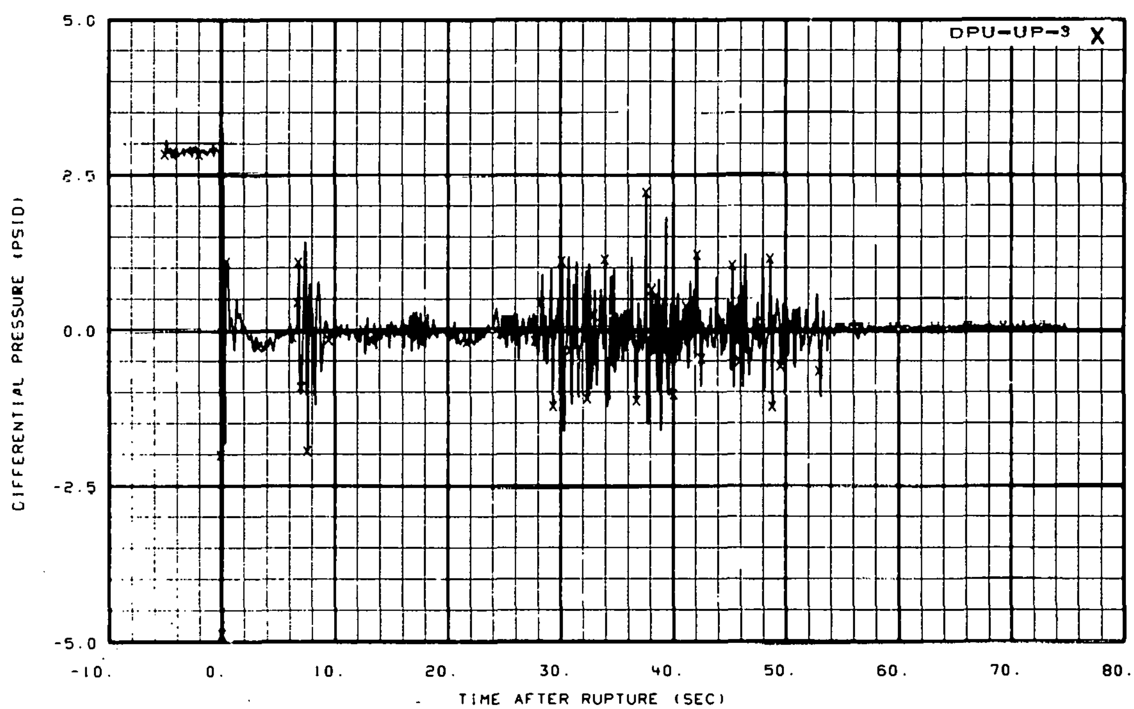

Fig. 46 Differential pressure in intact loop (upper plenum to Spool 3).

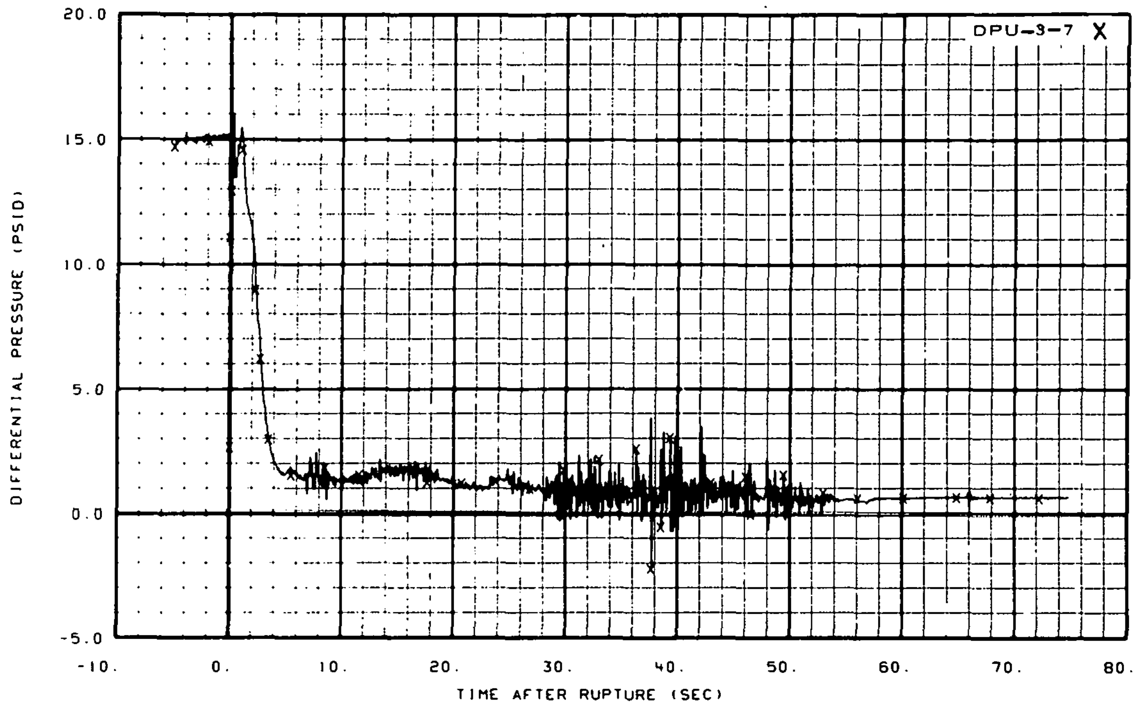

Fig. 47 Differential pressure in intact loop (Spool 3 to Spool 7).

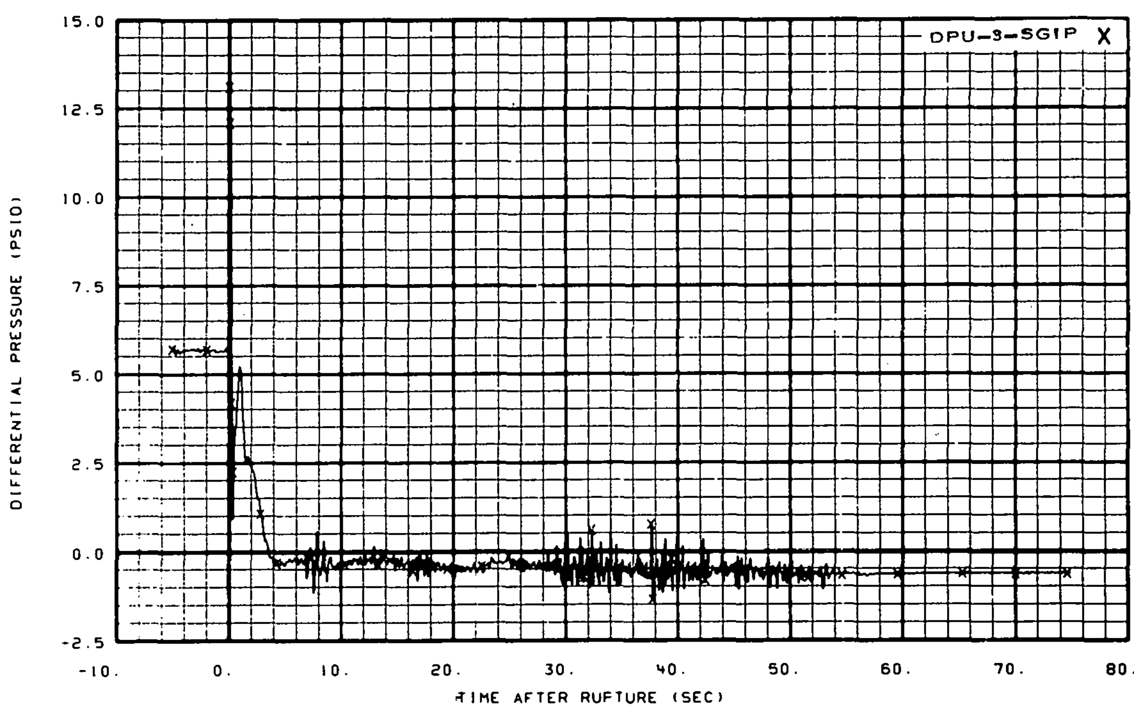

Fig. 48 Differential pressure in intact loop (Spool 3 to steam generator inlet plenum).

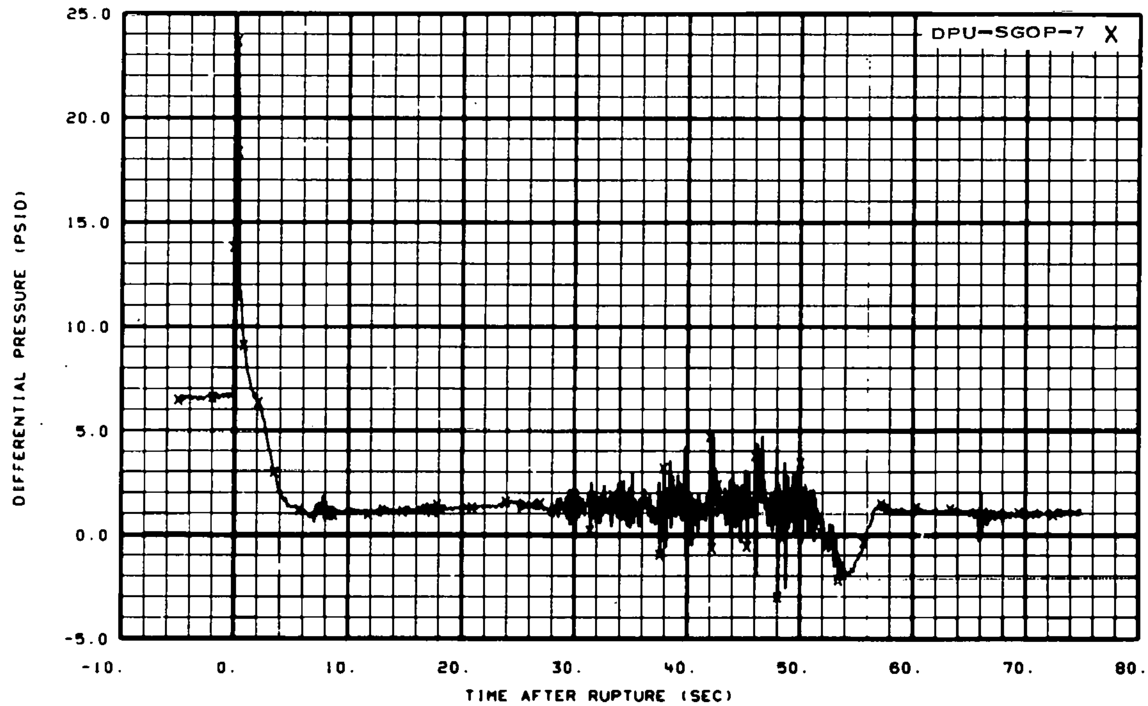

Fig. 49 Differential pressure in intact loop (steam generator outlet plenum to Spool 7).

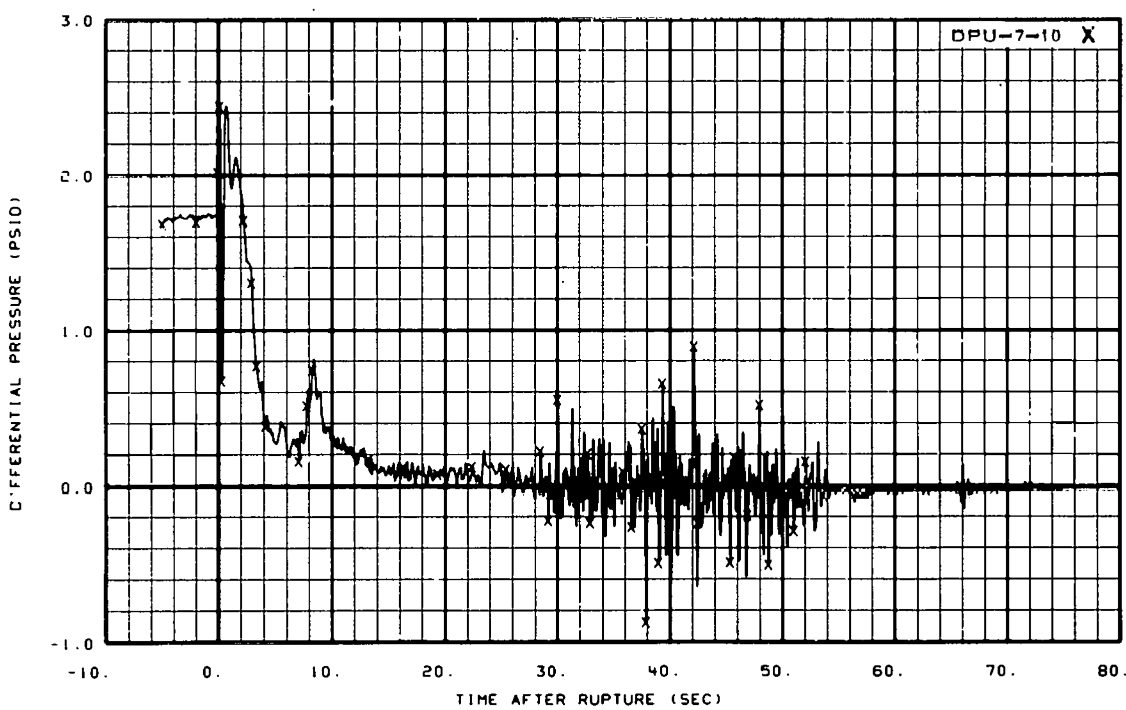

Fig. 50 Differential pressure in intact loop (Spool 7 to Spool 10).

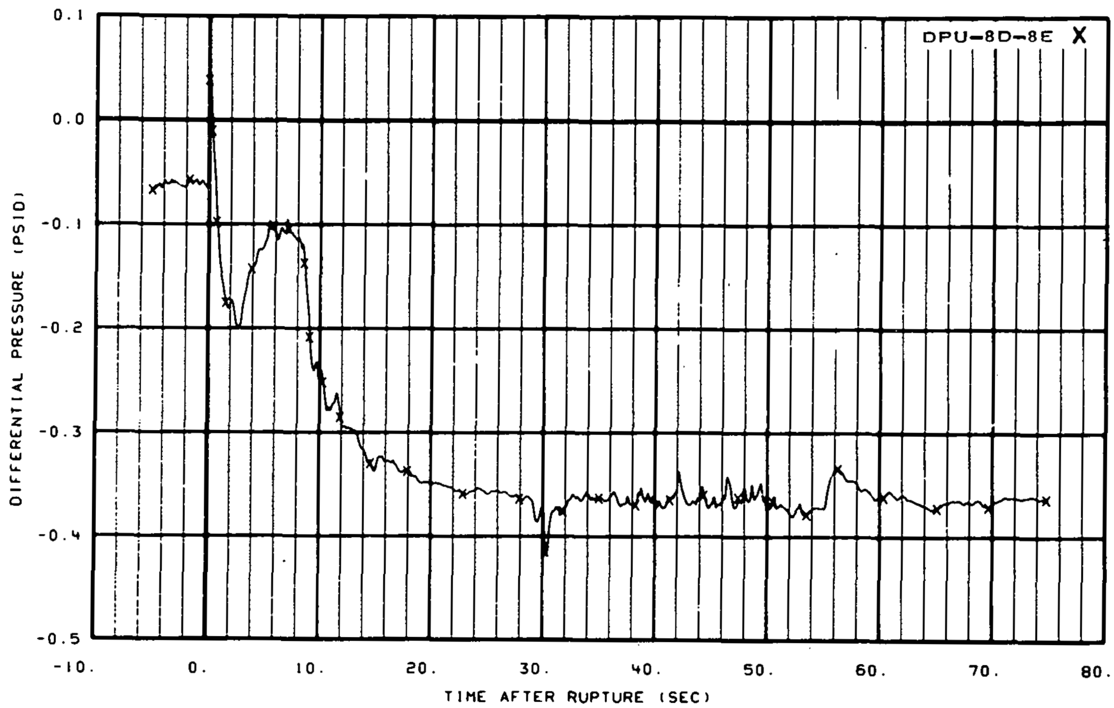

Fig. 51 Differential pressure in intact loop (Spool 8D to Spool 8E).

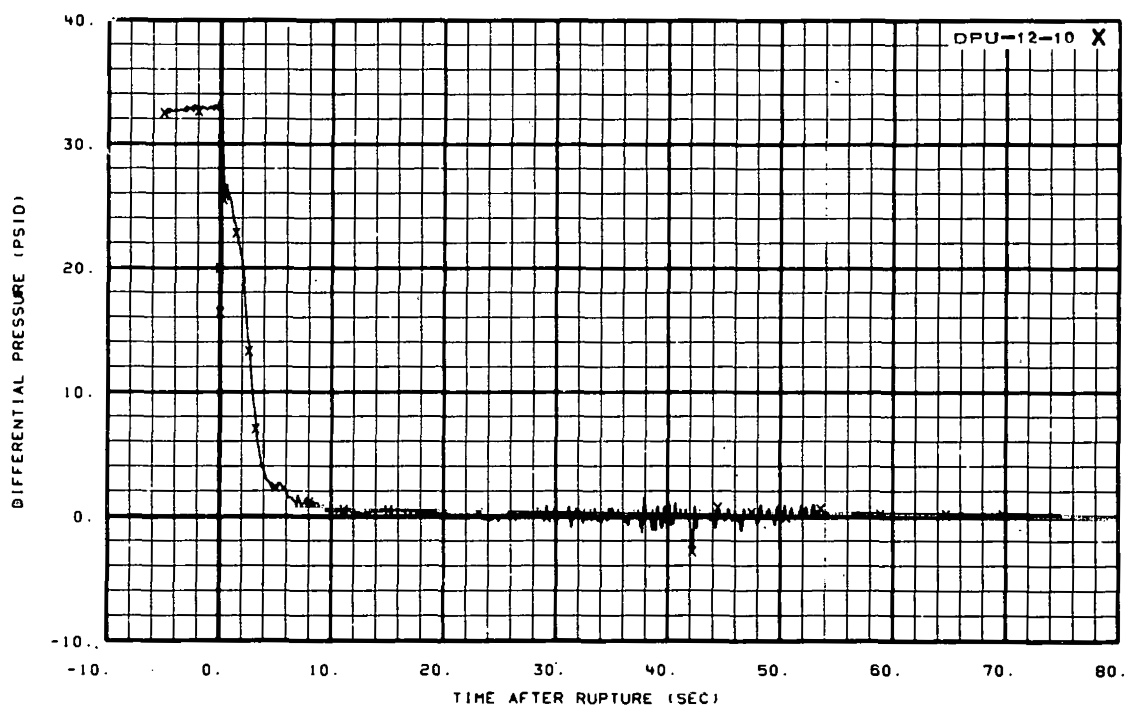

Fig. 52 Differential pressure in intact loop (Spool 12 to Spool 10).

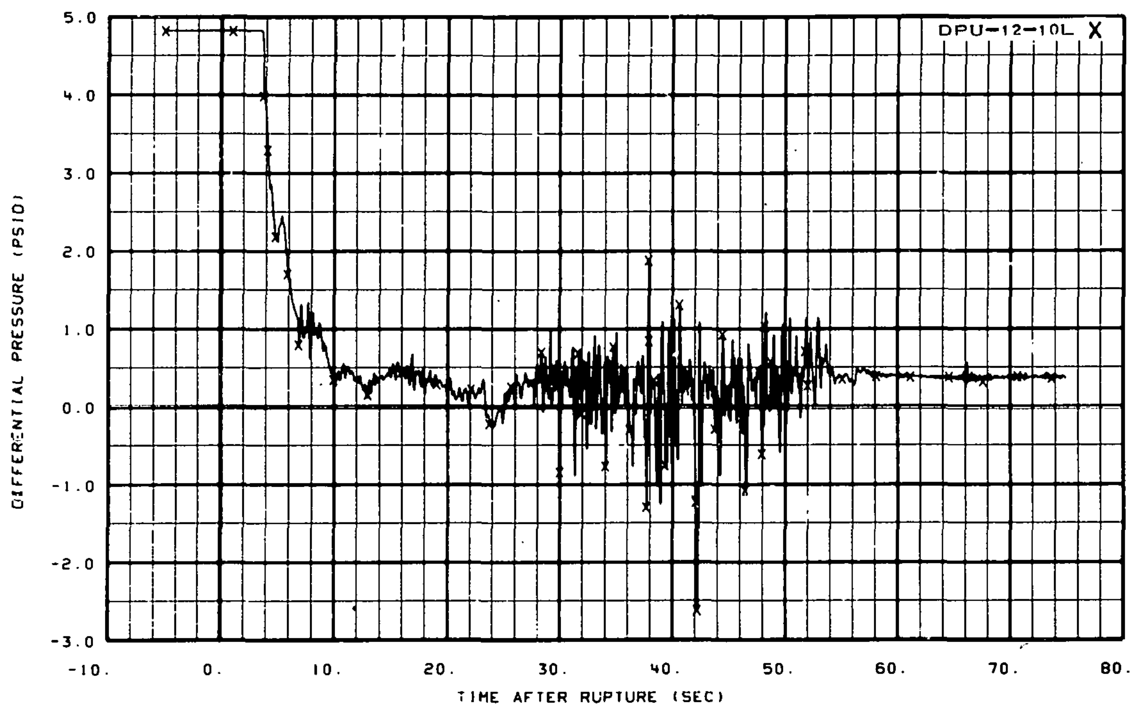

Fig. 53 Differential pressure in intact loop, low range (Spool 12 to Spool 10).

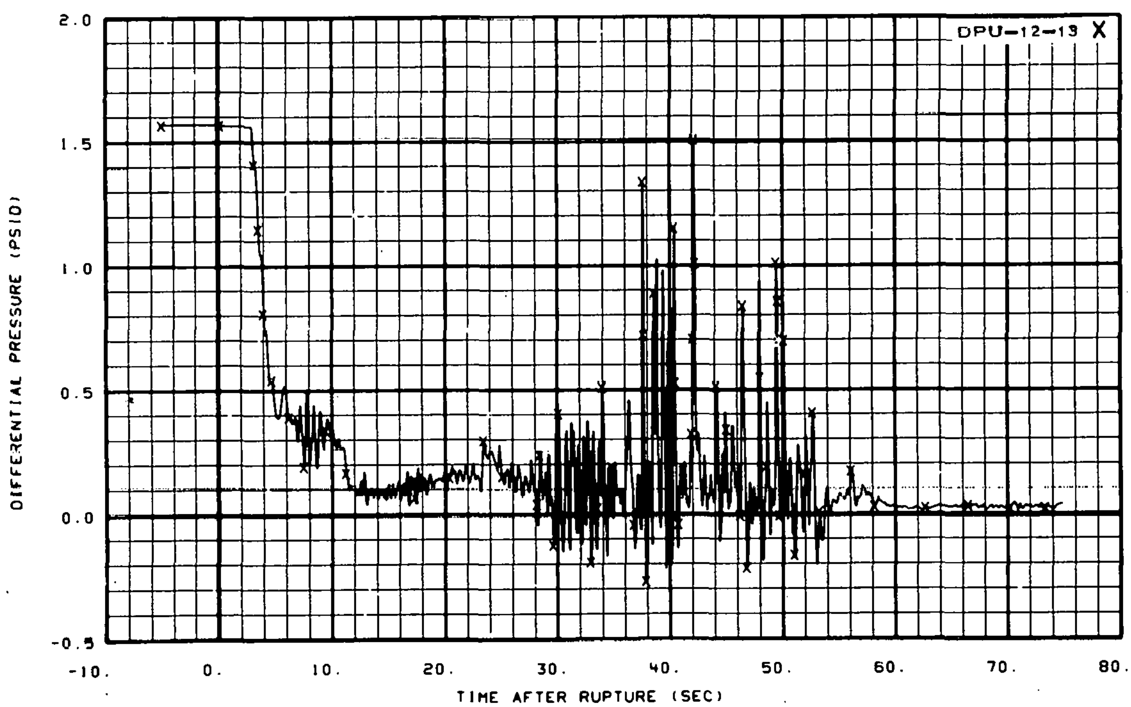

Fig. 54 Differential pressure in intact loop (Spool 12 to Spool 13).

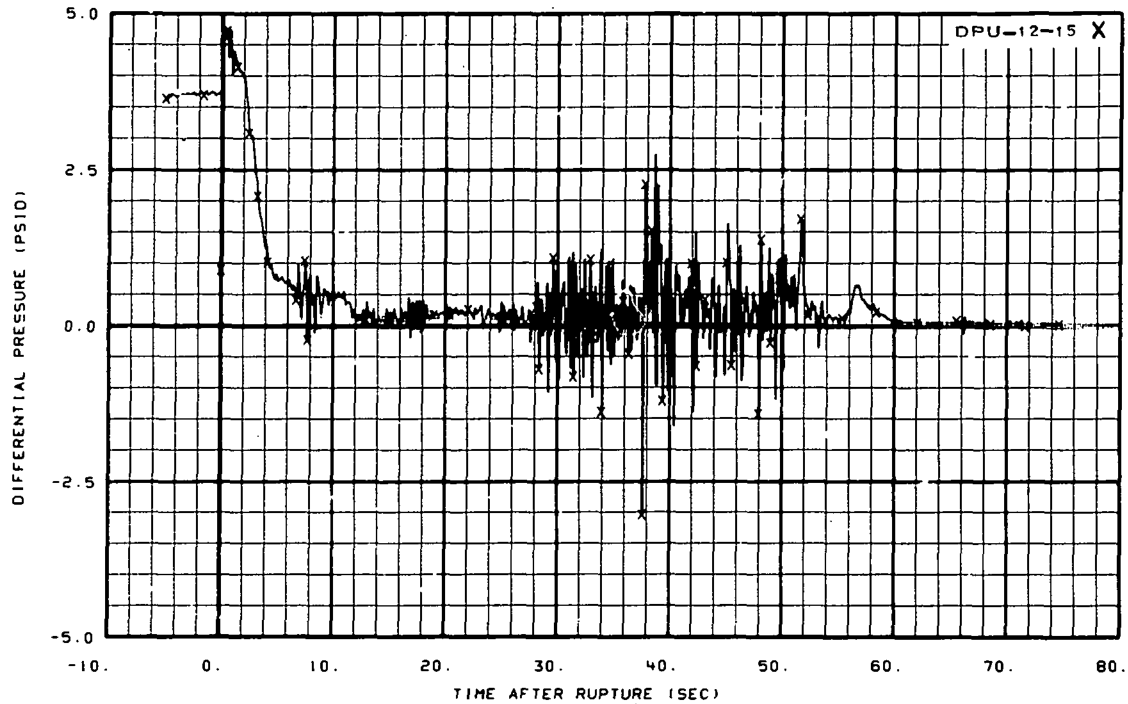

Fig. 55 Differential pressure in intact loop (Spool 12 to Spool 15).

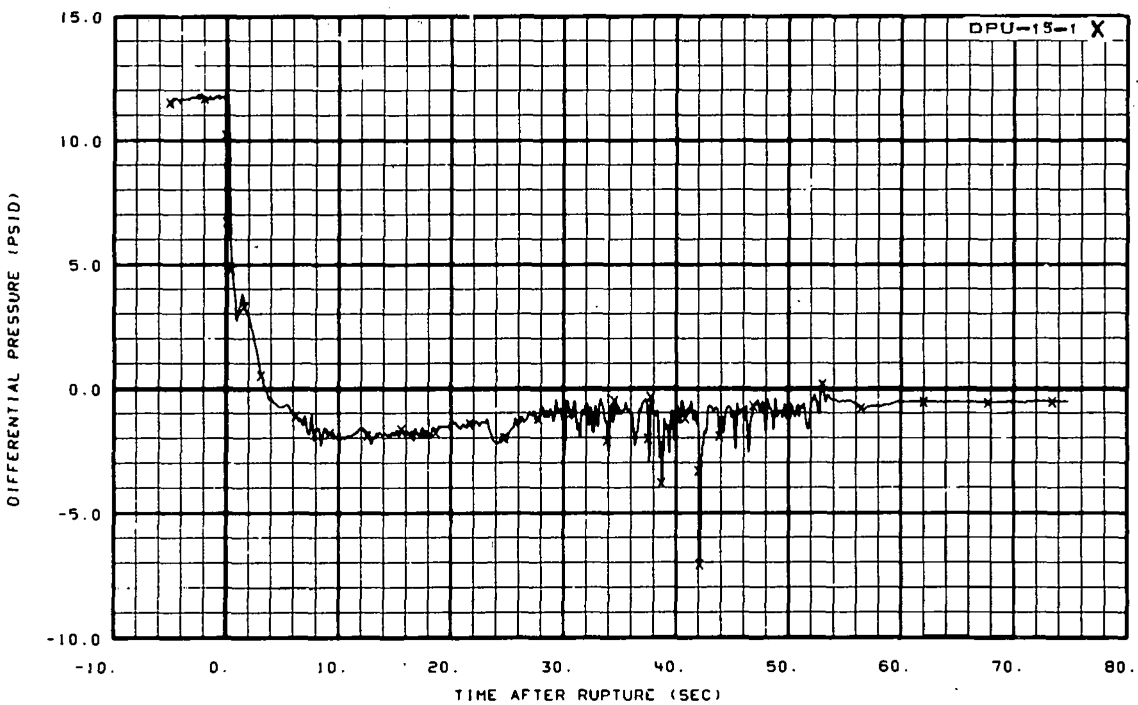

Fig. 56 Differential pressure in intact loop (Spool 15 to Spool 1).

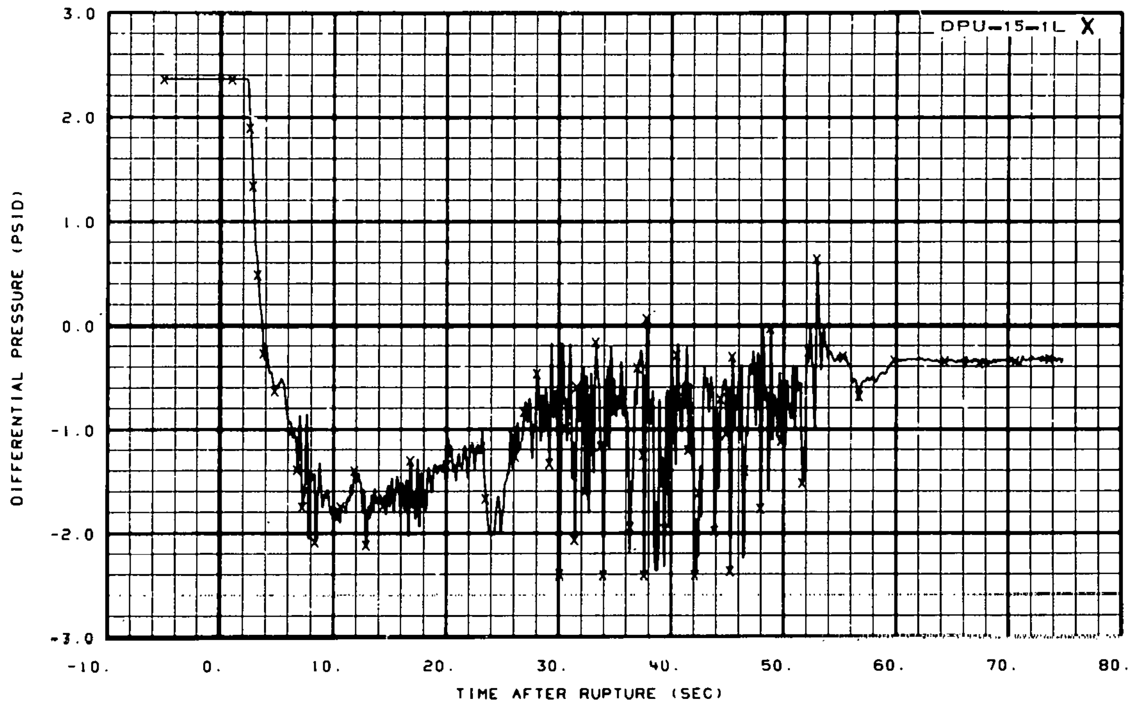

Fig. 57 Differential pressure in intact loop, low range (Spool 15 to Spool 1).

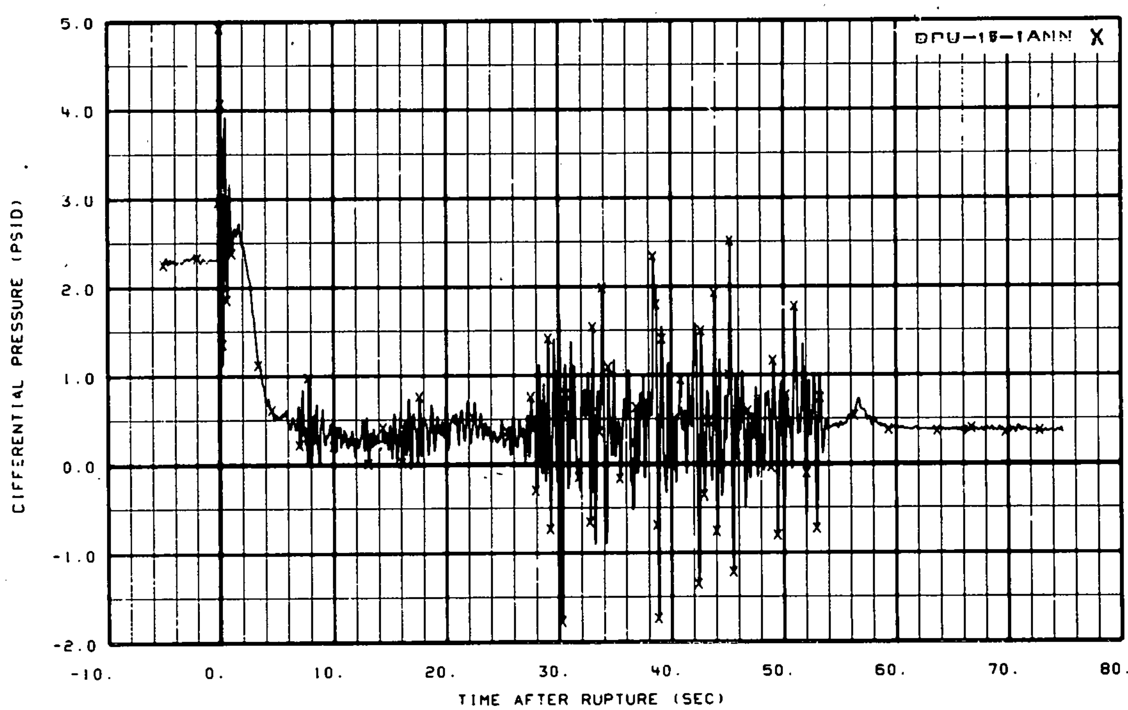

Fig. 58 Differential pressure in intact loop (Spool 15 to vessel inlet annulus).

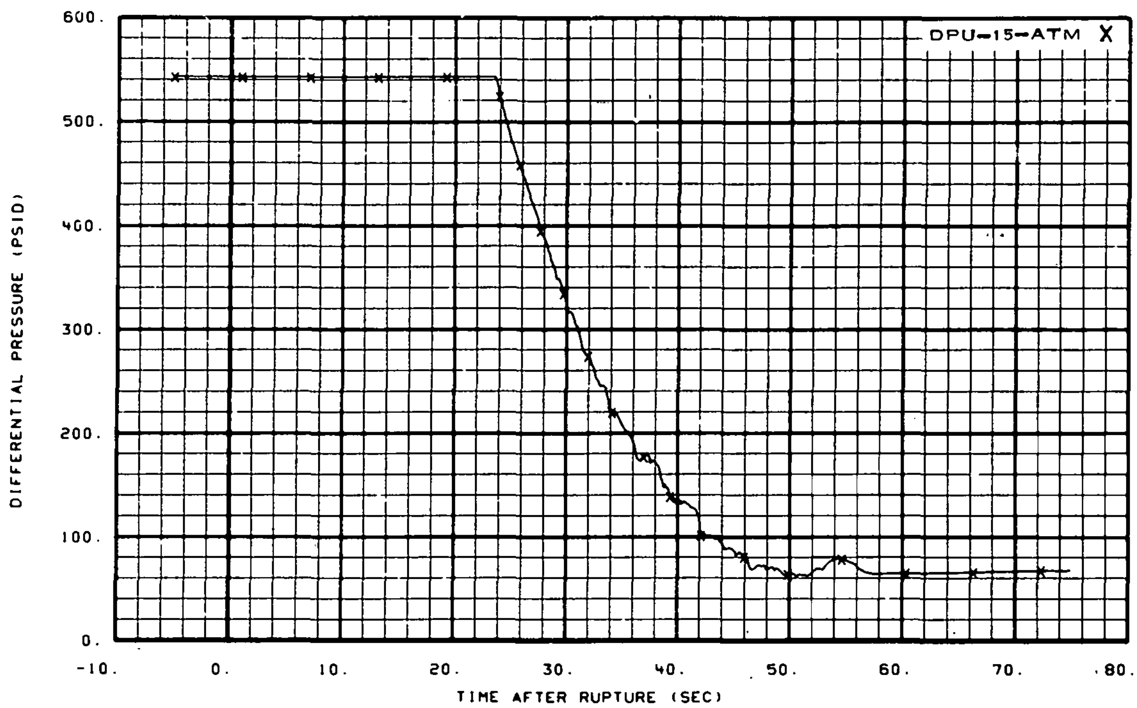

Fig. 59 Differential pressure in intact loop (Spool 15 to atmosphere).

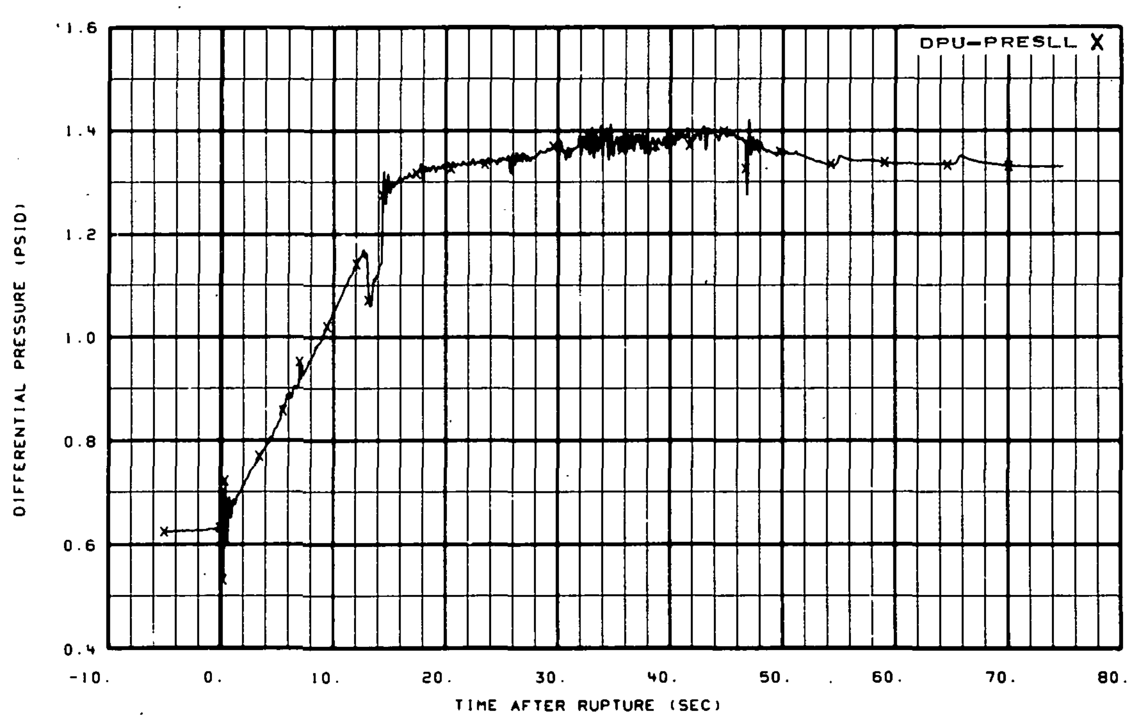

Fig. 60 Differential pressure in intact loop (pressurizer liquid level).

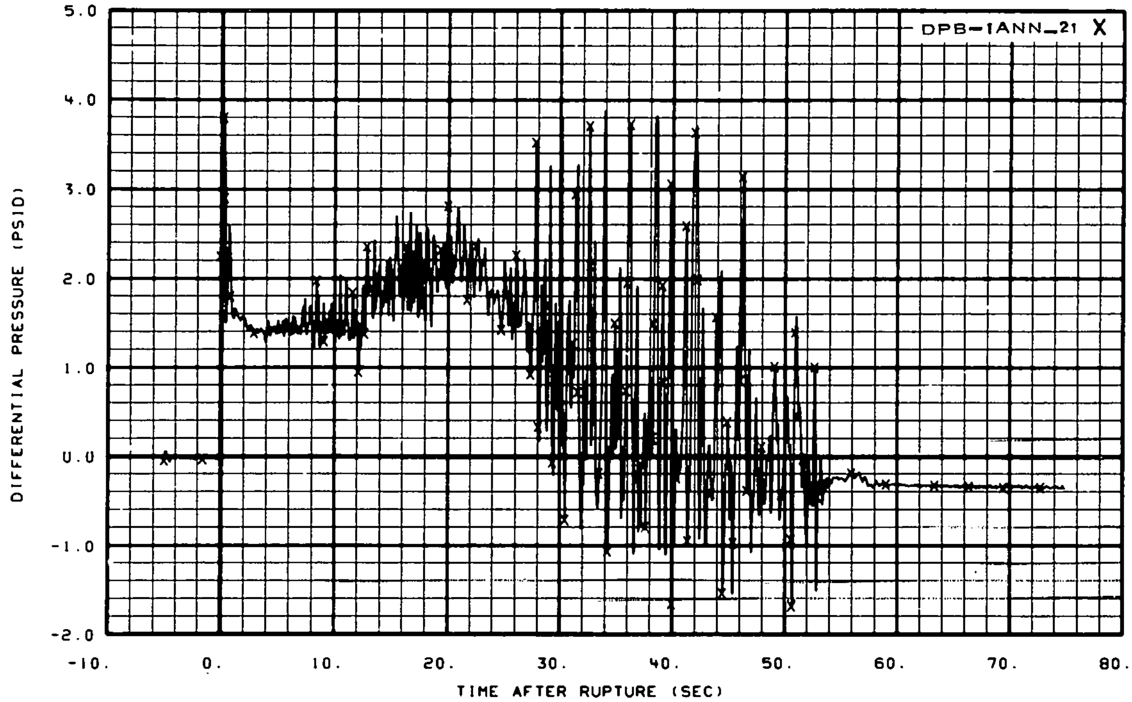

Fig. 61 Differential pressure in broken loop (vessel inlet annulus to Spool 21).

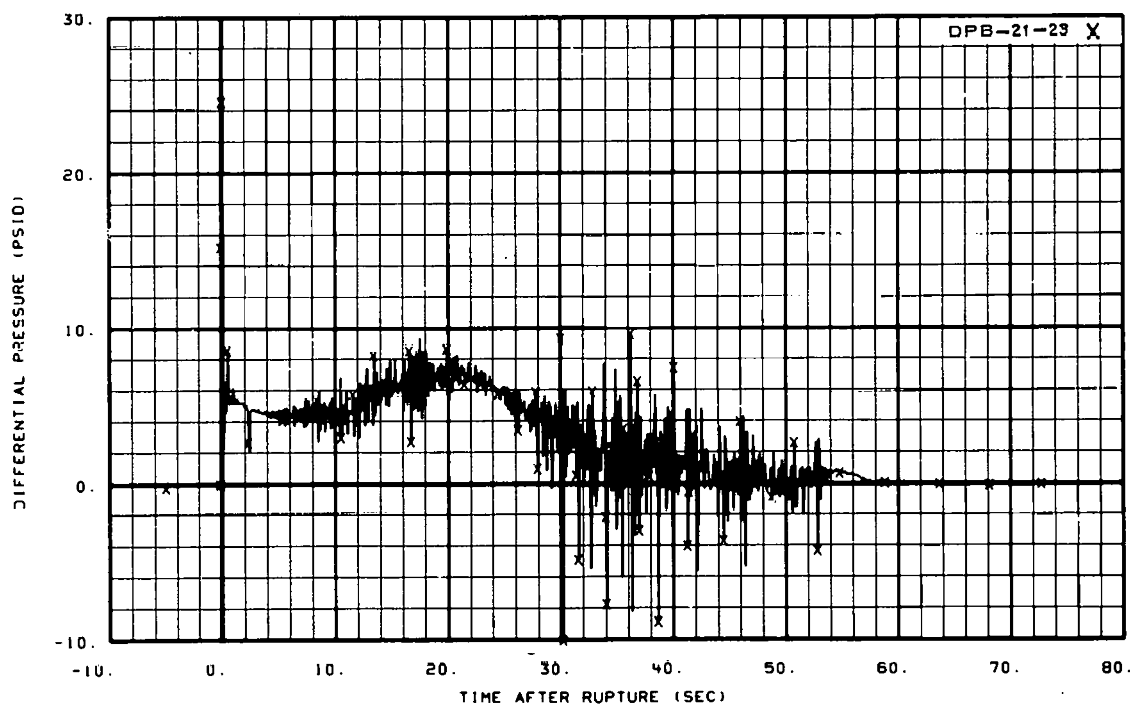

Fig. 62 Differential pressure in broken loop (Spool 21 to Spool 23).

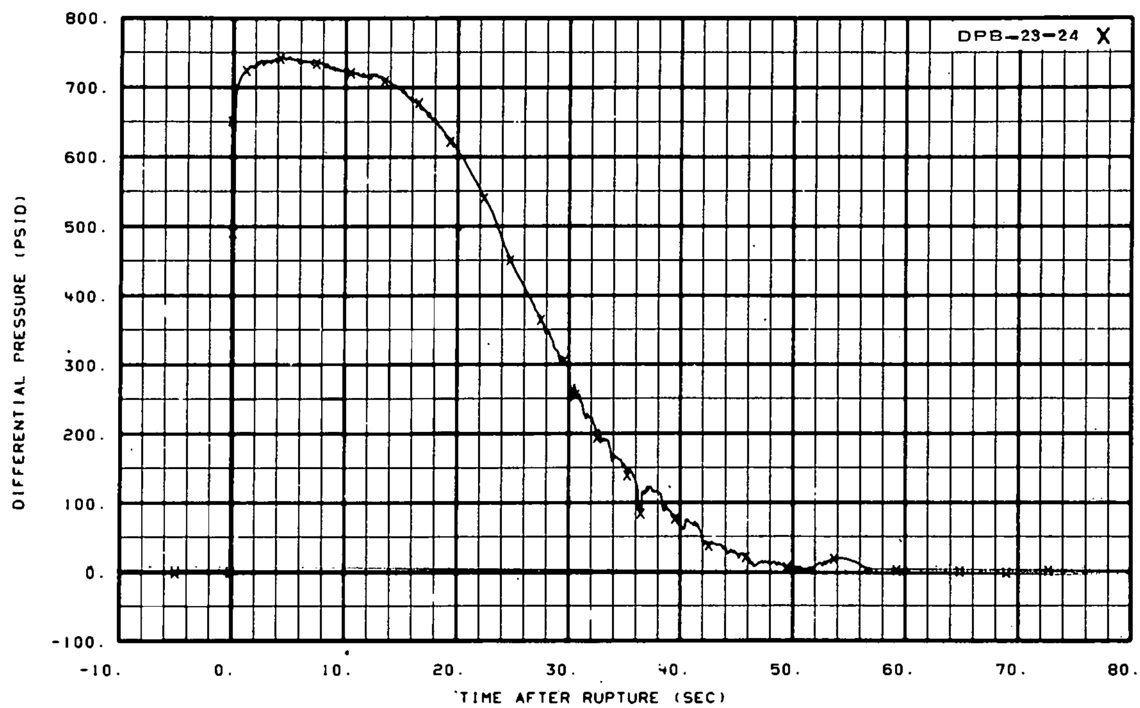

Fig. 63 Differential pressure in broken loop (Spool 23 to Spool 24).

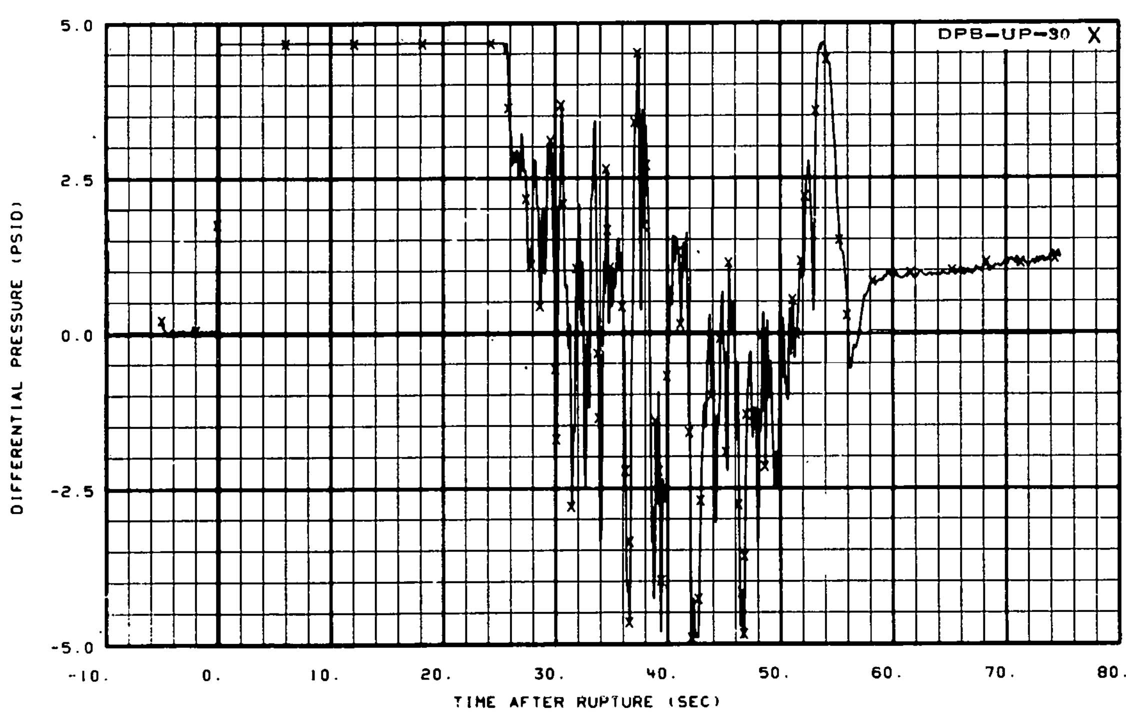

Fig. 64 Differential pressure in broken loop (upper plenum to Spool 30).

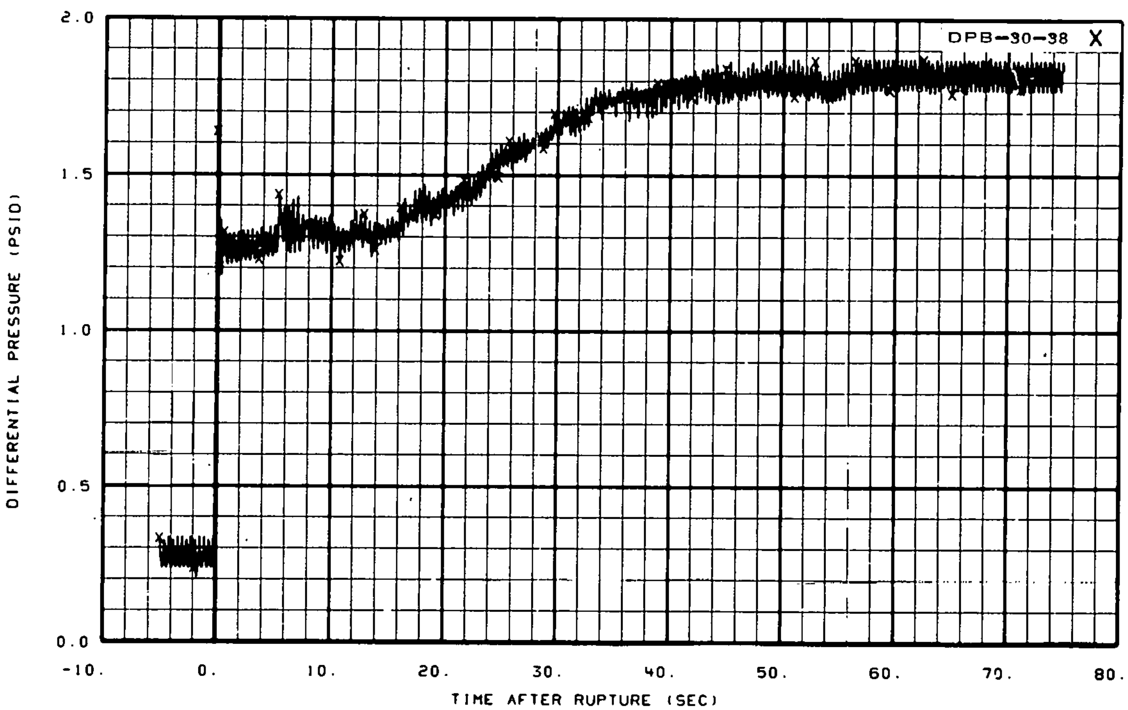

Fig. 65 Differential pressure in broken loop (Spool 30 to Spool 38).

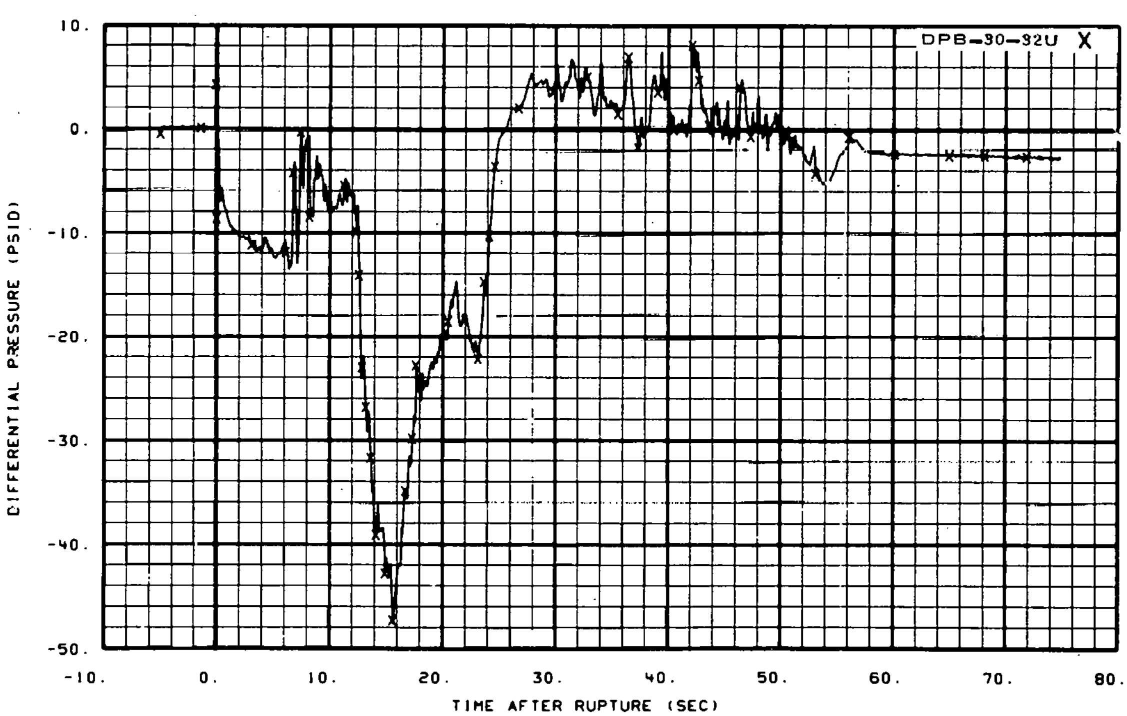

Fig. 66 Differential pressure in broken loop (Spool 30 to Spool 32U).

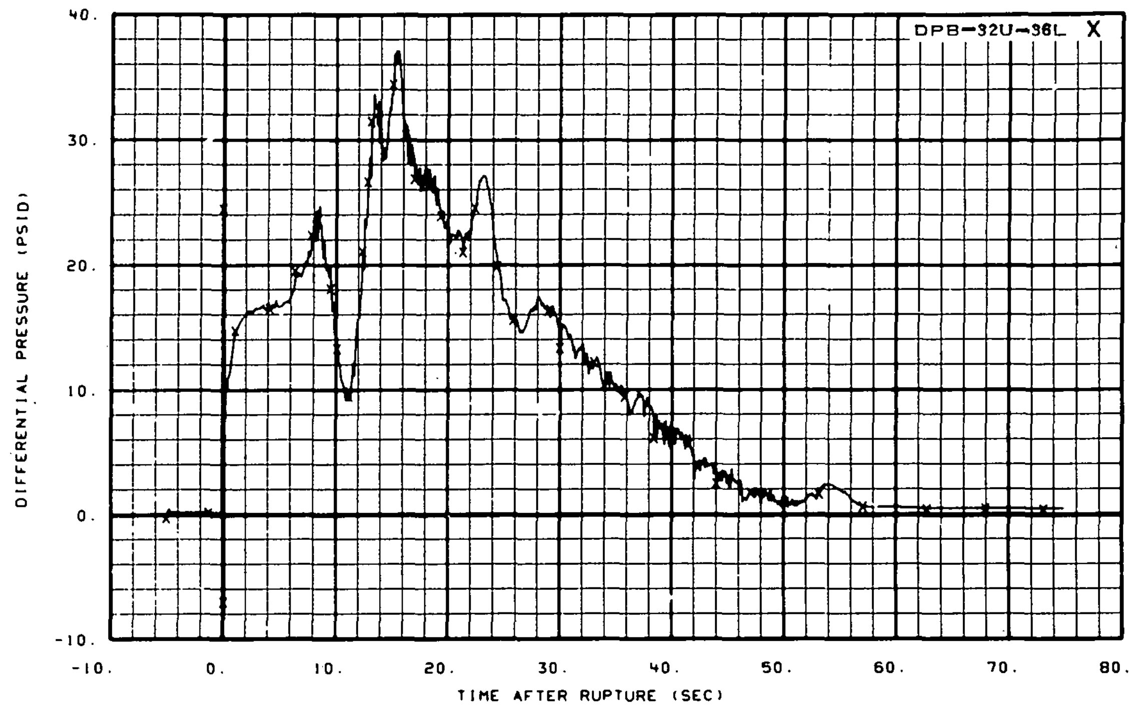

Fig. 67 Differential pressure in broken loop (Spool 32U to Spool 36L).

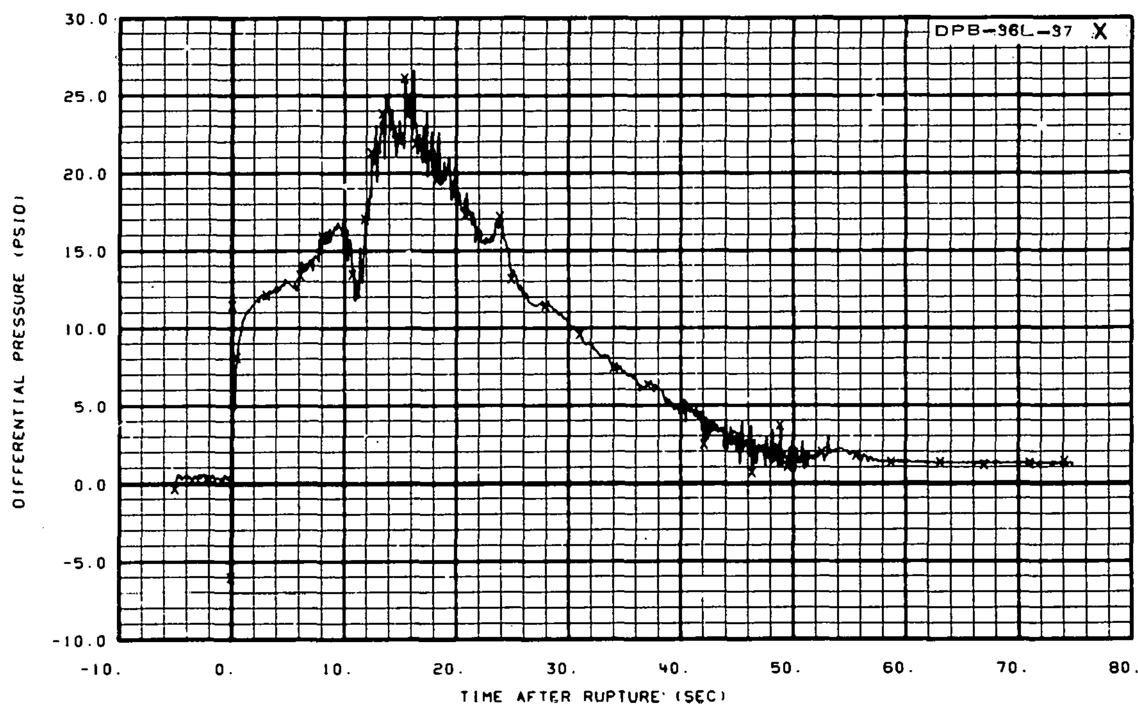

Fig. 68 Differential pressure in broken loop (Spool 36L to Spool 37).

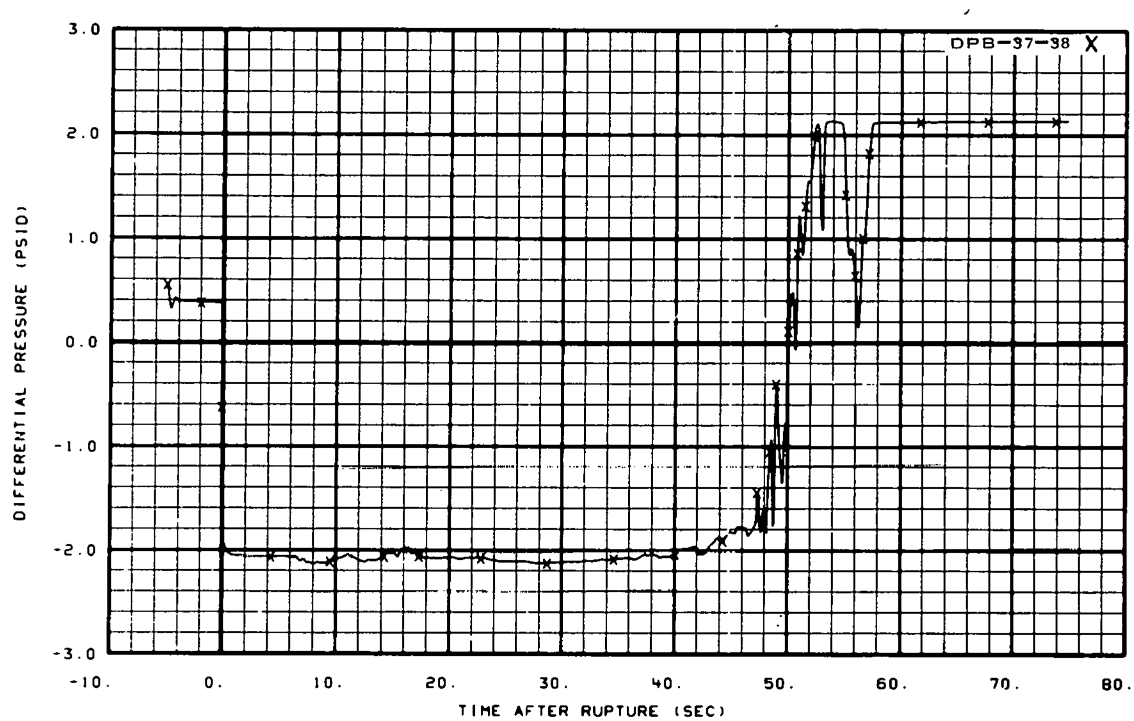

Fig. 69 Differential pressure in broken loop (Spool 37 to Spool 38).

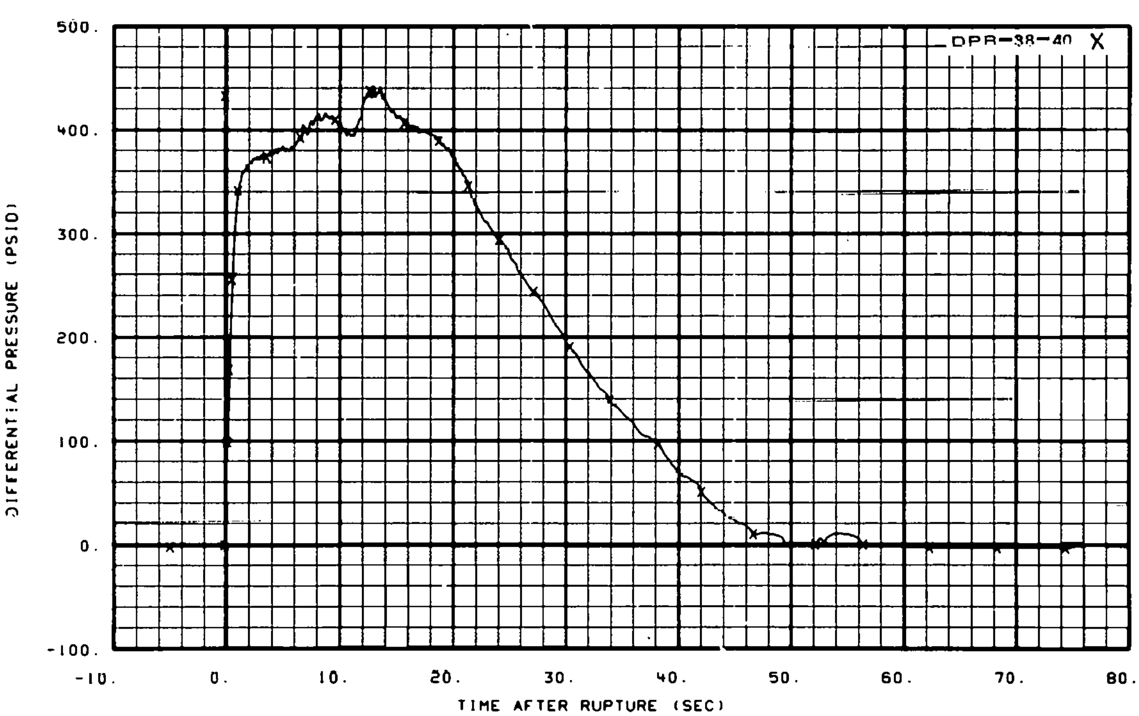

Fig. 70 Differential pressure in broken loop (Spool 38 to Spool 40).

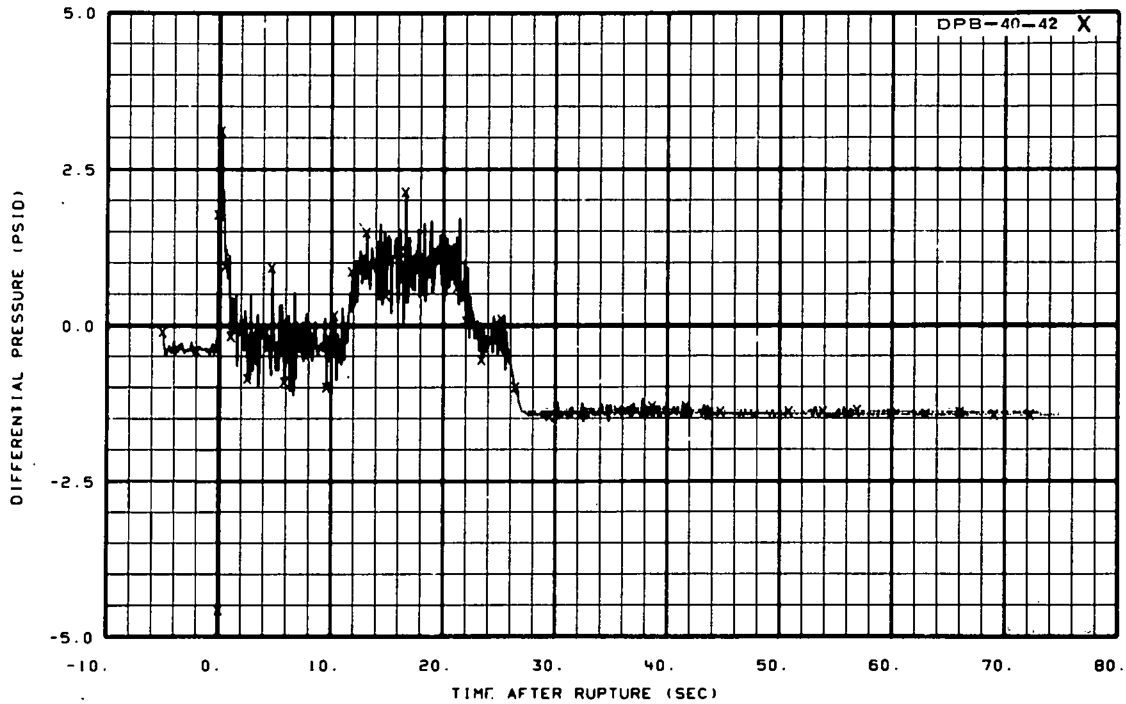

Fig. 71 Differential pressure in broken loop (Spool 40 to Spool 42).

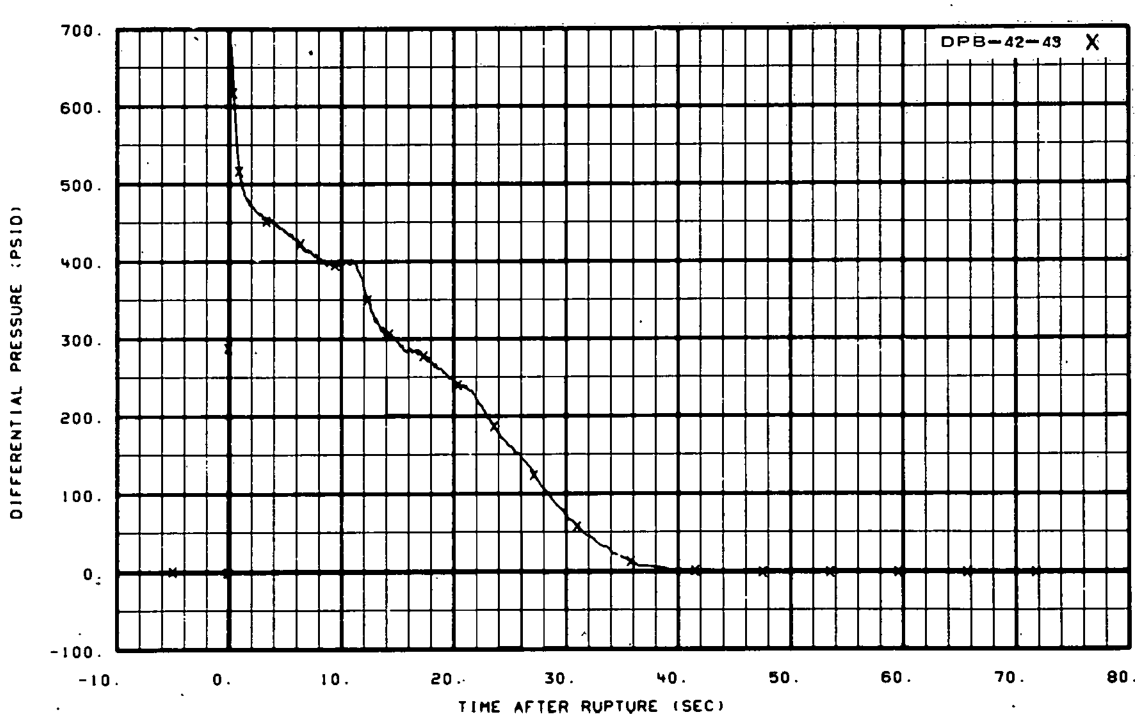

Fig. 72 Differential pressure in broken loop (Spool 42 to Spool 43).

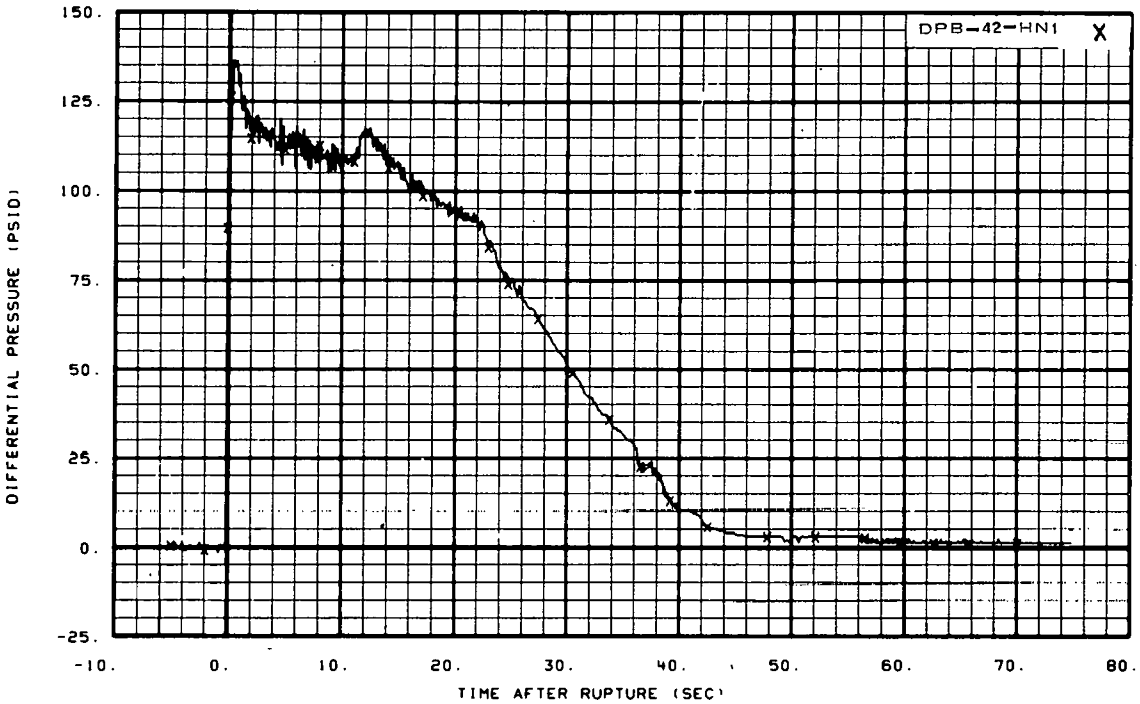

Fig. 73 Differential pressure in broken loop (Spool 42 to pump side nozzle throat).

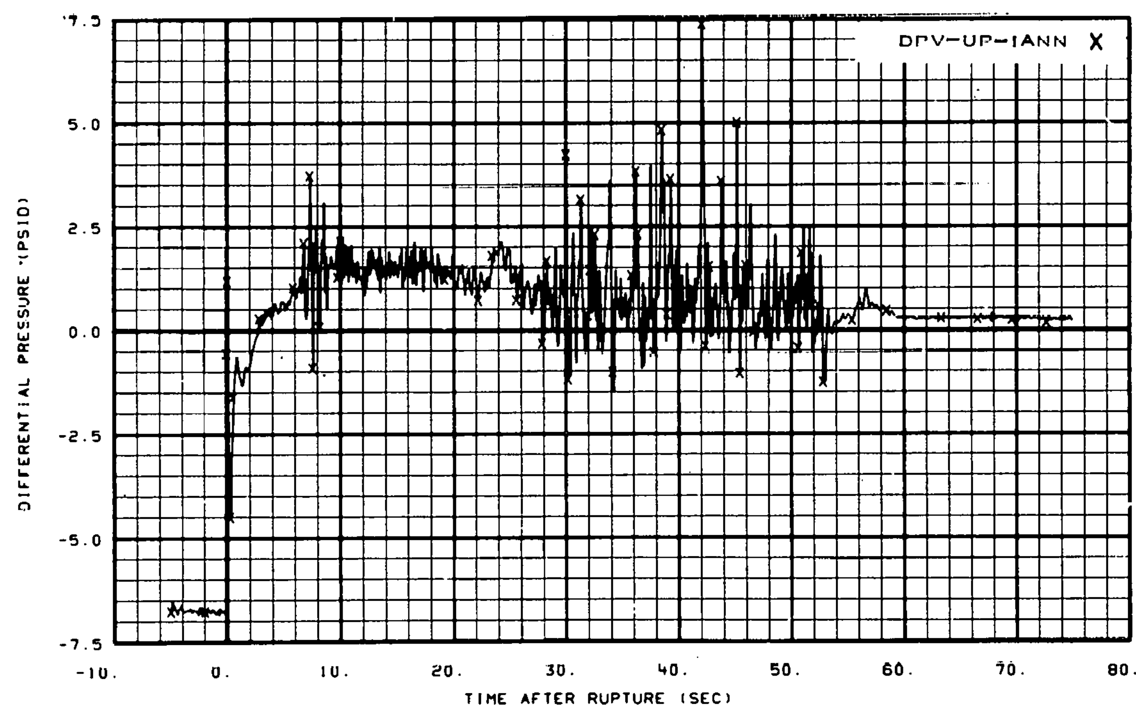

Fig. 74 Differential pressure in vessel (upper plenum to inlet annulus).

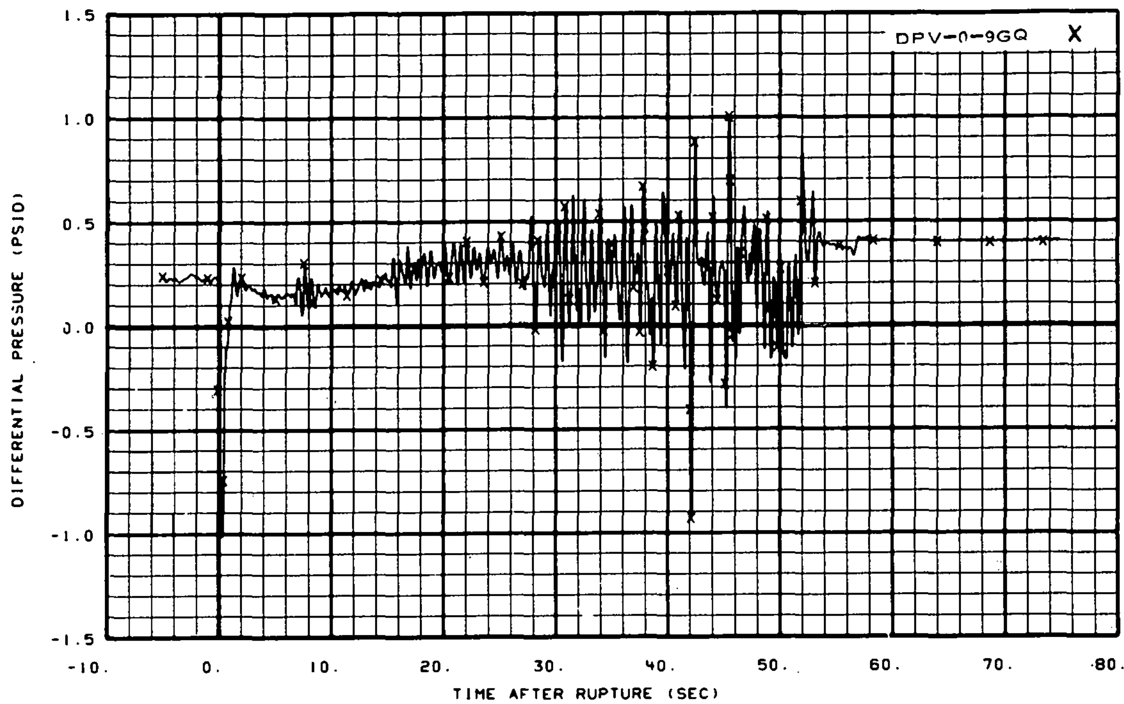

Fig. 75 Differential pressure in vessel (DPV-0-9GQ).

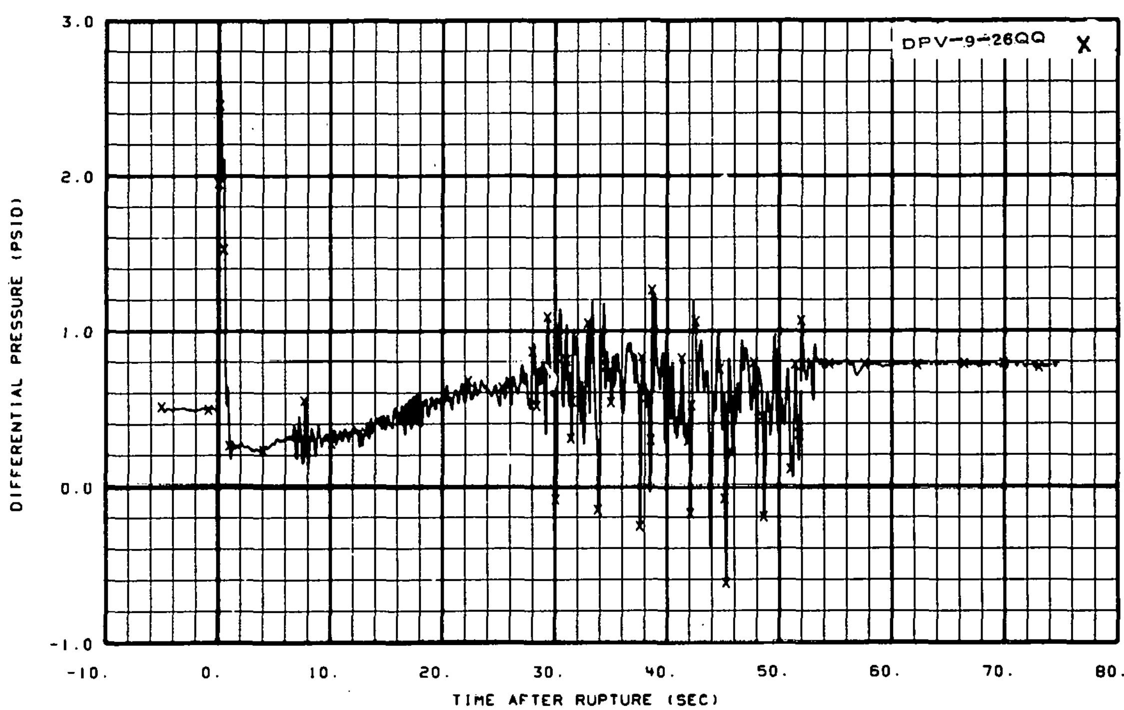

Fig. 76 Differential pressure in vessel (DPV-9-26QQ).

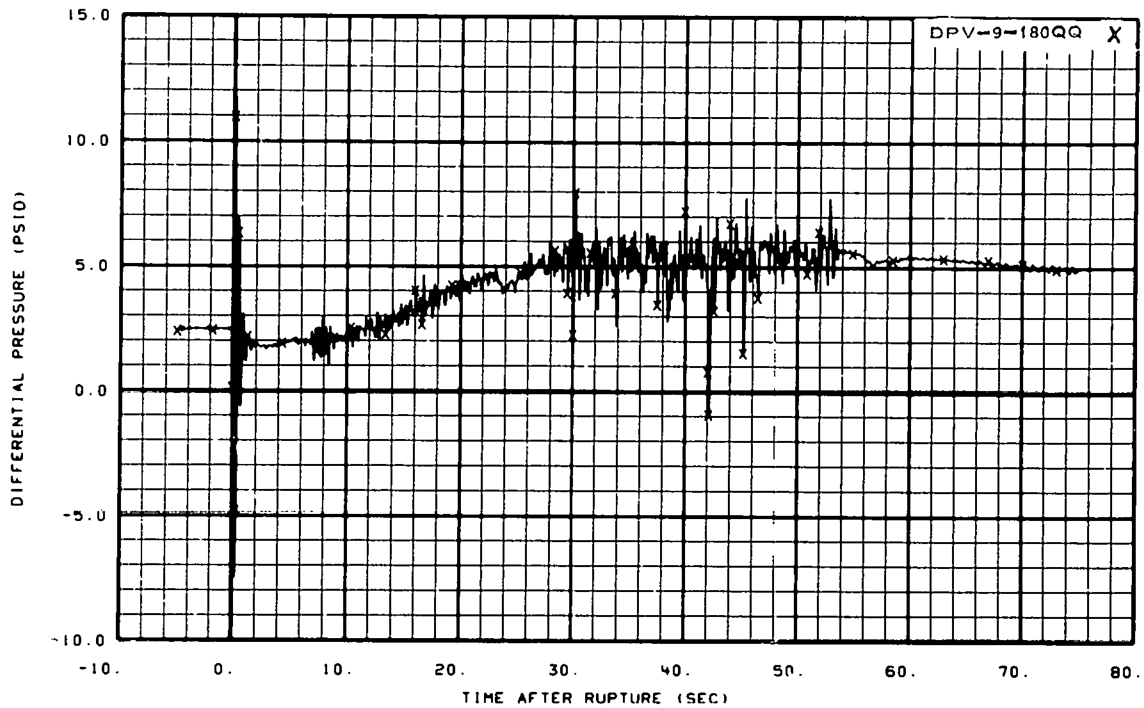

Fig. 77 Differential pressure in vessel (DPV-9-180QQ).

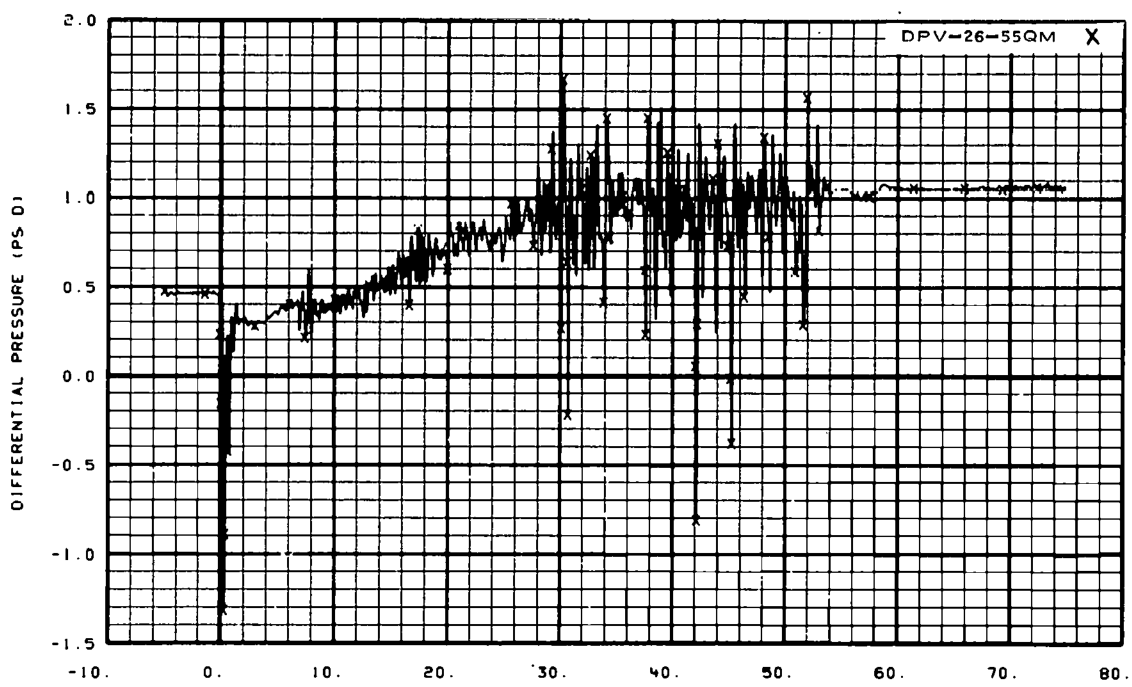

Fig. 78 Differential pressure in vessel (DPV-26-55QM).

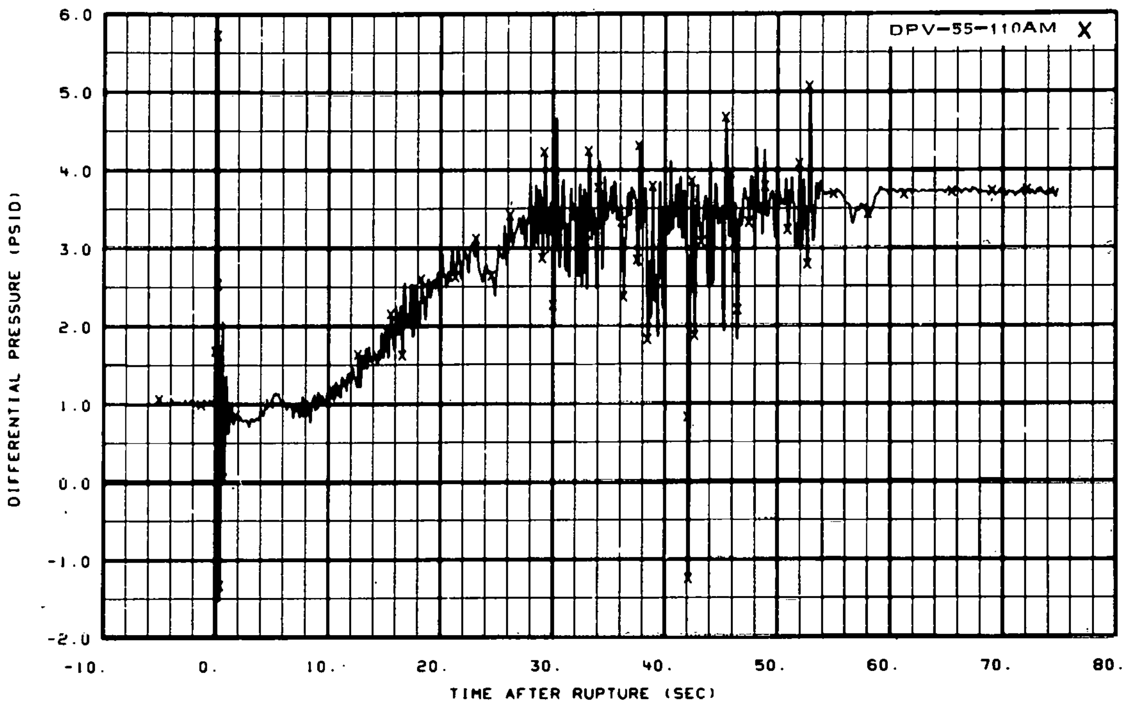

Fig. 79 Differential pressure in vessel (DPV-55-110AM).

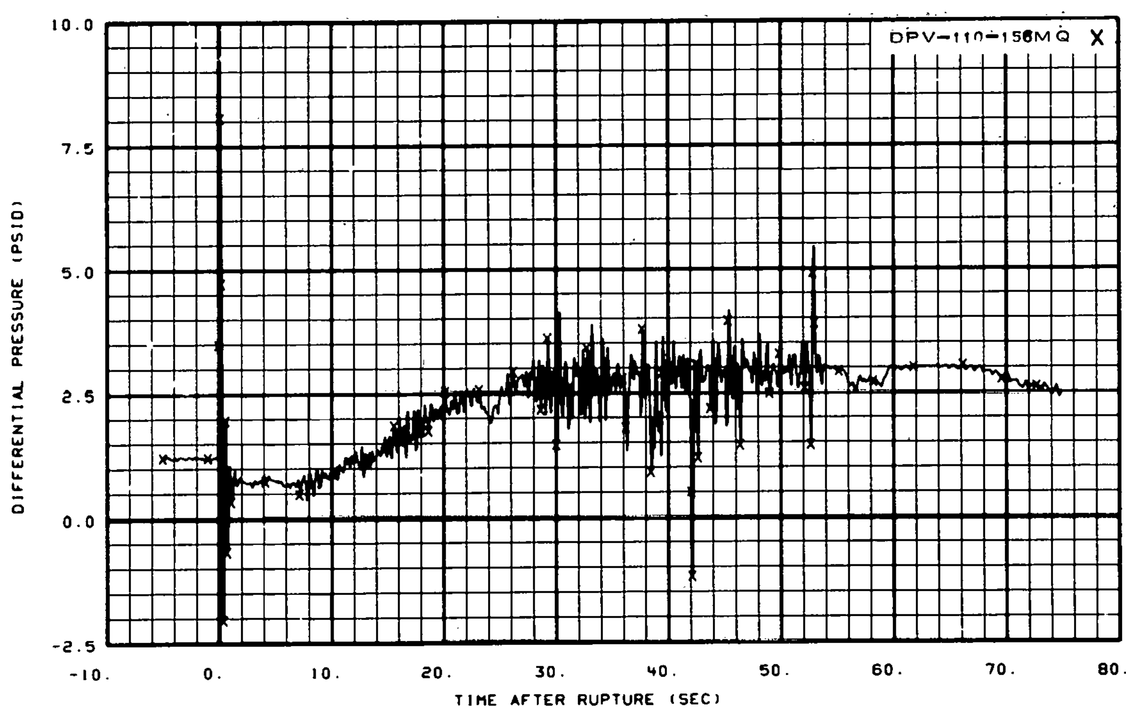

Fig. 80 Differential pressure in vessel (DPV-110-156MQ).

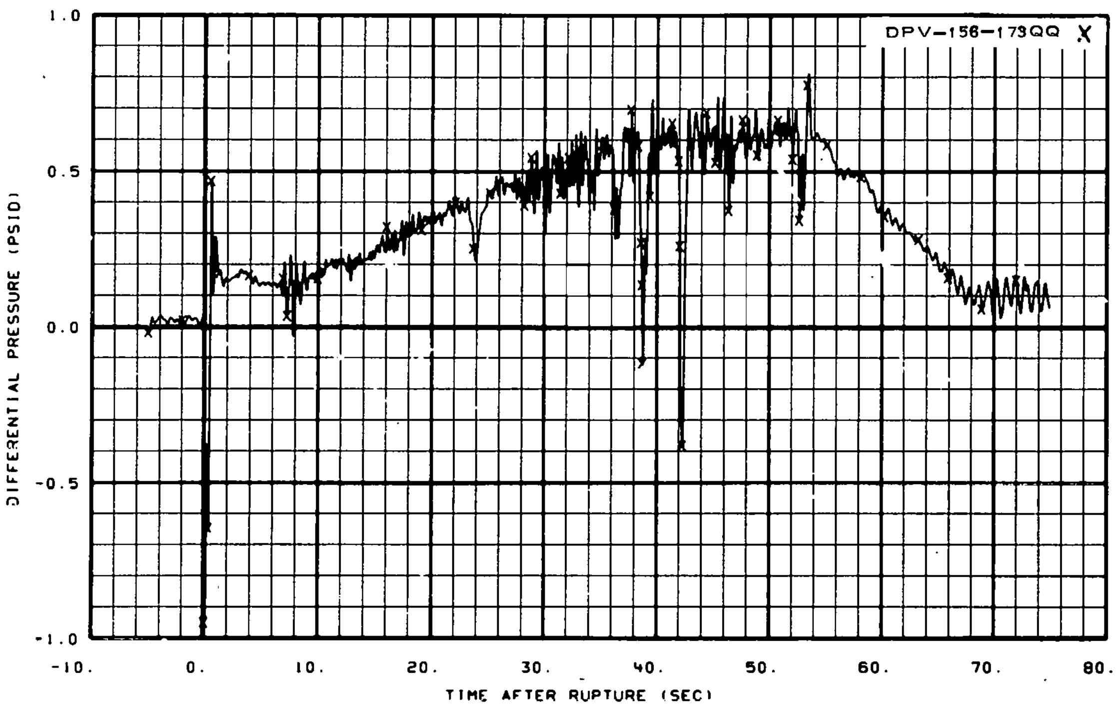

Fig. 81 Differential pressure in vessel (DPV-156-17300).

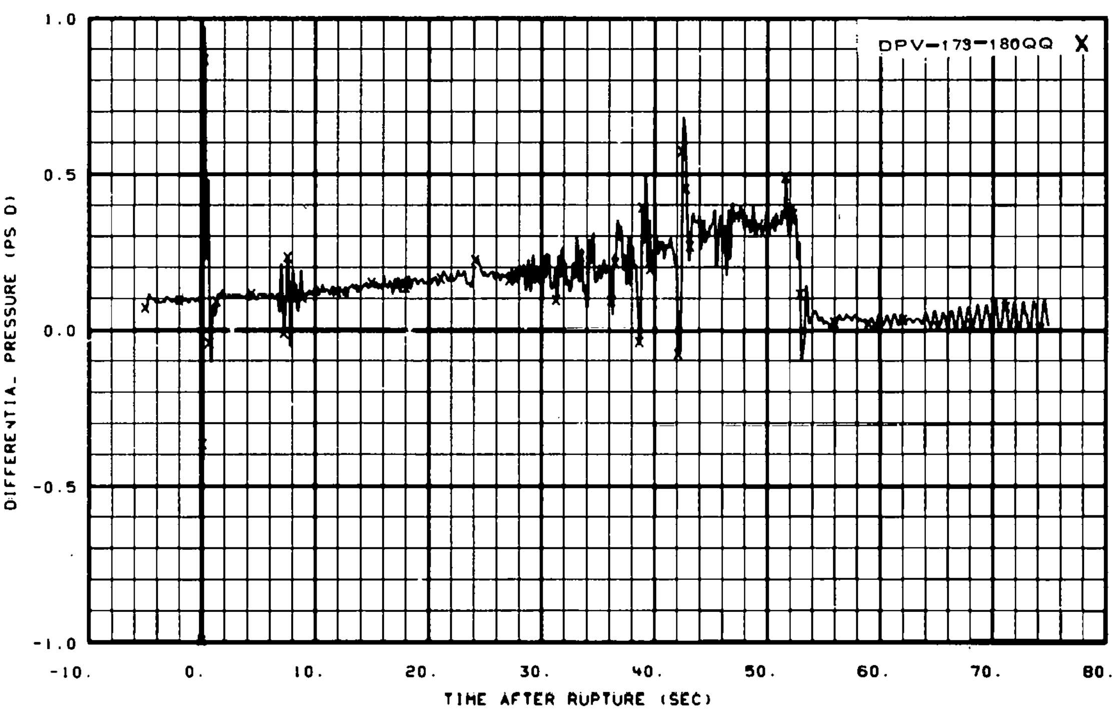

Fig. 82. Differential pressure in vessel (DPV-173-180QQ).

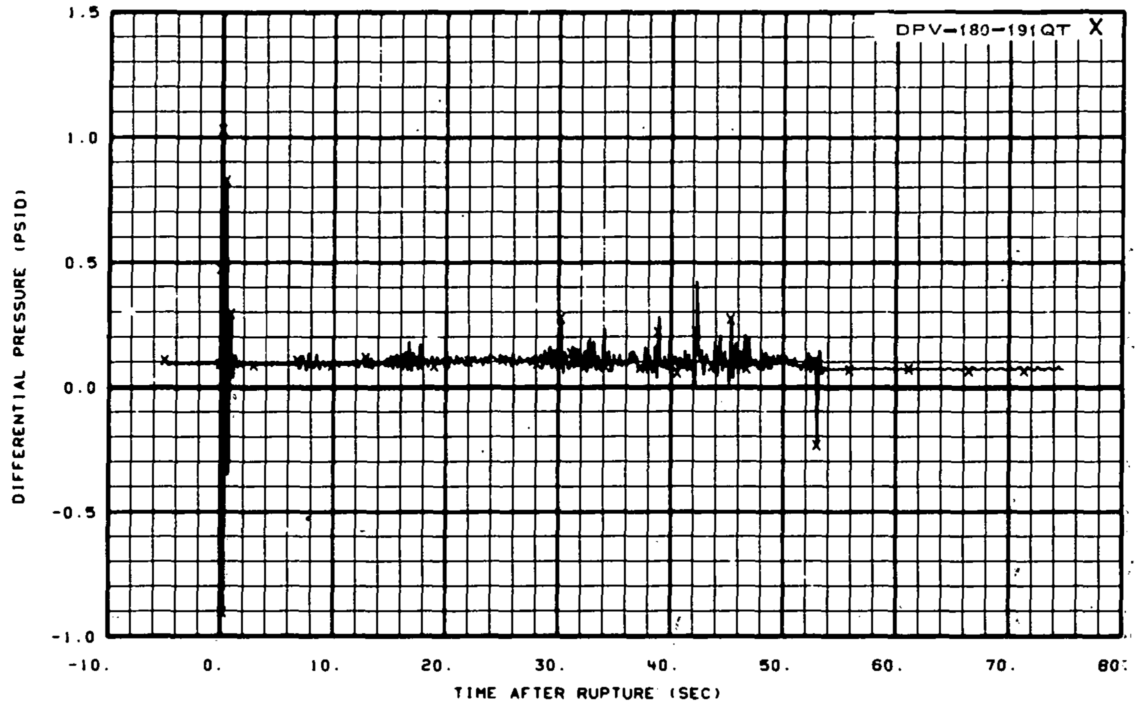

Fig. 83 Differential pressure in vessel (DPV-180-191QT).

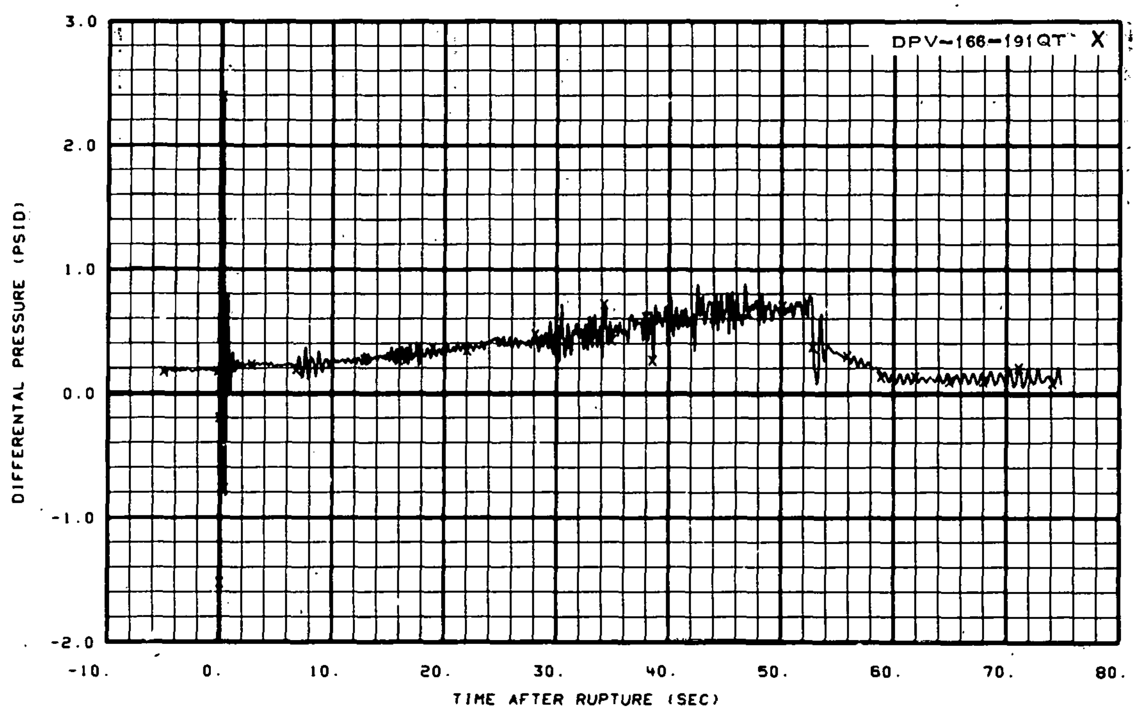

Fig. 84 Differential pressure in vessel (DPV-166-191QT).

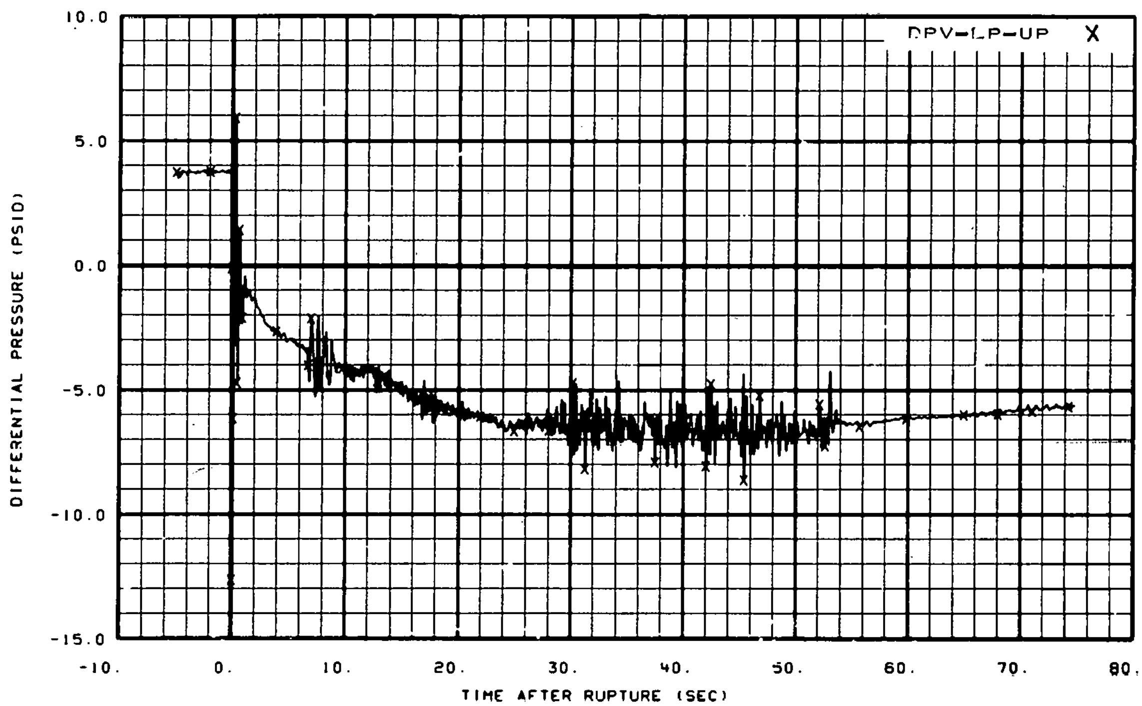

Fig. 85 Differential pressure in vessel (lower plenum to upper plenum).

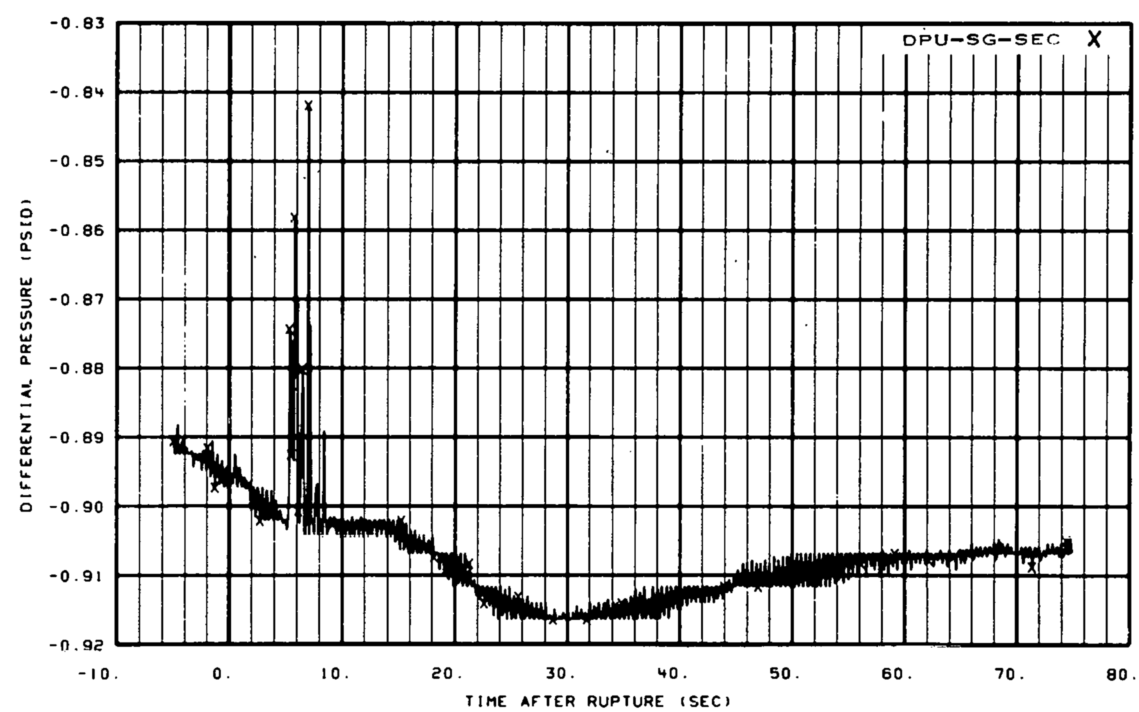

Fig. 86 Differential pressure in steam generator secondary (secondary side liquid level).

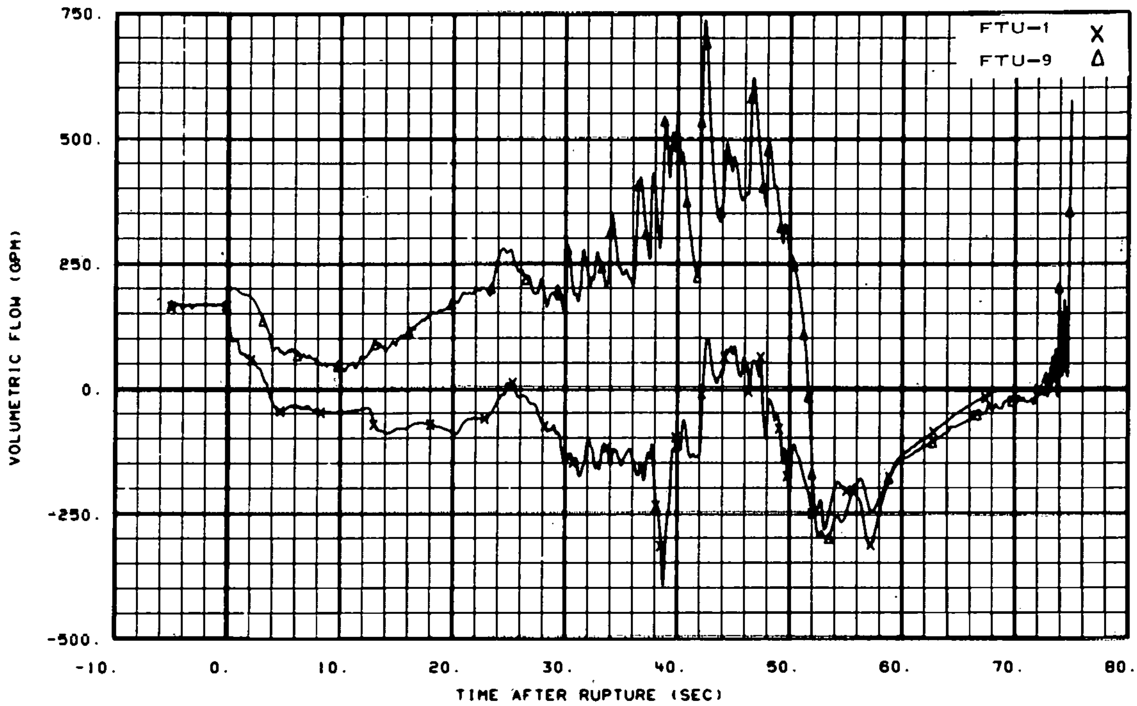

Fig. 87 Volumetric flows in intact loop (FTU-1 and FTU-9).

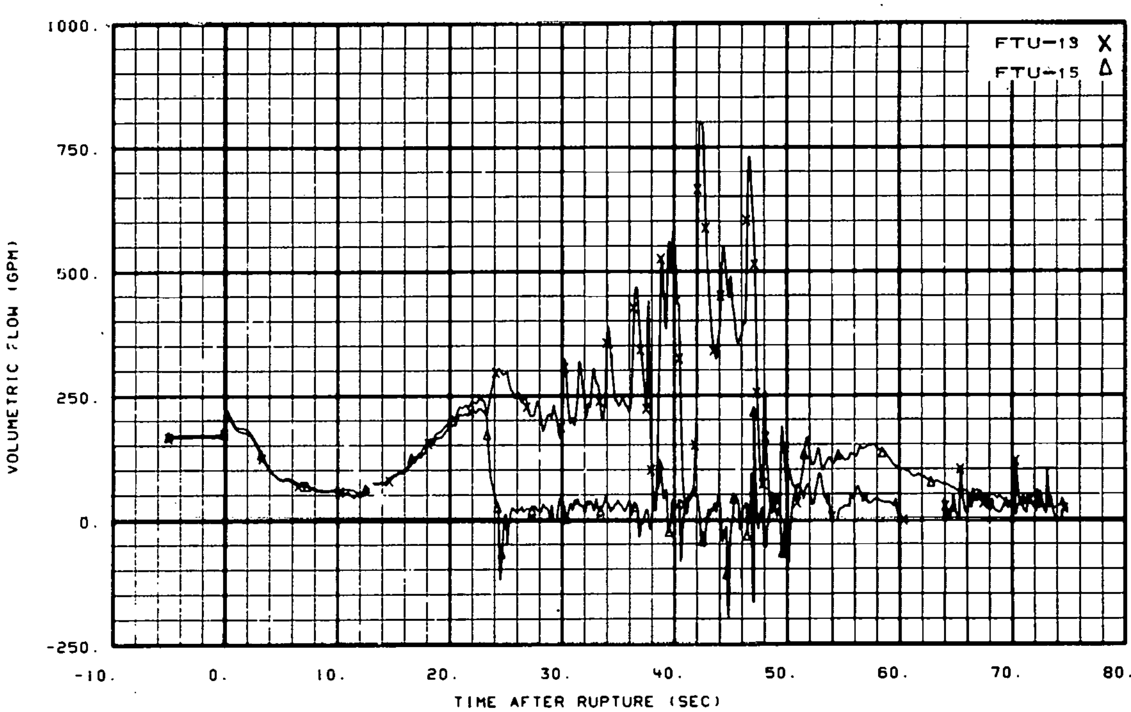

Fig. 88 Volumetric flows in intact loop (FTU-13 and FTU-15).

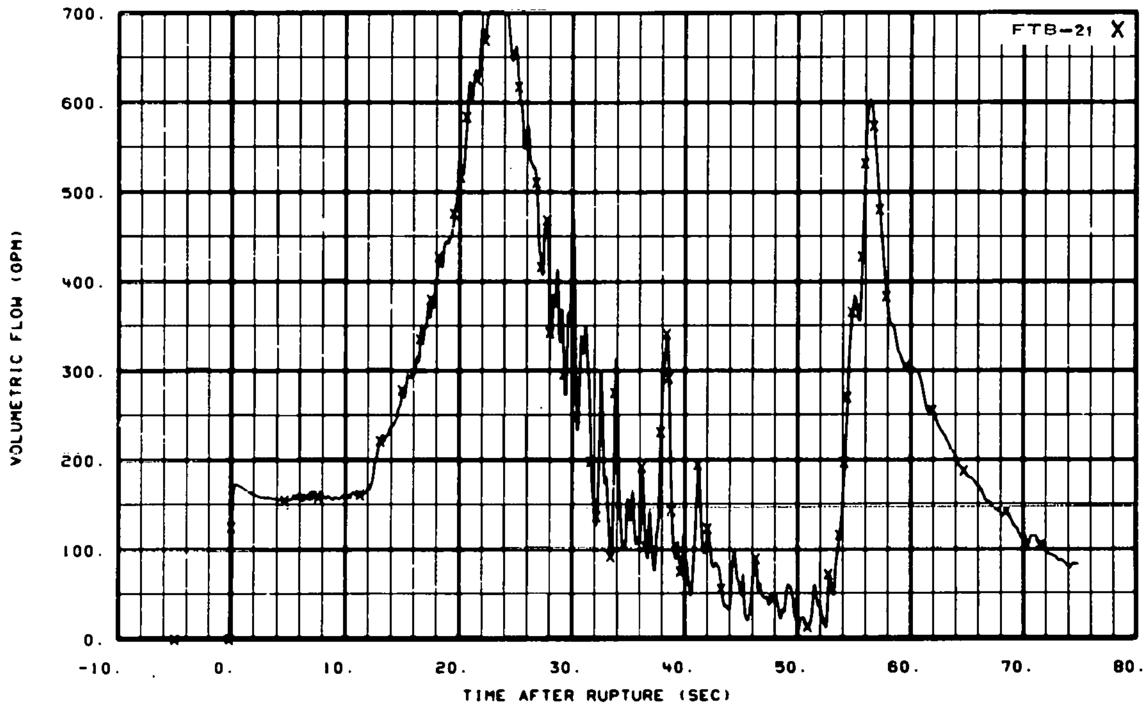

Fig. 89 Volumetric flow in broken loop (FTB-21).

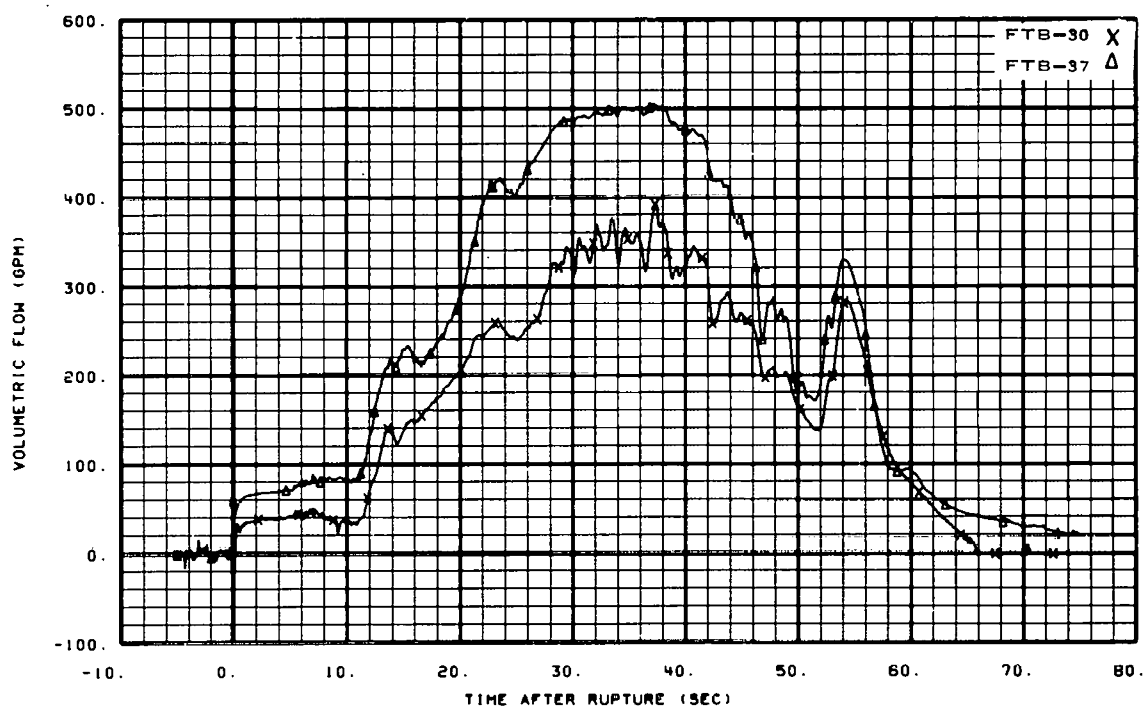

Fig. 90 Volumetric flows in broken loop (FTB-30 and FTB-37).

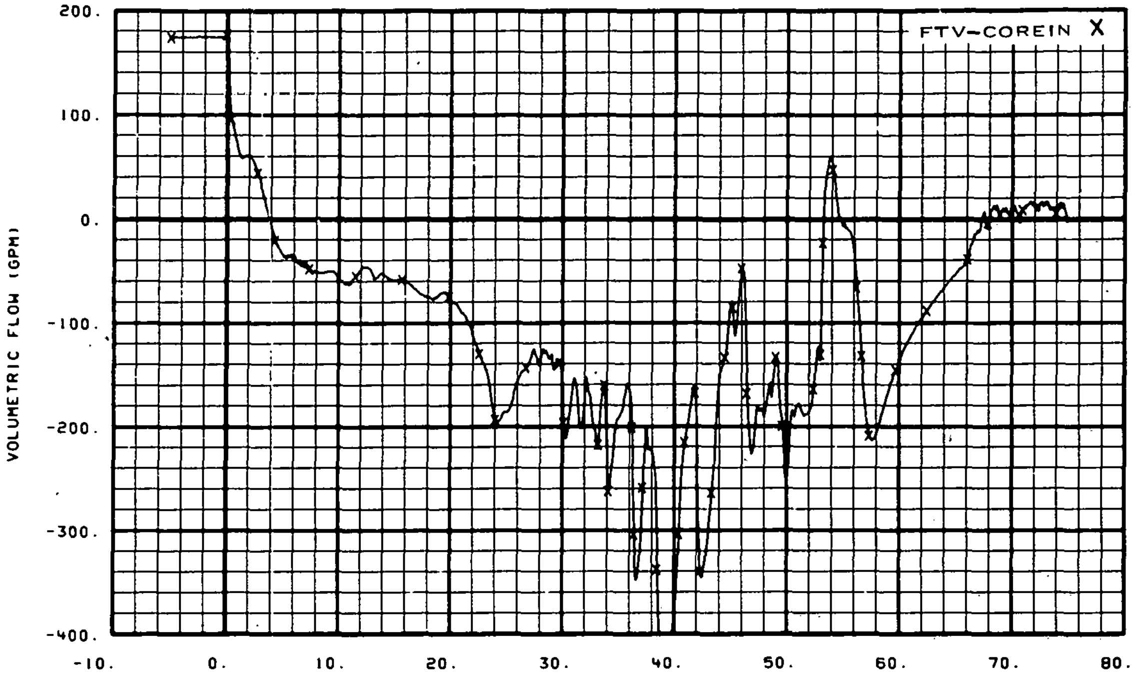

Fig. 91 Volumetric flow in core entrance.

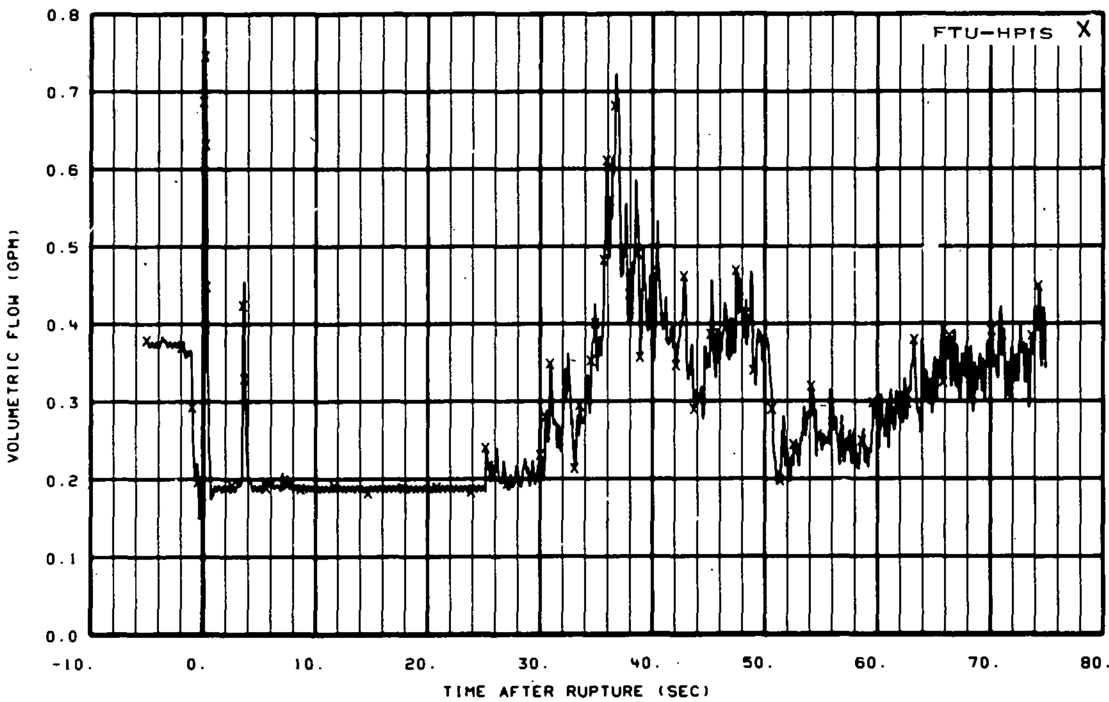

Fig. 92 Volumetric flow from high-pressure injection system.

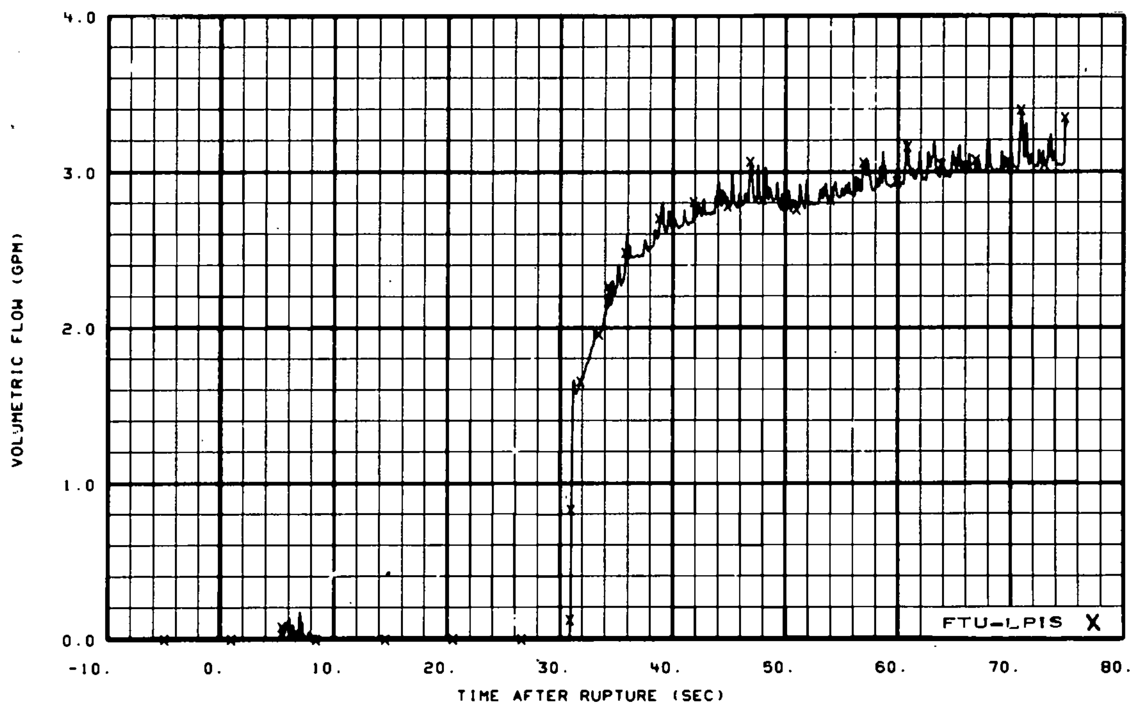

Fig. 93 Volumetric flow from low-pressure injection system.

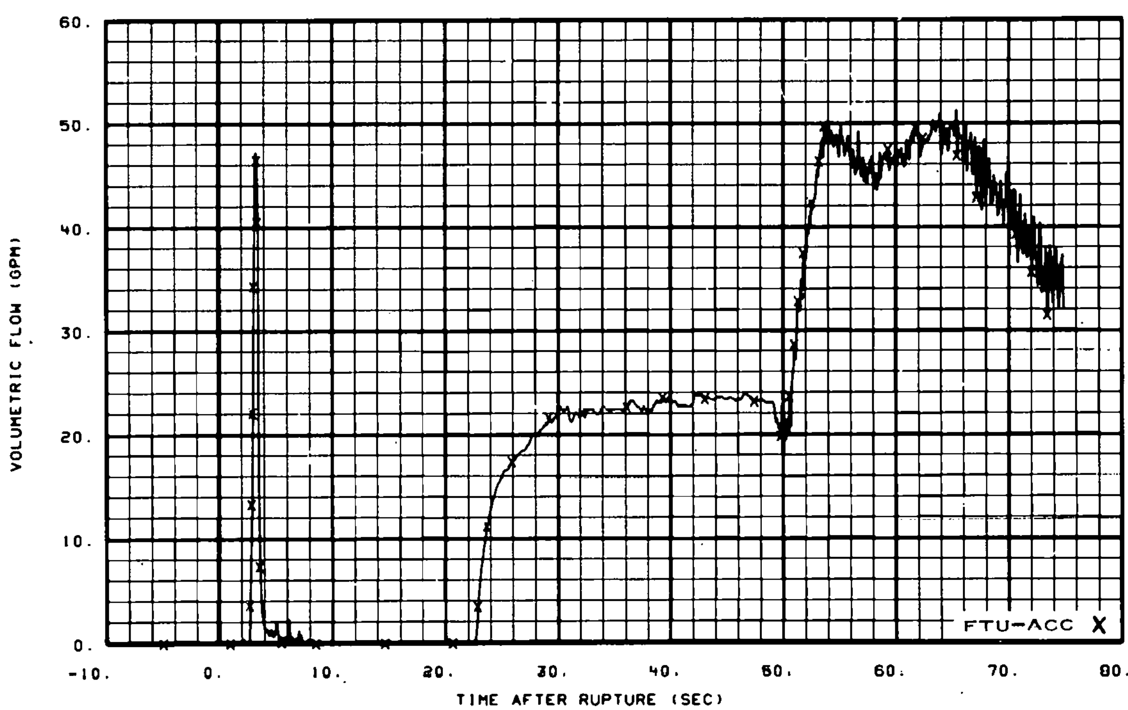

Fig. 94 Volumetric flow from intact loop accumulator.

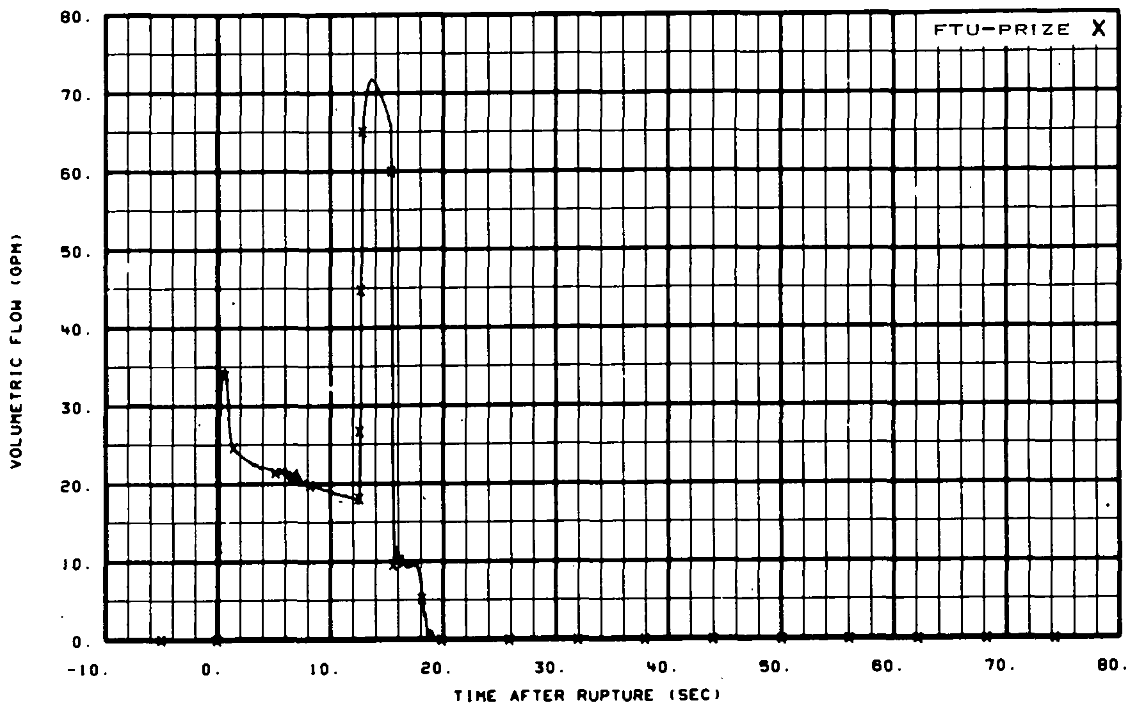

Fig. 95 Volumetric flow from pressurizer.

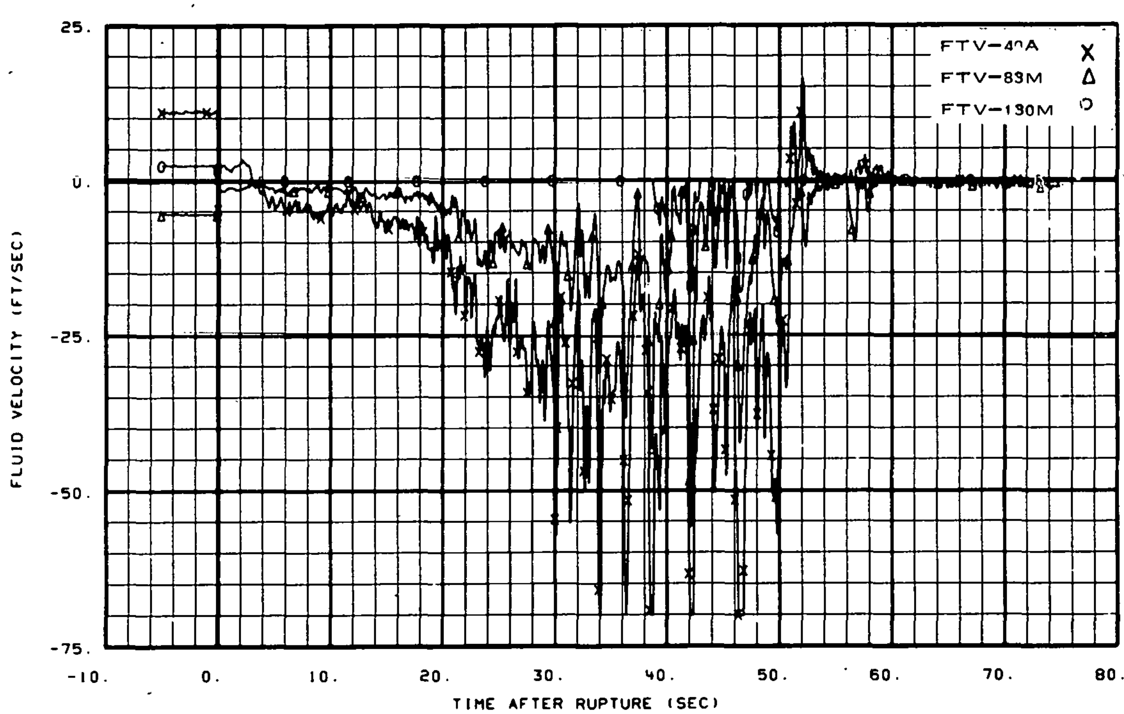

Fig. 96 Fluid velocities in vessel.

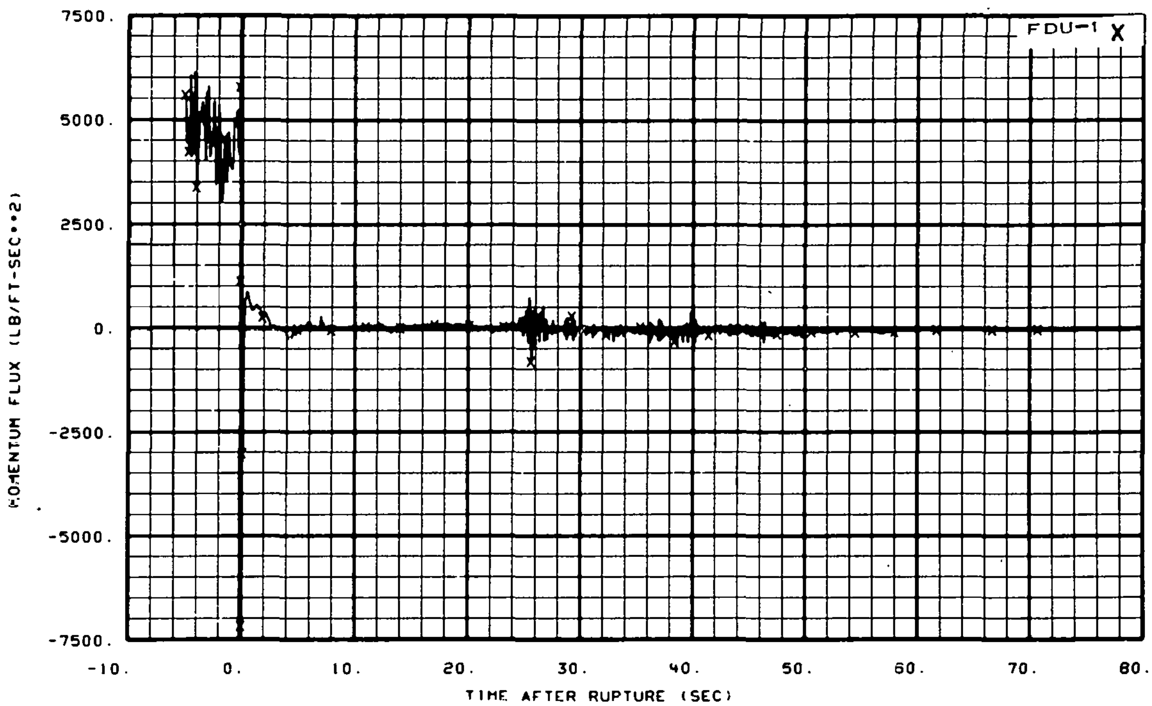

Fig. 97 Momentum flux in intact loop (Spool 1).

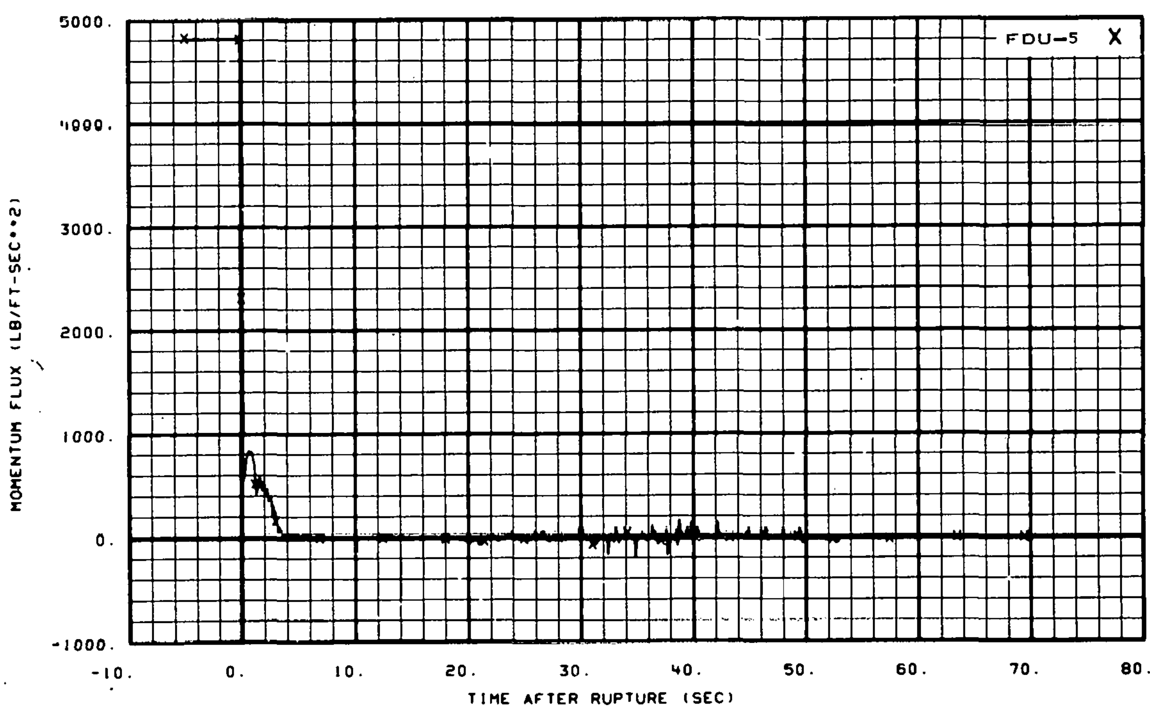

Fig. 98 Momentum flux in intact loop (Spool 5).

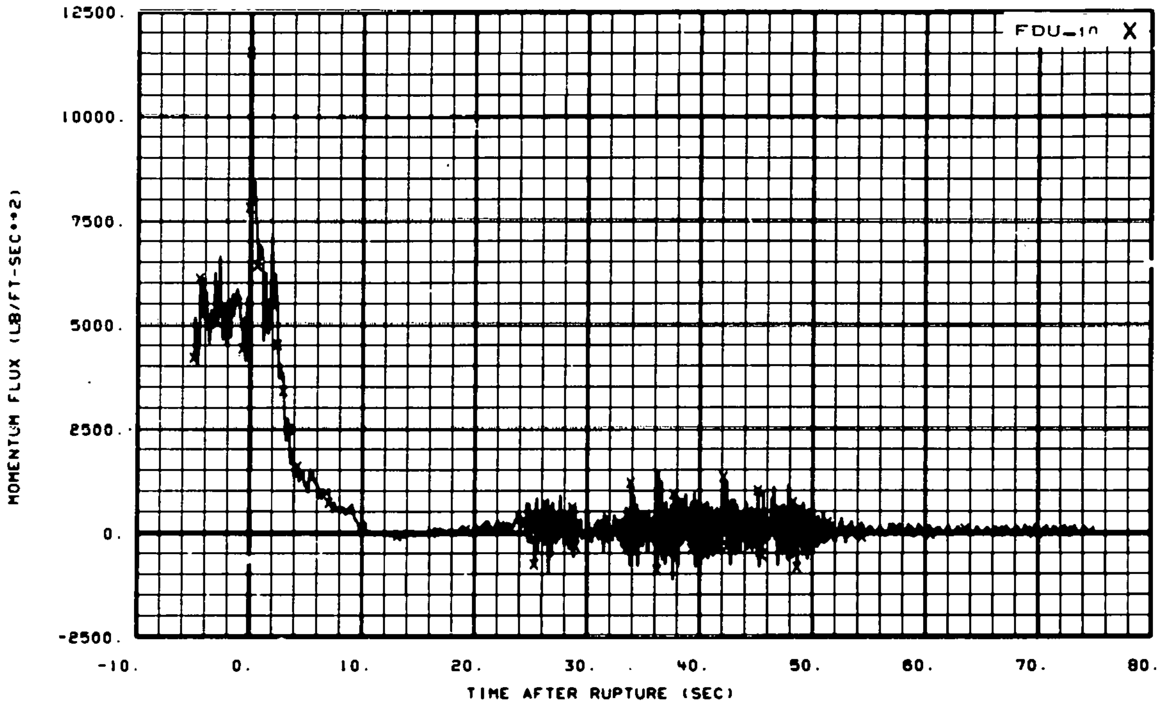

Fig. 99 Momentum flux in intact loop (Spool 10).

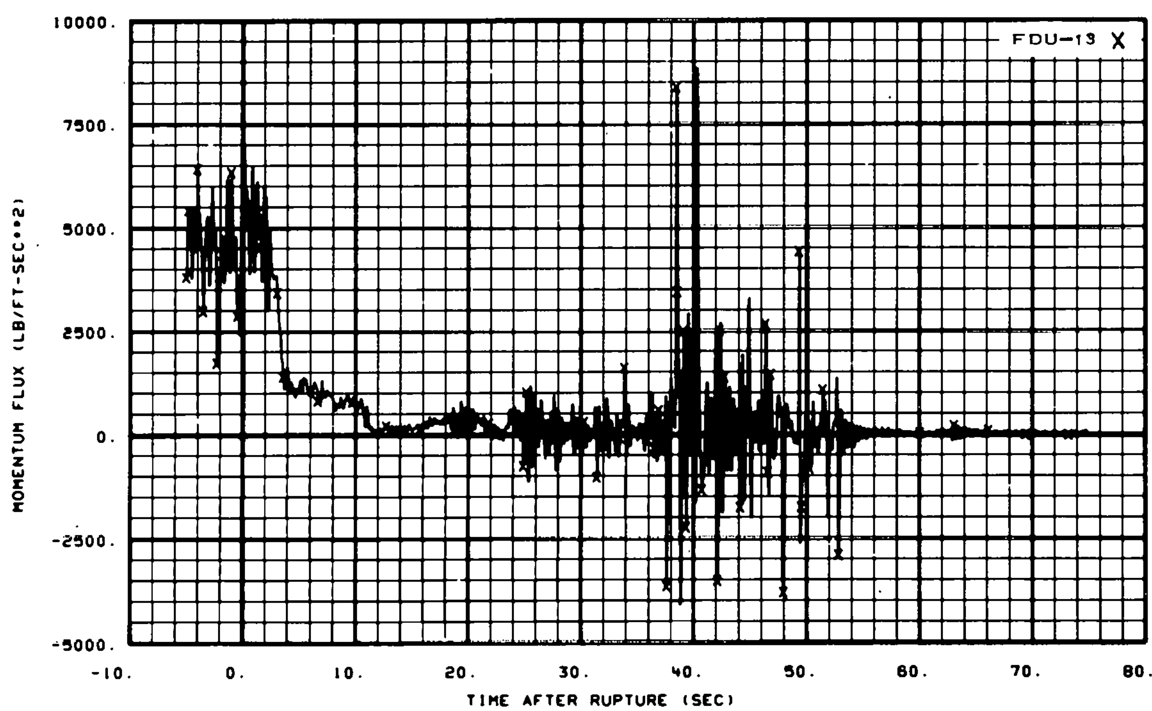

Fig. 100 Momentum flux in intact loop (Spool 13).

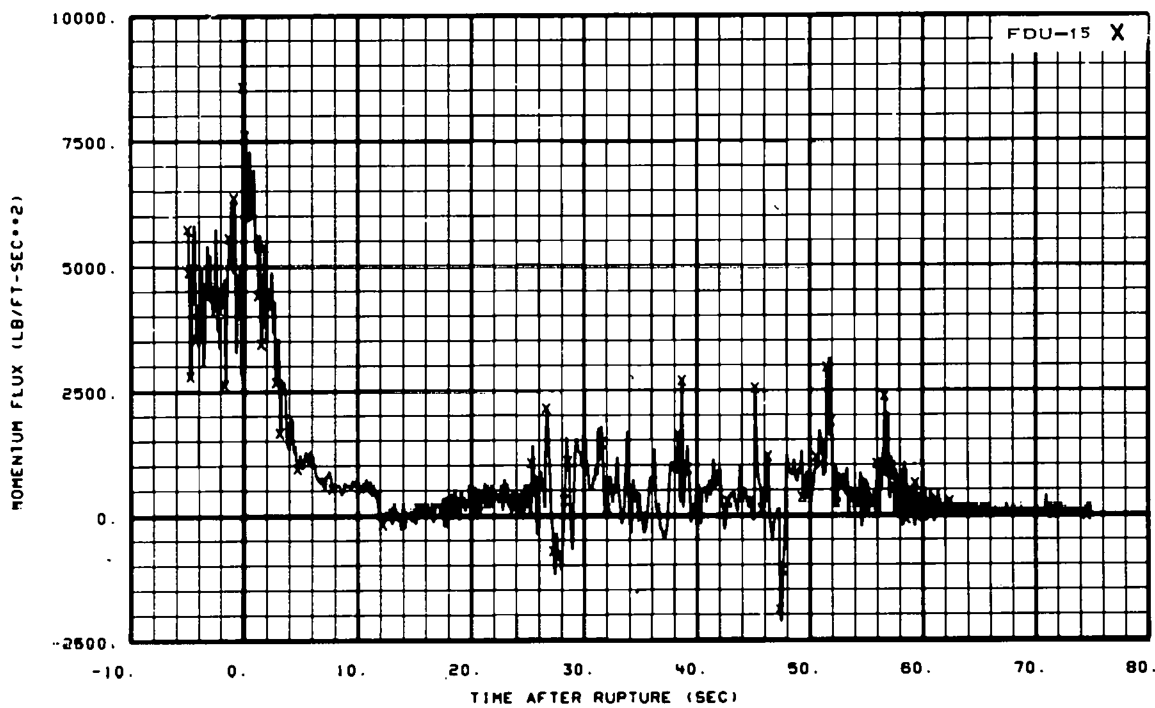

Fig. 101 Momentum flux in intact loop (Spool 15).

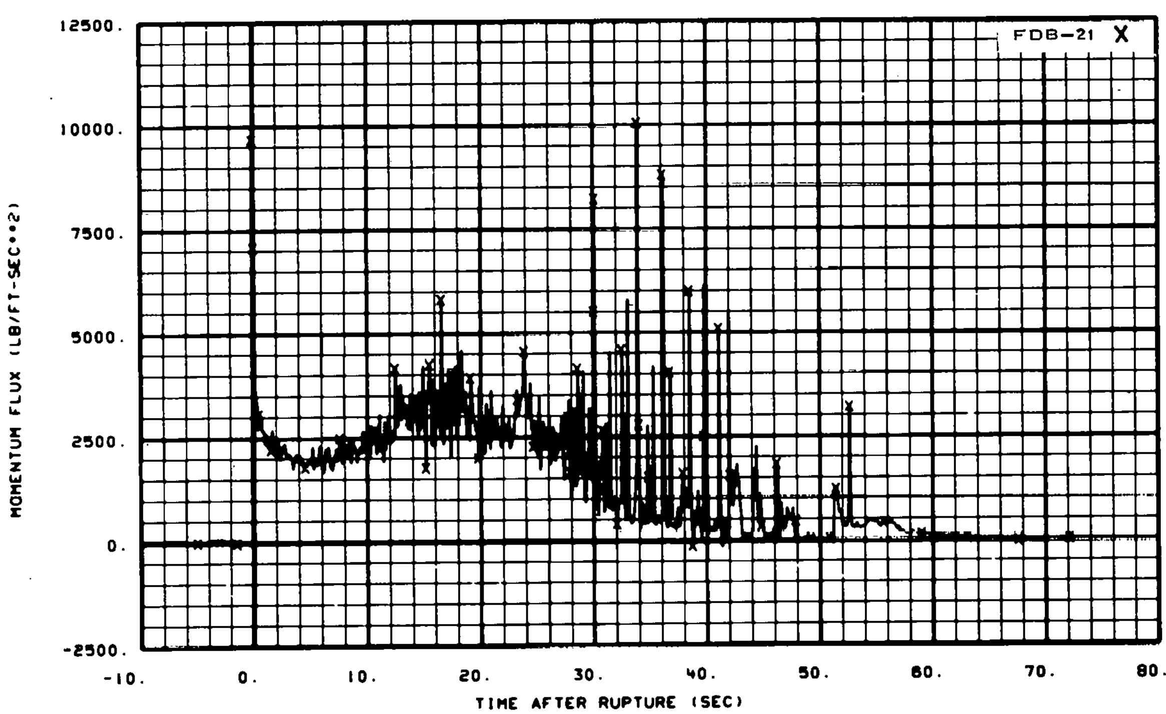

Fig. 102 Momentum flux in broken loop (Spool 21).

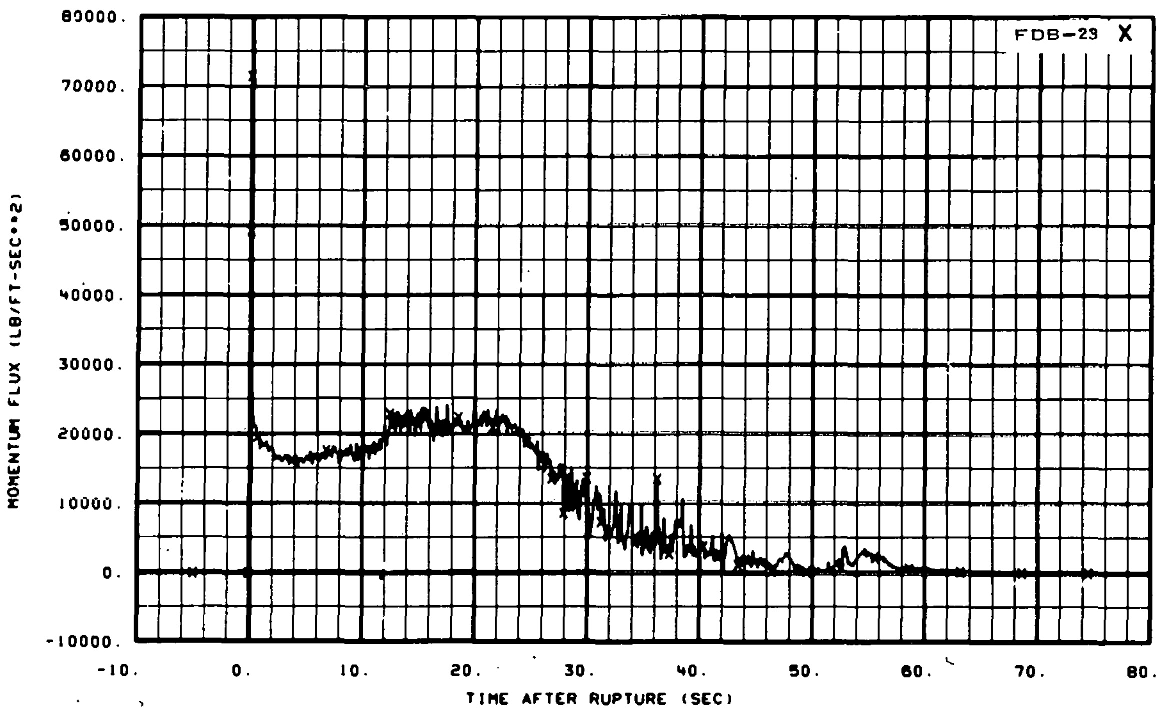

Fig. 103 Momentum flux in broken loop (Spool 23).

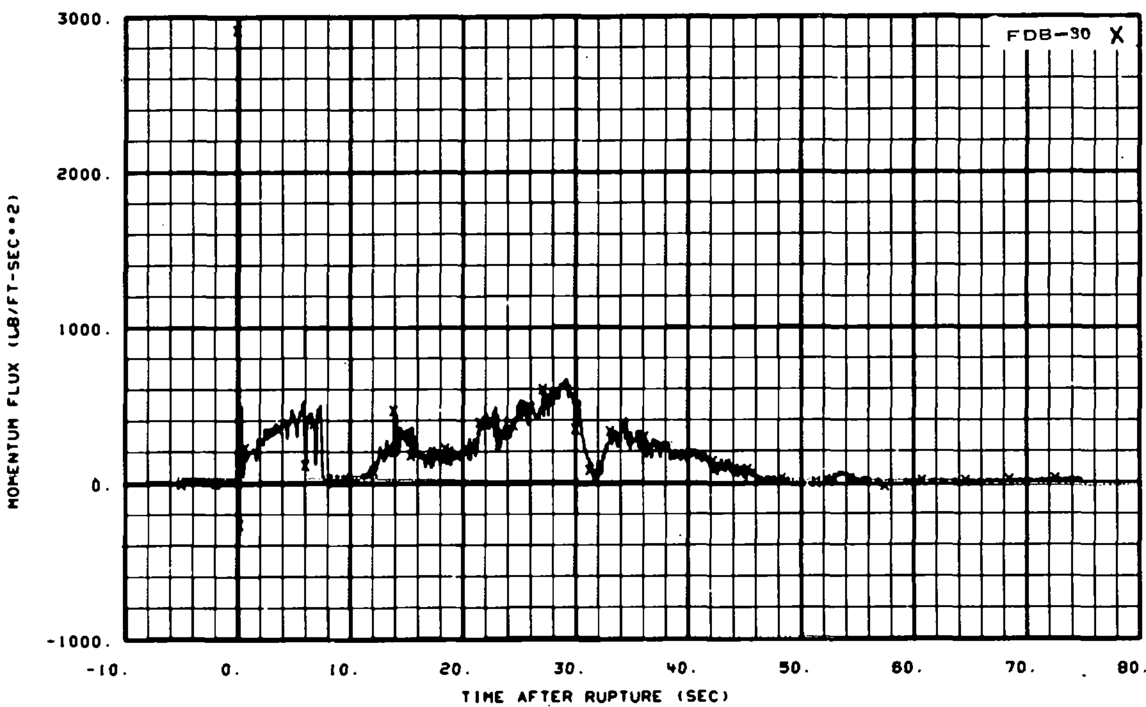

Fig. 104 Momentum flux in broken loop (Spool 30).

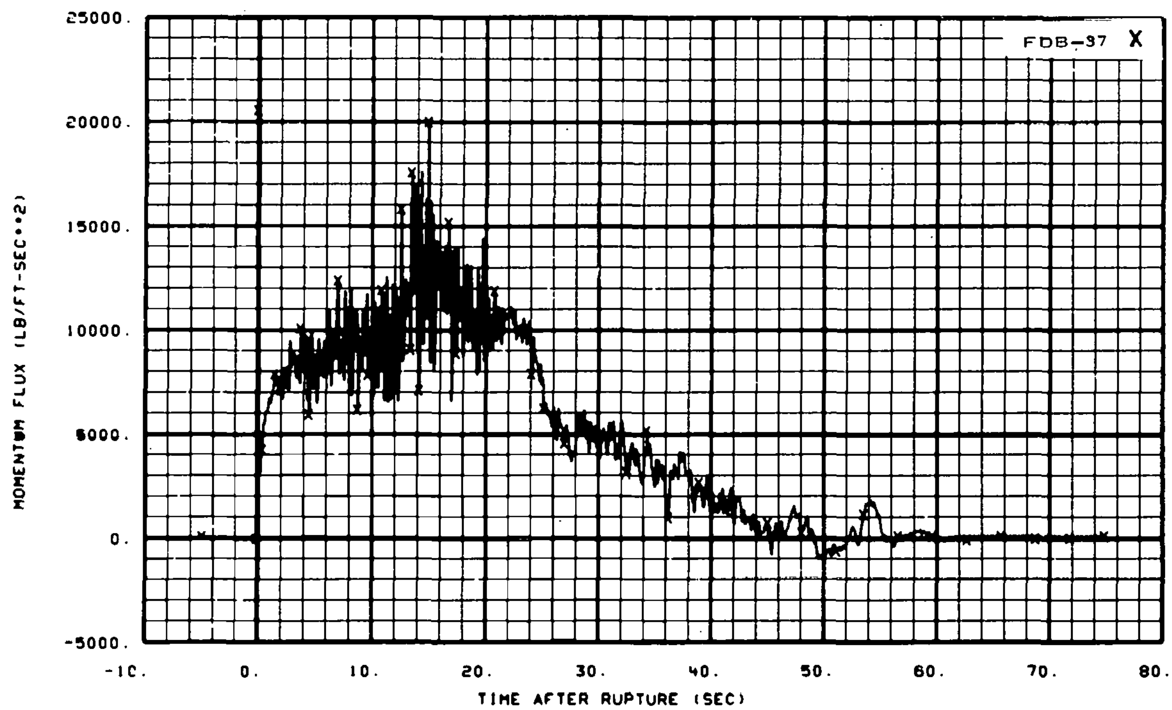

Fig. 105 Momentum flux in broken loop (Spool 37).

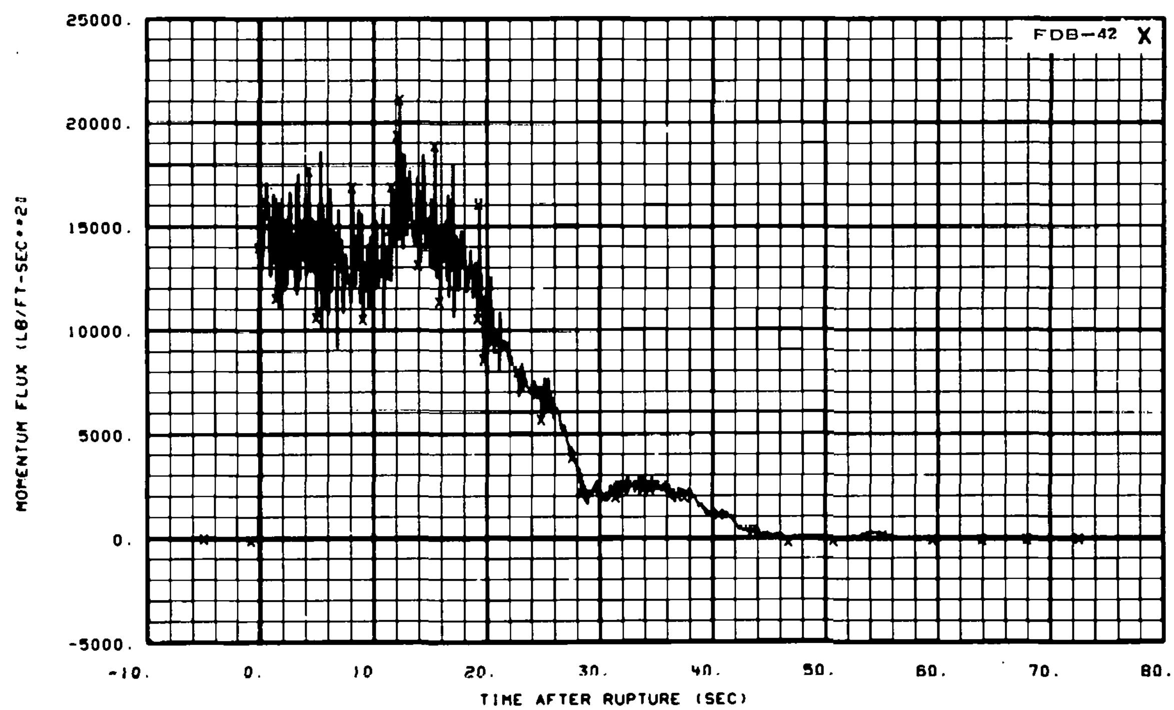

Fig. 106 Momentum flux in broken loop (Spool 42).

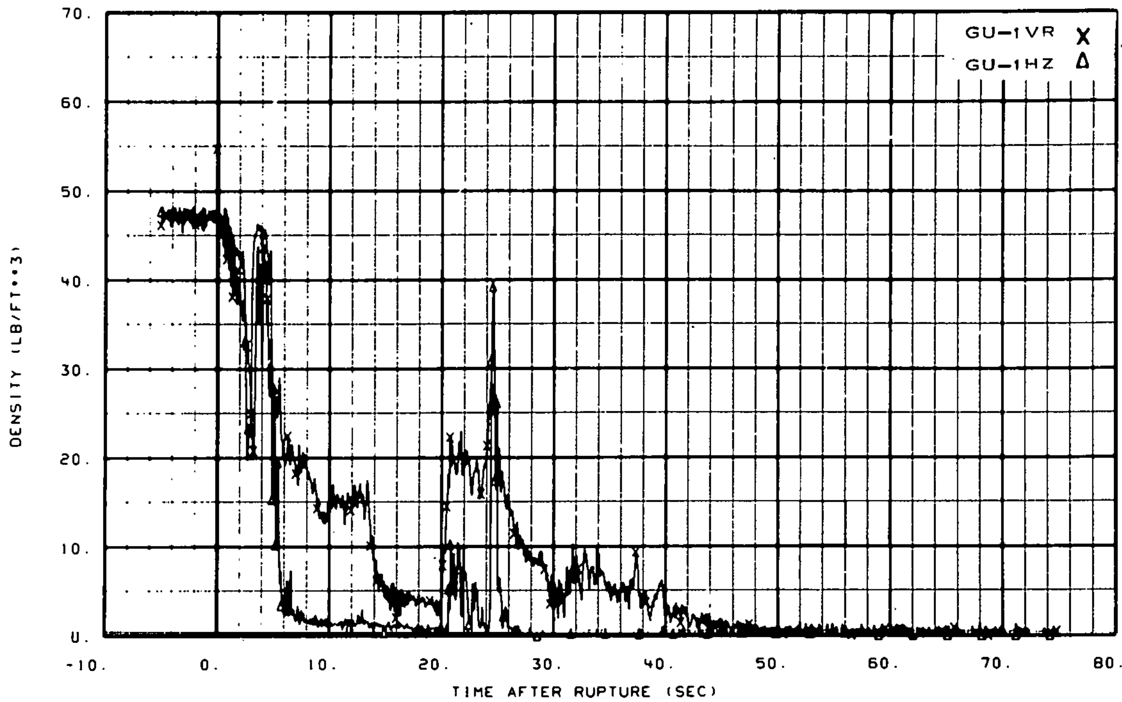

Fig. 107 Densities in intact loop (GU-1VR and GU-1HZ).

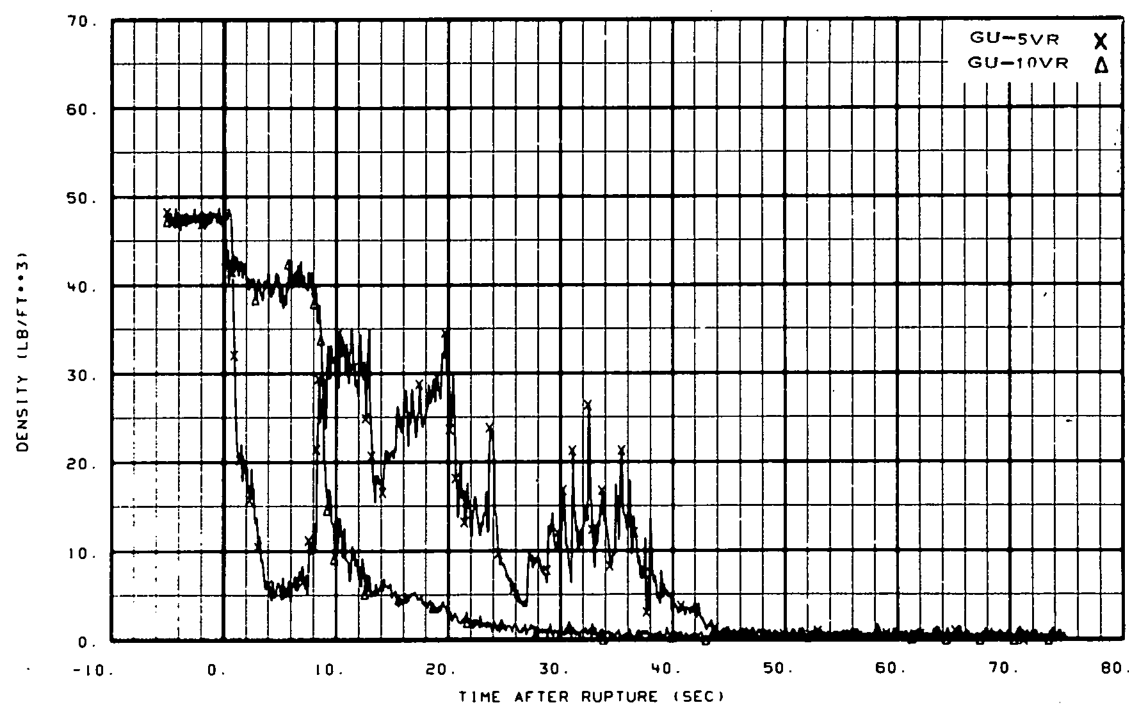

Fig. 108 Densities in intact loop (GU-5VR and GU-10VR).

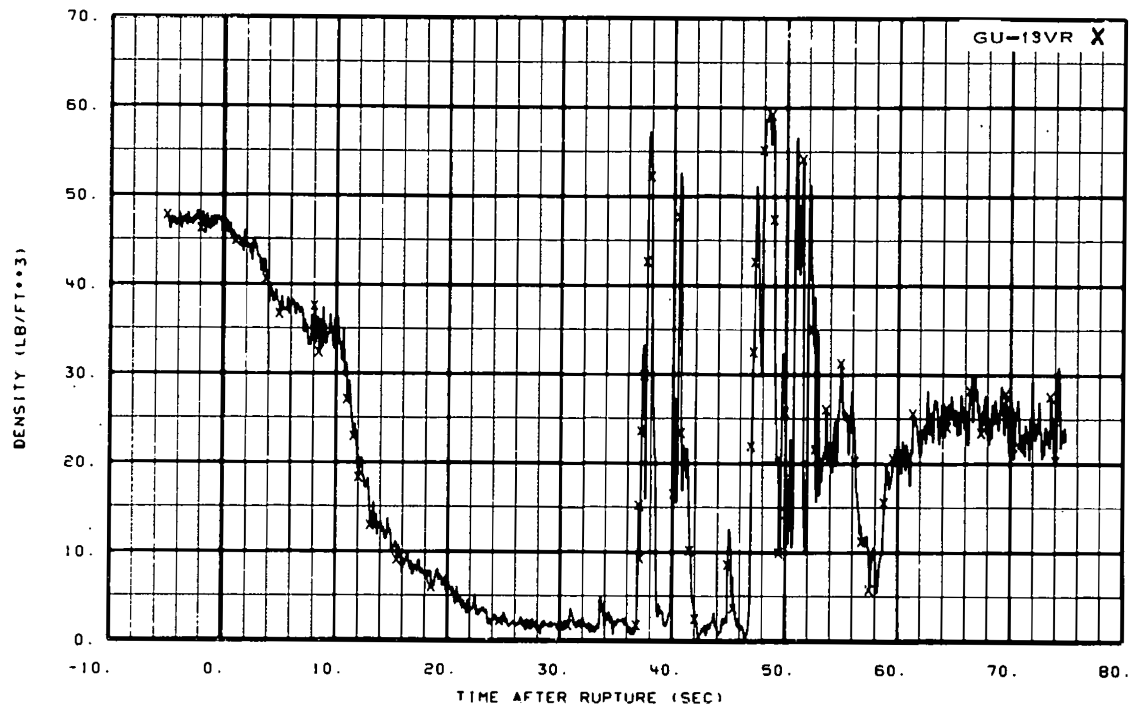

Fig. 109 Density in intact loop (GU-13VR).

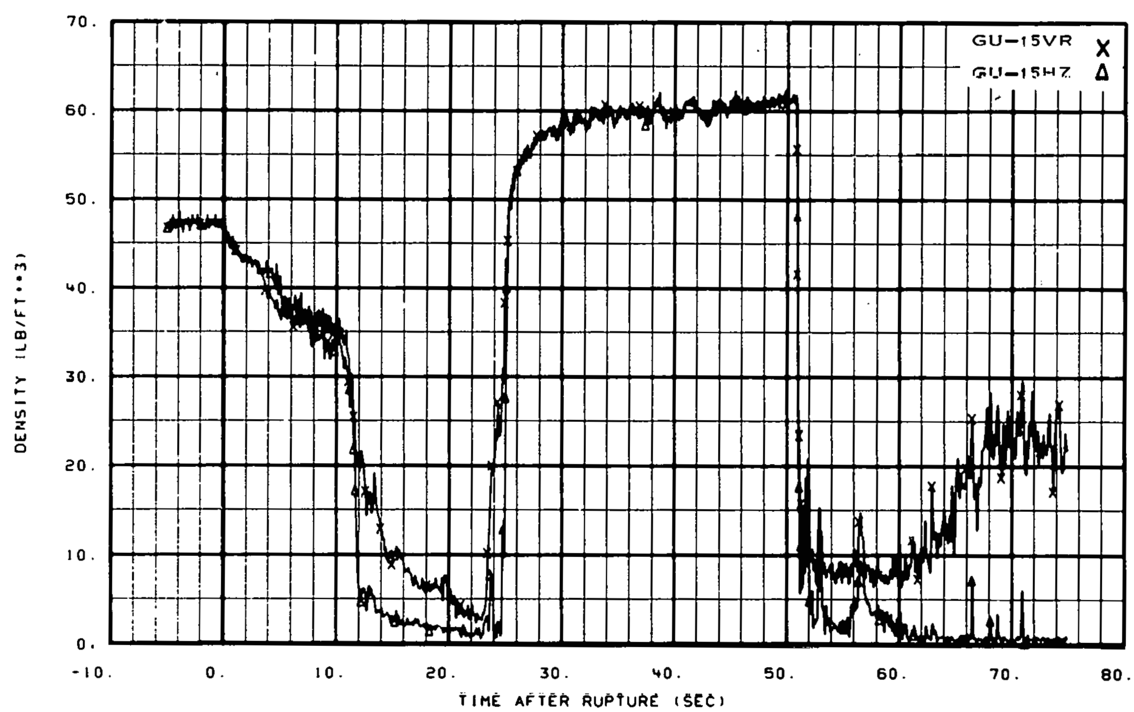

Fig. 110 Densities in intact loop (GU-15VR and GU-15HZ).

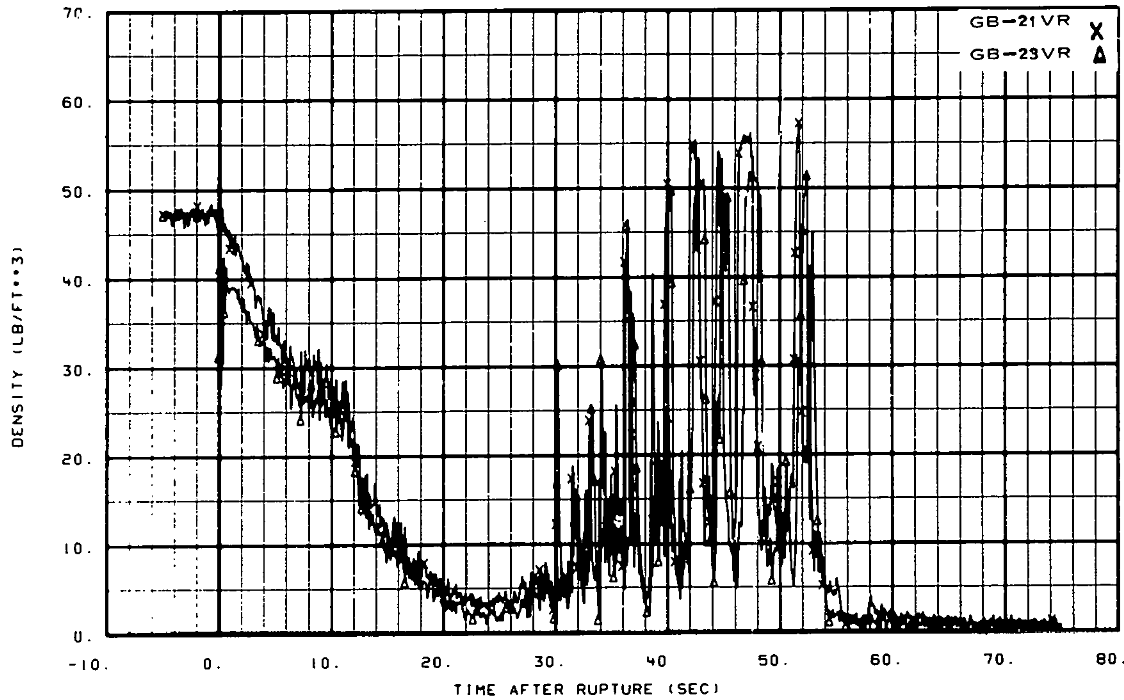

Fig. 111 Densities in broken loop (GB-21VR and GB-23VR).

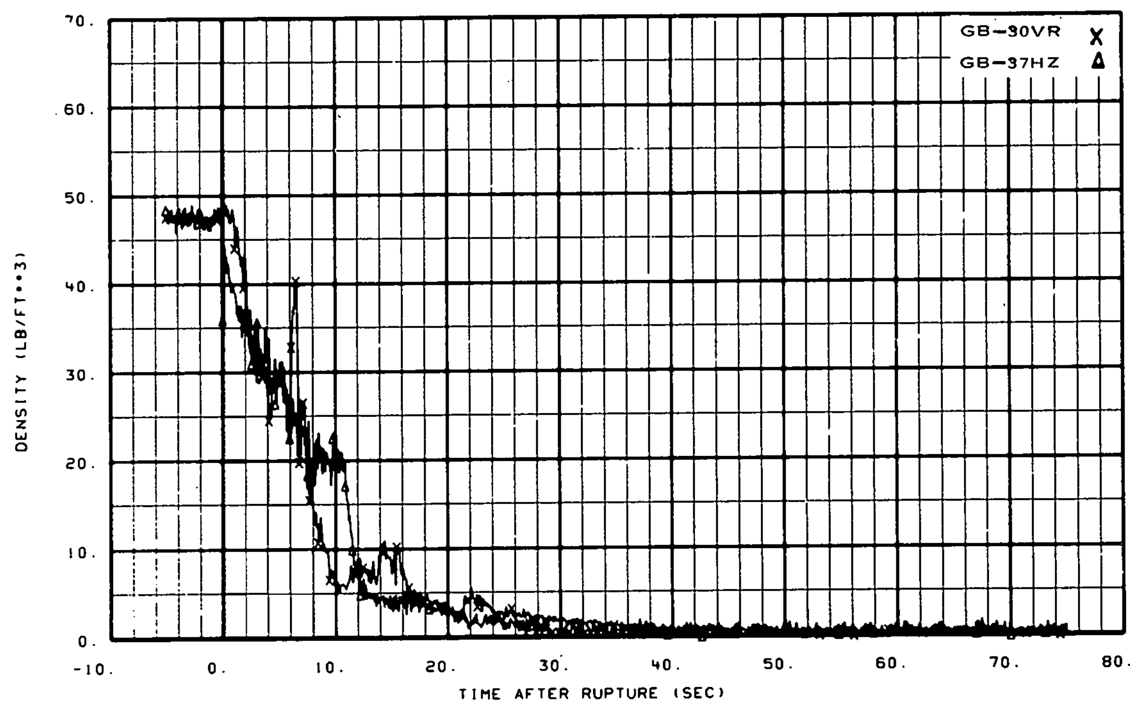

Fig. 112 Densities in broken loop (GB-30VR and GB-37HZ).

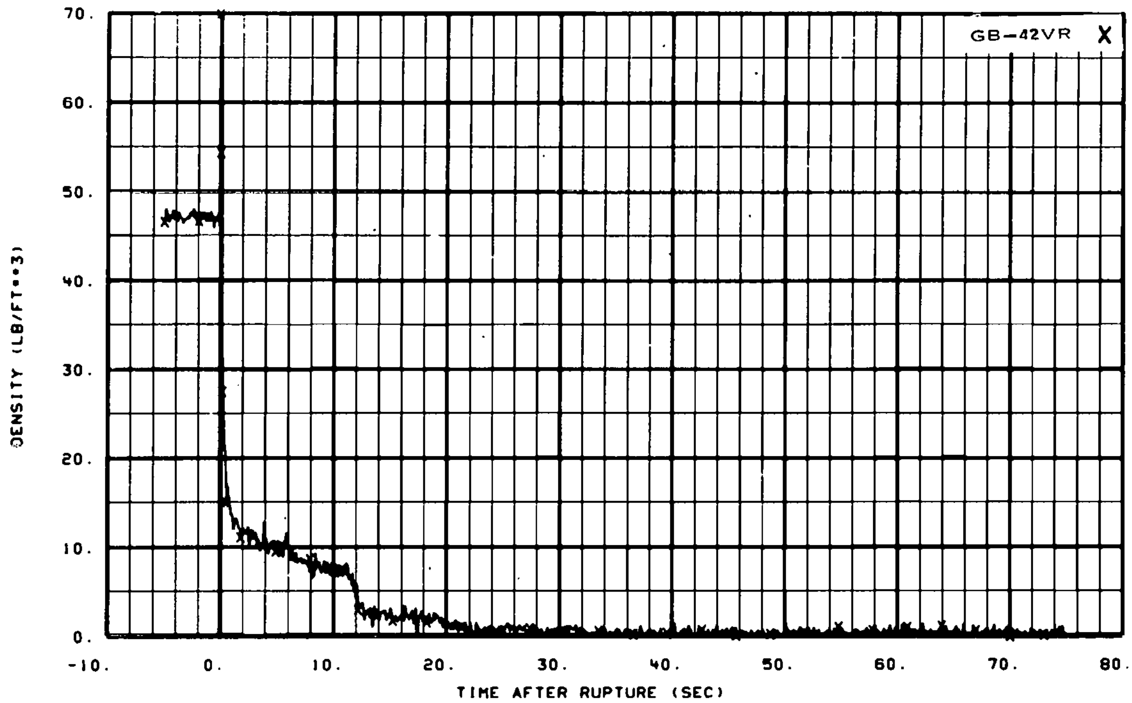

Fig. 113 Density in broken loop (GB-42VR).

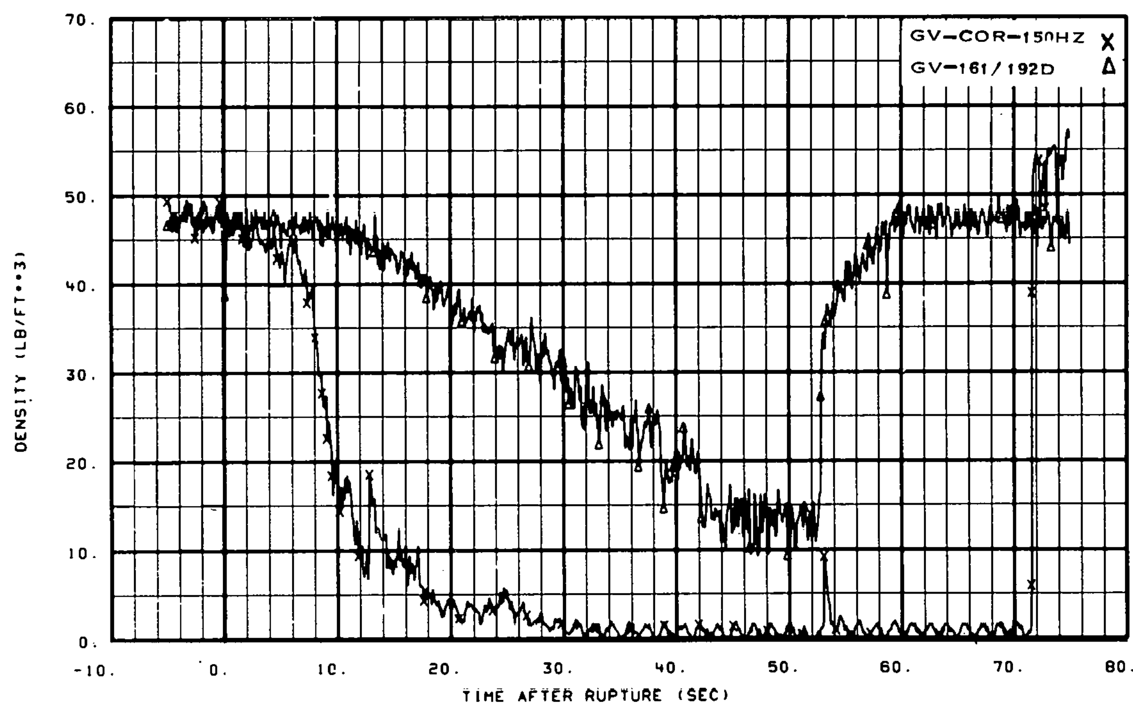

Fig. 114 Densities in vessel (GV-COR-150HZ and GV-161/192D).

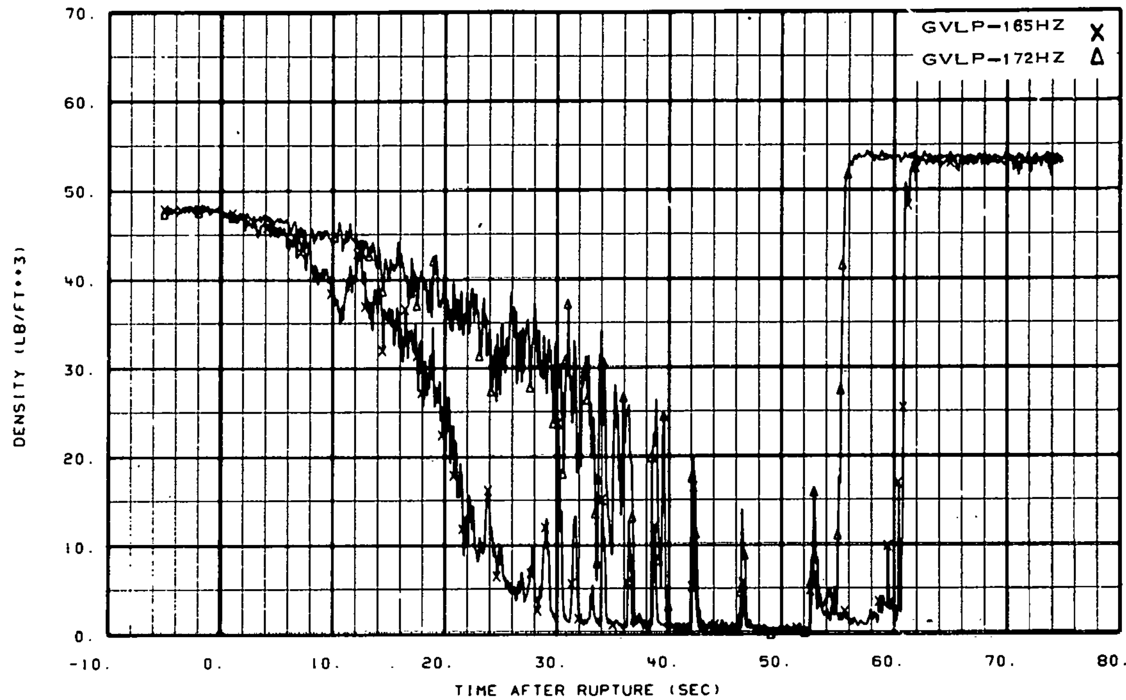

Fig. 115 Densities in vessel (GVLP-165HZ and GVLP-172HZ).

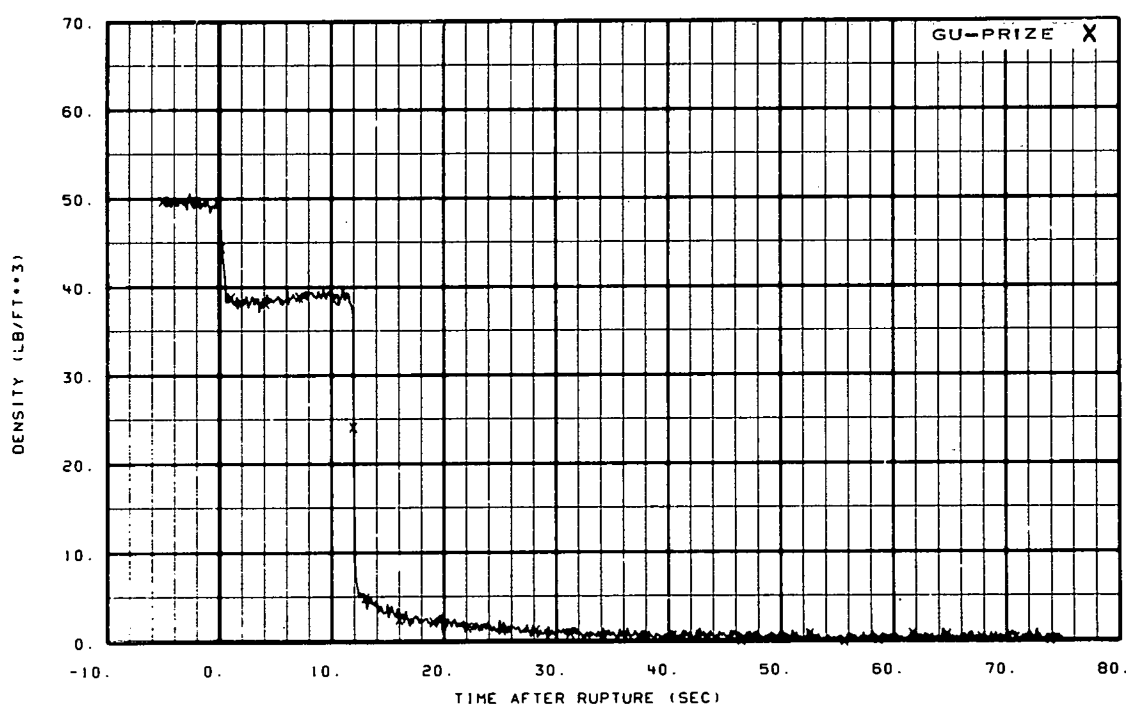

Fig. 116 Density in pressurizer.

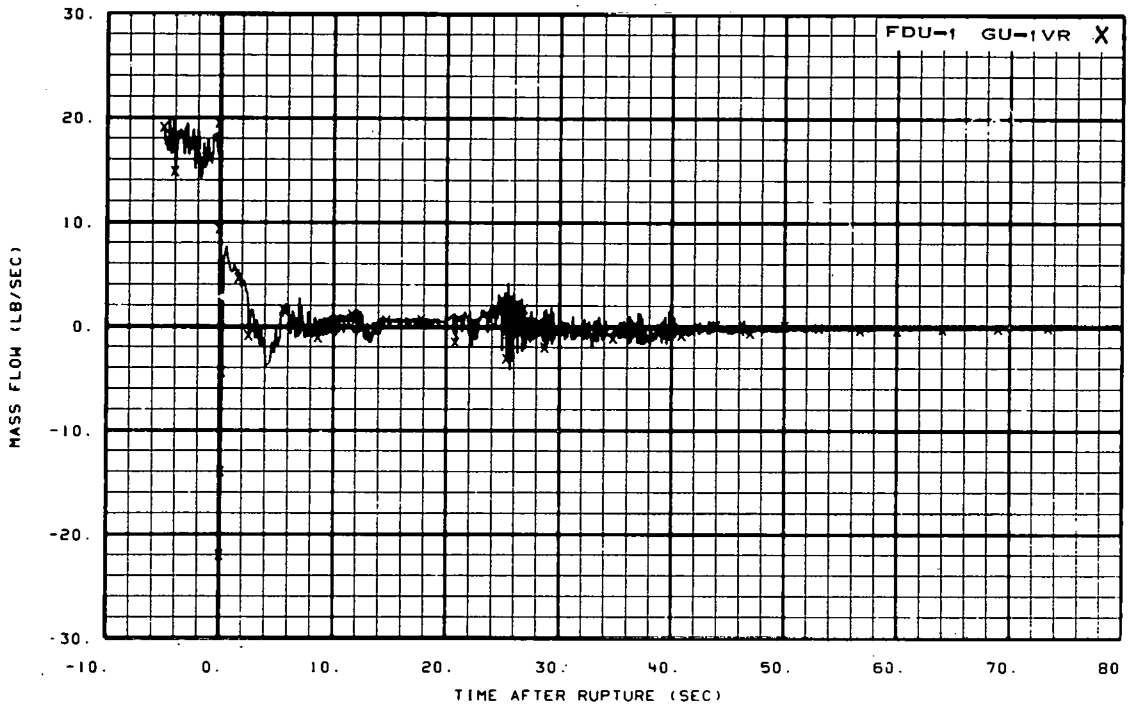

Fig. 117 Mass flow in intact loop (FDU-1 and GU-1VR).

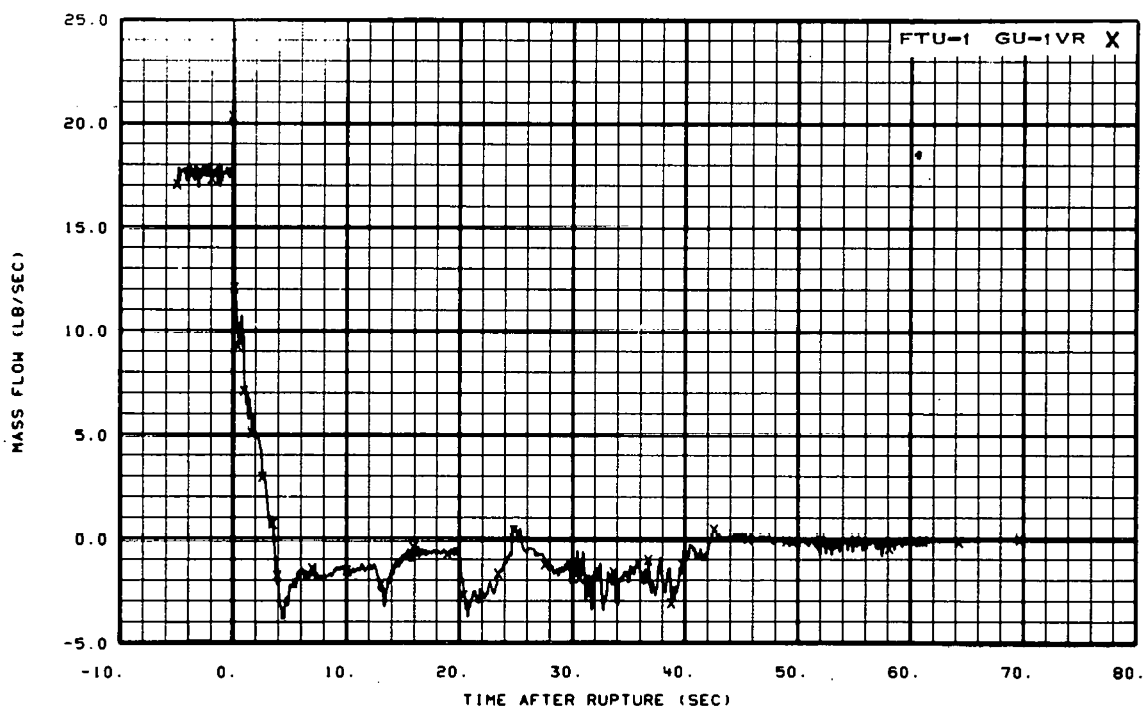

Fig. 118 Mass flow in intact loop (FTU-1 and GU-1VR).

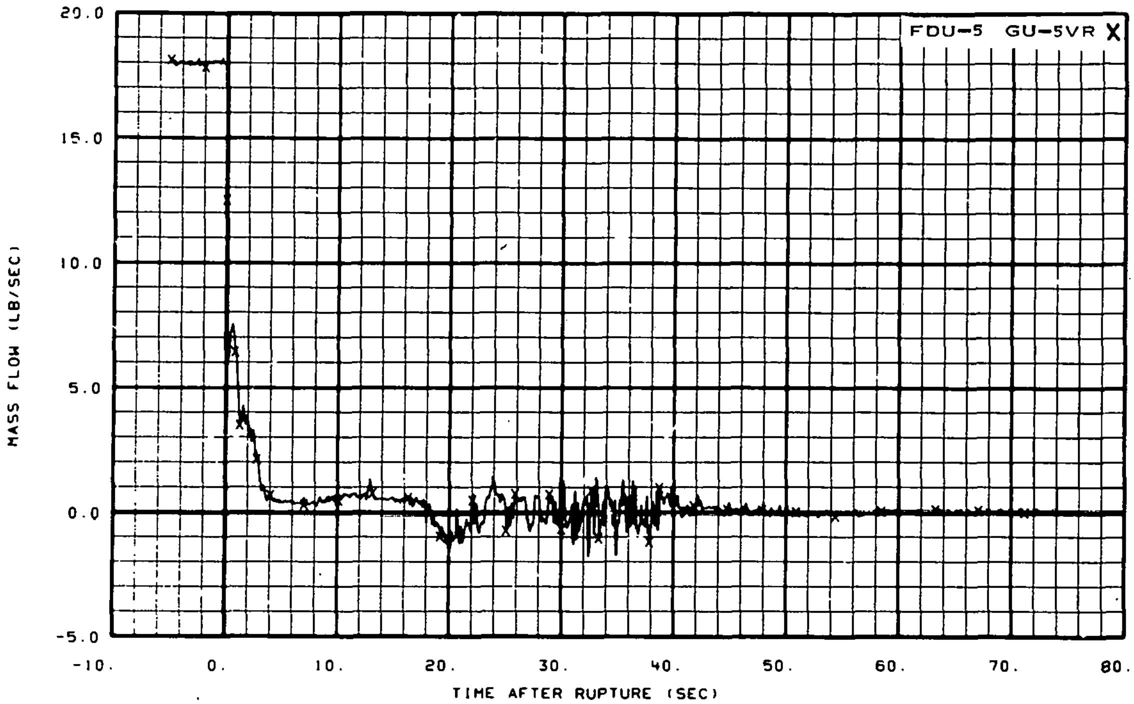

Fig. 119 Mass flow in intact loop (FDU-5 and GU-5VR).

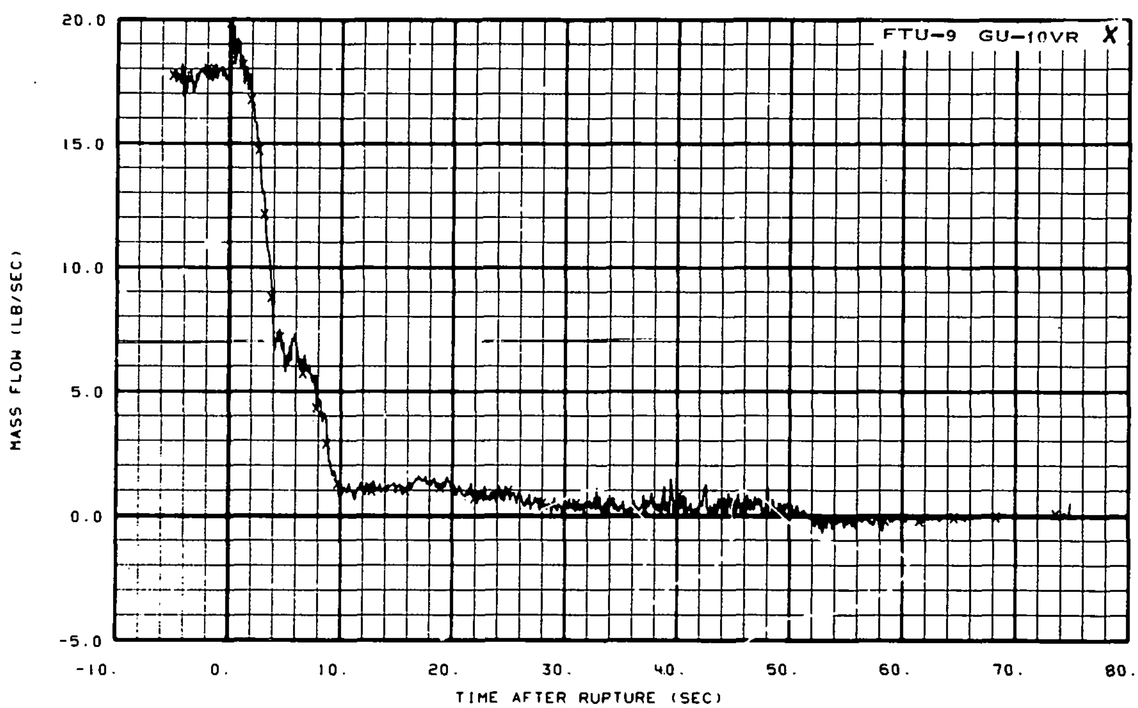

Fig. 120 Mass flow in intact loop (FTU-9 and GU-10VR).

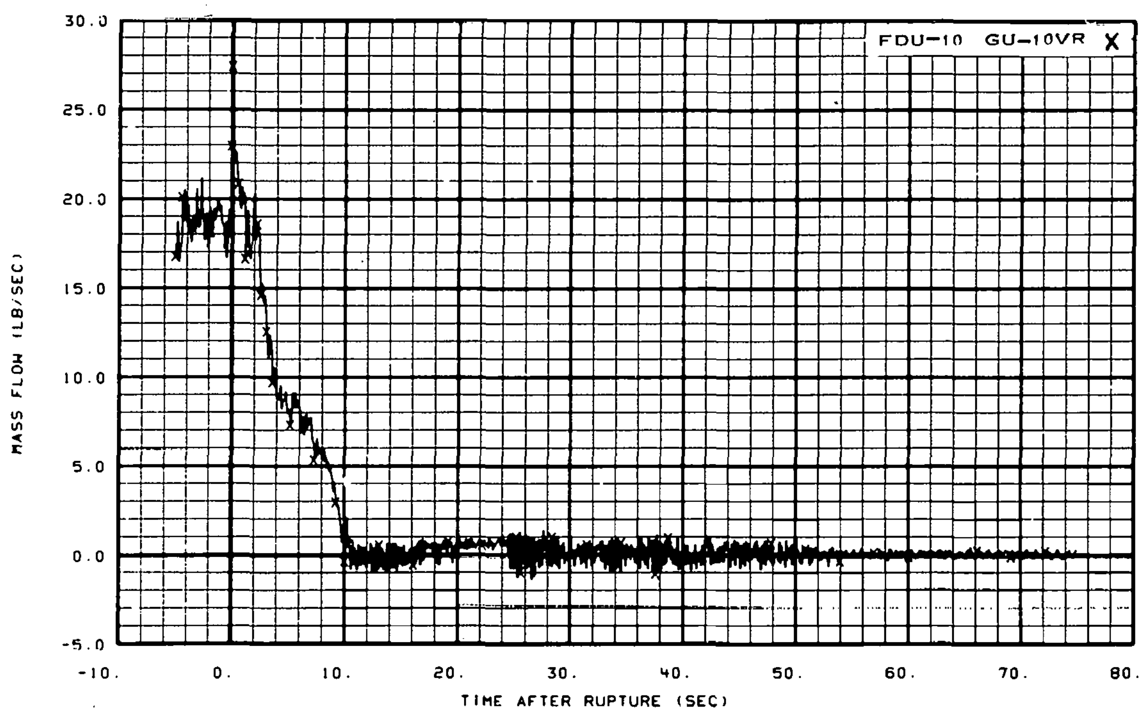

Fig. 121 Mass flow in intact loop (FDU-10 and GU-10VR).

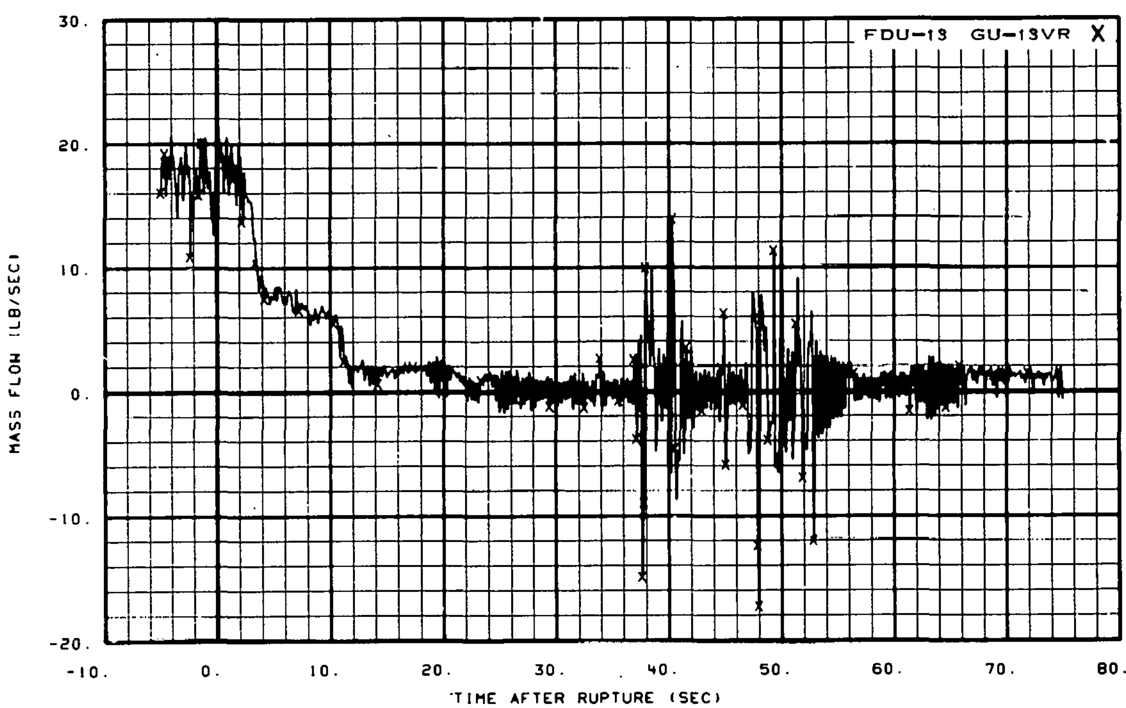

Fig. 122 Mass flow in intact loop (FDU-13 and GU-13VR).

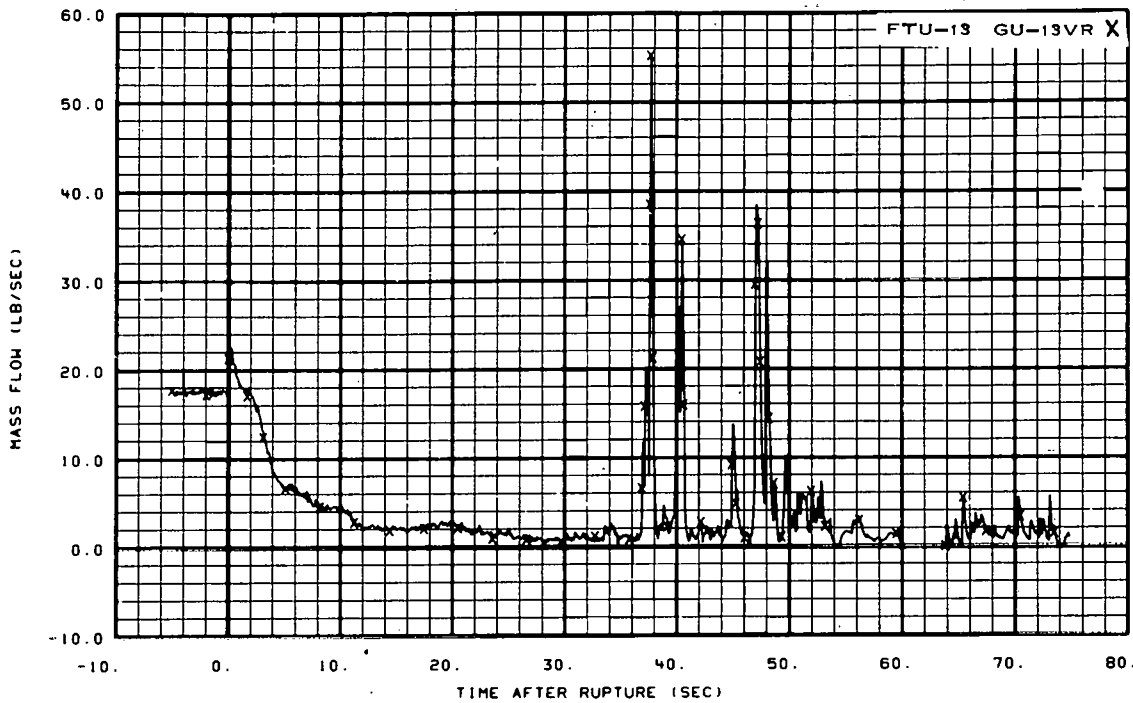

Fig. 123 Mass flow in intact loop (FTU-13 and GU-13VR).

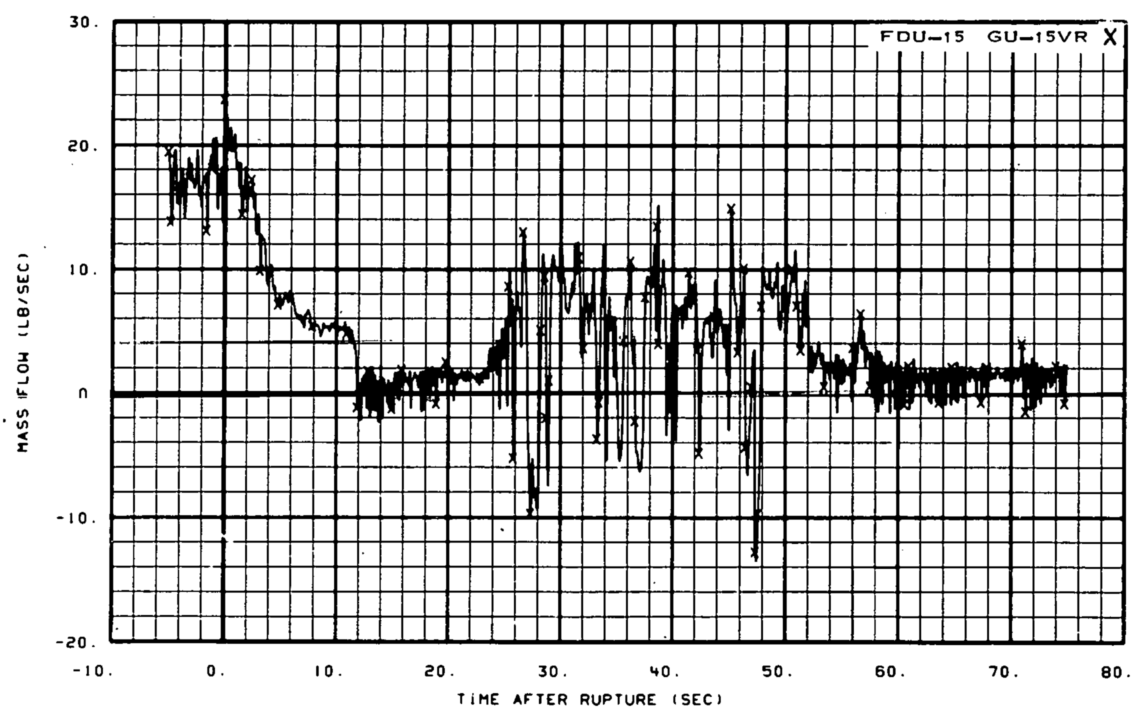

Fig. 124 Mass flow in intact loop (FDU-15 and GU-15VR).

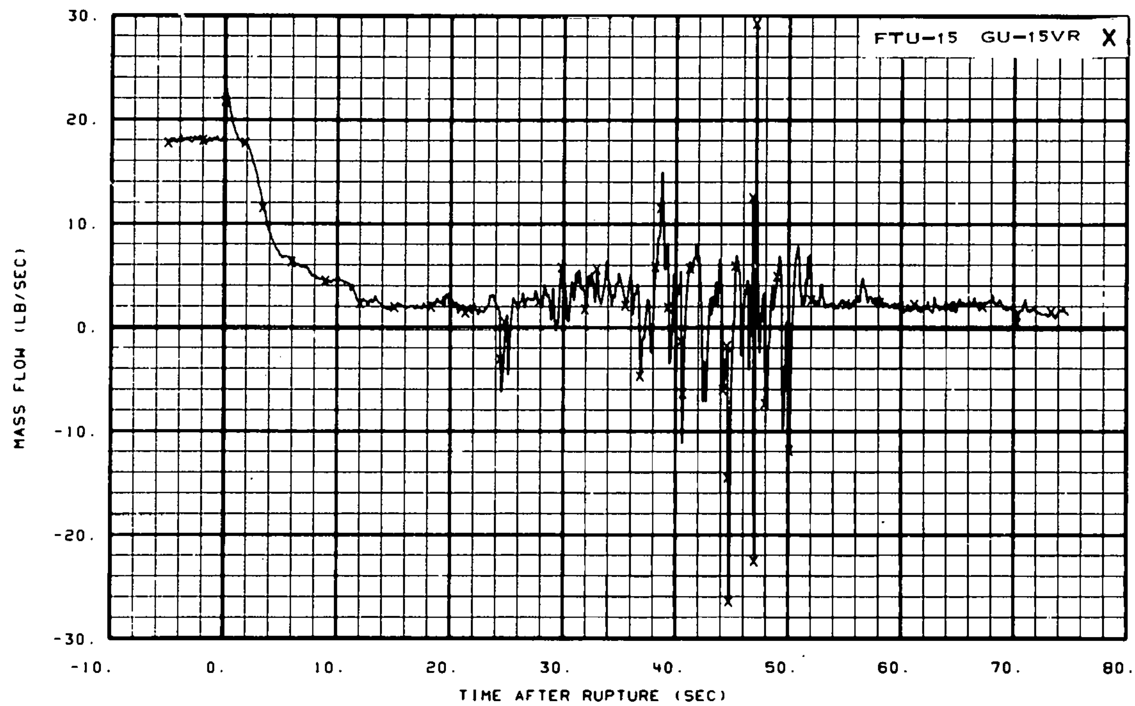

Fig. 125 Mass flow in intact loop (FTU-15 and GU-15VR).

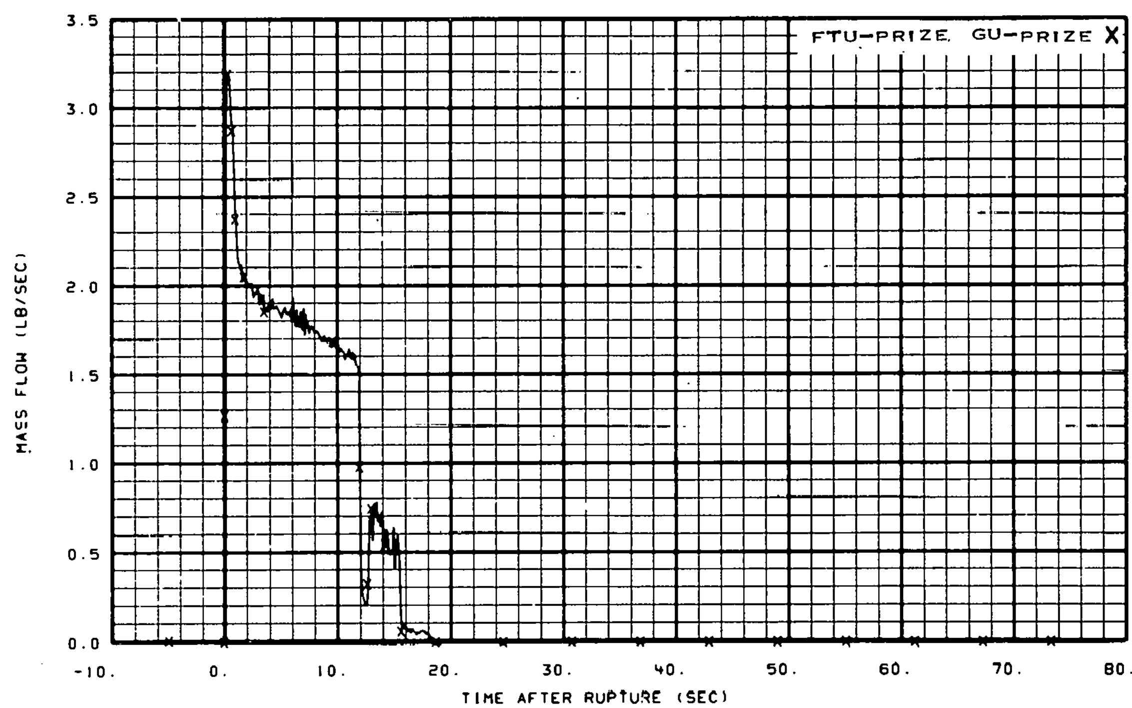

Fig. 126 Mass flow from pressurizer.

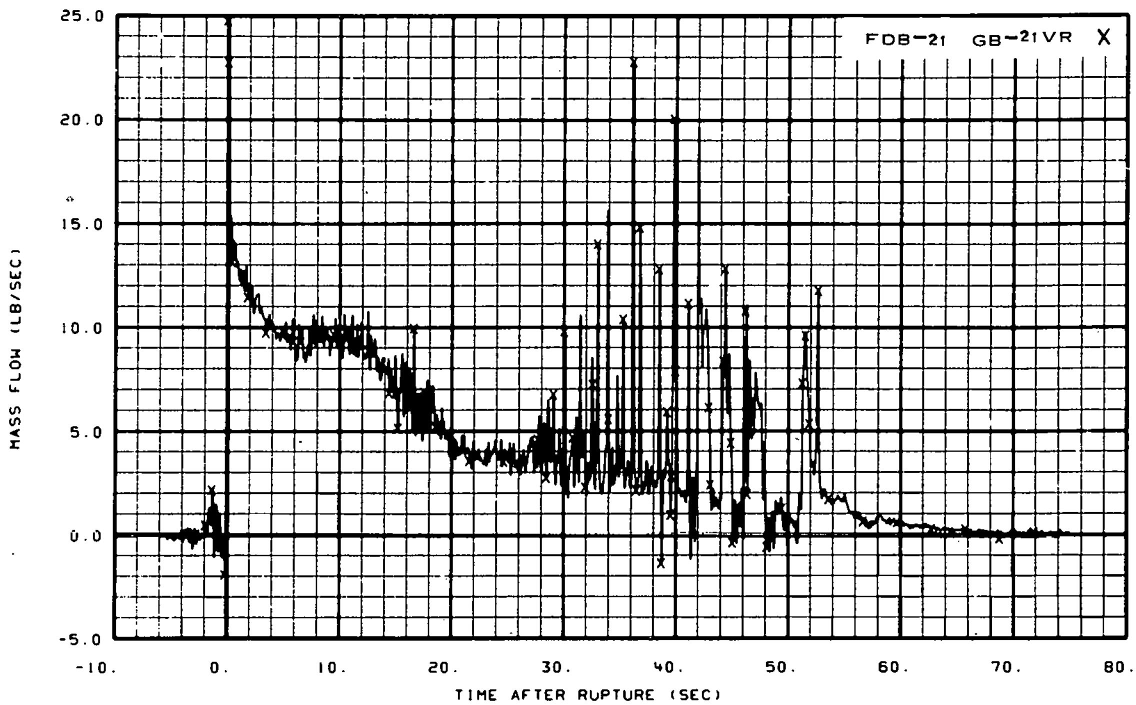

Fig. 127 Mass flow in broken loop (FDB-21 and GB-21VR).

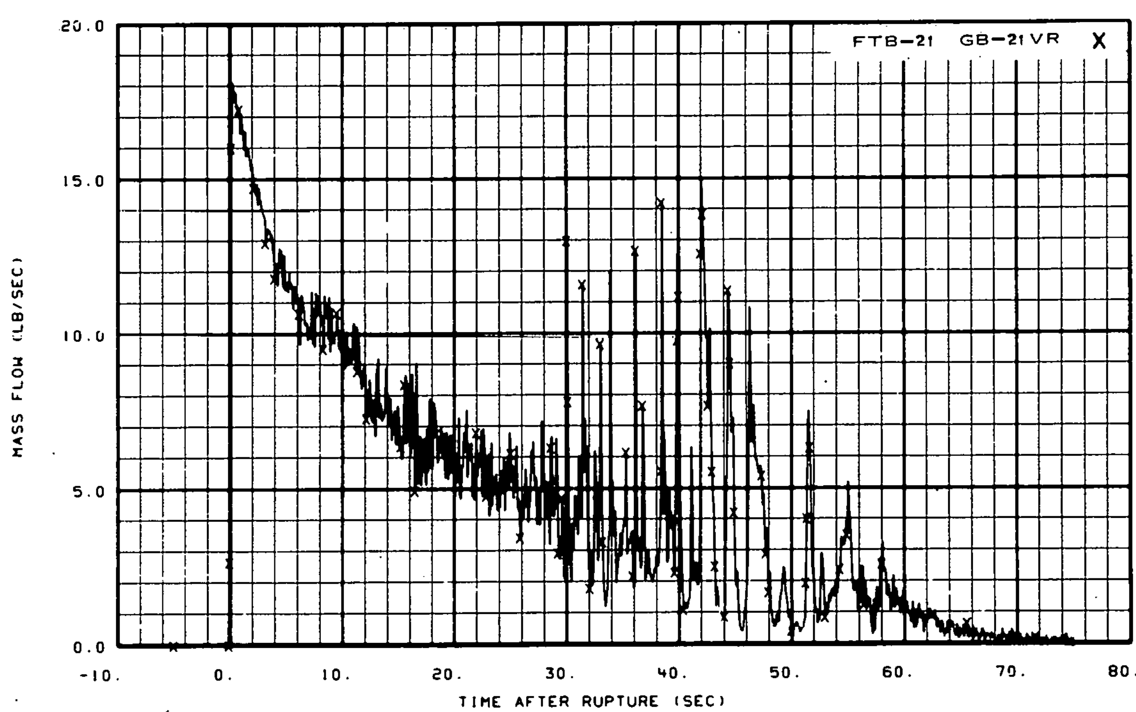

Fig. 128 Mass flow in broken loop (FTB-21 and GB-21VR).

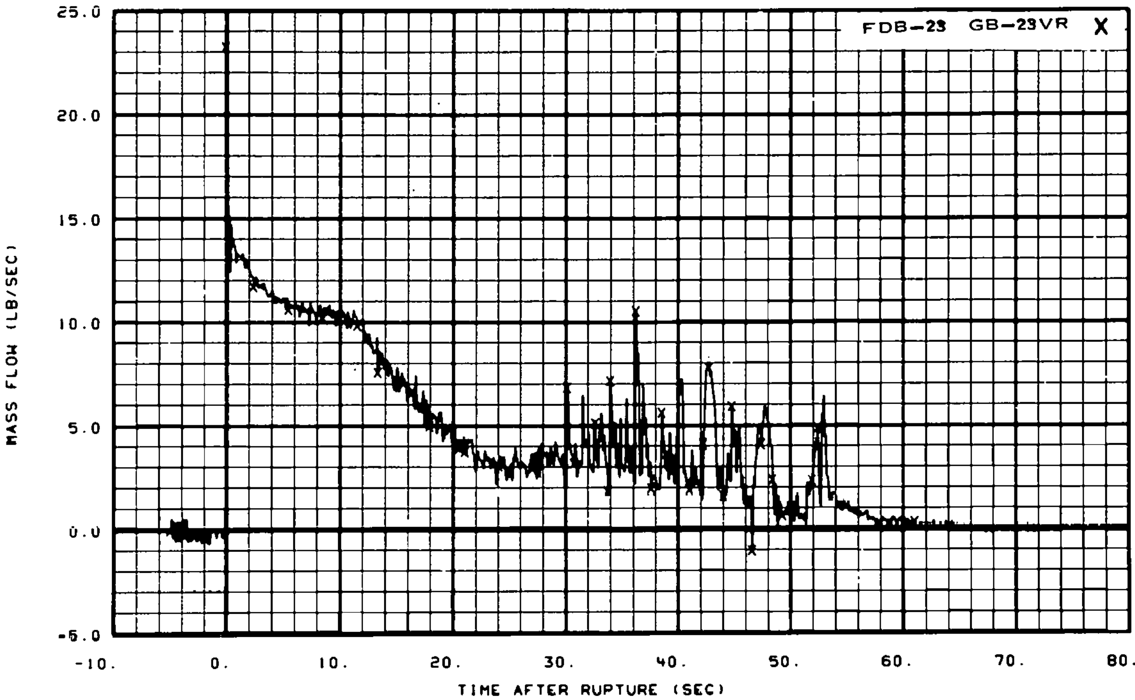

Fig. 129 Mass flow in broken loop (FDB-23 and GB-23VR).

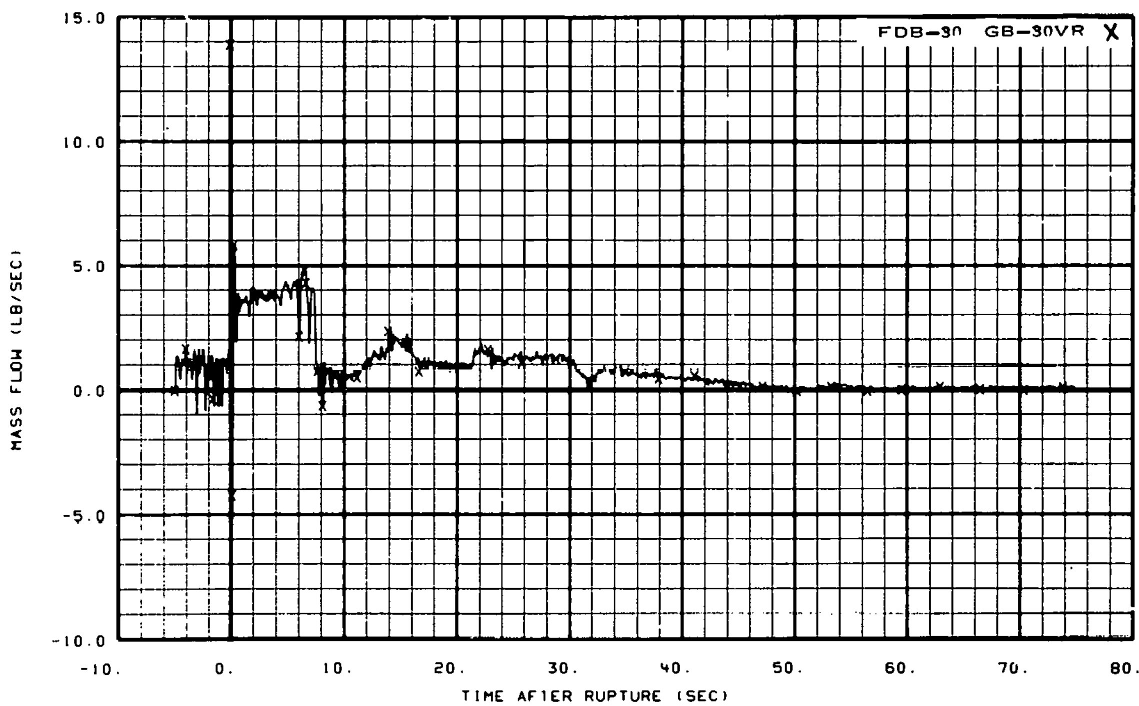

Fig. 130 Mass flow in broken loop (FDB-30 and GB-30VR).

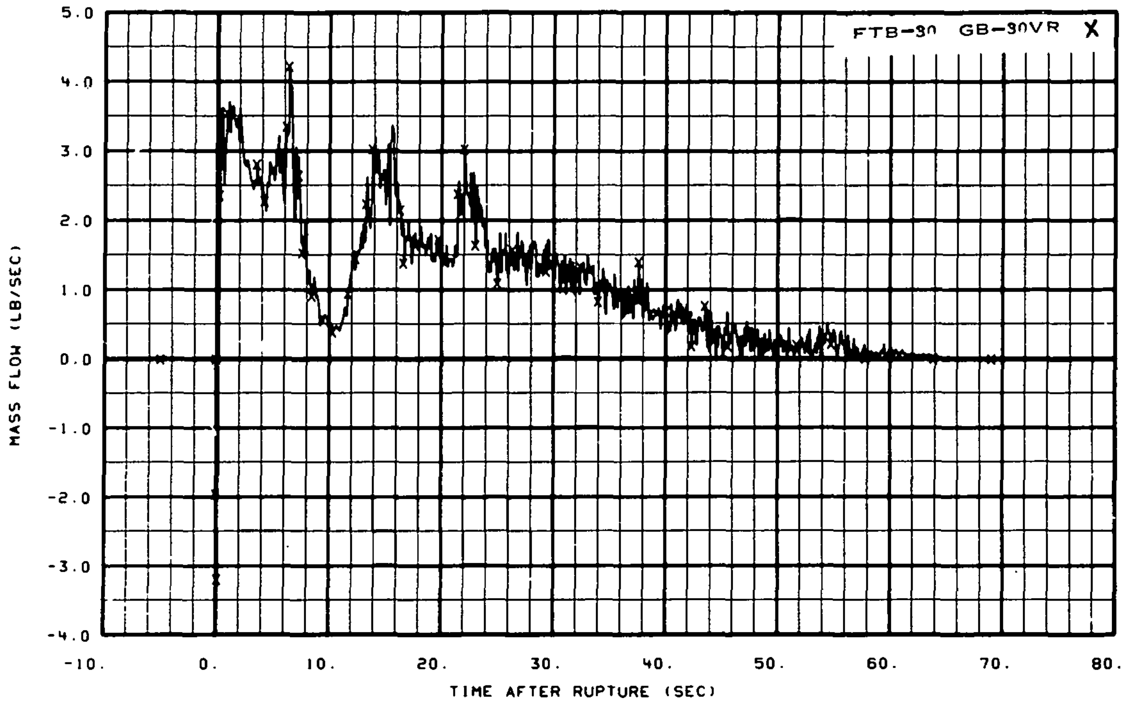

Fig. 131 Mass flow in broken loop (FTB-30 and GB-30VR).

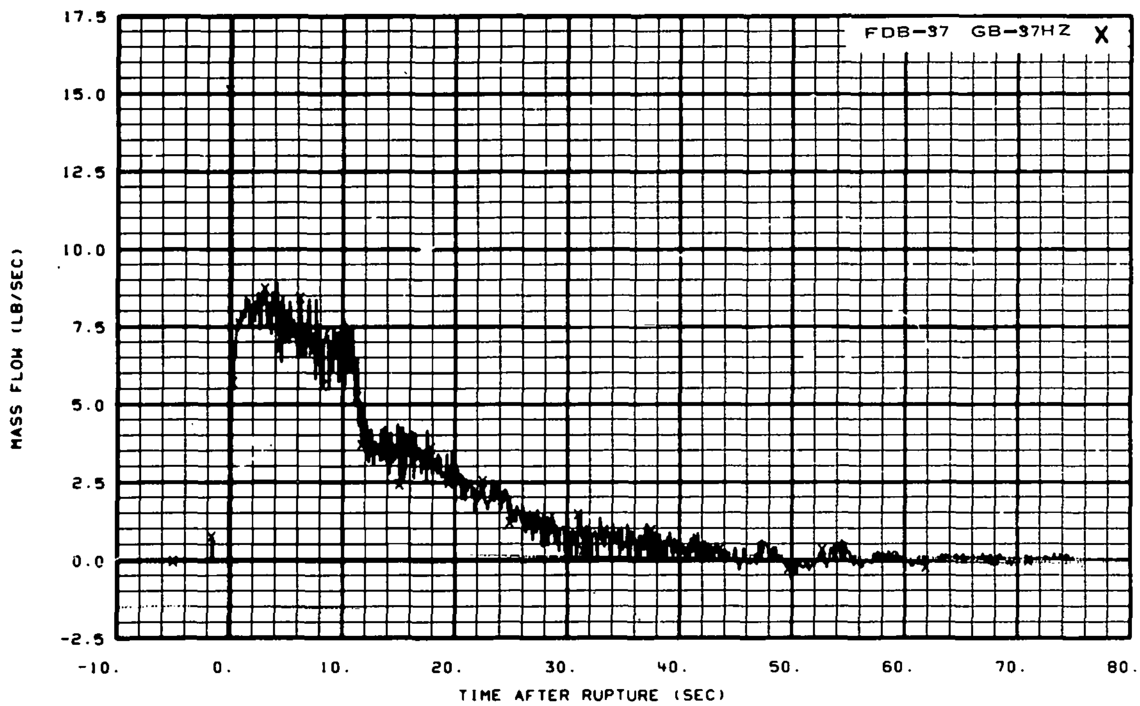

Fig. 132 Mass flow in broken loop (FDB-37 and GB-37HZ).

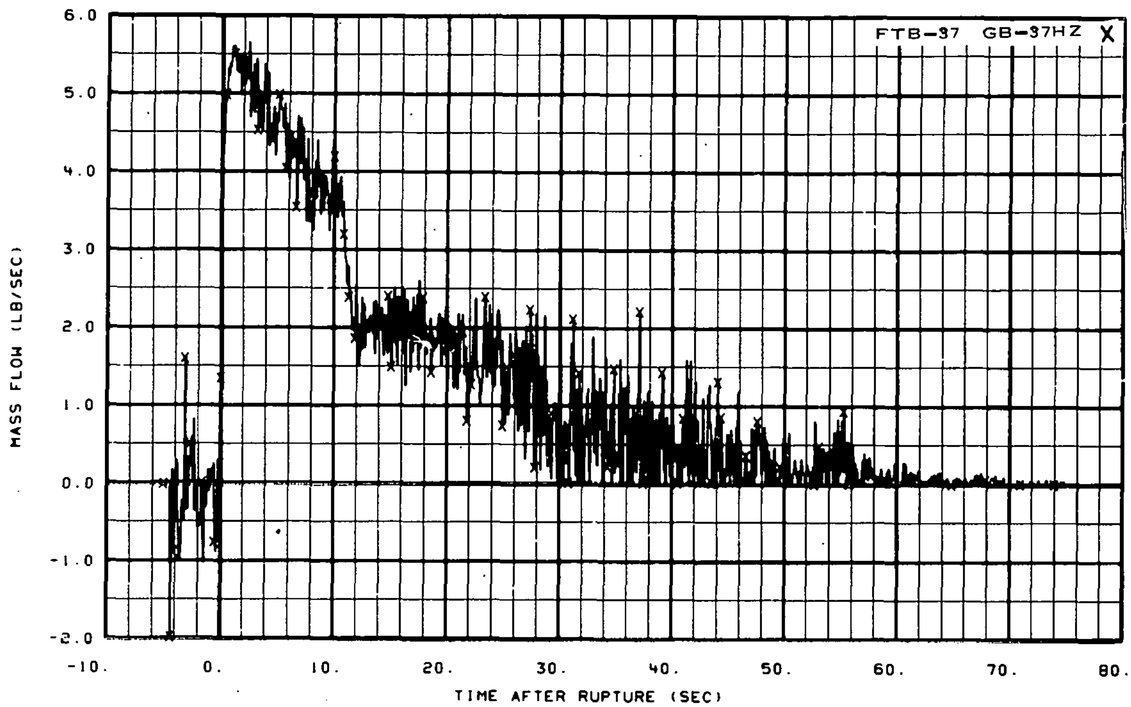

Fig. 133 Mass flow in broken loop (FTB-37 and GB-37HZ).

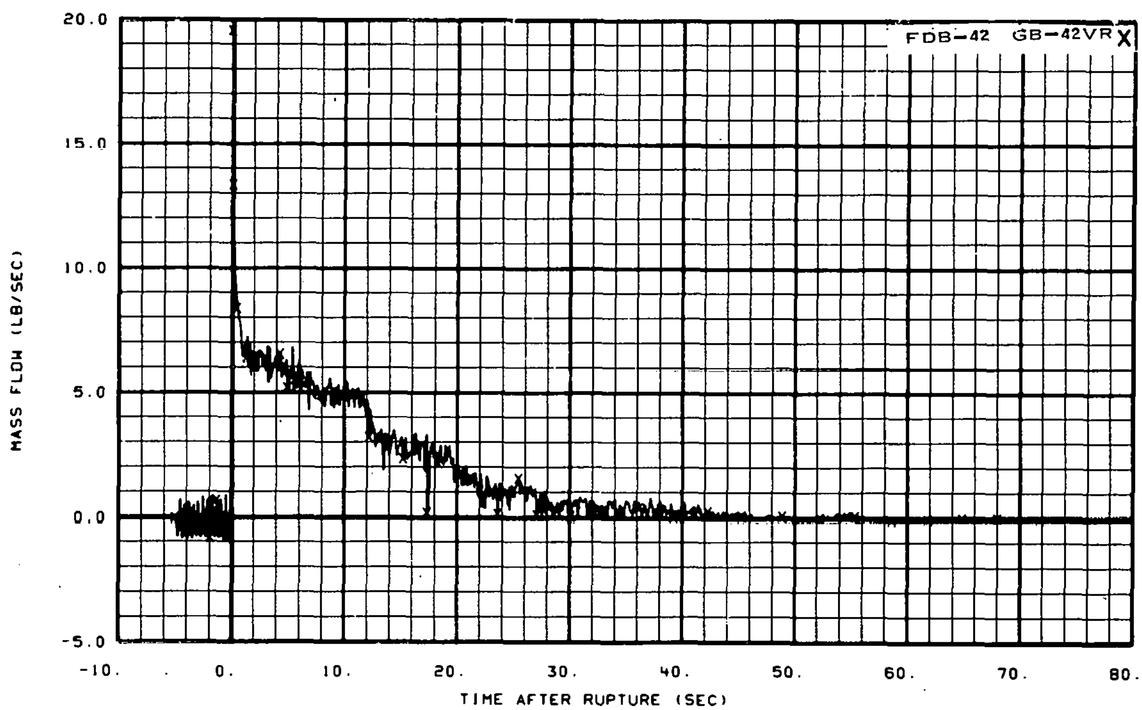

Fig. 134 Mass flow in broken loop (FDB-42 and GB-42VR).

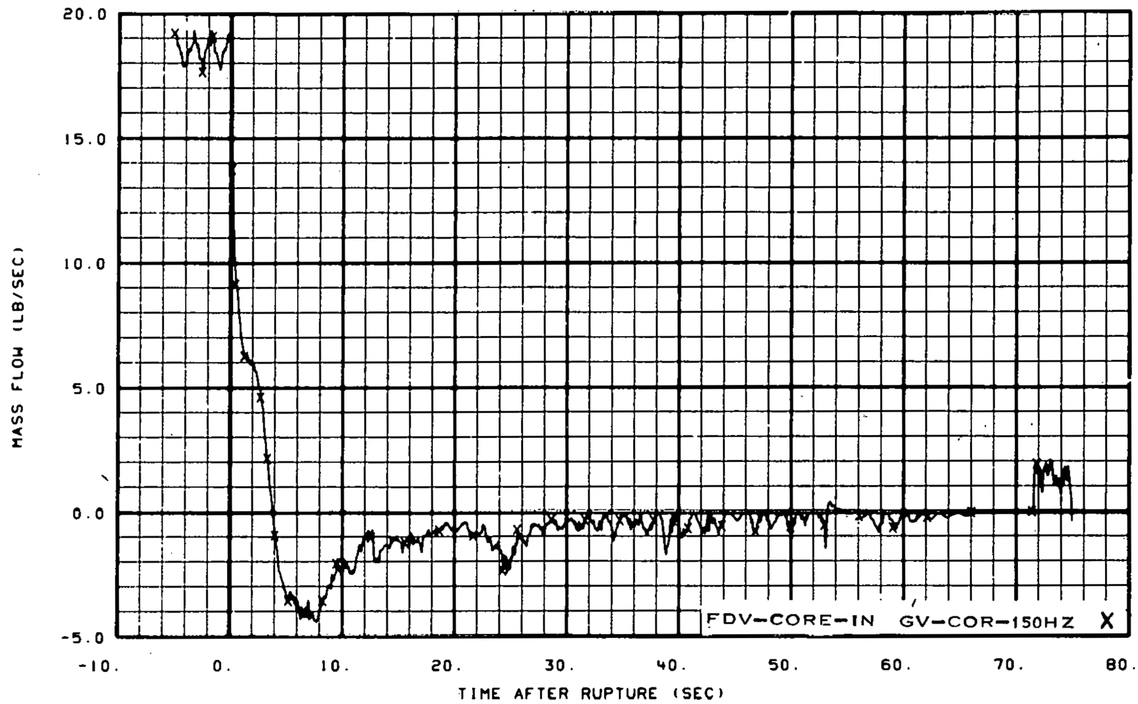

Fig. 135 Mass flow in vessel (FTV-CORE-IN and GV-COR-150HZ).

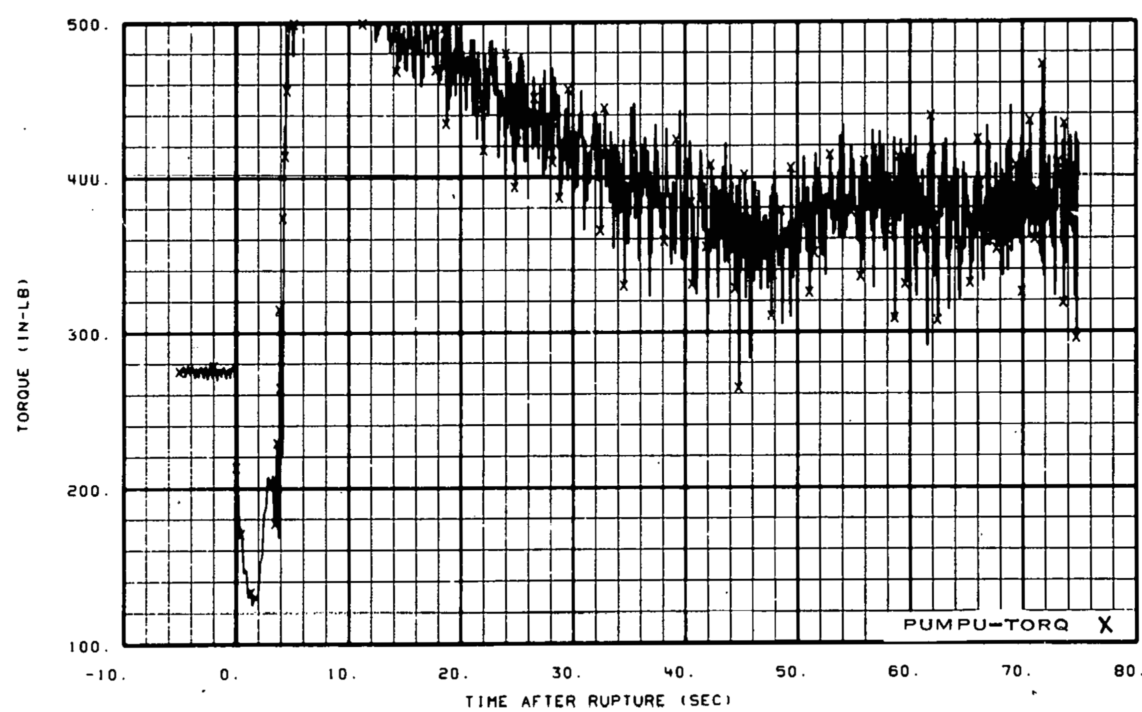

Fig. 136 Primary pump torque.

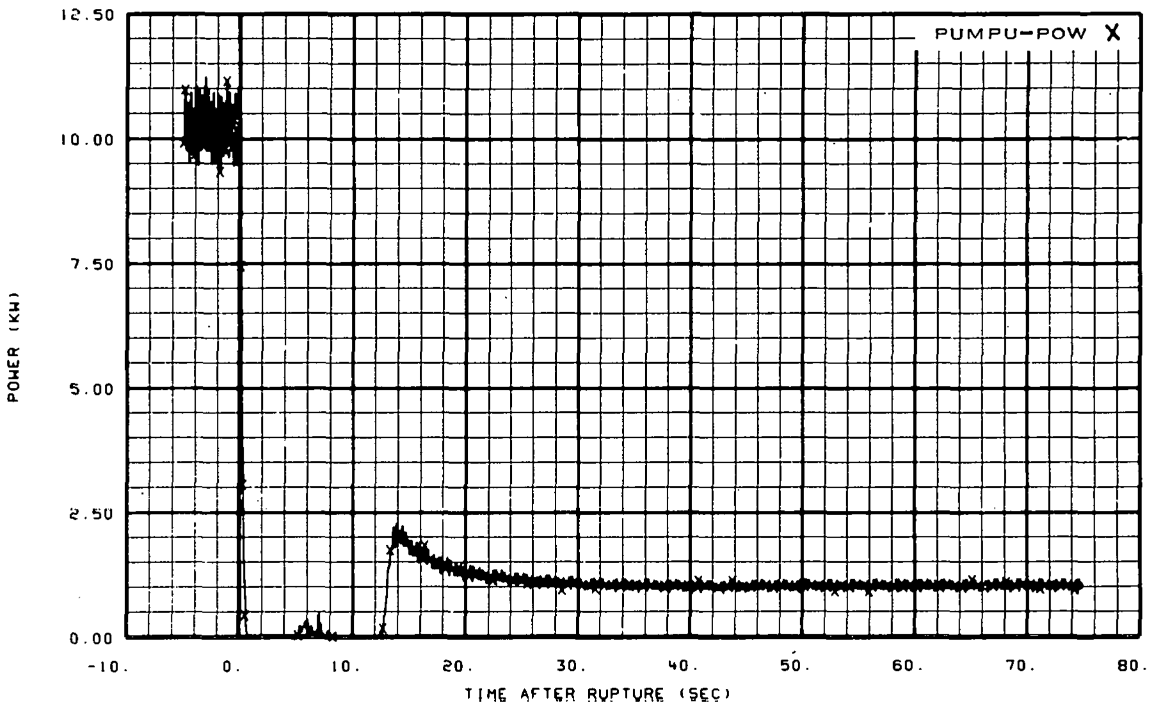

Fig. 137 Primary pump power.

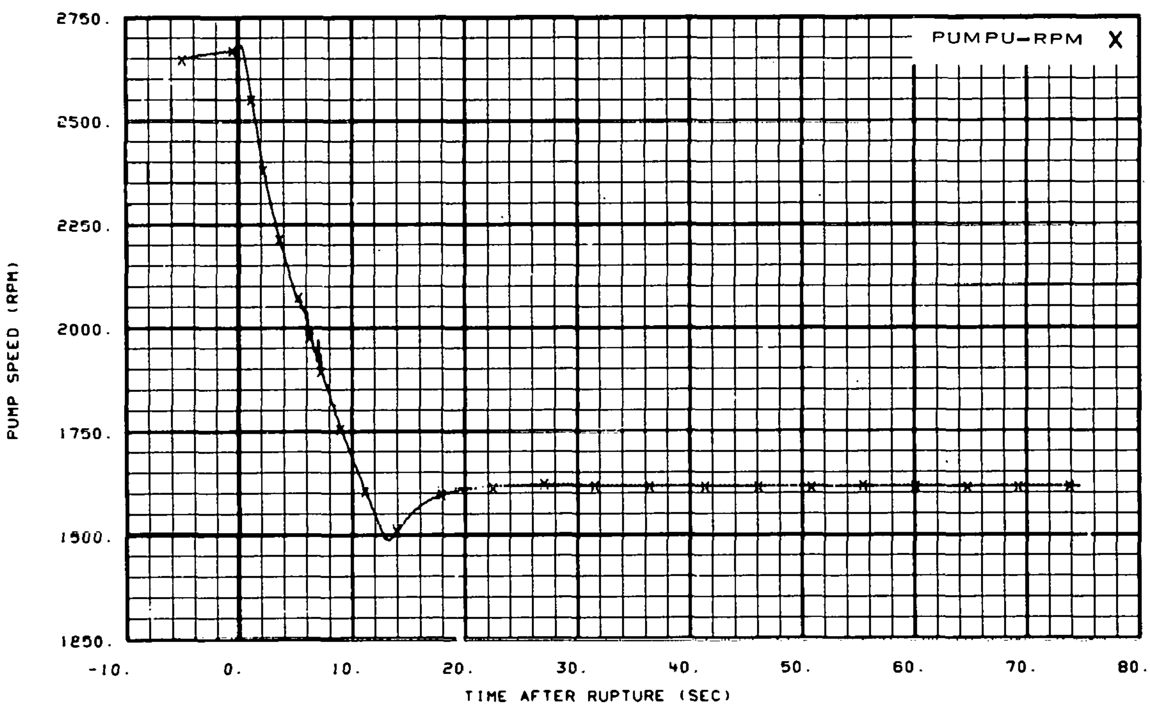

Fig. 138 Primary pump speed.

IV. REFERENCE

1. S. N. Zender, *Experiment Data Report for Semiscale Mod-1 Test S-01-2 (Isothermal Blowdown with Core Resistance Simulator)*, ANCR-1194 (February 1975).

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