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格納容器圧力抑制系信頼性実証試験
データレポート・9（TEST 1202）

1980年7月

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格納容器圧力抑制系信頼性実証試験データレポート・9
（TEST 1202）

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本報告は，格納容器圧力抑制系信頼性実証試験装置によるTEST1202のデータ報告である。本試験は，破断口径240mmの大口径蒸気放出試験であり，プールスウェルを試験対象とする。また本試験の前に実施されたTEST1201（200mm），および本試験後に引き続いて実施されたTEST1203（220mm）とともに，破断口径を変数とするパラメトリック試験を構成する。本試験は支障なく行われ，得られたドライウェル初期圧力上昇率は，約225kPa／sであった。

本試験計画は，電源開発促進対策特別事業の一環として科学技術庁より原研に委託されたものである。
本報告は，先に作成した原研所内資料JAERI－memo 8613（1979年12月）の内容に検討，修正を加え，公開に付するものである。

Full-Scale Mark II CRT Program*
Data Report No. 9 (TEST 1202)

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Recorded data for TEST 1202 conducted on the Full-Scale Mark II CRT (Containment Responce Test) Facility are presented. The TEST 1202 is a test under the condition of steam discharge with a large break diameter (240 mm) and the second one of the steam discharge pool swell test series. It is also one of the parametric tests with different break diameters, i.e. TEST 1201 (200 mm), TEST 1202 (240 mm) and TEST 1203 (220 mm). The test was successful and a value of 225 kPa/s was obtained as the initial pressurization rate in the drywell.

Keywords : BWR, LOCA, Pressure Suppression, Mark II Containment, Hydraulic Loads, Full-Scale Test, Pool Swell, Data

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目　　次

1. まえがき …… 1
2. 試験装置 …… 2
3. 試験条件と試験結果 …… 34
謝　辞 …… 36
試験データ …… 45

Contents

1. Introduction 1

2. Test Facility and Test Instrumentations 2

3. Test Conditions and Test Results 34

Acknowledgement 36

Long Term Plots of Data 45

Short Term of Plots of Data 89

List of Tables

Table

2. 1 Comparison of Major Design Parameters
2. 2 Summary of Data Channels
2. 3 Summary of Data Acquisition Systems
2. 4 Identification of Data Channels
2. 5 List of Data Channels (Computer Recorded Channels)
2. 6 List of Data Channels (PCM Track-1 Channels)
2. 7 List of Data Channels (PCM Track-2 Channels)
2. 8 State of Measurement Equipment (Computer Recorded Channels)
2. 9 State of Measurement Equipment (PCM Track-1 Channels)
2.10 State of Measurement Equipment (PCM Track-2 Channels)
2.11 Calibration Data
2.12 Measurement Ranges

3. 1 Test Matrix
3. 2 Test Specifications
3. 3 Summary of Data Recording
3. 4 Initial and Final Conditions

List of Figures

Figure

2. 1 Schematic Flow Diagram of Test Facility
2. 2 Transducer Locations for Primary System
2. 3 Transducer Locations for Drywell
2. 4 Transducer Locations for Wetwell (Plan View)
2. 5 Transducer Locations for Vent Pipes and Thermocouple Locations for Wetwell
2. 6 Pressure and Differential Pressure Transducer Locations for Wetwell
2. 7 Water Level Detector and Phase Boundary Detector Locations for Wetwell
2. 8 Locations of Strain Gages
2. 9 Locations of Accelerometers

3. 1 Operation Records
3. 2 Initial Temperature Distribution in Primary System
3. 3 Initial and Final Temperature Distributions in Drywell
3. 4 Initial and Final Temperature Distributions in Wetwell

1. まえがき

格納容器圧力抑制系信頼性実証試験は，わが国の最新型沸騰水型炉に使用されているMark II格納容器における冷却材喪失事故時の熱水力現象を模擬した試験を行い，格納容器の信頼性実証に資するデータを得ることを目的としている。本試験計画は，電源開発促進対策特別事業の一環として科学技術庁より原研に委託されたものであり，昭和５２年度を初年度として５年間にわたり実施される予定である。原研内では，安全工学部安全工学第１研究室が試験計画の立案および試験結果の解析を担当し，同安全試験技術室が試験装置の建設，運転，管理を担当している。試験装置は，昭和５４年３月原研東海研究所敷地内に完成し，以降１カ月に約１回の割合で試験を実施している。

本報告書は，昭和５４年９月１４日に実施した蒸気放出によるプールスウェル試験，TEST １２０２のデータレポートである。本試験は，放出ノズル口径２４０mm の大口径蒸気放出試験であり，TEST １２０１に引き続くプールスウェルを試験対象とした蒸気放出試験である。本試験では，放出初期（ベントクリアリング以前）のドライウェル内圧力上昇率は約２２５kPa／sであり，目標とした約２００kPa／sを上回った。

2. 試 験 装 置

試験装置の概略をFig. 2.1に示す。試験装置主要部は，試験格納容器，圧力容器，放出配管等により構成される。試験格納容器ウェットウェル部は，1100MWe級Mark II格納容器のウェットウェルの中心角20°の1セクタを模擬したものであり，各部の高さ，内部のベント管等の寸法は実炉とほぼ同一である。ドライウェル，1次系の容積は，実炉の相当部分の約1/18である。これらの諸元をTable 2.1に示す。

本試験装置における計測の項目をTable 2.2に，計測チャンネルリストおよび計測点位置をTable 2.5～2.7およびFig. 2.2～2.9に示す。データは2系統の収録装置によって収録する。比較的変化の遅い信号（温度，水位計出力等）は，小型計算機により1チャンネルあたり50 data/sのサンプリング速度で収録する。一方，比較的変化の速い信号（圧力，歪，加速度等）は，PCM（Pulse Code Modulation）方式により455.55 data/sのサンプリング速度で収録し，試験後，小型計算機を介してデータを再編集する。以後の処理は，いずれも原研計算センターの大型計算機によって行なう。データ収録装置の主要諸元をTable 2.3に示す。

本試験における計測器の動作状態をTable 2.8～2.10に，圧力・差圧変換器の較正係数をTable 2.11に，計測レンジの設定値をTable 2.12に示す。前回の試験TEST 1201で生じた試験装置本体ならびに計測系の故障個所は，本試験の前にすべて修復している。なお，TEST1201以後，試験装置本体および計測系に関する大きな変更はないが，TEST1201で新設した水位計16チャンネルのうち，ラインL2上の8チャンネル（WWLS－221－228）の出力は低速収録計（計算機）により収録し，ラインL1上の8チャンネルはTEST1201と同様に電磁オシログラフにより記録した。

本試験においては，水位計，加速度計等の計測器の故障，不調が12件生じたが，特に大きな計測上の障害，試験装置本体の故障はなかった。

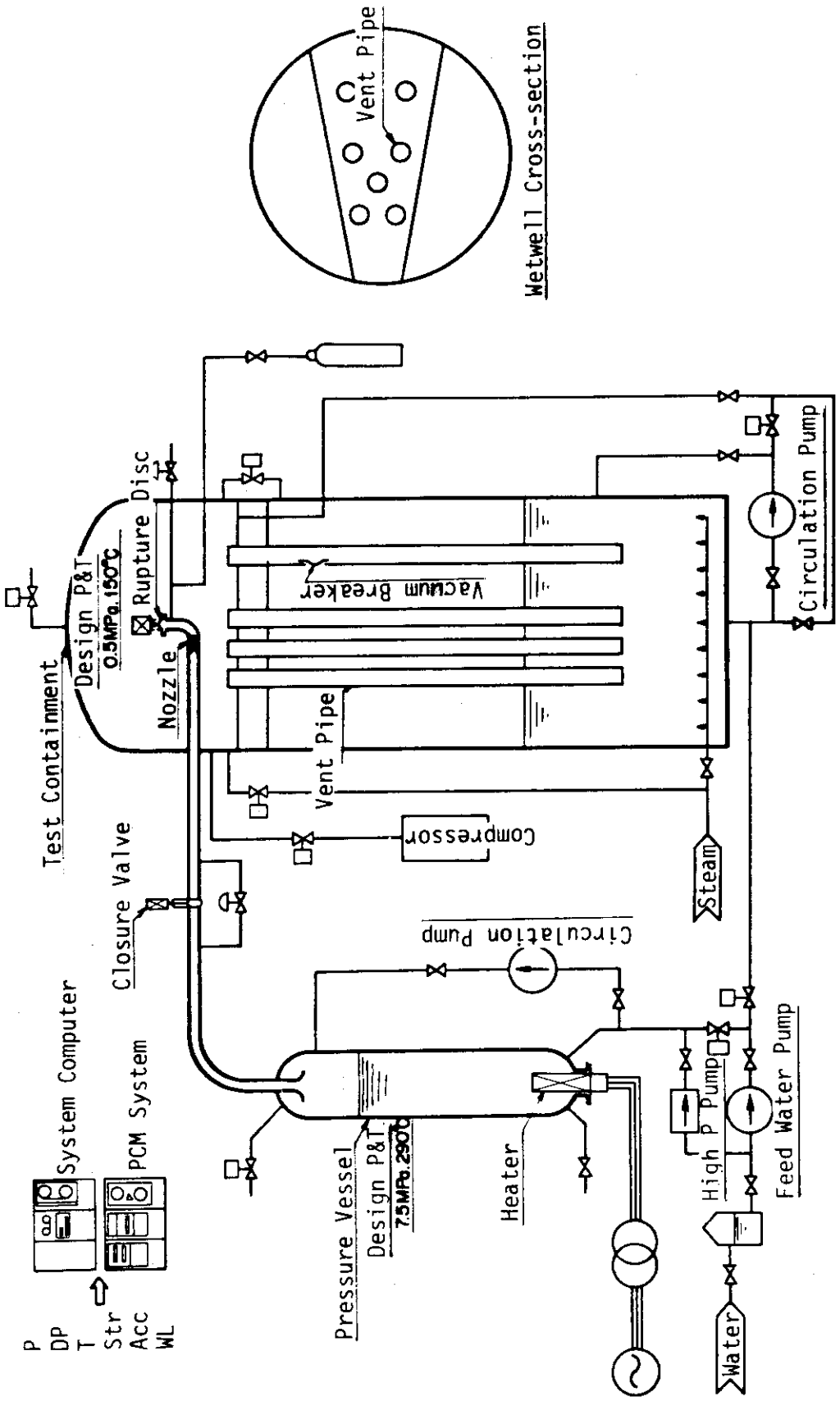

Fig. 2.1 Schematic Flow Diagram of Test Facility

Table 2.1 Comparison of Major Design Parameters

Parameter		Reference Mark II	CRT Facility
Drywell			
Free Volume, Including Air Volumes in Vent Pipes	(m^3)	5700	329
Vent Pipe			
Number	(-)	108	7
Length	(m)	14.2	13.6
Clearance, to Pool Bottom	(m)	3.66	3.66
Number of Vacuum Breakers	(-)	11	1
Wetwell			
Free Volume	(m^3)	4100	255
Water Volume	(m^3)	3200	188
Height, to Diaphragm Floor	(m)	17.3	17.0
Pressure Vessel			
Inside Diameter	(m)	6.4	2.2
Height	(m)	22.0	10.4

Table 2.2 Summary of Data Channels

Location	Item	Data Acqusition		
		Computer	PCM Track-1	PCM Track-2
Pressure Vessel	Pressure	2		
	Diff. Press.	6		
	Temperature	6		
	Water Level	6		
Blowdown Pipe	Pressure	2		
	Diff. Press.	1		
	Temperature	3		
	Timing Sig.	2	2	2
Drywell	Pressure	1	1	
	Temperature	8		
	Water Level	4		
Vent Pipe	Pressure		9	
	Temperature	6		
	Water Level	19		
	Strain		4	
	Acceleration			4
	Timing Sig.	1		
Wetwell	Pressure	1	20	
	Diff. Press.	2		
	Temperature	32		
	Water Level	88		15
	Acceleration			12

Table 2.3 Summary of Data Acquisition Systems

		Computer	PCM System
Max. Number of Channels		192	39 x 2 tracks
Input Range	(V)	±10.00	±10.00
Resolution	(mV/digit)	4.883	19.53
Sampling Rate	(data/ch./s)	50.00	455.56
Skew	(ms/ch.)	0.028	0.0488

Table 2.4 Identification of Data Channels

Channel Code = A B C D - E F G

A B Location

= P V Pressure Vessel
= B P Blowdown Pipe
= D W Drywell
= V P Vent Pipe
= W W Wetwell

C Measurement Item

= P Pressure
= D Differential Pressure
= T Temperature
= L Water Level Signal
= S Strain
= A Acceleration
= M Actuation Signal

D Data Acquisition System

= S Computer Recorded , 50 data/s
= F PCM Recorded , 455.6 data/s

E Group Number

F G Sequential Number

Table 2.5 List of Data Channels (Computer Recorded Channels)

Channel No.	Channel Code	Measurement Location
1	BPMS-001	RUPTURE DISC BREAK SIGNAL
2	BPMS-002	MAIN DISCHARGE VALVE CLOSE SIGNAL
3	VPMS-001	OPENING OF VACUUM BREAKER (5-STEPS)
4		
5	PVPS-001	VESSEL STEAM DOME
6	PVPS-002	VESSEL STEAM DOME
7	BPPS-001	BLOWDOWN PIPE (8.4M FROM OUTL.)
8	BPPS-002	BLOWDOWN PIPE (0.9M FROM OUTL.)
9	DWPS-001	DRYWELL
10	WWPS-001	WETWELL AIRSPACE (15.0M ABOVE BOTT.)
11		
12	PVDS-001	DP OVER VESSEL (EL = 0.0M - +9.2M)
13	PVDS-002	DP OVER VESSEL (EL = 0.0M - +2.6M)
14	PVDS-003	DP OVER VESSEL (EL = +2.2M - +4.2M)
15	PVDS-004	DP OVER VESSEL (EL = +3.8M - +5.8M)
16	PVDS-005	DP OVER VESSEL (EL = +5.4M - +7.4M)
17	PVDS-006	DP OVER VESSEL (EL = +7.0M - +9.2M)
18	BPDS-001	DYNAMIC PRESS. IN BLOWDOWN PIPE
19	WWDS-001	DP OVER POOL (EL = 4.5M -15.5M)
20	WWDS-002	DP ACROSS DIAPHRAGM FLOOR
21	WWLS-221	WETWELL (L2, 9.125M ABOVE BOTT.)
22	PVTS-001	VESSEL (EL = 0.6M)
23	PVTS-002	VESSEL (EL = 2.2M)
24	PVTS-003	VESSEL (EL = 3.8M)
25	PVTS-004	VESSEL (EL = 5.4M)
26	PVTS-005	VESSEL (EL = 7.0M)
27	PVTS-006	VESSEL (EL = 8.6M)
28	BPTS-001	BLOWDOWN PIPE (6.5M FROM OUTL.)
29	BPTS-002	BLOWDOWN PIPE (4.1M FROM OUTL.)
30	BPTS-003	BLOWDOWN PIPE (0.9M FROM OUTL.)
31	DWTS-101	DRYWELL (0.5M ABOVE DF)
32	DWTS-102	DRYWELL (2.5M ABOVE DF)
33	DWTS-103	DRYWELL (4.5M ABOVE DF)
34	DWTS-201	DRYWELL (0.5M ABOVE DF)
35	DWTS-202	DRYWELL (2.5M ABOVE DF)
36	DWTS-203	DRYWELL (4.5M ABOVE DF)
37	DWTS-301	DRYWELL (0.5M ABOVE DF)
38	DWTS-302	DRYWELL (3.5M ABOVE DF)
39	VPTS-101	VP1 (0.5M ABOVE OUTL.)
40	VPTS-102	VP1 (11.5M ABOVE OUTL.)
41	VPTS-201	VP2 (0.5M ABOVE OUTL.)
42	VPTS-202	VP2 (11.5M ABOVE OUTL.)
43	VPTS-301	VP3 (0.5M ABOVE OUTL.)
44	VPTS-302	VP3 (11.5M ABOVE OUTL.)
45	WWTS-101	WETWELL (T1, 1.0M ABOVE BOTT.)
46	WWTS-102	WETWELL (T1, 3.0M ABOVE BOTT.)
47	WWTS-103	WETWELL (T1, 5.0M ABOVE BOTT.)
48	WWTS-104	WETWELL (T1, 7.0M ABOVE BOTT.)
49	WWTS-105	WETWELL (T1, 9.0M ABOVE BOTT.)
50	WWTS-106	WETWELL (T1, 11.0M ABOVE BOTT.)
51	WWTS-107	WETWELL (T1, 13.0M ABOVE BOTT.)
52	WWTS-108	WETWELL (T1, 15.0M ABOVE BOTT.)

Table 2.5 (continued)

Channel No.	Channel Code	Measurement Location
53	WWTS-201	WETWELL (T2, 1.0M ABOVE BOTT.)
54	WWTS-202	WETWELL (T2, 3.0M ABOVE BOTT.)
55	WWTS-203	WETWELL (T2, 5.0M ABOVE BOTT.)
56	WWTS-204	WETWELL (T2, 7.0M ABOVE BOTT.)
57	WWTS-205	WETWELL (T2, 9.0M ABOVE BOTT.)
58	WWTS-206	WETWELL (T2, 11.0M ABOVE BOTT.)
59	WWTS-207	WETWELL (T2, 13.0M ABOVE BOTT.)
60	WWTS-208	WETWELL (T2, 15.0M ABOVE BOTT.)
61	WWTS-301	WETWELL (T3, 1.0M ABOVE BOTT.)
62	WWTS-302	WETWELL (T3, 3.0M ABOVE BOTT.)
63	WWTS-303	WETWELL (T3, 5.0M ABOVE BOTT.)
64	WWTS-304	WETWELL (T3, 7.0M ABOVE BOTT.)
65	WWTS-305	WETWELL (T3, 9.0M ABOVE BOTT.)
66	WWTS-306	WETWELL (T3, 11.0M ABOVE BOTT.)
67	WWTS-307	WETWELL (T3, 13.0M ABOVE BOTT.)
68	WWTS-308	WETWELL (T3, 15.0M ABOVE BOTT.)
69	WWTS-401	WETWELL (T4, 1.0M ABOVE BOTT.)
70	WWTS-402	WETWELL (T4, 3.0M ABOVE BOTT.)
71	WWTS-403	WETWELL (T4, 5.0M ABOVE BOTT.)
72	WWTS-404	WETWELL (T4, 7.0M ABOVE BOTT.)
73	WWTS-405	WETWELL (T4, 9.0M ABOVE BOTT.)
74	WWTS-406	WETWELL (T4, 11.0M ABOVE BOTT.)
75	WWTS-407	WETWELL (T4, 13.0M ABOVE BOTT.)
76	WWTS-408	WETWELL (T4, 15.0M ABOVE BOTT.)
77	WWLS-222	WETWELL (L2, 9.875M ABOVE BOTT.)
78	PVLS-001	VESSEL (EL = 0.6M)
79	PVLS-002	VESSEL (EL = 2.2M)
80	PVLS-003	VESSEL (EL = 3.8M)
81	PVLS-004	VESSEL (EL = 5.4M)
82	PVLS-005	VESSEL (EL = 7.0M)
83	PVLS-006	VESSEL (EL = 8.6M)
84	DWLS-001	DRYWELL (0.048M ABOVE DF)
85	DWLS-002	DRYWELL (0.096M ABOVE DF)
86	DWLS-003	DRYWELL (0.144M ABOVE DF)
87	DWLS-004	DRYWELL (0.192M ABOVE DF)
88	VPLS-101	VP1 (0.042M ABOVE OUTL.)
89	VPLS-103	VP1 (2.042M ABOVE OUTL.)
90	VPLS-105	VP1 (4.042M ABOVE OUTL.)
91	VPLS-201	VP2 (0.042M ABOVE OUTL.)
92	VPLS-203	VP2 (2.042M ABOVE OUTL.)
93	VPLS-205	VP2 (4.042M ABOVE OUTL.)
94	VPLS-301	VP3 (0.042M ABOVE OUTL.)
95	VPLS-302	VP3 (1.042M ABOVE OUTL.)
96	VPLS-303	VP3 (2.042M ABOVE OUTL.)
97	VPLS-304	VP3 (3.042M ABOVE OUTL.)
98	VPLS-305	VP3 (4.042M ABOVE OUTL.)
99	VPLS-401	VP4 (0.042M ABOVE OUTL.)
100	VPLS-403	VP4 (2.042M ABOVE OUTL.)
101	VPLS-405	VP4 (4.042M ABOVE OUTL.)
102	VPLS-501	VP5 (0.042M ABOVE OUTL.)
103	VPLS-502	VP5 (1.042M ABOVE OUTL.)
104	VPLS-503	VP5 (2.042M ABOVE OUTL.)
105	VPLS-504	VP5 (3.042M ABOVE OUTL.)
106	VPLS-505	VP5 (4.042M ABOVE OUTL.)

Table 2.5 (continued)

Channel No.	Channel Code	Measurement Location
107	WWLS-104	WETWELL (L1, 5.75M ABOVE BOTT.)
108	WWLS-105	WETWELL (L1, 6.50M ABOVE BOTT.)
109	WWLS-106	WETWELL (L1, 7.25M ABOVE BOTT.)
110	WWLS-107	WETWELL (L1, 8.00M ABOVE BOTT.)
111	WWLS-108	WETWELL (L1, 8.75M ABOVE BOTT.)
112	WWLS-109	WETWELL (L1, 9.50M ABOVE BOTT.)
113	WWLS-110	WETWELL (L1, 10.25M ABOVE BOTT.)
114	WWLS-111	WETWELL (L1, 11.00M ABOVE BOTT.)
115	WWLS-112	WETWELL (L1, 11.75M ABOVE BOTT.)
116	WWLS-113	WETWELL (L1, 12.50M ABOVE BOTT.)
117	WWLS-114	WETWELL (L1, 13.25M ABOVE BOTT.)
118	WWLS-115	WETWELL (L1, 14.00M ABOVE BOTT.)
119	WWLS-116	WETWELL (L1, 14.75M ABOVE BOTT.)
120	WWLS-201	WETWELL (L2, 3.50M ABOVE BOTT.)
121	WWLS-202	WETWELL (L2, 4.25M ABOVE BOTT.)
122	WWLS-203	WETWELL (L2, 5.00M ABOVE BOTT.)
123	WWLS-204	WETWELL (L2, 5.75M ABOVE BOTT.)
124	WWLS-205	WETWELL (L2, 6.50M ABOVE BOTT.)
125	WWLS-206	WETWELL (L2, 7.25M ABOVE BOTT.)
126	WWLS-207	WETWELL (L2, 8.00M ABOVE BOTT.)
127	WWLS-208	WETWELL (L2, 8.75M ABOVE BOTT.)
128	WWLS-209	WETWELL (L2, 9.50M ABOVE BOTT.)
129	WWLS-210	WETWELL (L2, 10.25M ABOVE BOTT.)
130	WWLS-211	WETWELL (L2, 11.00M ABOVE BOTT.)
131	WWLS-212	WETWELL (L2, 11.75M ABOVE BOTT.)
132	WWLS-213	WETWELL (L2, 12.50M ABOVE BOTT.)
133	WWLS-214	WETWELL (L2, 13.25M ABOVE BOTT.)
134	WWLS-215	WETWELL (L2, 14.00M ABOVE BOTT.)
135	WWLS-216	WETWELL (L2, 14.75M ABOVE BOTT.)
136	WWLS-303	WETWELL (L3, 5.00M ABOVE BOTT.)
137	WWLS-305	WETWELL (L3, 6.50M ABOVE BOTT.)
138	WWLS-307	WETWELL (L3, 8.00M ABOVE BOTT.)
139	WWLS-309	WETWELL (L3, 9.50M ABOVE BOTT.)
140	WWLS-311	WETWELL (L3, 11.00M ABOVE BOTT.)
141	WWLS-313	WETWELL (L3, 12.50M ABOVE BOTT.)
142	WWLS-315	WETWELL (L3, 14.00M ABOVE BOTT.)
143	WWLS-401	WETWELL (L4, 3.50M ABOVE BOTT.)
144	WWLS-402	WETWELL (L4, 4.25M ABOVE BOTT.)
145	WWLS-403	WETWELL (L4, 5.00M ABOVE BOTT.)
146	WWLS-404	WETWELL (L4, 5.75M ABOVE BOTT.)
147	WWLS-405	WETWELL (L4, 6.50M ABOVE BOTT.)
148	WWLS-406	WETWELL (L4, 7.25M ABOVE BOTT.)
149	WWLS-407	WETWELL (L4, 8.00M ABOVE BOTT.)
150	WWLS-408	WETWELL (L4, 8.75M ABOVE BOTT.)
151	WWLS-409	WETWELL (L4, 9.50M ABOVE BOTT.)
152	WWLS-410	WETWELL (L4, 10.25M ABOVE BOTT.)
153	WWLS-411	WETWELL (L4, 11.00M ABOVE BOTT.)
154	WWLS-412	WETWELL (L4, 11.75M ABOVE BOTT.)
155	WWLS-413	WETWELL (L4, 12.50M ABOVE BOTT.)
156	WWLS-414	WETWELL (L4, 13.25M ABOVE BOTT.)
157	WWLS-415	WETWELL (L4, 14.00M ABOVE BOTT.)
158	WWLS-416	WETWELL (L4, 14.75M ABOVE BOTT.)
159	WWLS-503	WETWELL (L5, 5.00M ABOVE BOTT.)
160	WWLS-505	WETWELL (L5, 6.50M ABOVE BOTT.)

Table 2.5 (continued)

Channel No.	Channel Code	Measurement Location
161	WWLS-507	WETWELL (L5, 8.00M ABOVE BOTT.)
162	WWLS-509	WETWELL (L5, 9.50M ABOVE BOTT.)
163	WWLS-511	WETWELL (L5, 11.00M ABOVE BOTT.)
164	WWLS-513	WETWELL (L5, 12.50M ABOVE BOTT.)
165	WWLS-515	WETWELL (L5, 14.00M ABOVE BOTT.)
166	WWLS-604	WETWELL (L6, 5.75M ABOVE BOTT.)
167	WWLS-606	WETWELL (L6, 7.25M ABOVE BOTT.)
168	WWLS-608	WETWELL (L6, 8.75M ABOVE BOTT.)
169	WWLS-610	WETWELL (L6, 10.25M ABOVE BOTT.)
170	WWLS-612	WETWELL (L6, 11.75M ABOVE BOTT.)
171	WWLS-614	WETWELL (L6, 13.25M ABOVE BOTT.)
172	WWLS-616	WETWELL (L6, 14.75M ABOVE BOTT.)
173	WWLS-704	WETWELL (L7, 5.75M ABOVE BOTT.)
174	WWLS-706	WETWELL (L7, 7.25M ABOVE BOTT.)
175	WWLS-708	WETWELL (L7, 8.75M ABOVE BOTT.)
176	WWLS-710	WETWELL (L7, 10.25M ABOVE BOTT.)
177	WWLS-712	WETWELL (L7, 11.75M ABOVE BOTT.)
178	WWLS-714	WETWELL (L7, 13.25M ABOVE BOTT.)
179	WWLS-716	WETWELL (L7, 14.75M ABOVE BOTT.)
180	WWLS-804	WETWELL (L8, 5.75M ABOVE BOTT.)
181	WWLS-806	WETWELL (L8, 7.25M ABOVE BOTT.)
182	WWLS-808	WETWELL (L8, 8.75M ABOVE BOTT.)
183	WWLS-810	WETWELL (L8, 10.25M ABOVE BOTT.)
184	WWLS-812	WETWELL (L8, 11.75M ABOVE BOTT.)
185	WWLS-814	WETWELL (L8, 13.25M ABOVE BOTT.)
186	WWLS-816	WETWELL (L8, 14.75M ABOVE BOTT.)
187	WWLS-223	WETWELL (L2, 10.625M ABOVE BOTT.)
188	WWLS-224	WETWELL (L2, 11.375M ABOVE BOTT.)
189	WWLS-225	WETWELL (L2, 12.125M ABOVE BOTT.)
190	WWLS-226	WETWELL (L2, 12.875M ABOVE BOTT.)
191	WWLS-227	WETWELL (L2, 13.625M ABOVE BOTT.)
192	WWLS-228	WETWELL (L2, 14.375M ABOVE BOTT.)

Table 2.6 List of Data Channels (PCM Track-1 Channels)

Channel No.	Channel Code	Measurement Location
1	BPMF-001	RUPTURE DISC BREAK SIGNAL
2	BPMF-002	MAIN DISCHARGE VALVE CLOSE SIGNAL
3	VPLS-502	VP5 (1,042M ABOVE OUTL.)
4	DWPF-001	DRYWELL
5	VPPF-101	VP1 (0.5M ABOVE OUTL.)
6	VPPF-201	VP2 (0.5M ABOVE OUTL.)
7	VPPF-301	VP3 (0.5M ABOVE OUTL.)
8	VPPF-302	VP3 (6.0M ABOVE OUTL.)
9	VPPF-303	VP3 (11.5M ABOVE OUTL.)
10	VPPF-401	VP4 (0.5M ABOVE OUTL.)
11	VPPF-501	VP5 (0.5M ABOVE OUTL.)
12	VPPF-502	VP5 (6.0M ABOVE OUTL.)
13	VPPF-503	VP5 (11.5M ABOVE OUTL.)
14	WWPF-101	POOL BOTT., UNDER VP1
15	WWPF-102	POOL BOTT., UNDER VP2
16	WWPF-103	POOL BOTT., UNDER VP3
17	WWPF-104	POOL BOTT., UNDER VP4
18	WWPF-105	POOL BOTT., UNDER VP5
19	WWPF-106	POOL BOTT., BETW. VP1, VP6 & PEDESTAL
20	WWPF-107	POOL BOTT., BETW. VP2 & VP3
21	WWPF-201	WALL BESIDE VP2 (P1, 1.8M ABOVE BOTT.)
22	WWPF-202	WALL BESIDE VP2 (P1, 3.6M ABOVE BOTT.)
23	WWPF-203	WALL BESIDE VP2 (P1, 6.0M ABOVE BOTT.)
24	WWPF-301	WALL BESIDE VP3 (P2, 1.8M ABOVE BOTT.)
25	WWPF-302	WALL BESIDE VP3 (P2, 3.6M ABOVE BOTT.)
26	WWPF-303	WALL BESIDE VP3 (P2, 6.0M ABOVE BOTT.)
27	WWPF-401	SHELL BESIDE VP3 (P3, 1.8M ABOVE BOTT.)
28	WWPF-402	SHELL BESIDE VP3 (P3, 3.6M ABOVE BOTT.)
29	WWPF-501	SHELL BESIDE VP4 (P4, 1.8M ABOVE BOTT.)
30	WWPF-502	SHELL BESIDE VP4 (P4, 3.6M ABOVE BOTT.)
31	WWPF-602	WALL BESIDE VP4 (P5, 3.6M ABOVE BOTT.)
32	WWPF-702	WALL BESIDE VP7 (P6, 3.6M ABOVE BOTT.)
33	WWPF-001	WETWELL AIRSPACE (15.0M ABOVE BOTT.)
34		
35	VPSF-101	LOWER BRACE BETW. VP1 & WALL
36	VPSF-102	LOWER BRACE BETW. VP1 & VP2
37	VPSF-103	LOWER BRACE BETW. VP1 & VP6
38	VPSF-201	UPPER BRACE BETW. VP1 & PEDESTAL
39		

Table 2.7 List of Data Channels (PCM Track-2 Channels)

Channel No.	Channel Code	Measurement Location
1	BPMF-001	RUPTURE DISC BREAK SIGNAL
2	BPMF-002	MAIN DISCHARGE VALVE CLOSE SIGNAL
3	VPLS-502	VP5 (1.042M ABOVE OUTL.)
4	VPAF-101	VP2 OUTL. (0DEG)
5	VPAF-102	VP2 OUTL. (90DEG)
6	VPAF-201	VP5 OUTL. (0DEG)
7	VPAF-202	VP5 OUTL. (90DEG)
8	WWAF-001	POOL BOTT., UNDER VP5
9	WWAF-002	POOL BOTT., BETW. VP2, VP3, VP4 & VP7
10	WWAF-003	WALL BESIDE VP2 (3.0M ABOVE BOTT.)
11	WWAF-004	WALL BESIDE VP7 (3.0M ABOVE BOTT.)
12	WWAF-005	SHELL BESIDE VP3 (3.0M ABOVE BOTT.)
13	WWAF-006	SHELL BESIDE VP3 (6.0M ABOVE BOTT.)
14	WWAF-007	SHELL BESIDE VP4 (3.0M ABOVE BOTT.)
15	WWAF-008	SHELL BESIDE VP4 (6.0M ABOVE BOTT.)
16	WWAF-009	PEDESTAL (3.0M ABOVE BOTT.)
17	WWAF-010	PEDESTAL (6.0M ABOVE BOTT.)
18	WWAF-011	SHELL AT DF LEVEL (0DEG)
19	WWAF-012	SHELL AT DF LEVEL (90DEG)
20		
21	WWLF-101	PHASE BDRY. (0.9M BELOW OUTL., CENTER)
22	WWLF-102	PHASE BDRY. (0.9M BELOW OUTL., 0DEG)
23	WWLF-104	PHASE BDRY. (0.9M BELOW OUTL., 90DEG)
24	WWLF-106	PHASE BDRY. (0.9M BELOW OUTL., 180DEG)
25	WWLF-108	PHASE BDRY. (0.9M BELOW OUTL., 270DEG)
26	WWLF-201	PHASE BDRY. (0.6M BELOW OUTL., CENTER)
27	WWLF-203	PHASE BDRY. (0.6M BELOW OUTL., 45DEG)
28	WWLF-205	PHASE BDRY. (0.6M BELOW OUTL., 135DEG)
29	WWLF-207	PHASE BDRY. (0.6M BELOW OUTL., 225DEG)
30	WWLF-209	PHASE BDRY. (0.6M BELOW OUTL., 315DEG)
31	WWLF-301	PHASE BDRY. (0.3M BELOW OUTL., CENTER)
32	WWLF-302	PHASE BDRY. (0.3M BELOW OUTL., 0DEG)
33	WWLF-304	PHASE BDRY. (0.3M BELOW OUTL., 90DEG)
34	WWLF-306	PHASE BDRY. (0.3M BELOW OUTL., 180DEG)
35	WWLF-308	PHASE BDRY. (0.3M BELOW OUTL., 270DEG)
36		
37		
38		
39		

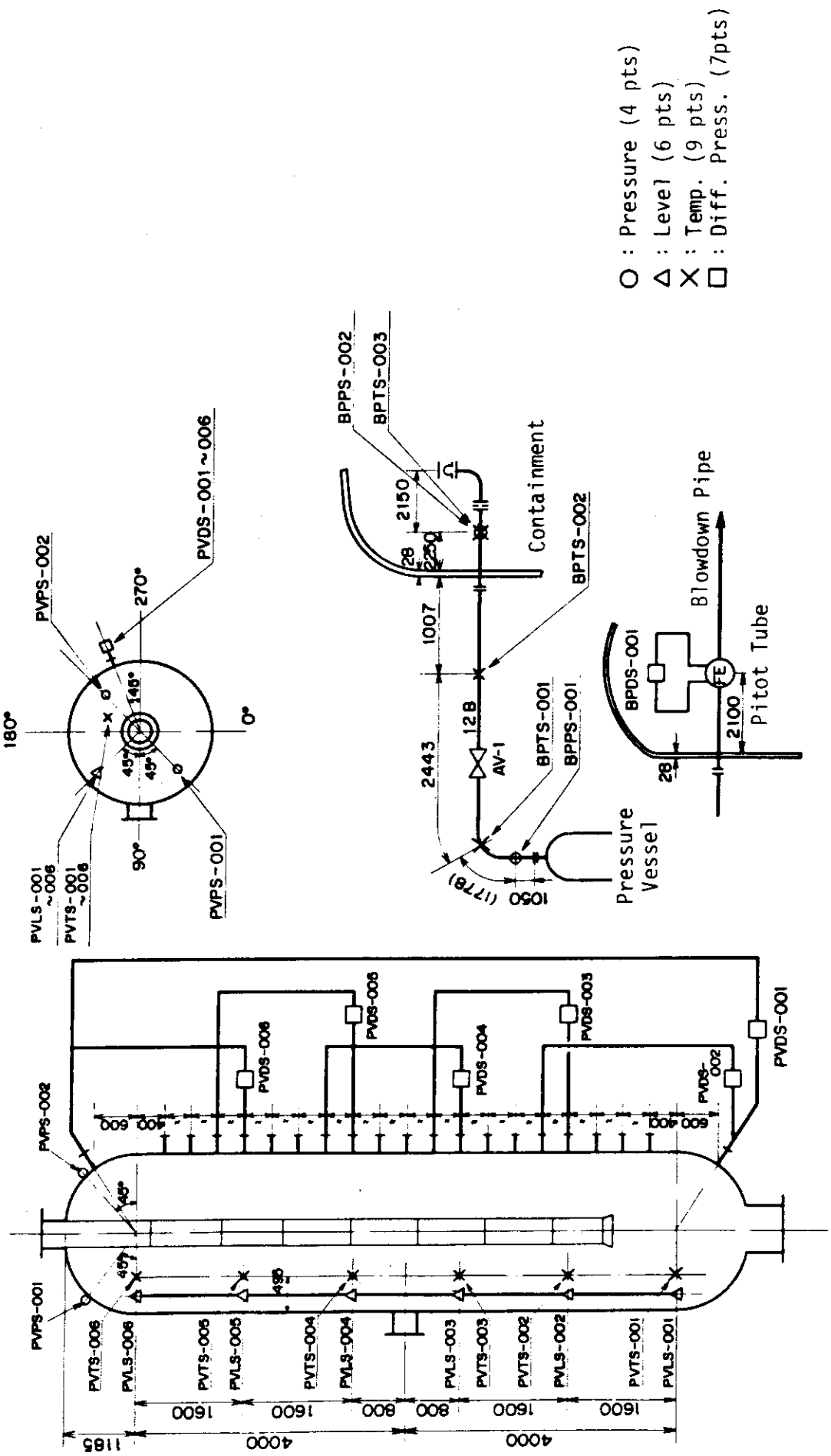

Fig. 2.2 Transducer Locations for Primary System

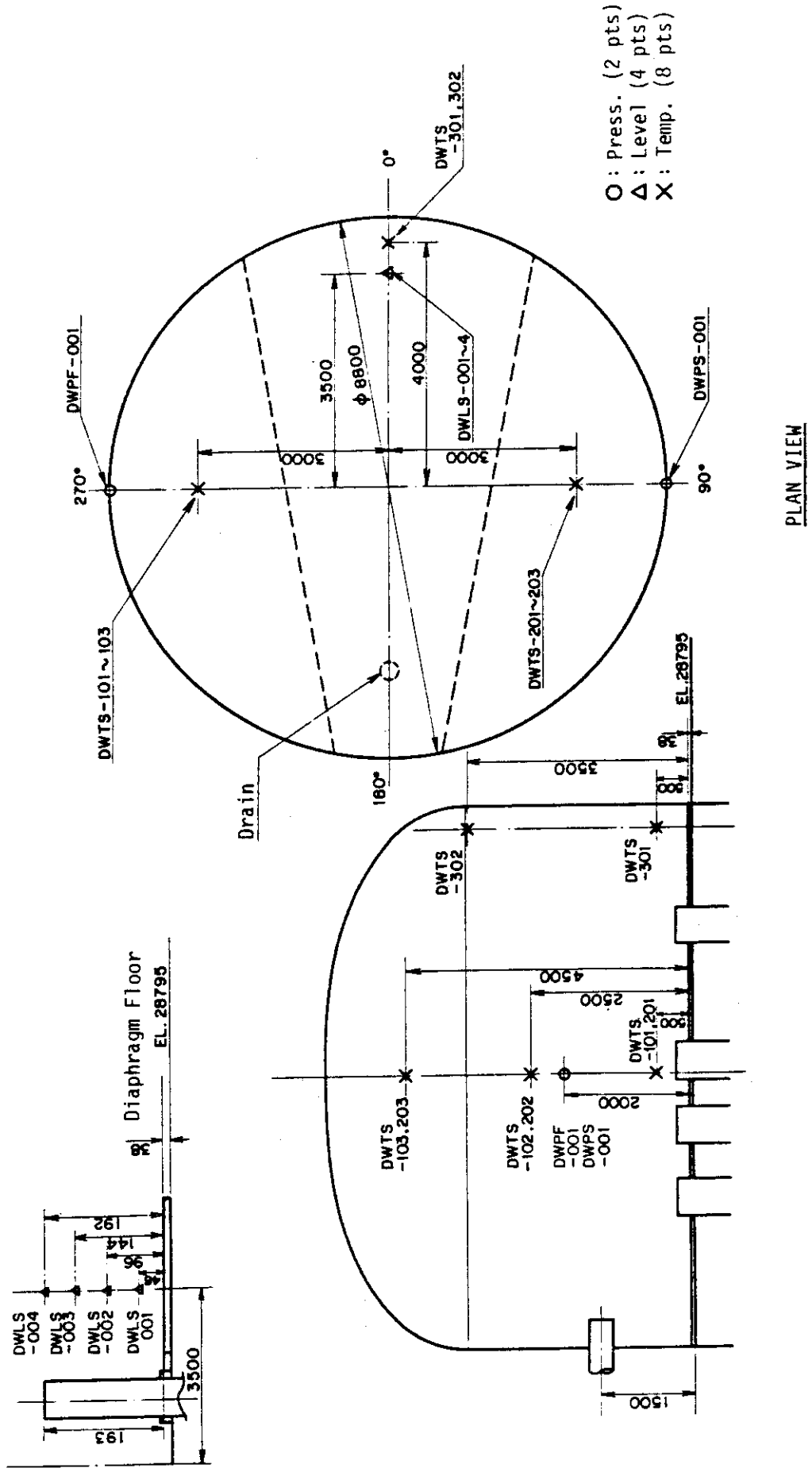

Fig. 2.3 Transducer Locations for Drywell

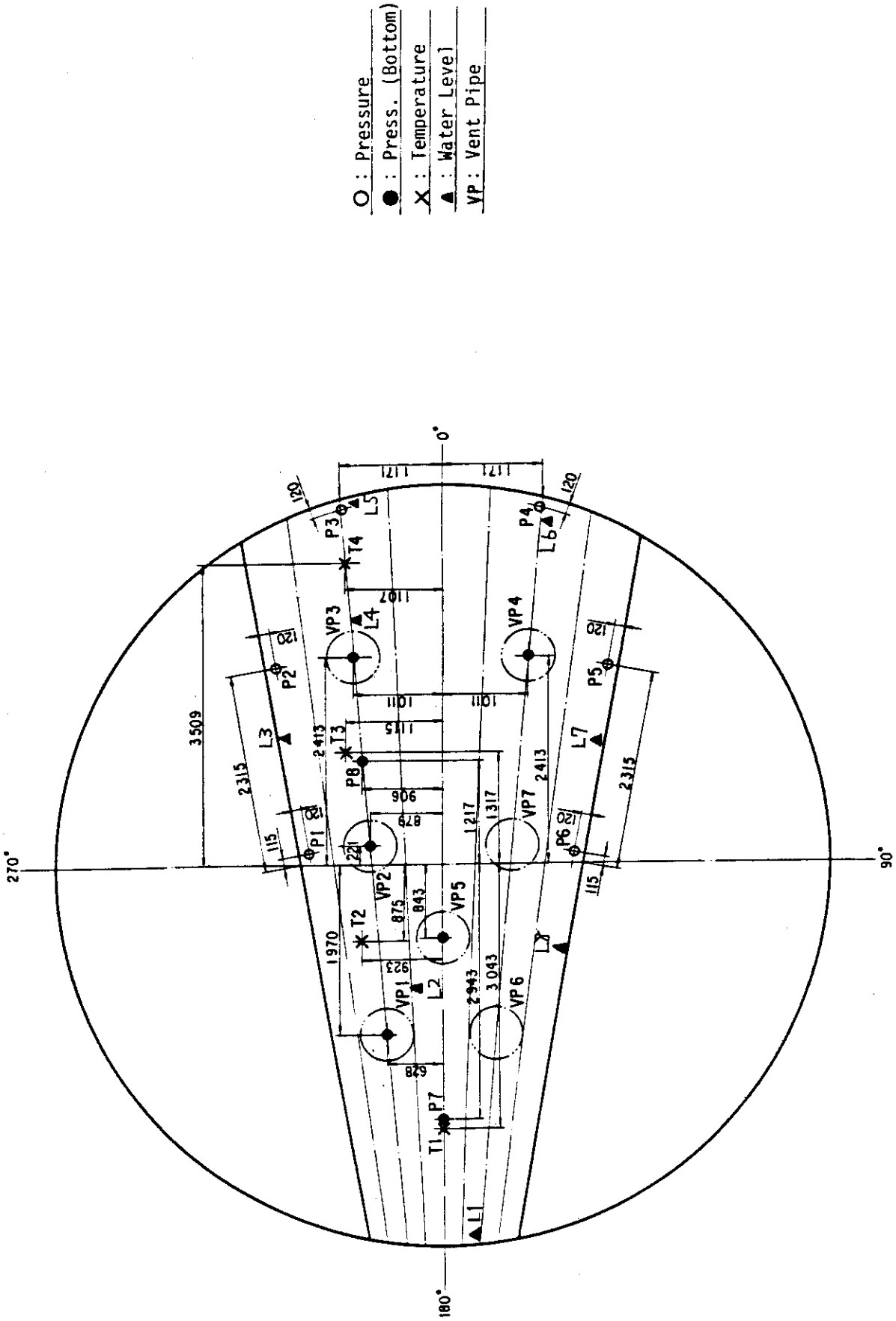

Fig. 2 4 Transducer Locations for Wetwell (Plan View)

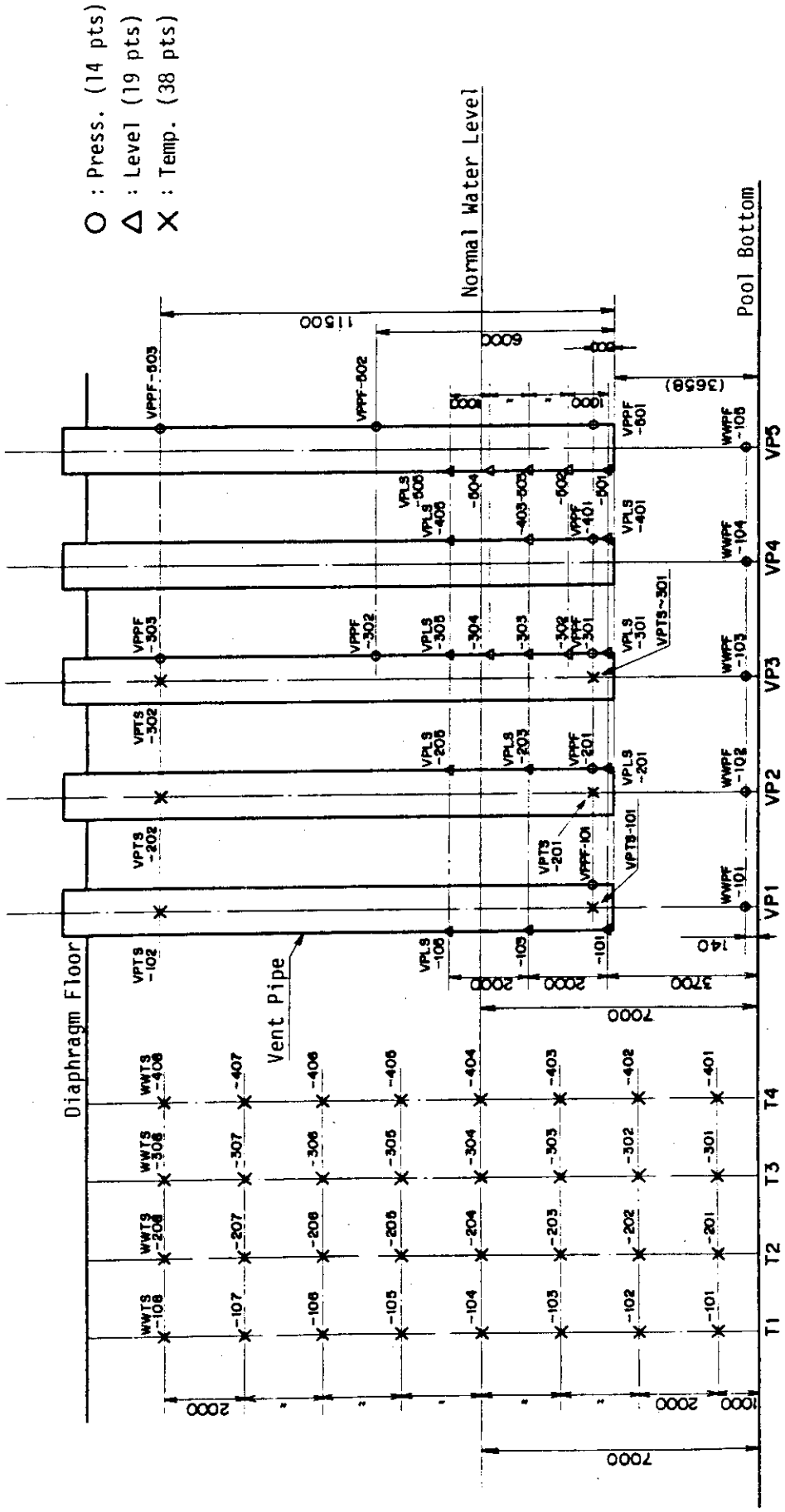

Fig. 2.5 Transducer Locations for Vent Pipes and Thermocouple Locations for Wetwell

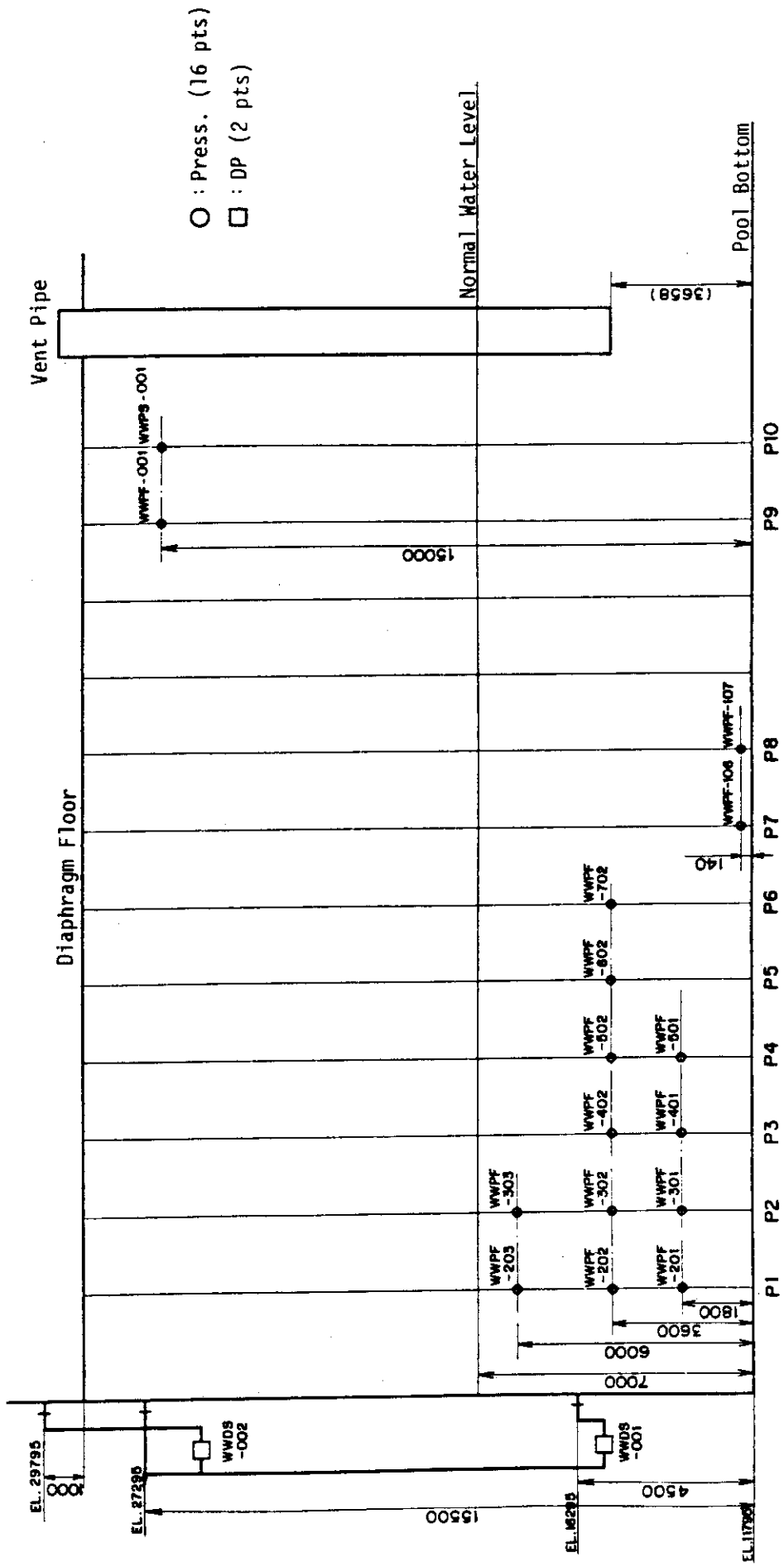

Fig. 2.6 Pressure and Differential Pressure Transducer Locations for Wetwell

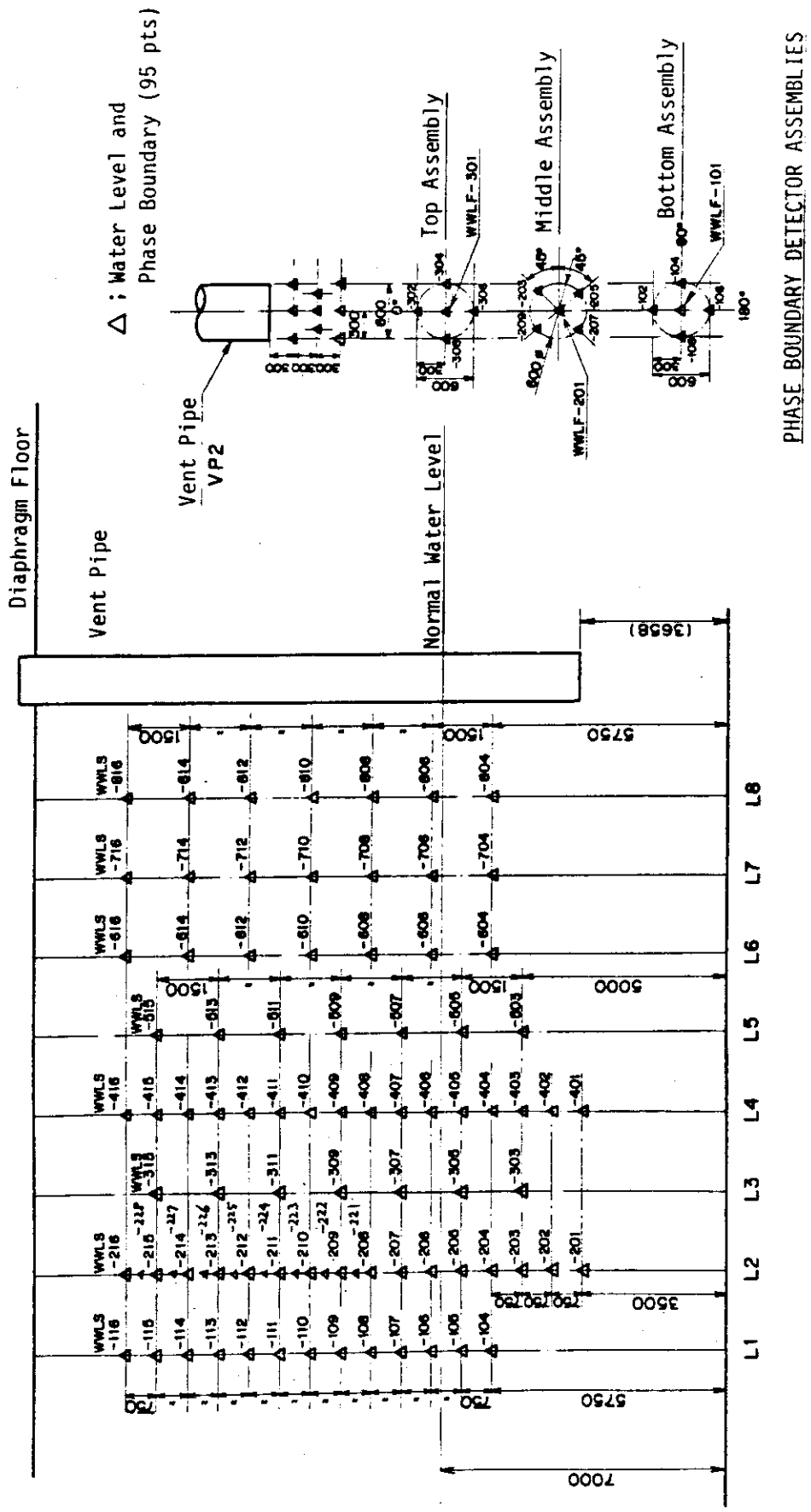

Fig. 2.7 Water Level Detector and Phase Boundary Detector Locations for Wetwell

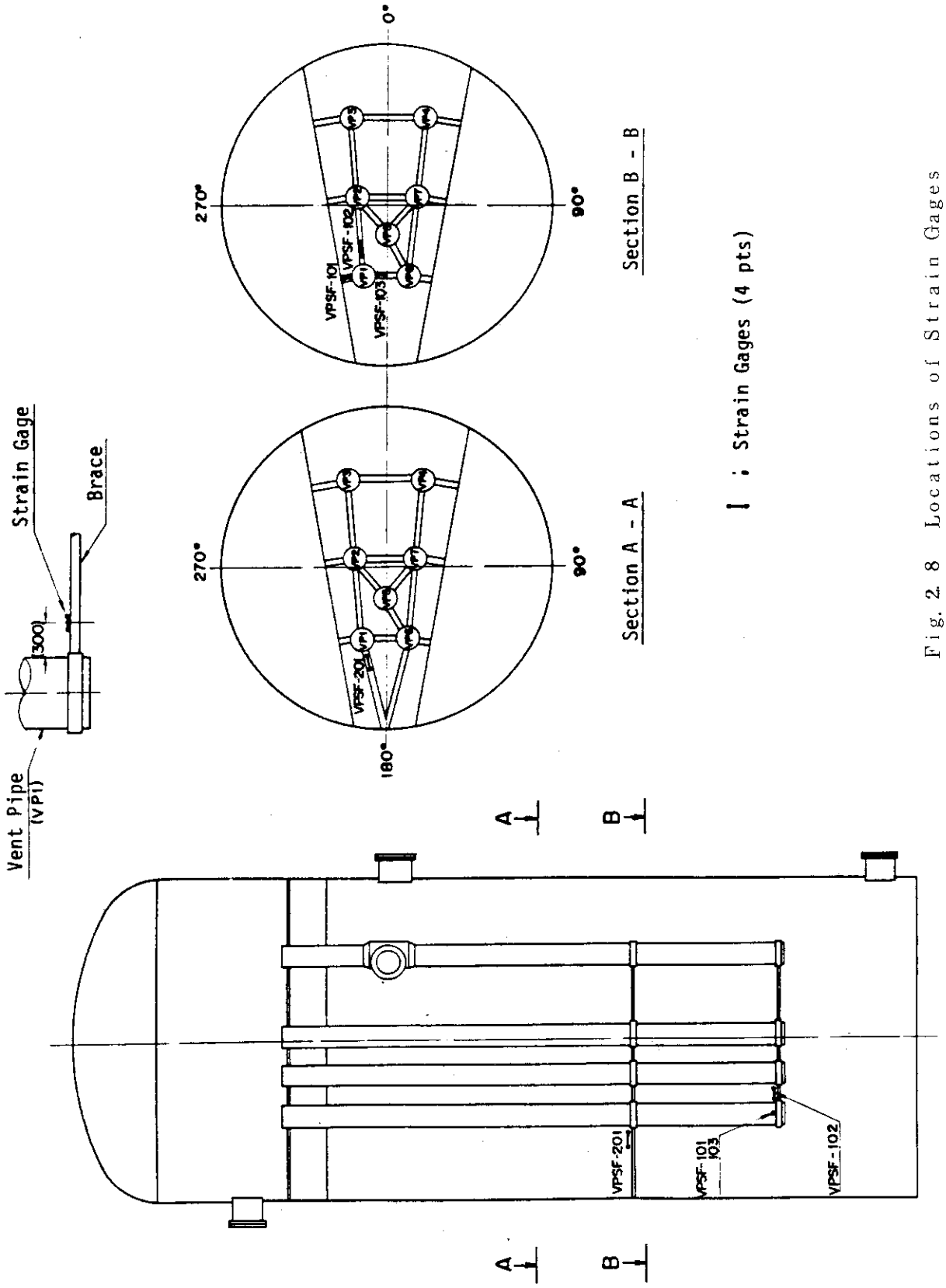

Fig. 2.8 Locations of Strain Gages

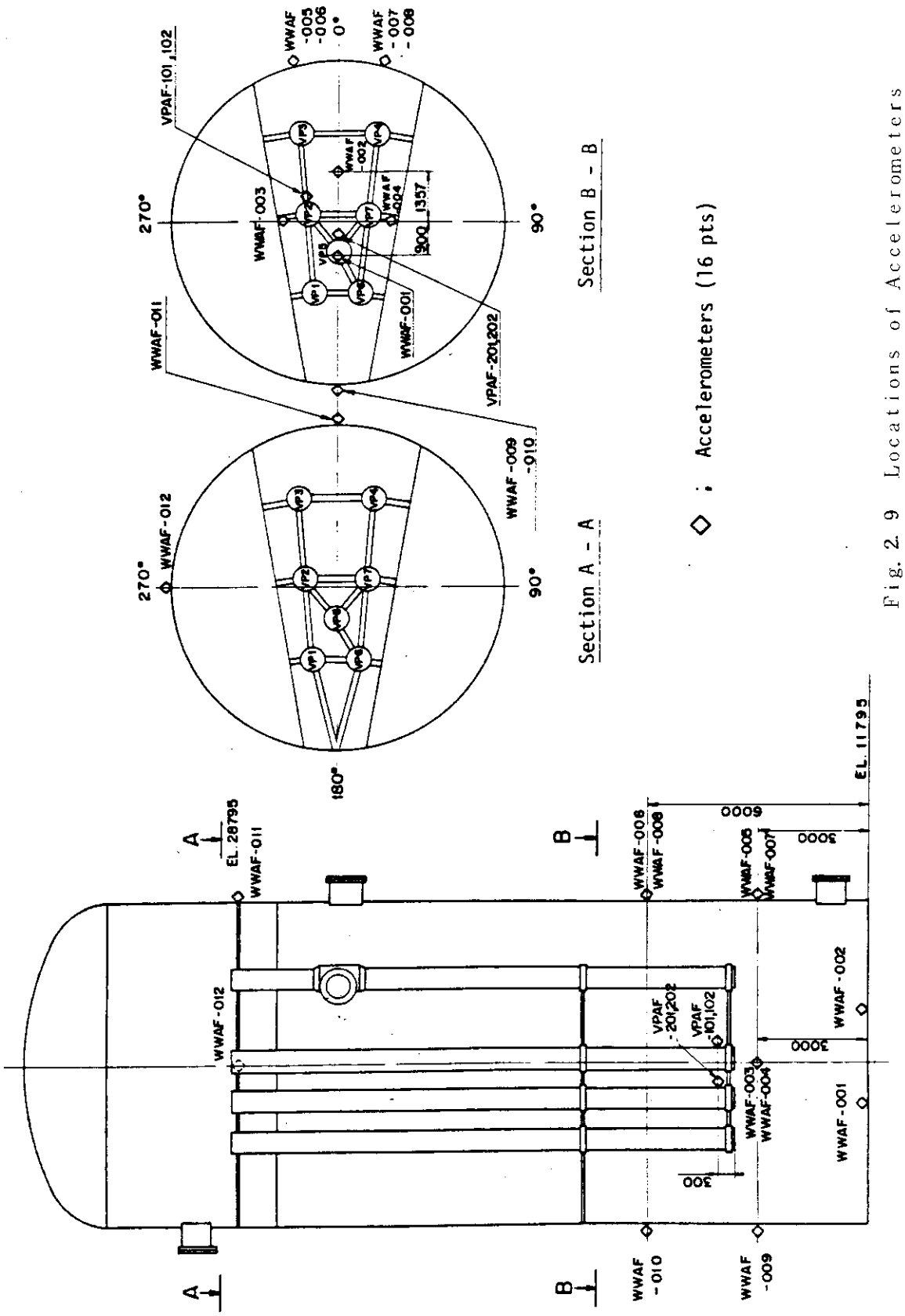

Fig. 2.9 Locations of Accelerometers

Table 2.8 State of Measurement Equipments (Computer Recorded Channels)

Channel No.	Channel Code	Acceptability o Yes ø No	Remarks
1	BPMS-001	o	
2	BPMS-002	o	
3	VPMS-001	o	
4			
5	PVPS-001	o	
6	PVPS-002	o	
7	BPPS-001	o	
8	BPPS-002	o	
9	DWPS-001	o	
10	WWPS-001	o	
11			
12	PVDS-001	o	
13	PVDS-002	o	
14	PVDS-003	o	
15	PVDS-004	o	
16	PVDS-005	o	Drifted as much as 1 kPa
17	PVDS-006	o	Drifted as much as 2 kPa
18	BPDS-001	ø	Unreasonable data
19	WWDS-001	o	
20	WWDS-002	o	Saturated at 123 kPa
21			
22	PVTS-001	o	
23	PVTS-002	o	
24	PVTS-003	o	
25	PVTS-004	o	
26	PVTS-005	o	
27	PVTS-006	o	
28	BPTS-001	o	
29	BPTS-002	o	
30	BPTS-003	o	

Table 2.8 (continued)

Channel No.	Channel Code	Acceptability o Yes	ø No	Remarks
31	DWTS-101	o		
32	DWTS-102	o		
33	DWTS-103	o		
34	DWTS-201	o		
35	DWTS-202	o		
36	DWTS-203	o		
37	DWTS-301	o		
38	DWTS-302	o		
39	VPTS-101	o		
40	VPTS-102	o		
41	VPTS-201	o		
42	VPTS-202	o		
43	VPTS-301	o		
44	VPTS-302	o		
45	WWTS-101	o		
46	WWTS-102	o		
47	WWTS-103	o		
48	WWTS-104	o		
49	WWTS-105	o		Wetted during pool swell
50	WWTS-106	o		"
51	WWTS-107	o		"
52	WWTS-108		ø	Broken during pool swell
53	WWTS-201	o		
54	WWTS-202	o		
55	WWTS-203	o		
56	WWTS-204	o		
57	WWTS-205	o		Wetted during pool swell
58	WWTS-206	o		"
59	WWTS-207	o		"
60	WWTS-208	o		

Table 2.8 (continued)

Channel No.	Channel Code	Acceptability o Yes	ø No	Remarks
61	WWTS-301	o		
62	WWTS-302	o		
63	WWTS-303	o		
64	WWTS-304	o		
65	WWTS-305	o		Wetted during pool swell
66	WWTS-306	o		"
67	WWTS-307	o		"
68	WWTS-308	o		
69	WWTS-401	o		
70	WWTS-402	o		
71	WWTS-403	o		
72	WWTS-404	o		
73	WWTS-405	o		Wetted during pool swell
74	WWTS-406	o		"
75	WWTS-407	o		"
76	WWTS-408		ø	Broken at 8.6 s
77	WWLS-222	o		
78	PVLS-001		ø	Sensor Failure
79	PVLS-002	o		"
80	PVLS-003	o		
81	PVLS-004	o		
82	PVLS-005	o		
83	PVLS-006	o		
84	DWLS-001	o		
85	DWLS-002	o		
86	DWLS-003	o		
87	DWLS-004	o		
88	VPLS-101	o		
89	VPLS-103	o		
90	VPLS-105	o		

Table 2.8 (continued)

Channel No.	Channel Code	Acceptability o Yes	ø No	Remarks
91	VPLS-201		o	
92	VPLS-203		o	
93	VPLS-205		o	
94	VPLS-301		o	
95	VPLS-302		o	
96	VPLS-303		o	
97	VPLS-304		o	
98	VPLS-305		o	
99	VPLS-401		o	
100	VPLS-403		o	
101	VPLS-405		o	
102	VPLS-501		o	
103	VPLS-502		o	
104	VPLS-503		o	
105	VPLS-504		o	
106	VPLS-505		o	
107	WWLS-104		o	
108	WWLS-105		o	
109	WWLS-106		o	
110	WWLS-107		o	
111	WWLS-108		o	
112	WWLS-109		o	
113	WWLS-110		o	
114	WWLS-111		o	
115	WWLS-112		o	
116	WWLS-113		o	
117	WWLS-114		o	
118	WWLS-115		o	
119	WWLS-116		o	
120	WWLS-201		o	

Table 2.8 (continued)

Channel No.	Channel Code	Acceptability o Yes	ø No	Remarks
121	WWLS-202		o	
122	WWLS-203		o	
123	WWLS-204		o	
124	WWLS-205		o	
125	WWLS-206		o	
126	WWLS-207		o	
127	WWLS-208		o	
128	WWLS-209		o	
129	WWLS-210		o	
130	WWLS-211		o	
131	WWLS-212		o	
132	WWLS-213		o	
133	WWLS-214		o	
134	WWLS-215		o	
135	WWLS-216		o	
136	WWLS-303		o	
137	WWLS-305		o	
138	WWLS-307		o	
139	WWLS-309		o	
140	WWLS-311		o	
141	WWLS-313		o	
142	WWLS-315		o	
143	WWLS-401		o	
144	WWLS-402		o	
145	WWLS-403		o	
146	WWLS-404		o	
147	WWLS-405		o	
148	WWLS-406		o	
149	WWLS-407		o	
150	WWLS-408		o	

Table 2.8 (continued)

Channel No.	Channel Code	Acceptability o Yes	ø No	Remarks
151	WWLS-409	o		
152	WWLS-410	o		
153	WWLS-411	o		
154	WWLS-412	o		
155	WWLS-413	o		
156	WWLS-414	o		
157	WWLS-415	o		
158	WWLS-416	o		
159	WWLS-503	o		
160	WWLS-505		ø	Unreasonable data
161	WWLS-507	o		
162	WWLS-509	o		
163	WWLS-511	o		
164	WWLS-513	o		
165	WWLS-515	o		
166	WWLS-604	o		
167	WWLS-606	o		
168	WWLS-608	o		
169	WWLS-610	o		
170	WWLS-612	o		
171	WWLS-614	o		
172	WWLS-616	o		
173	WWLS-704	o		
174	WWLS-706	o		
175	WWLS-708	o		
176	WWLS-710	o		
177	WWLS-712	o		
178	WWLS-714	o		
179	WWLS-716	o		
180	WWLS-804	o		

Table 2.8 (continued)

Channel No.	Channel Code	Acceptability o Yes	ø No	Remarks
181	WWLS-806	o		
182	WWLS-808	o		
183	WWLS-810	o		
184	WWLS-812	o		
185	WWLS-814	o		
186	WWLS-816	o		
187	WWLS-223	o		
188	WWLS-224	o		
189	WWLS-225	o		
190	WWLS-226	o		
191	WWLS-227	o		
192	WWLS-228	o		

Table 2.9 State of Measurement Equipments (PCM Track-1 Channels)

Channel No.	Channel No.	Acceptability o Yes	ø No	Remarks
1	BPMF-001	o		
2	BPMF-002	o		
3	VPLS-502	o		
4	DWPF-001	o		
5	VPPF-101	o		
6	VPPF-201	o		
7	VPPF-301	o		
8	VPPF-302	o		
9	VPPF-303	o		
10	VPPF-401	o		
11	VPPF-501	o		
12	VPPF-502	o		
13	VPPF-503	o		
14	WWPF-101	o		
15	WWPF-102	o		
16	WWPF-103	o		
17	WWPF-104	o		
18	WWPF-105	o		
19	WWPF-106	o		
20	WWPF-107	o		
21	WWPF-201	o		
22	WWPF-202	o		
23	WWPF-203	o		
24	WWPF-301	o		
25	WWPF-302	o		
26	WWPF-303	o		
27	WWPF-401	o		
28	WWPF-402	o		
29	WWPF-501	o		
30	WWPF-502	o		

Table 2.9 (continued)

Channel No.	Channel Code	Acceptability o Yes	ø No	Remarks
31	WWPF-602		o	
32	WWPF-702		o	
33	WWPF-001		o	
34				
35	VPSF-101		o	
36	VPSF-102		o	
37	VPSF-103		ø	Unreasonable data
38	VPSF-201		o	
39				

Table 2.10 State of Measurement Equipments (PCM Track-2 Channels)

Channel No.	Channel Code	Acceptability o Yes	ø No	Remarks
1	BPMF-001	o		
2	BPMF-002	o		
3	VPLS-502	o		
4	VPAF-101		ø	Questionable (high noise level)
5	VPAF-102	o		Seemingly overloaded
6	VPAF-201	o		Seemingly overloaded
7	VPAF-202		ø	Questionable (high noise level)
8	WWAF-001		ø	Questionable (low freq. component)
9	WWAF-002		ø	"
10	WWAF-003	o		
11	WWAF-004		ø	Questionable (low freq. component)
12	WWAF-005	o		
13	WWAF-006	o		
14	WWAF-007	o		
15	WWAF-008	o		
16	WWAF-009	o		
17	WWAF-010	o		
18	WWAF-011		ø	Questionable (low freq. component)
19	WWAF-012	o		
20				
21	WWLF-101	o		
22	WWLF-102	o		
23	WWLF-104	o		
24	WWLF-106	o		
25	WWLF-108	o		
26	WWLF-201	o		
27	WWLF-203	o		
28	WWLF-205	o		
29	WWLF-207	o		
30	WWLF-209	o		

Table 2.10 (continued)

Channel No.	Channel Code	Acceptability o Yes	ø No	Remarks
31	WWLF-301		o	
32	WWLF-302		o	
33	WWLF-304		o	
34	WWLF-306		o	
35	WWLF-308		o	
36				
37				
38				
39				

Table 2.11 Calibration Data

PRESSURE CHANNELS (COMPUTER RECORDED)

Pressure Vessel

Date of Calibration Sept. 12,1979

Range of Calibration Pressure (kPa) 101 - 6495

Water Level in Pressure Vessel (m) Full

Test Containment

Date of Calibration Sept. 13, 1979

Range of Calibration Pressure (kPa) 101 - 438.1

Water Level in Wetwell (m) 7

Channel No.	Channel Code	kPa/Digit	Max. Deviation kPa
System Computer			
5	PVPS-001	4.862	7.7
6	PVPS-002	4.819	6.7
7	BPPS-001	4.829	7.1
8	BPPS-002	4.842	6.8
9	DWPS-001	0.2363	0.29
10	WWPS-001	0.2397	0.64

DIFFERENTIAL PRESSURE CHANNELS (COMPUTER RECORDED)

Pressure Vessel

Date of Calibration Sept. 12, 1979

Calibration Conducted by Filling Water into Vessel.

Test Containment

Date of Calibration Sept. 13, 1979

Calibration Conducted by:

[] Filling Water into Containment

[X] Applying Known Pressure on Transducer

Channel No.	Channel Code	kPa/Digit	Max. Deviation kPa
System Computer			
12	PVDS-001	0.04745	
13	PVDS-002	0.02401	
14	PVDS-003	0.02393	
15	PVDS-004	0.02379	
16	PVDS-005	0.02360	
17	PVDS-006	0.02366	
18	BPDS-001	2.315	
19	WWDS-001	0.05005	
20	WWDS-002	0.05023	

Table 2.11 (Continued)

PRESSURE CHANNELS (PCM RECORDED)

Test Containment

Date of Calibration Sept. 13, 1979

Range of Calibration Pressure (kPa) 101 - 438.1

Water Level in Wetwell (m) 7

Channel No.	Channel Code	kPa/Digit	Max. Deviation kPa
PCM Track-1			
4	DWPF-001	0.9475	0.53
5	VPPF-101	0.9448	0.55
6	VPPF-201	0.9577	0.39
7	VPPF-301	0.9615	0.23
8	VPPF-302	0.9587	0.24
9	VPPF-303	0.9503	0.39
10	VPPF-401	0.9559	0.25
11	VPPF-501	0.9475	0.40
12	VPPF-502	0.9485	0.20
13	VPPF-503	0.9568	0.34
14	WWPF-101	0.9512	0.60
15	WWPF-102	0.9469	0.92
16	WWPF-103	0.9568	0.42

Channel No.	Channel Code	kPa/Digit	Max. Deviation kPa
PCM Track-1			
17	WWPF-104	0.9596	0.86
18	WWPF-105	0.9552	0.73
19	WWPF-106	0.9605	0.56
20	WWPF-107	0.9540	0.87
21	WWPF-201	0.9596	0.28
22	WWPF-202	0.9540	0.54
23	WWPF-203	0.9515	0.23
24	WWPF-301	0.9487	0.27
25	WWPF-302	0.9531	0.36
26	WWPF-303	0.9451	0.43
27	WWPF-401	0.9559	0.95
28	WWPF-402	0.9549	0.42
29	WWPF-501	0.9552	0.92
30	WWPF-502	0.9549	0.25
31	WWPF-602	0.9521	0.45
32	WWPF-702	0.9568	0.48
33	WWPF-001	0.9503	0.72

Table 2.12 Measurement Ranges

Ch. No.	Item[1]	Location[1]	Measurement Range			LPF Cut-Off Freq. (Hz)
			Manufacturer's Specification for Transducer	Expected Overall Range	Unit	
Computer Recorded Channels						
5 - 8	P	PV/BP	101 - 9908	101 - 10000	kPa	100
9	P	DW	0 - 591	0 - 900[2]	kPa	100
10	P	WW	0 - 591	0 - 900[2]	kPa	100
12	D	PV	0 - 98.1	0 - 100	kPa	100
13 - 17	D	PV	0 - 49	0 - 50	kPa	100
18	D	BP	0 - 4904	0 - 4950	kPa	100
19	D	WW	0 - 98.1	0 - 150	kPa	100
20	D	DW-WW	0 - 98.1	0 - 150	kPa	100
22 - 30	T	PV/BP		0 - 300	°C	250
31 - 38	T	DW		0 - 200	°C	250
39 - 44	T	VP		0 - 150	°C	250
45 - 76	T	WW		0 - 150	°C	250
PCM Track-1 Channels						
4	P	DW	0 - 591	0 - 900[2]	kPa	250
5 - 33	P	WW	0 - 591	0 - 900[2]	kPa	250
34 - 38	S	VP		-2300 - +2300	μm/m	250
PCM Track-2 Channels						
4 - 7	A	VP	-980 - +980[3]	-980 - +980	m/s^2	300
8 - 19	A	WW	-980 - +980[3]	-196 - +196	m/s^2	300

Notes:

1) For meanings of the abbreviations see Table 2.5.

2) Linear response of transducers beyond manufacturer-specified range was expected.

3) Range for transducer and charge preamplifier.

3. 試験条件と試験結果

冷却材喪失事故（ＬＯＣＡ）時に圧力抑制系内に発生する熱水力現象のうち，格納容器荷重の主要な原因となるものは，事故発生直後のいわゆるプールスウェル現象と，圧力抑制プール内での蒸気凝縮に付随する現象との２つに大別される。

プールスウェルは大破断ＬＯＣＡに固有の現象である。また，プールスウェルに起因する格納容器動荷重の大半は，破断断面積が大きい場合ほど大きな値となる。プールスウェルを試験装置によって模擬するにあたって，破断断面積，あるいは１次系からの放出流量をスケールするという手段がまず考えられる。しかしながら，本試験装置の１次系の形状が実炉とは大きく異なること，また本試験装置では放出流量の直接計測を行なっていないことから，これらの方法はいずれも難点がある。そこで，本試験計画においては，保守的であり，かつ現行の設計評価モデル* の検証に有効であるという観点から，破断直後のドライウェル圧力変化の想定値（具体的には，破断からベントクリアリングまでの期間の圧力上昇率）を模擬するという方法を基本的な条件として採用した。

Table 3.1 に示すように，昭和５４年８月から１１月にかけて，プールスウェルを主要な試験対象とする大口径蒸気放出試験を計６回実施した。本試験はこれらの第２回目にあたり，破断口径２４０mm の試験であって，先に行なわれたＴＥＳＴ１２０１（２００mm）および本試験に引き続くＴＥＳＴ１２０３（２２０mm）と共に破断口径を変数とするパラメトリック試験を構成する。また，これらのパラメトリック試験では，実炉**における主蒸気管即時両端破断事故時のドライウェル圧力上昇率の想定値である約２００ kPa／s***が得られる破断口径を見出すことを目的の一つとした。

本試験での破断断面積は，実炉**における主蒸気管両端破断事故時の想定臨界断面積（圧力容器側配管断面積＋流量制限器断面積）に本試験装置の体積縮小率 1/18 を乗じた値の約２２４％，また幾何学的破断断面積（配管断面積×２）を同様に縮小した値の約１４７％に相当し，保守的に設定されている。

さらに本試験では，プール内に形成される空気泡に対する冷却効果を軽減し，プールスウェルに関して保守的な条件を実現するため，プール初期水温は実炉の運転時の上限温度である３２℃を上回る約５３℃に設定した。

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* ドライウェル圧力変化の評価値を入力とする解析モデルにより，プールスウェルの評価を行なう。

** １１００MWe 級ＢＷＲ Mark Ⅱ格納容器

*** 圧力上昇率の想定値は，事故時の原子炉運転条件，１次系からの流出流量（臨界流モデル），破断配管のノーディング，あるいは，格納容器構造材表面の熱伝達率等，解析上の多くの仮定およびモデルの選択に依存する。本試験の時点では，米国における先行Mark Ⅱプラントに関する評価方法（ＮＥＤＯ－21061 Rev. 2（１９７６））にならい，わが国の１１００MWe 級Mark Ⅱ格納容器の条件に関して評価を行った値を目標値とした。

本試験の初期条件，データ集録の状況，試験中の物質・エネルギー移動の要約をTables 3.2～3.4にそれぞれ示す。また，放出開始前後の運転記録をFig. 3.1に，圧力容器内，放出管内の初期温度分布をFig. 3.2に，ドライウェル，ウェットウェル内の初期および放出終了後の温度分布をそれぞれFig. 3.3およびFig. 3.4に示す。

試験結果の定量的評価および解析は後報にゆずり，ここでは試験結果の概要のみ述べる。

放出開始直後，圧力容器（蒸気ドーム内）には0秒～0.25秒にわたって約1 MPa，放出配管内には0秒～0.02秒にわたって最大約2.8 MPaの一時的減圧がそれぞれ発生した。減圧に伴うフラッシングのため圧力容器内の水位が上昇し，放出開始後1.22秒には，8.6 m（初期水位から3.2 m上方）に達し，以後約30秒間この位置における水位計はぬれた状態を示した。また放出配管内の圧力，温度は約1.25秒から1.65秒にかけて一時的に低下し，以後振動を伴って低下した。これらの結果から，放出開始約1.25秒後に圧力容器内の水面が放出配管入口レベル（9.105 m）に達し，以後しばらくの間，放出管入口は2相流状態であったと考えられる。

放出初期（ベントクリアリング以前）のドライウェル内の圧力上昇率は，破断口径200 mmでのTEST1201で得られた値約152 kPa/sより約50%大きい，約225 kPa/sで，前述の目標値約200 kPa/sを上回った。また，放出の初期のドライウェルおよびベント管の圧力の変動量はTEST1201と同様に水放出の場合よりも大きな値を示した。

ドライウェル内の温度は，放出開始後約4秒以後均一となり，圧力に対応する飽和温度にほぼ一致した。ドライウェル壁面等での蒸気凝縮によるドライウェル床面への水の蓄積量は，試験後大気圧下での計量において約1890 kgであった。これは全放出量の約17%に相当する。

ベントクリアリングには放出開始後約0.62秒を要し，クリアリング後プール内に形成された気泡の下端は，ベント管出口の少なくとも0.9 m下方に達した。ベントクリアリング直後のプール内圧力上昇は，プール底面において最大約144 kPaであった。

プールスウェルの末期，放出開始後約1.2秒から1.6秒にかけてベント管内の圧力がウェットウェル気相部の圧力を下回り，バキュームブレーカが最大開度まで開いた。

蒸気凝縮に伴う圧力振動の振幅は全般的に小さな値を示した。放出開始後約30秒からベント管内にプール水が間欠的に流入しはじめ，約32秒から45秒にかけてベント管内の最高水位は出口の1 m以上上方に達した。

放出開始約89秒後に主放出弁を全閉とし，試験を終了した。

謝　　辞

本報告は，先に作成した非公開資料JAERI-memo 8613の内容に検討・修正を加えたものを科学技術庁原子力局技術振興課の指導のもとに公開に付するものである。

試験装置の管理，ならびに試験の実施は，原研安全工学部安全試験技術室の関口一雄室長，三森武男氏，宮本善夫氏，千葉辰夫氏，伊藤秀雄氏，大崎秀機氏，塚本導雄氏が担当した。本報告の刊行にあたり，ここに深甚なる謝意を表する。

Table 3.1 Test Matrix

(As of January 1980)

Test Number	DISCHARGE CONDITIONS					INITIAL CONDITIONS					Number of Open Vents	Vacuum Breaker Function-ability	Date of Perform-ance	Ref. Report Number JAERI-M	REMARKS
						Pressure Vessel			Wetwell						
	Disch. Fluid	Nozzle Diam. (mm)	Pipe Inlet Level (m)	Drywell Prepurge (%)	Time of Blowdown (s)	Press. (kPa)	Temp. (°C)	Water Level (m)	Pool Temp. (°C)	Vent Subm. (m)					
0001	water	100	2.105	none		ca.600			22.5	3.342	7	yes	2/18/79		Shakedown test performed by Hitachi Ltd. Excluded from reporting.
0002	water	100	2.105	none		7015	286	6.28	24.6	3.867	7	yes	2/21	8598	Shakedown test performed by Hitachi Ltd.
0003	water	100	2.105	none		6976	286	7.35	27.8	3.802	7	yes	2/23	8761	Shakedown test performed by Hitachi Ltd.
0004	water	200	2.105	none		7005	286	6.89	9.9	3.852	7	yes	2/28	8762	Shakedown test performed by Hitachi Ltd.
1101	water	200	2.105	none	72	7020	286	7.17	29.9	3.632	7	yes	3/30	8763	
2101	water	74	2.105	none	343	6966	287	7.99	14.2	3.345	7	yes	4/27	8764	
3101	water	74	2.105	23	298	6887	286	7.79	18.9	3.347	7	yes	5/25	8665	
3102	water	200	2.105	98	68.5	6966	287	7.73	33.2	3.622	7	yes	6/29	8765	
1201	steam	200	9.105	none	85	6894	286	5.71	52.3	3.327	7	yes	8/24	8887	
1202	steam	240	9.105	none	89.0	6976	286	5.44	53.5	3.342	7	yes	9/14	present	
1203	steam	220	9.105	none	91.9	6974	286	5.06	53.9	3.340	7	yes	10/05		
1204	steam	220	9.105	none	89.9	6971	286	5.32	18.7	3.338	7	yes	10/22		
1205	steam	220	9.105	none	94.5	6966	287	5.77	53.5	3.350	7	no	11/09		
1206	steam	220	9.105	none	85.1	6966				1.962	7	yes	11/29		

TEST NO. = A B C D

A = 1 Pool Swell Test
A = 2 Condensation Oscillation Test without Prepurge
A = 3 Condensation Oscillation Test with Prepurge
B = 1 Water Blowdown
B = 2 Steam Blowdown
B = 3 Air Blowdown
CD = Sequential Number

Table 3.2 Test Specifications

FULL-SCALE MARK II CRT DATA SHEET (TEST SPECIFICATIONS)

TEST NUMBER 1202 DATE OF PERFORMANCE Sept. 14, 1979

(A) SPECIFICATIONS FOR TEST FACILITY CONFIGURATION AND TEST PROCEDURE

(1) Diameter of Discharge Nozzle (mm) 240

(2) Inlet Level of Blowdown Pipe (m) 9.105

(3) Percentage of Prepurge, Specified/Performed (%) None

(4) Number of Open Vent Pipes 7

(5) Vacuum Breaker Functionability Yes

(B) SPECIFICATIONS FOR INITIAL CONDITIONS

(1) Pressure Vessel

Item	Specified	Performed
Pressure (kPa)	6966	6976
Temperature (°C)	285	286.6
Water Level (m)	5.0	5.444

(2) Test Containment

Item		Specified	Performed	
			Before Prepurge	Before Break
Pressure (kPa)	Drywell	101		101.6
	Wetwell	101		101.6
Pool Temp. (°C)		50.0		53.5
Pool Level (m)		7.0		7.000

(C) AMBIENT CONDITIONS

Pressure (kPa) 101.6 Temperature (°C) 26.0

Table 3.3 Summary of Data Recording

(A) Structure of Computer Processed Tapes

Tape No.		12020		12021		12022	
File No.	Index	Contents	Period (s)	Contents	Period (s)	Contents	Period (s)
1		Tape No. Heading		Tape No. Heading		Tape No. Heading	
2	1	R0		R0		R0	
3	2	R1		R1		R1	
4	3	R2		R2		R2	
5	4	Data	-13 to 140	Data	-13 to 131	Data	-13 to 131
6	5						

(B) Structure of PCM Tape

Record No.	Tape Counter Indication	Time Code	Contents
1	960 - 1022	17°23'35" -17°23'48"	R0
2	1022 - 1096	17°26'09" -17°26'23"	R1
3	1096 - 1163	17°48'48" -17°49'00"	R2
4	1163 - 1898	17°53'42" -17°56'07"	Data
5			
6			

Notes: 1. Last digit of tape number indicates contents of the tape;
- 0 Online data recorded by the system computer.
- 1 Data transferred from PCM recorder track 1.
- 2 Data transferred from PCM recorder track 2.

2. R0, R1, R2 are records for calibration of data channels;
- R0 Zero scale calibration outputs.
- R1 Full scale calibration outputs.
- R2 Initial values.

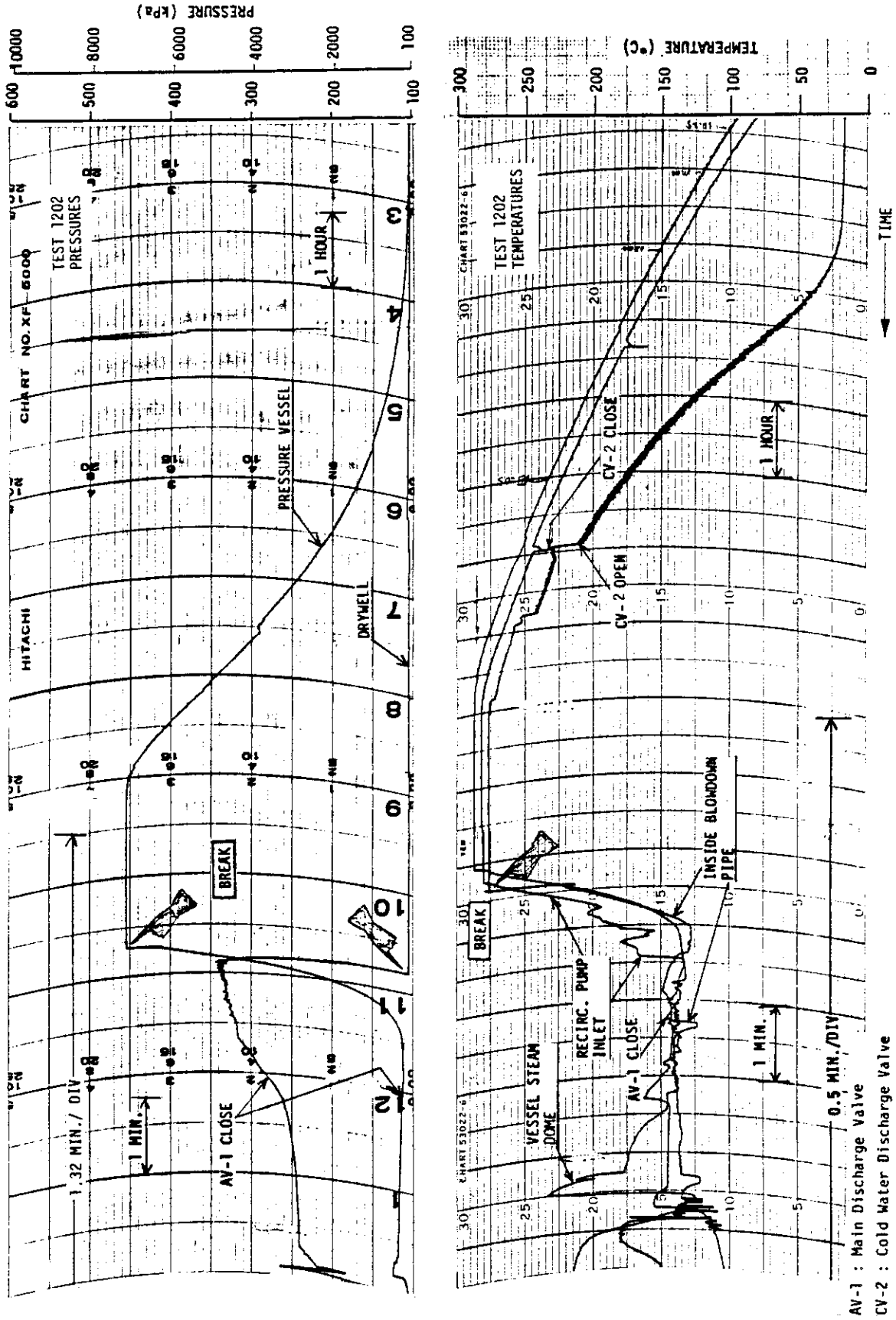
Table 3.4 Initial and Final Conditions

TEST NUMBER 1202 DATE OF PERFORMANCE Sep. 14, 1979

	Unit	Before Test	After Test*	Balance
PRESSURE VESSEL				
Pressure	kPa	6976		
Averaged Liquid Temperature	°C	286.6	133.0	
Max./Min. Liquid Temperature	°C	287.2/286.4		
Averaged Steam Temperature	°C	286.3	140.1	
Sat. Press. Based on Liquid Temp.	kPa	7085	295.3	
Liquid Level Based on PVDS-001	m	5.44	1.22	
Liquid Level Based on PVDS-002 - 006	m	5.44	1.32	
Mass of Water	kg	1.62×10^{4}	5.27×10^{3}	-1.09×10^{4}
Energy of Water	kJ	2.14×10^{7}	3.05×10^{6}	-1.84×10^{7}
BLOWDOWN PIPE				
Max./Min. Temperature	°C	285.8/284.0		
DRYWELL				
Pressure	kPa	101.6	(215.8)	
Sat. Temp. Based on Pressure	°C		126.2	
Averaged Gas Phase Temperature	°C	50.8	130.0	
Max./Min. Gas Phase Temperature	°C	59.9/40.1	130.3/129.5	
Liquid Level	m		0 - 0.042	
VENT PIPES				
Max./Min. Inlet Temperature	°C	33.0/32.2	130.3/129.5	
Max./Min. Outlet Temperature	°C	54.2/54.1	69.3/66.3	
WETWELL				
Pressure	kPa	101.6	(214.2)	
Averaged Pool Temperature	°C	53.5	69.1	
Max./Min. Pool Temperature	°C	54.1/53.0	75.4/58.2	
Averaged Airspace Temperature	°C	33.4	58.7	
Max./Min. Airspace Temperature	°C	34.2/32.7	63.4/56.5	
Liquid Level	m	7.000	(7.363)	
Mass of Water	kg	1.87×10^{5}	1.97×10^{5}	1.00×10^{4}
Energy of Water	kJ	4.20×10^{7}	5.69×10^{7}	1.49×10^{7}
Mass of Air	kg	299	626	

REMARKS

* Numbers in parentheses are data measured after opening the equalizer valve between drywell and wetwell.



AV-1 : Main Discharge Valve
CV-2 : Cold Water Discharge Valve

Fig. 3.1 Operation Records

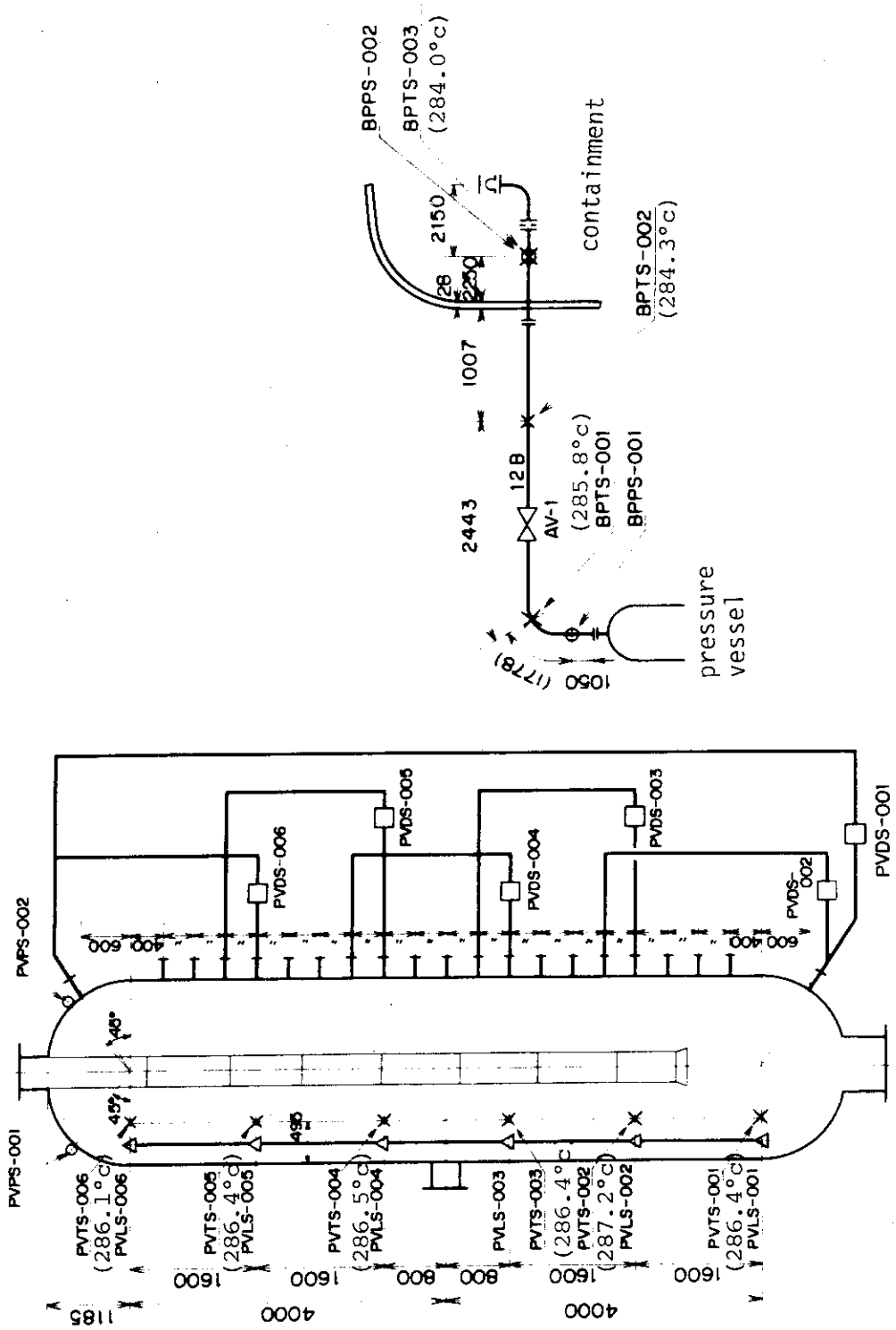
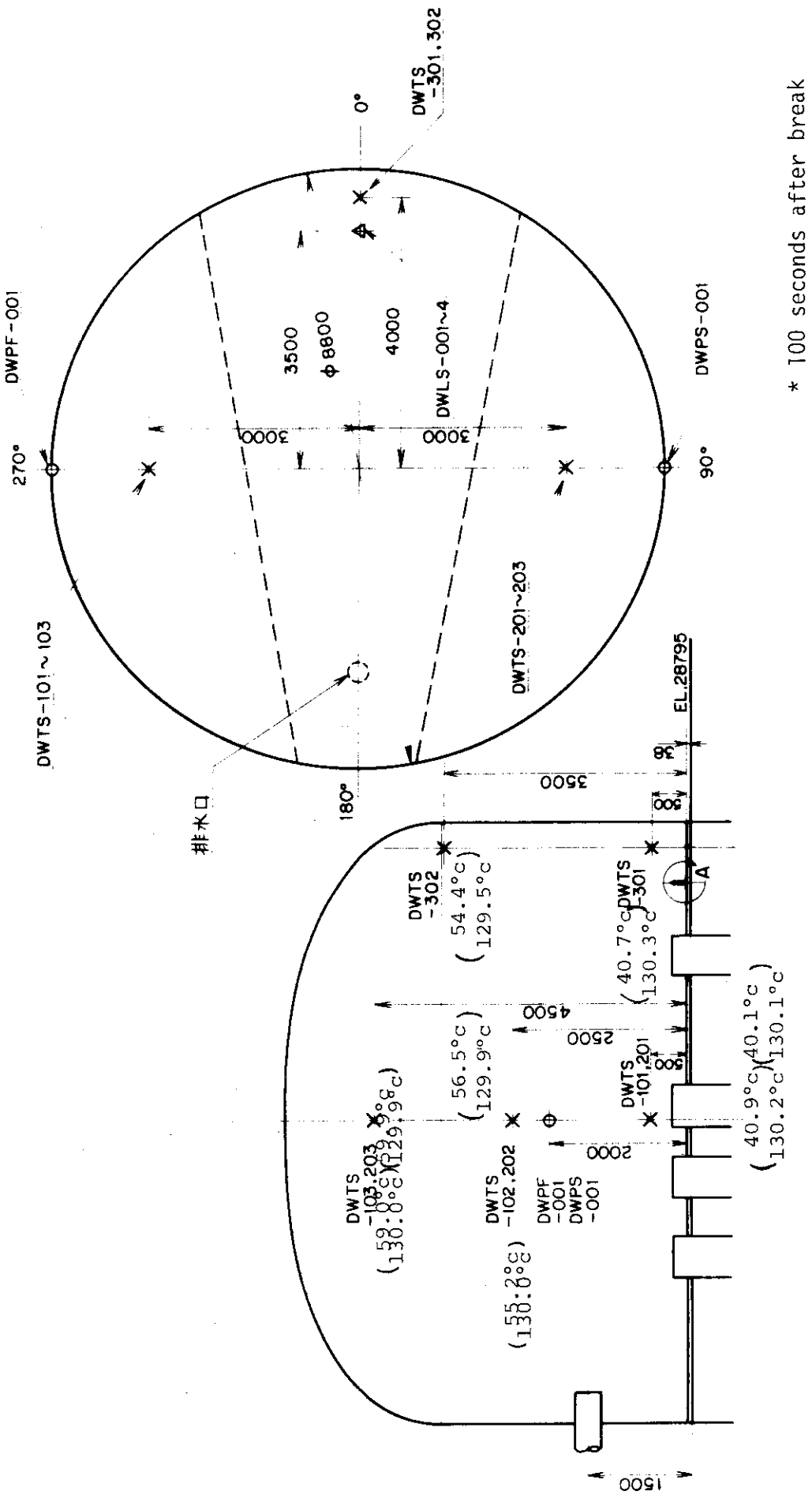


Fig. 3. 2 Initial Temperature Distribution in Primary System



* 100 seconds after break

Fig. 3.3 Initial and Final* Temperature Distributions in Drywell

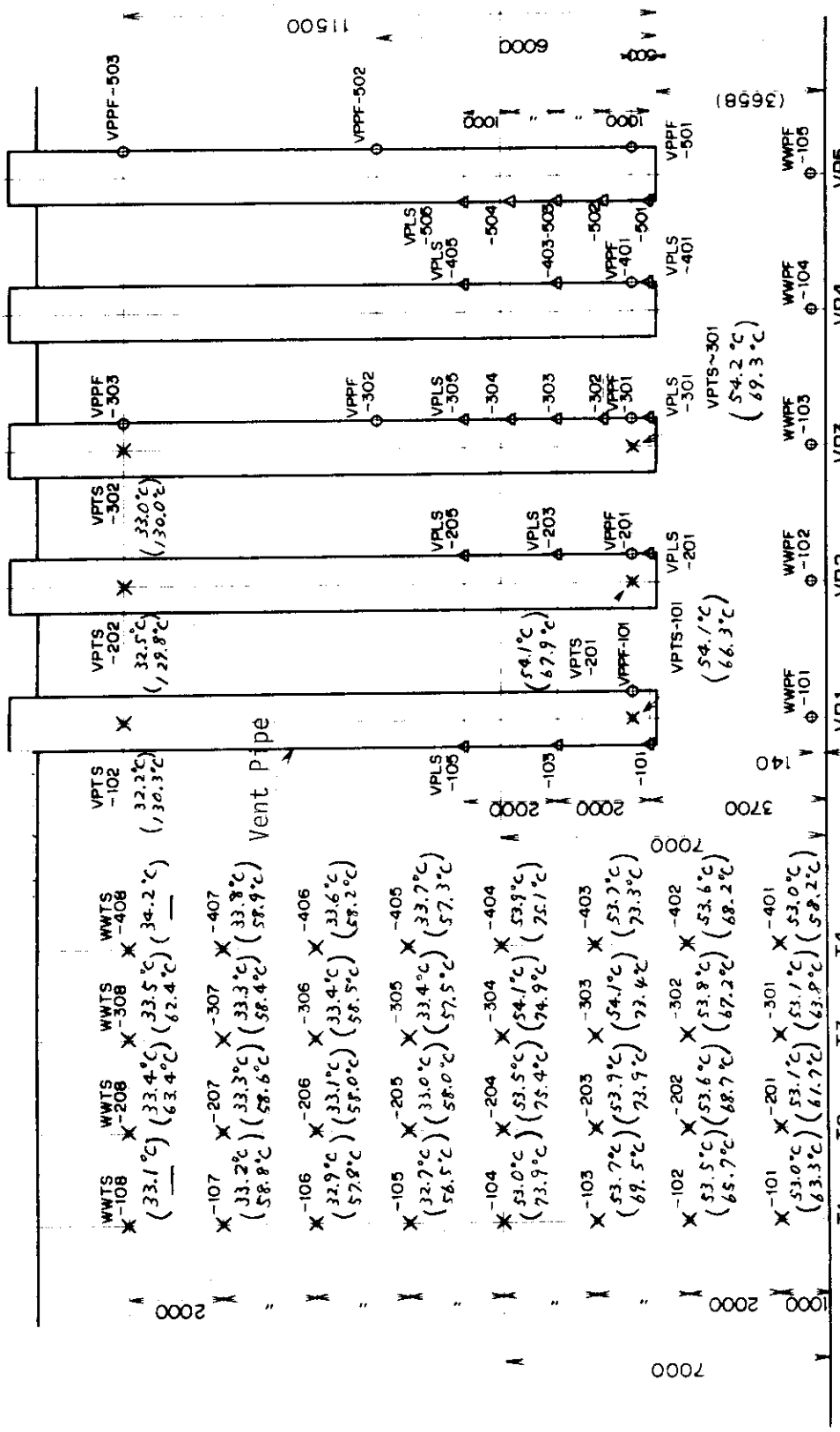


Fig. 3.4 Initial and Final* Temperature Distributions in Wetwell

Long Term Plots of Data

Long Term Plot Specification

Period 0-100 s

Plot No.	Recording System	Recording Rate (data/s)	Sampling Rate for Plots	Interval for Envelope Plots(s)	Remarks
L-0-1 to 38	Computer	50.00	1/3		
L-1-1 to 32	PCM Track-1	455.56	1/24	1.00	
L-2-1 to 12	PCM Track-2	455.56	1/24	1.00	

List of Long Term Plots

Computer Recorded Channels

Plot	L-0-1	Actuation Signals	
〃	L-0-2	Pressures in Pressure Vessel and Blowdown Pipe	
〃	L-0-3	Pressures in Drywell and Wetwell Airspace	
〃	L-0-4	DP over Pressure Vessel	
〃	L-0-5	DP across Wetwell Pool Surface	
〃	L-0-6	DP across Diaphragm Floor	
〃	L-0-7	Temperatures in Pressure Vessel	
〃	L-0-8	Temperatures in Blowdown Pipe	
〃	L-0-9	Temperatures in Drywell	(DWTS-101 - 103)
〃	L-0-10	Temperatures in Drywell	(DWTS-201 - 203)
〃	L-0-11	Temperatures in Drywell	(DWTS-301 - 302)
〃	L 0-12	Temperatures in Vent Pipe	(VP1)
〃	L-0-13	Temperatures in Vent Pipe	(VP2)
〃	L-0-14	Temperatures in Vent Pipe	(VP3)
〃	L-0-15	Temperatures in Wetwell	(WWTS-101 - 104)
〃	L-0-16	Temperatures in Wetwell	(WWTS-105 - 108)
〃	L-0-17	Temperatures in Wetwell	(WWTS-201 - 204)
〃	L-0-18	Temperatures in Wetwell	(WWTS-205 - 208)
〃	L-0-19	Temperatures in Wetwell	(WWTS-301 - 304)
〃	L-0-20	Temperatures in Wetwell	(WWTS-305 - 308)
〃	L-0-21	Temperatures in Wetwell	(WWTS-401 - 404)
〃	L-0-22	Temperatures in Wetwell	(WWTS-405 - 408)
〃	L-0-23	Water Level in Pressure Vessel	
〃	L-0-24	Water Level in Drywell	
〃	L-0-25	Water Level in Vent Pipe	(VP1)
〃	L-0-26	Water Level in Vent Pipe	(VP2)
〃	L-0-27	Water Level in Vent Pipe	(VP3)
〃	L-0-28	Water Level in Vent Pipe	(VP4)
〃	L-0-29	Water Level in Vent Pipe	(VP5)
〃	L-0-30	Water Level in Wetwell	(WWLS-104 - 116)
〃	L-0-31	Water Level in Wetwell	(WWLS-201 - 216)
〃	L-0-32	Water Level in Wetwell	(WWLS-303 - 315)
〃	L-0-33	Water Level in Wetwell	(WWLS-401 - 416)
〃	L-0-34	Water Level in Wetwell	(WWLS-503 - 515)
〃	L-0-35	Water Level in Wetwell	(WWLS-604 - 616)
〃	L-0-36	Water Level in Wetwell	(WWLS-704 - 716)
〃	L-0-37	Water Level in Wetwell	(WWLS-804 - 816)
〃	L-0-38	Water Level in Wetwell	(WWLS-221 - 228)

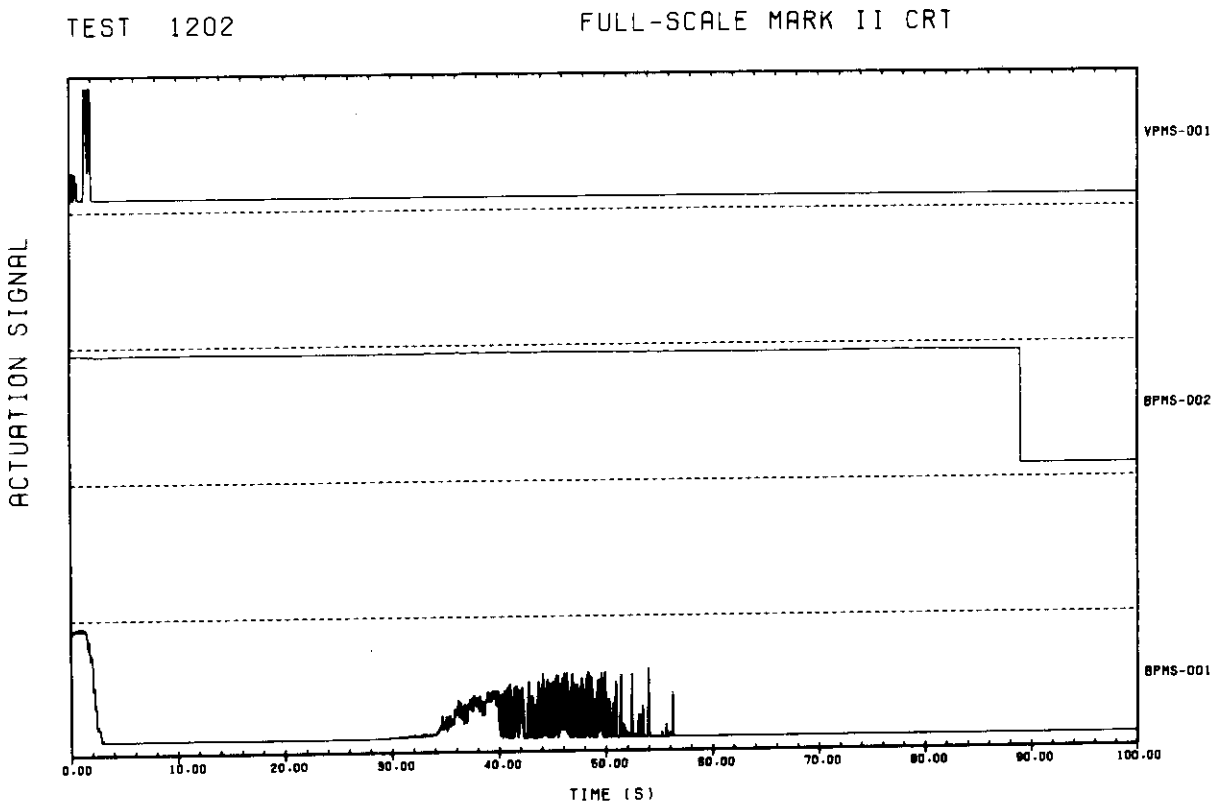
List of Long Term Plots (continued)

PCM Track-1 Channels

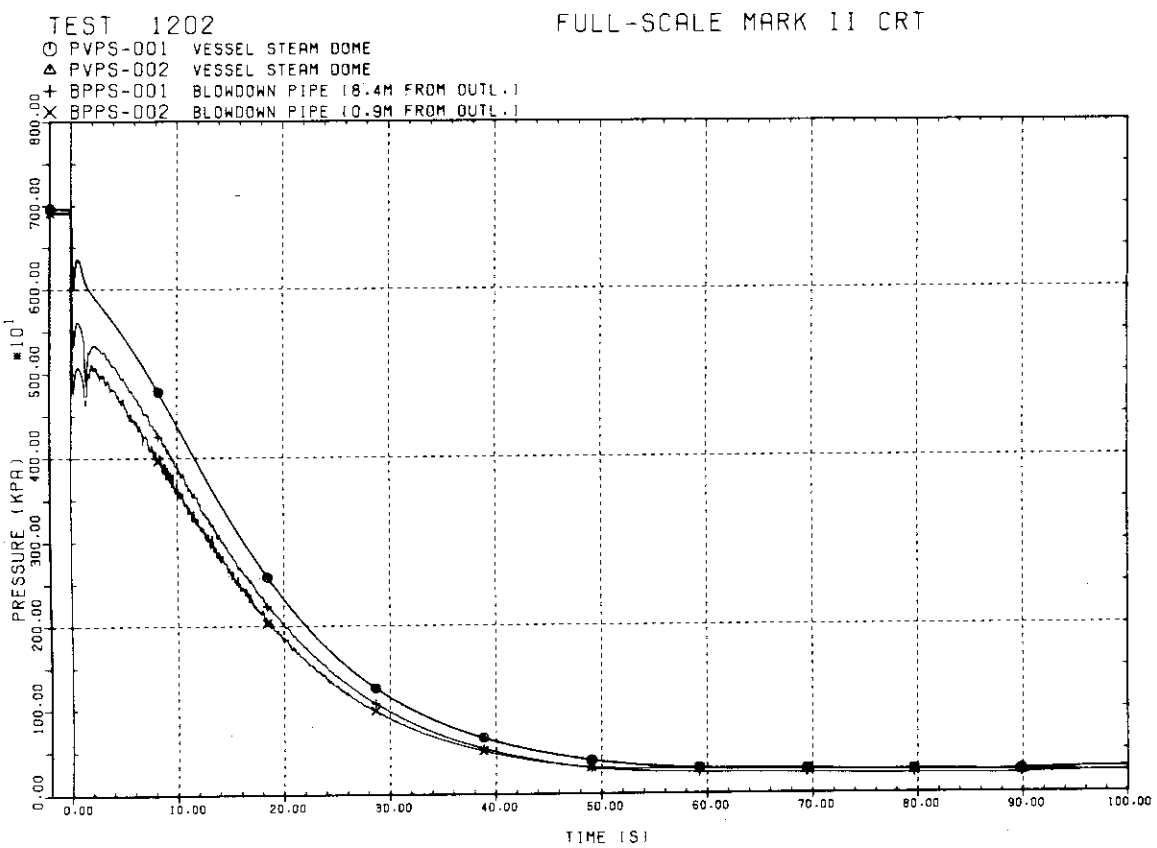
Plot	L-1-1	Pressures in Drywell and Wetwell Airspace	
〃	L-1-2	Pressure in Vent Pipe	(VPPF-101)
〃	L-1-3	Pressure in Vent Pipe	(VPPF-201)
〃	L-1-4	Pressure in Vent Pipe	(VPPF-301)
〃	L-1-5	Pressure in Vent Pipe	(VPPF-302)
〃	L-1-6	Pressure in Vent Pipe	(VPPF-303)
〃	L-1-7	Pressure in Vent Pipe	(VPPF-401)
〃	L-1-8	Pressure in Vent Pipe	(VPPF-501)
〃	L-1-9	Pressure in Vent Pipe	(VPPF-502)
〃	L-1-10	Pressure in Vent Pipe	(WWPF-503)
〃	L-1-11	Pressure in Wetwell	(WWPF-101)
〃	L-1-12	Pressure in Wetwell	(WWPF-102)
〃	L-1-13	Pressure in Wetwell	(WWPF-103)
〃	L-1-14	Pressure in Wetwell	(WWPF-104)
〃	L-1-15	Pressure in Wetwell	(WWPF-105)
〃	L-1-16	Pressure in Wetwell	(WWPF-106)
〃	L-1-17	Pressure in Wetwell	(WWPF-107)
〃	L-1-18	Pressure in Wetwell	(WWPF-201)
〃	L-1-19	Pressure in Wetwell	(WWPF-202)
〃	L-1-20	Pressure in Wetwell	(WWPF-203)
〃	L-1-21	Pressure in Wetwell	(WWPF-301)
〃	L-1-22	Pressure in Wetwell	(WWPF-302)
〃	L-1-23	Pressure in Wetwell	(WWPF-303)
〃	L-1-24	Pressure in Wetwell	(WWPF-401)
〃	L-1-25	Pressure in Wetwell	(WWPF-402)
〃	L-1-26	Pressure in Wetwell	(WWPF-501)
〃	L-1-27	Pressure in Wetwell	(WWPF-502)
〃	L-1-28	Pressure in Wetwell	(WWPF-602)
〃	L-1-29	Pressure in Wetwell	(WWPF-702)
〃	L-1-30	Strain of Vent Pipe Brace	(VPSF-101)
〃	L-1-31	Strain of Vent Pipe Brace	(VPSF-102)
〃	L-1-32	Strain of Vent Pipe Brace	(VPSF-201)

PCM Track-2 Channels

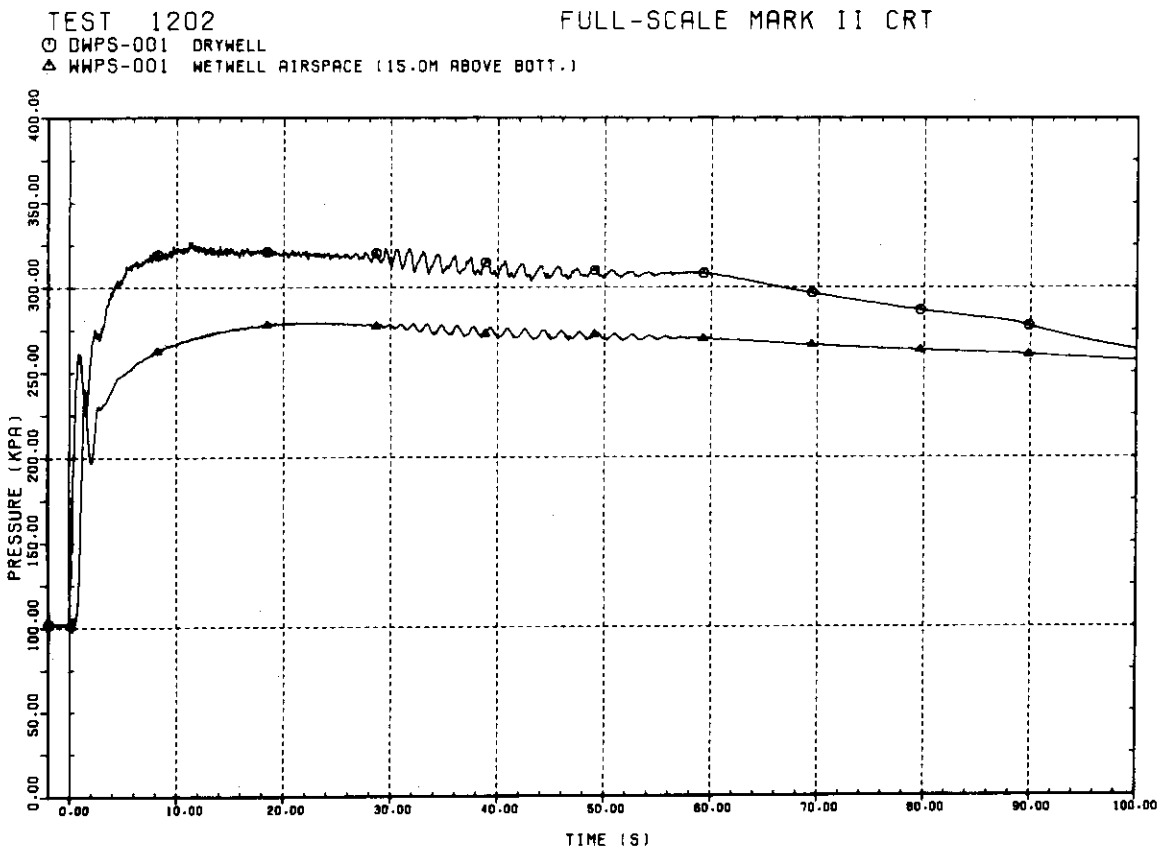
Plot	L-2-1	Acceleration of Vent Pipe Outlet	(VPAF-102)
〃	L-2-2	Acceleration of Vent Pipe Outlet	(VPAF-201)
〃	L-2-3	Acceleration of Containment Structure	(WWAF-005)
〃	L-2-4	Acceleration of Containment Structure	(WWAF-006)
〃	L-2-5	Acceleration of Containment Structure	(WWAF-007)
〃	L-2-6	Acceleration of Containment Structure	(WWAF-008)
〃	L-2-7	Acceleration of Containment Structure	(WWAF-009)
〃	L-2-8	Acceleration of Containment Structure	(WWAF-010)
〃	L-2-9	Acceleration of Containment Structure	(WWAF-012)
〃	L-2-10	Phase Boundary Signals	(WWLF-101 - 108)
〃	L-2-11	Phase Boundary Signals	(WWLF-201 - 209)
〃	L-2-12	Phase Boundary Signals	(WWLF-301 - 308)



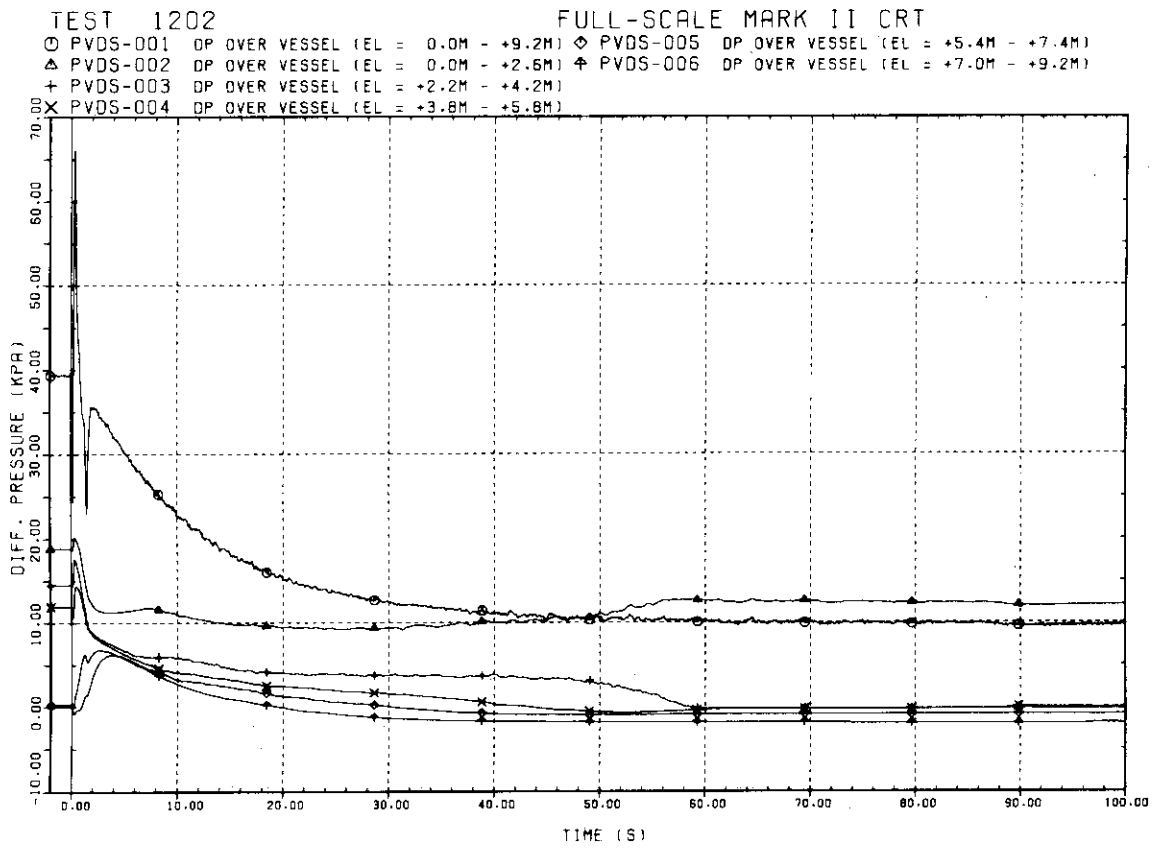
Plot L-0-1 Actuation Signals



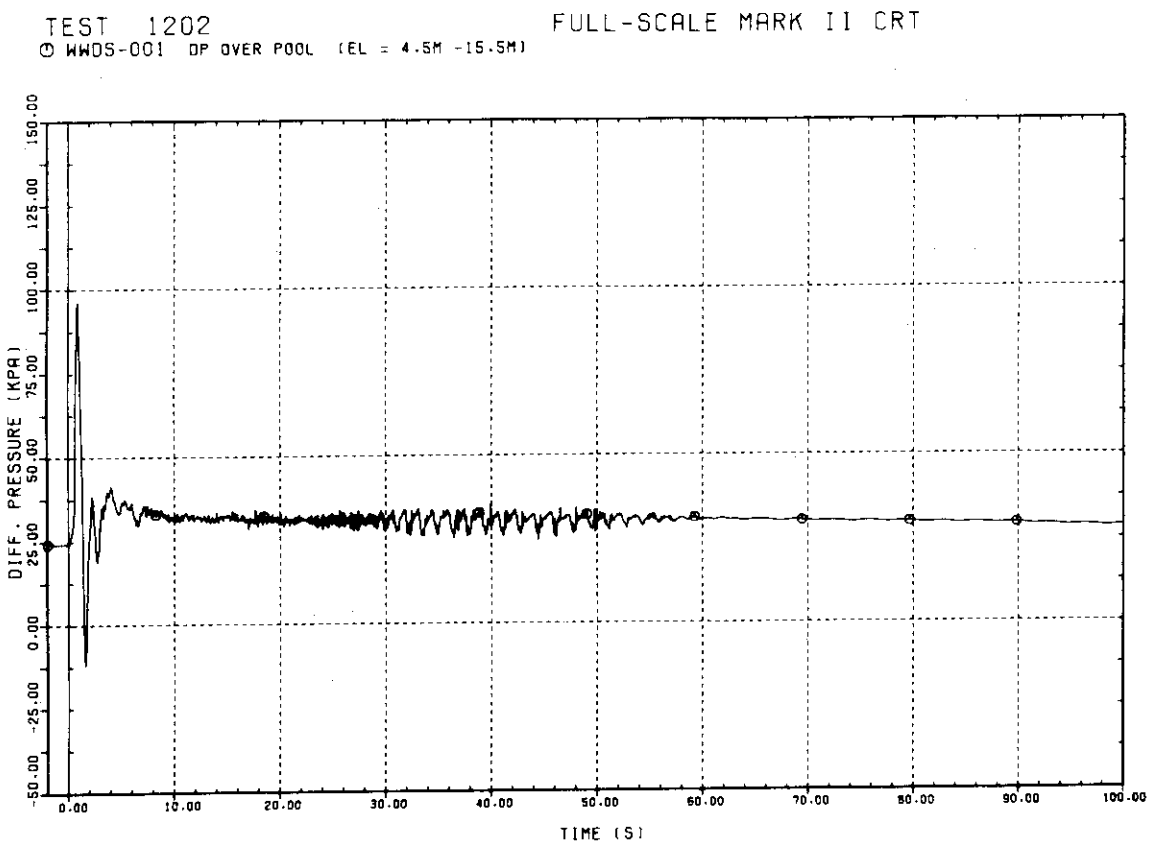
Plot L-0-2 Pressures in Pressure Vessel and Blowdown Pipe



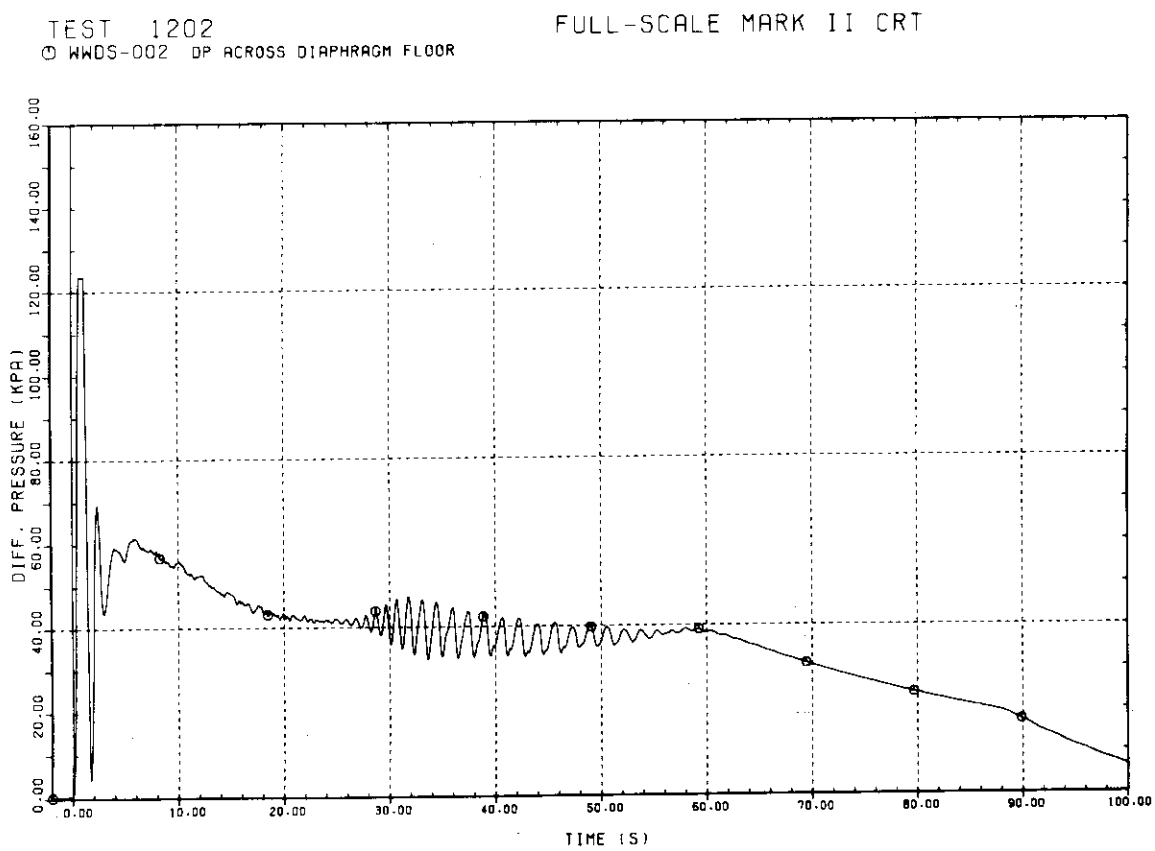
Plot L-0-3 Pressures in Drywell and Wetwell Airspace



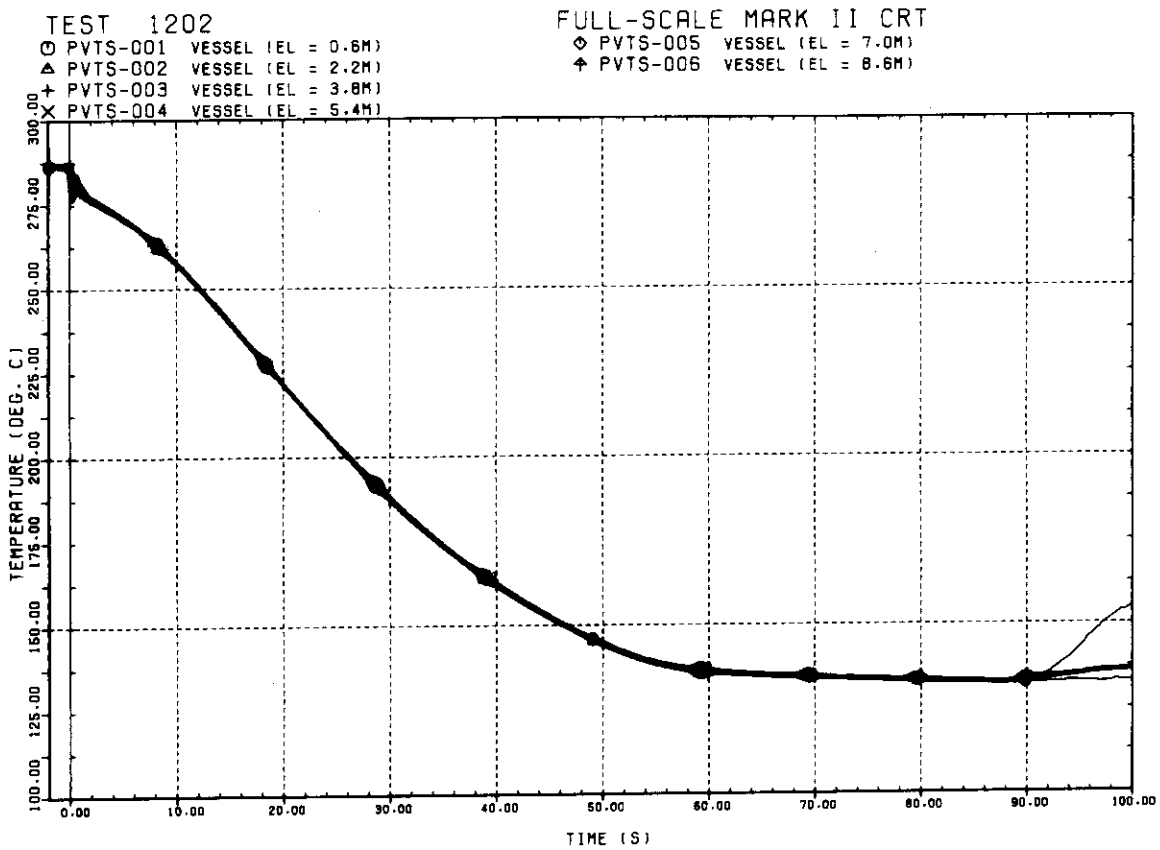
Plot L-0-4 Differential Pressures Over Vessel



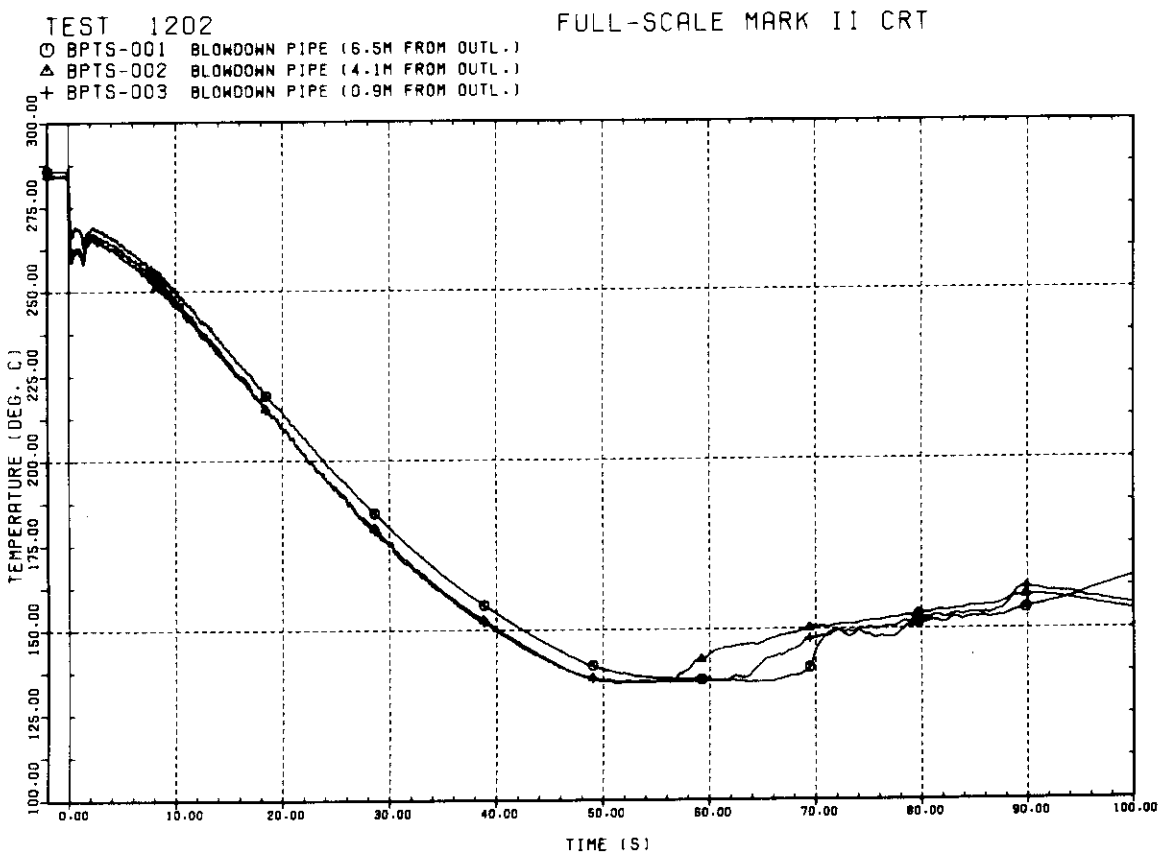
Plot L-0-5 Differential Pressure across Pool Surface



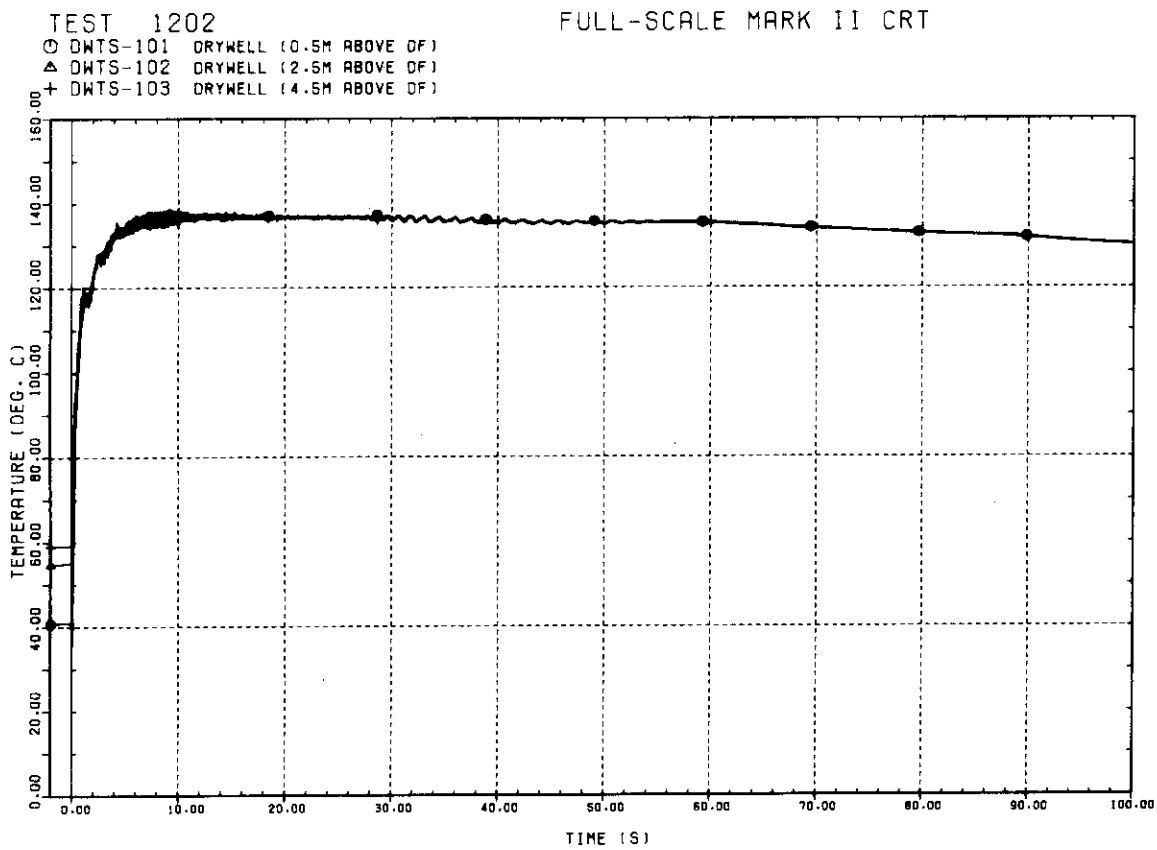
Plot L-0-6 Differential Pressure across Diaphragm Floor



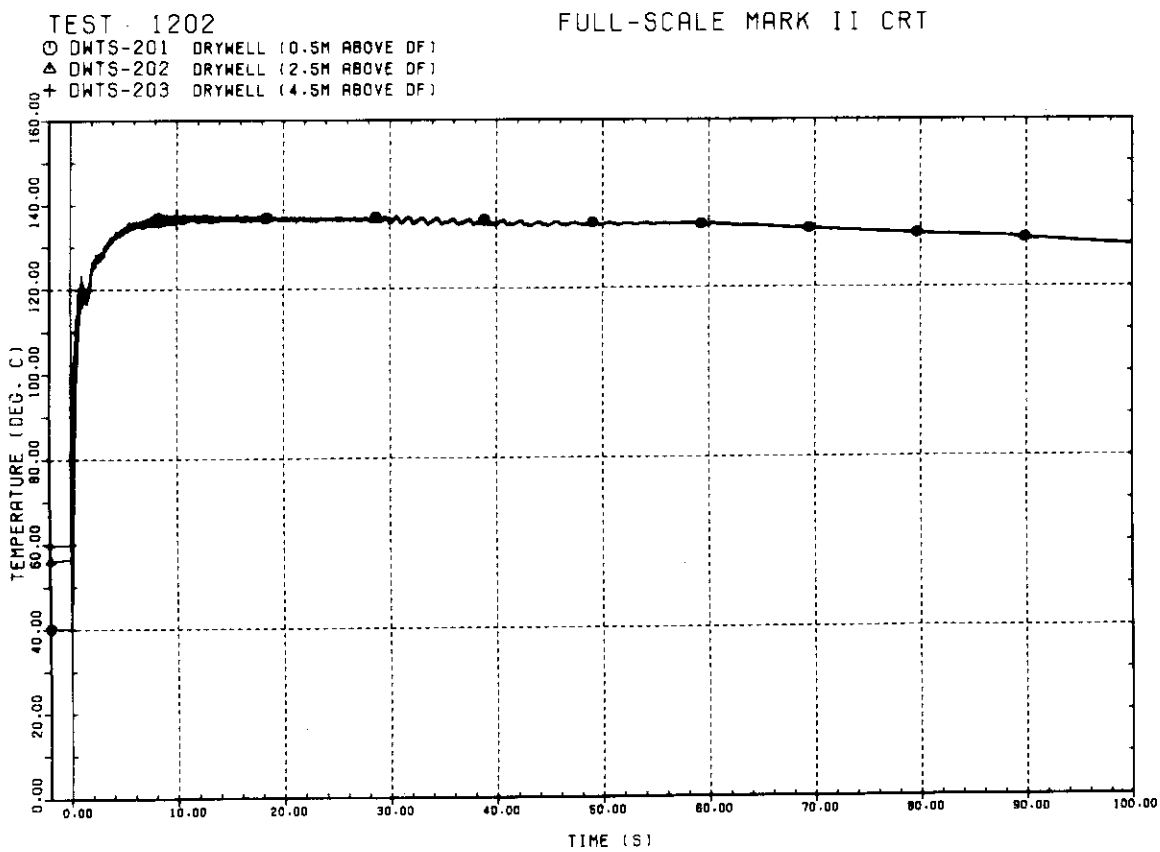
Plot L-0-7 Temperatures in Vessel



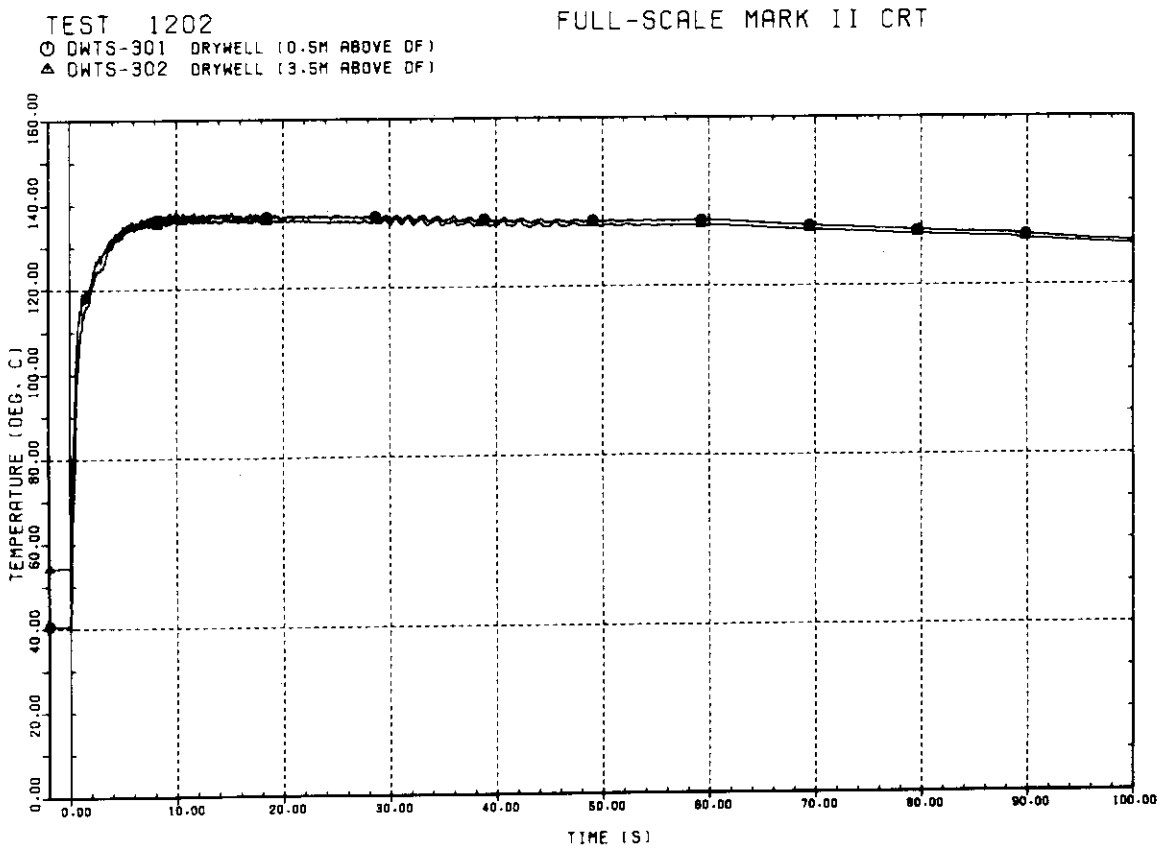
Plot L-0-8 Temperatures in Blowdown Pipe



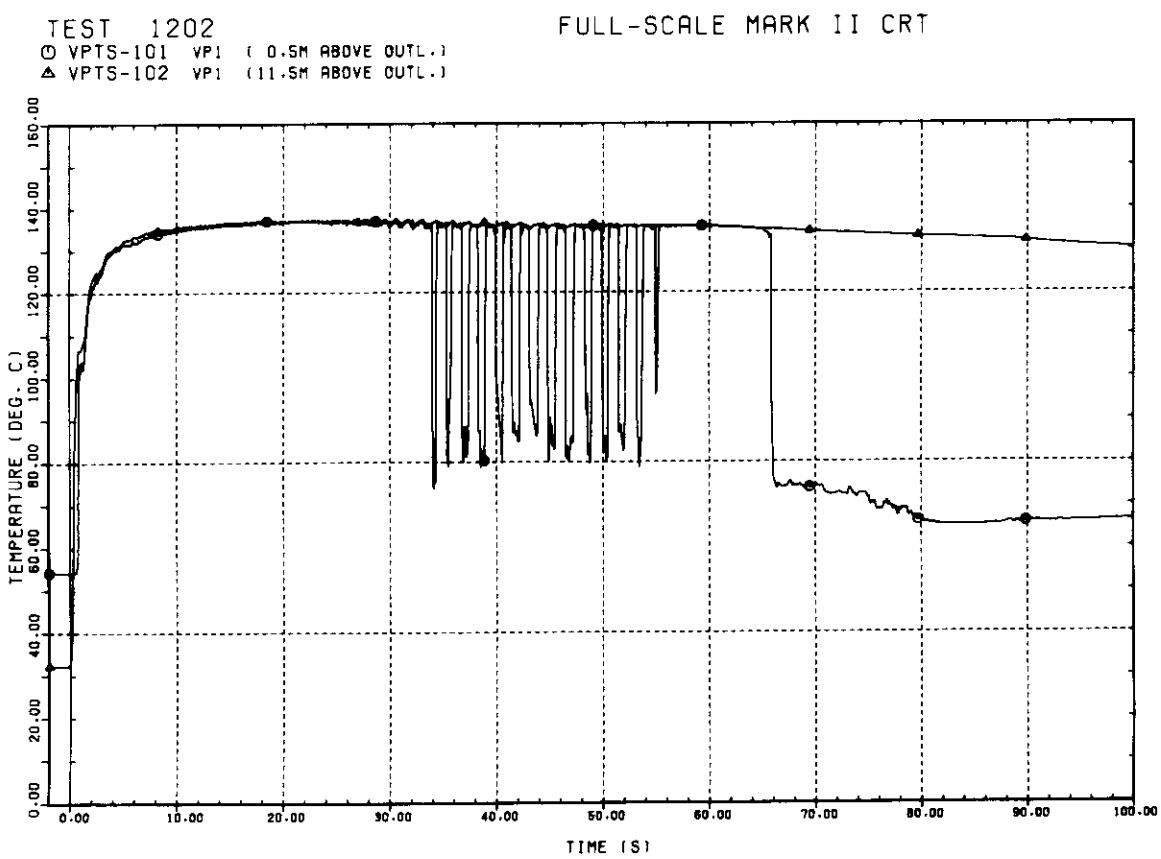
Plot L-0-9 Temperatures in Drywell



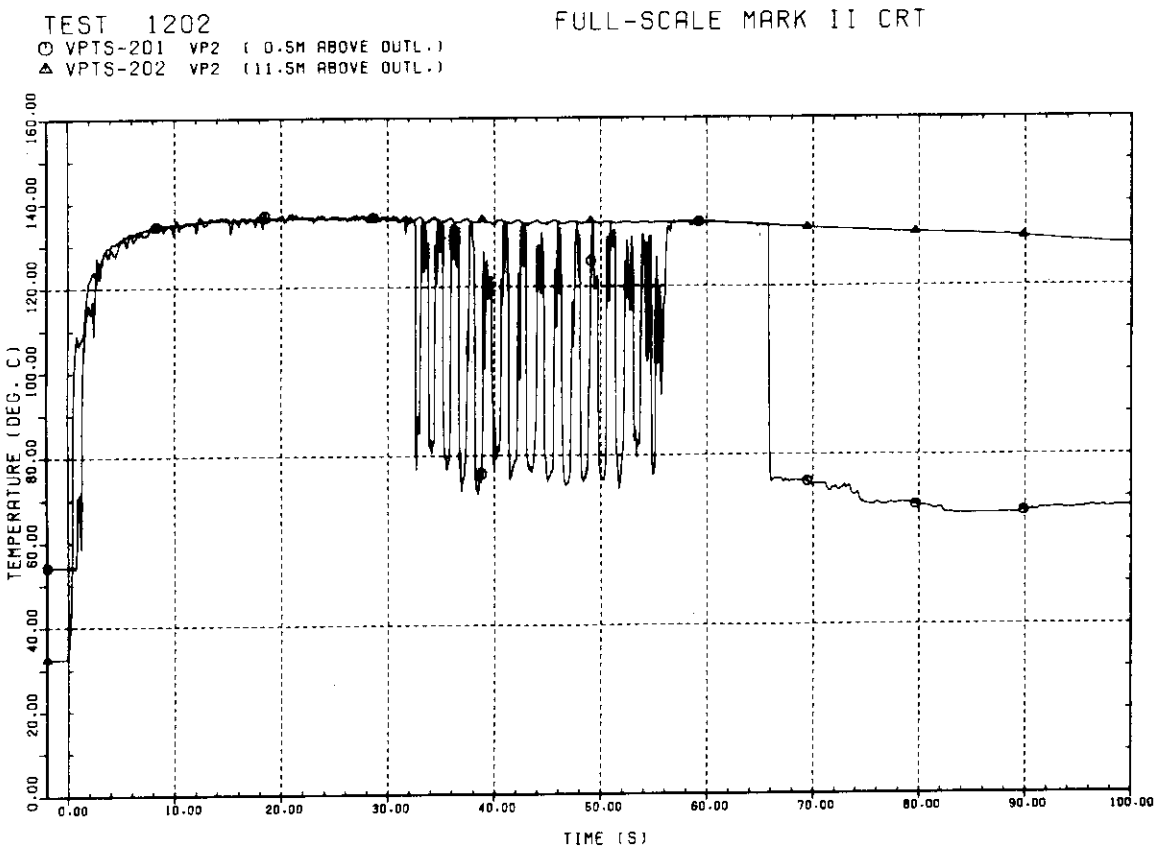
Plot L-0-10 Temperatures in Drywell



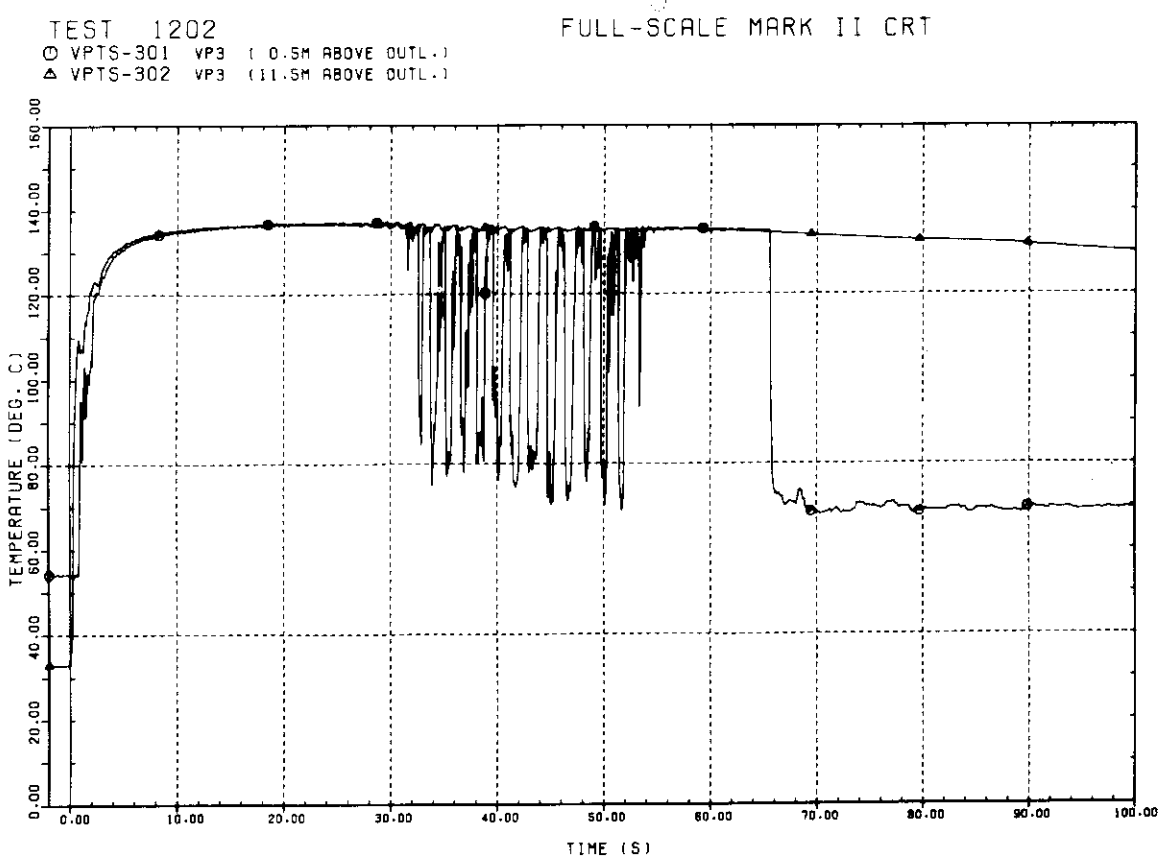
Plot L-0-11 Temperatures in Drywell



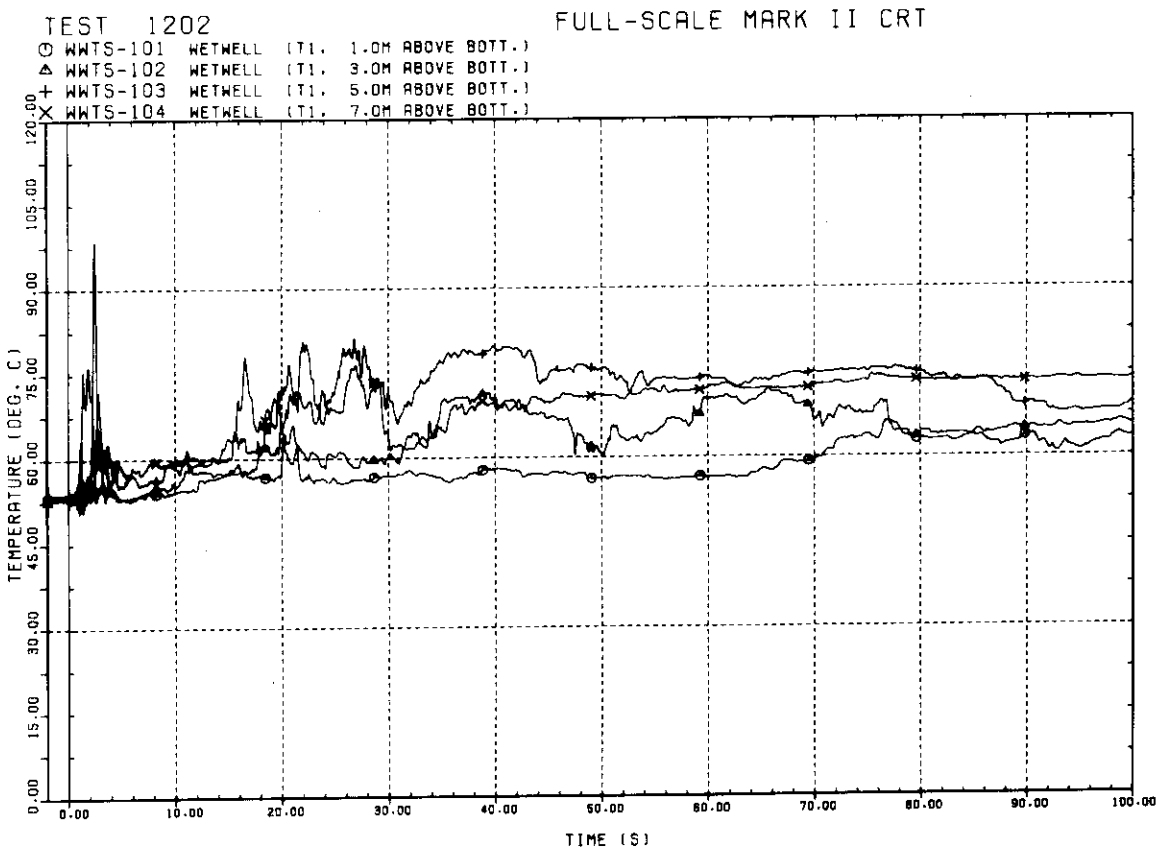
Plot L-0-12 Temperatures in Vent Pipe



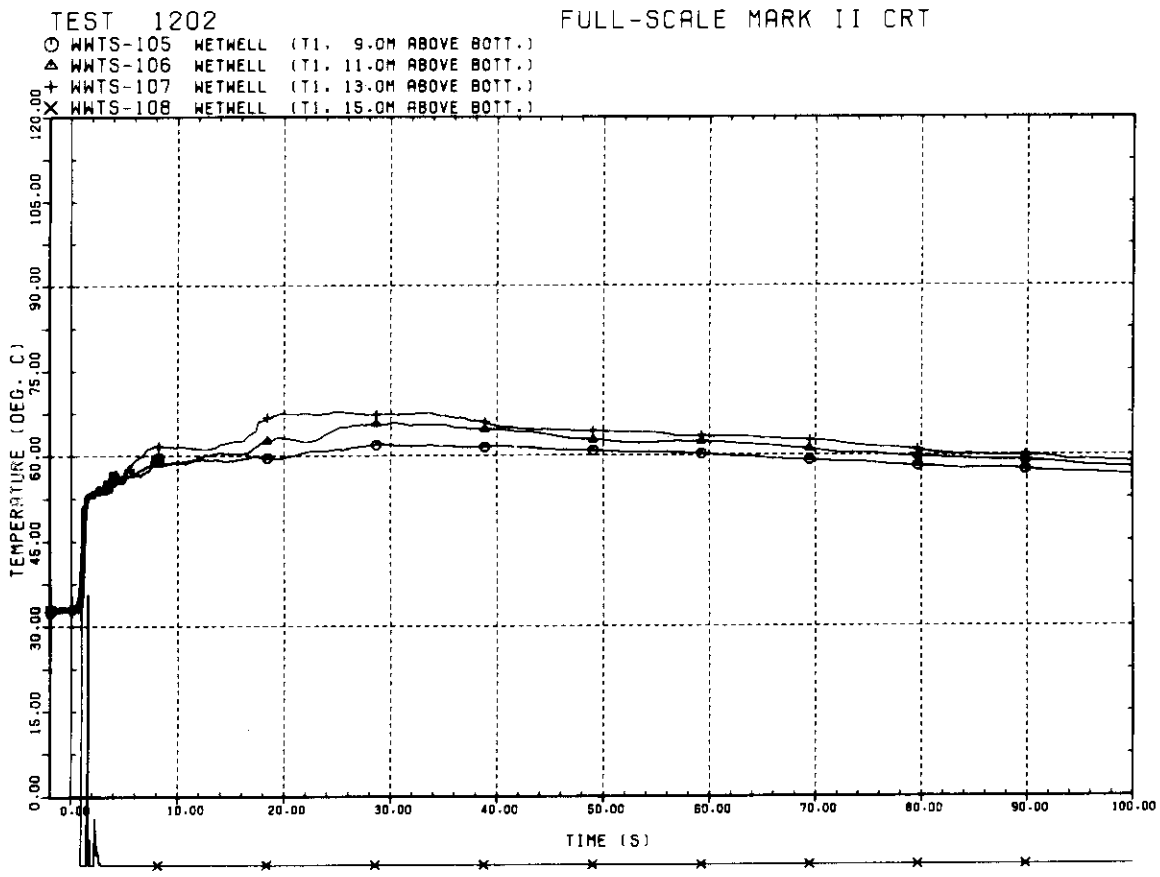
Plot L-0-13 Temperatures in Vent Pipe



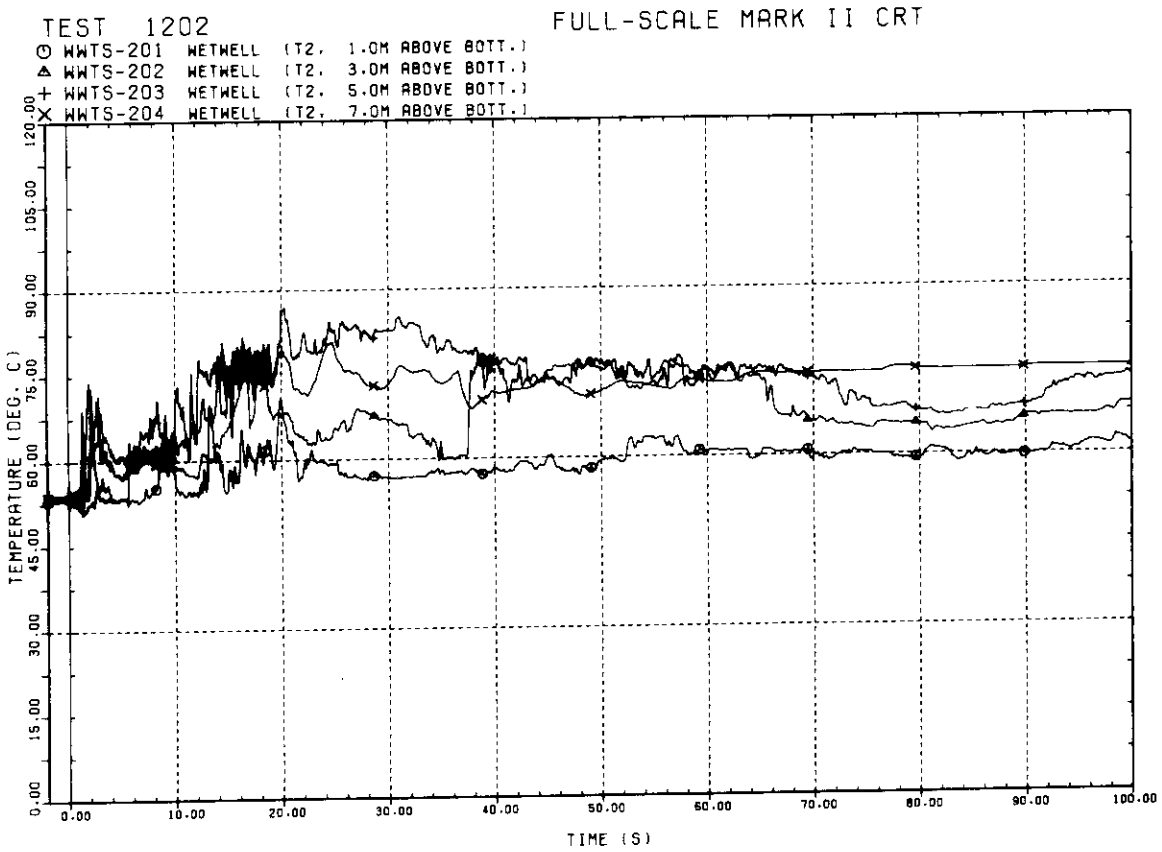
Plot L-0-14 Temperatures in Vent Pipe



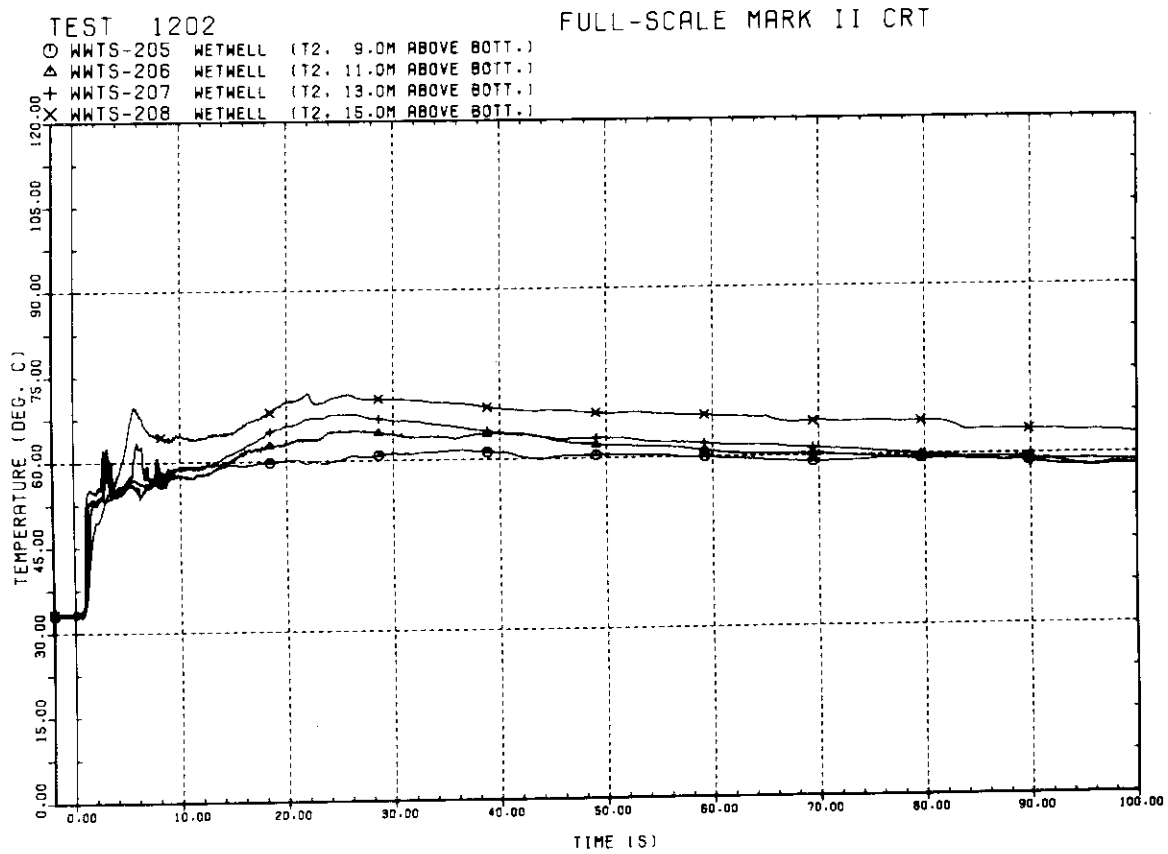
Plot L-O-15 Temperatures in Wetwell



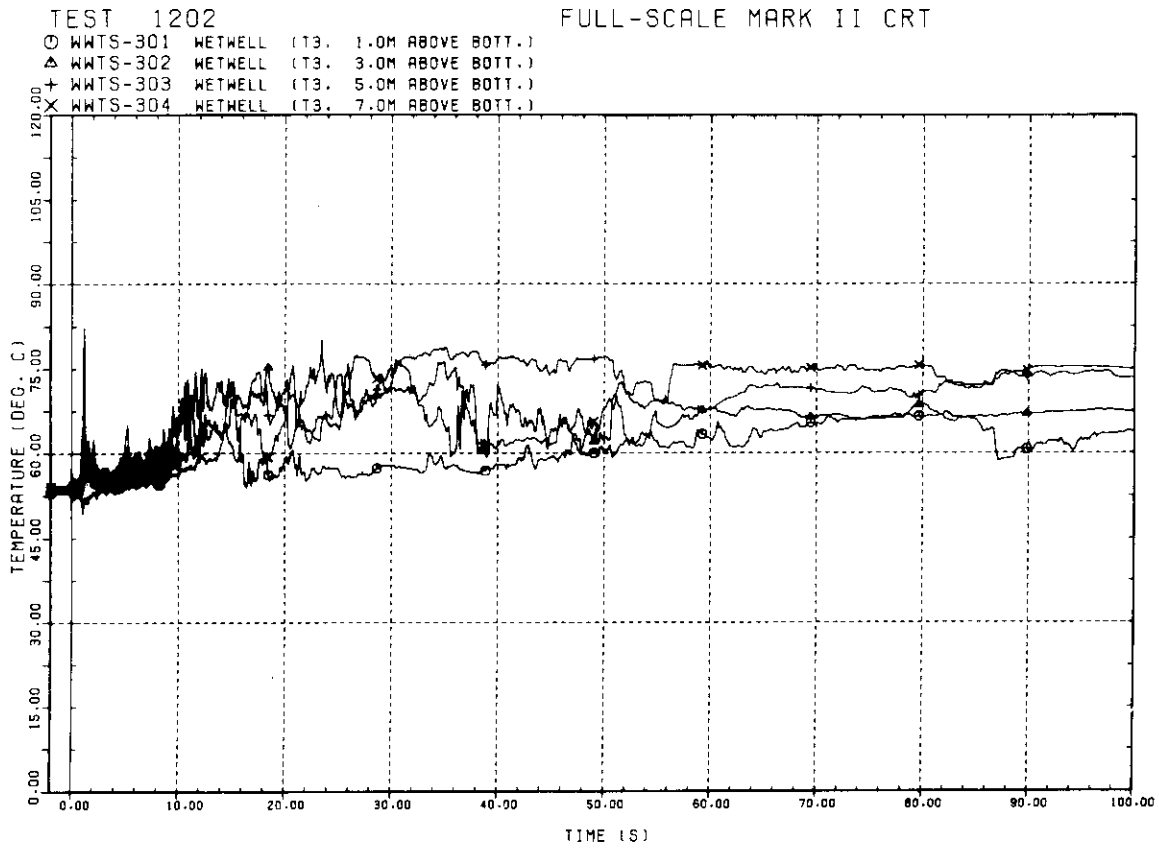
Plot L-O-16 Temperatures in Wetwell



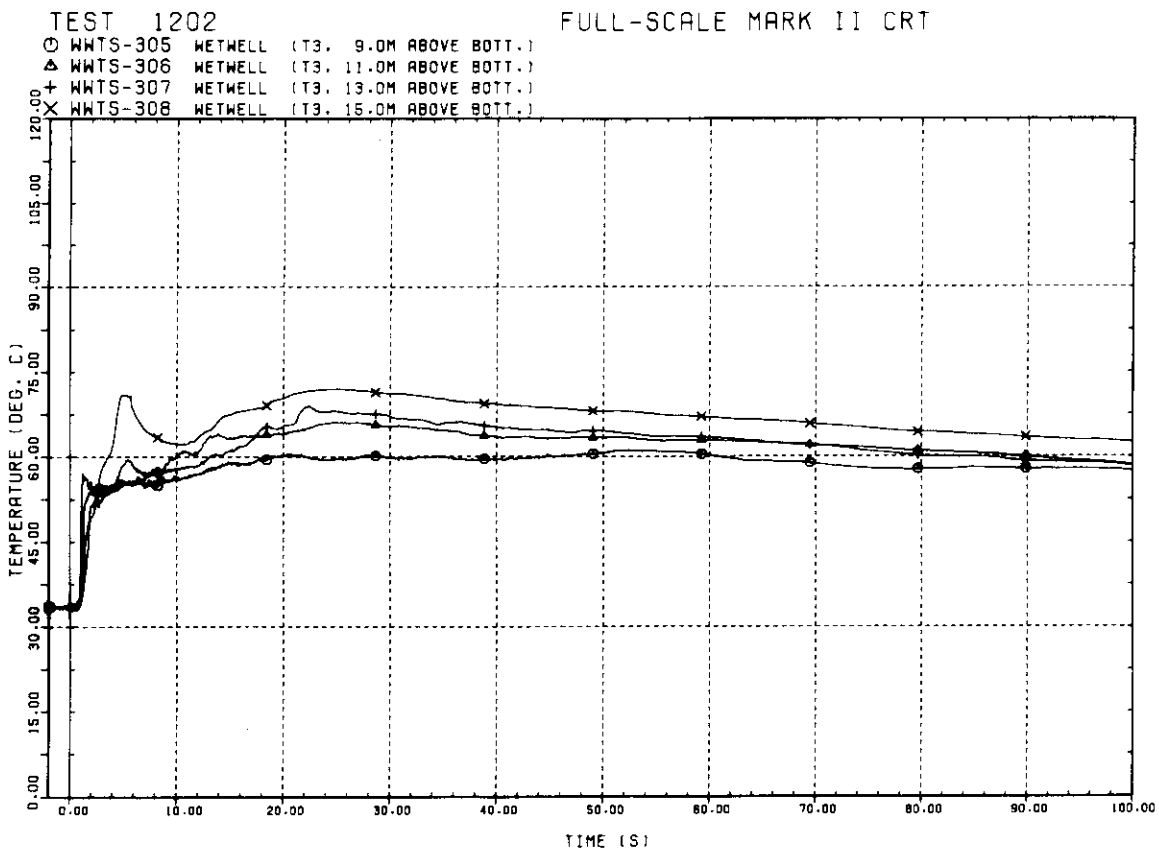
Plot-L-O-17 Temperatures in Wetwell



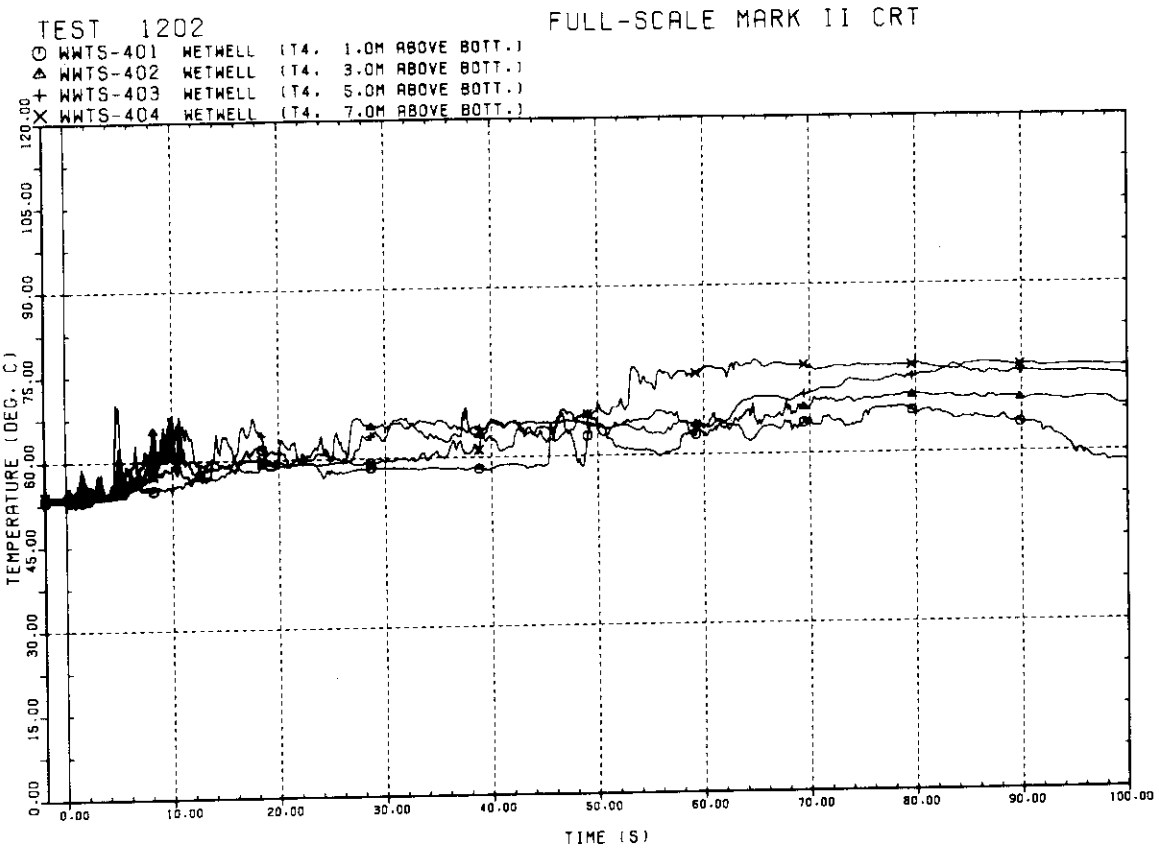
Plot L-O-18 Temperatures in Wetwell



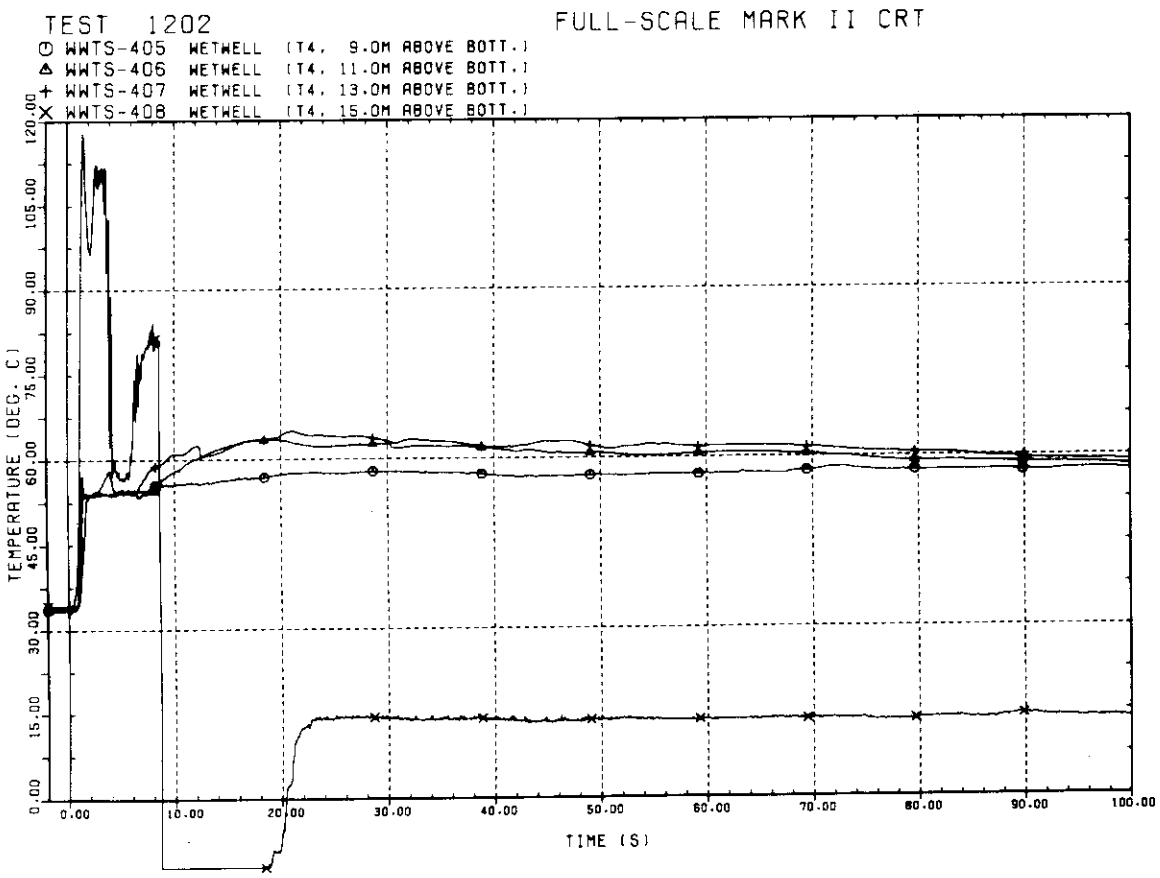
Plot L-O-19 Temperatures in Wetwell



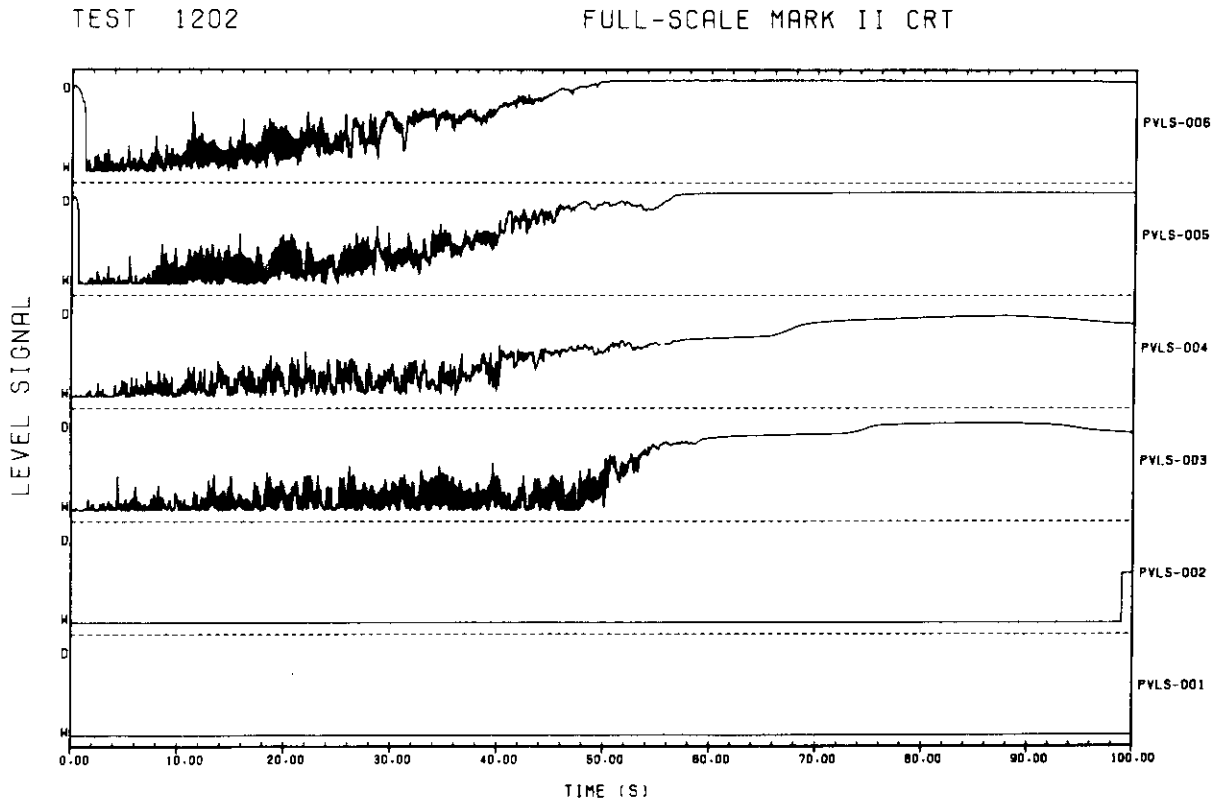
Plot L-O-20 Temperatures in Wetwell



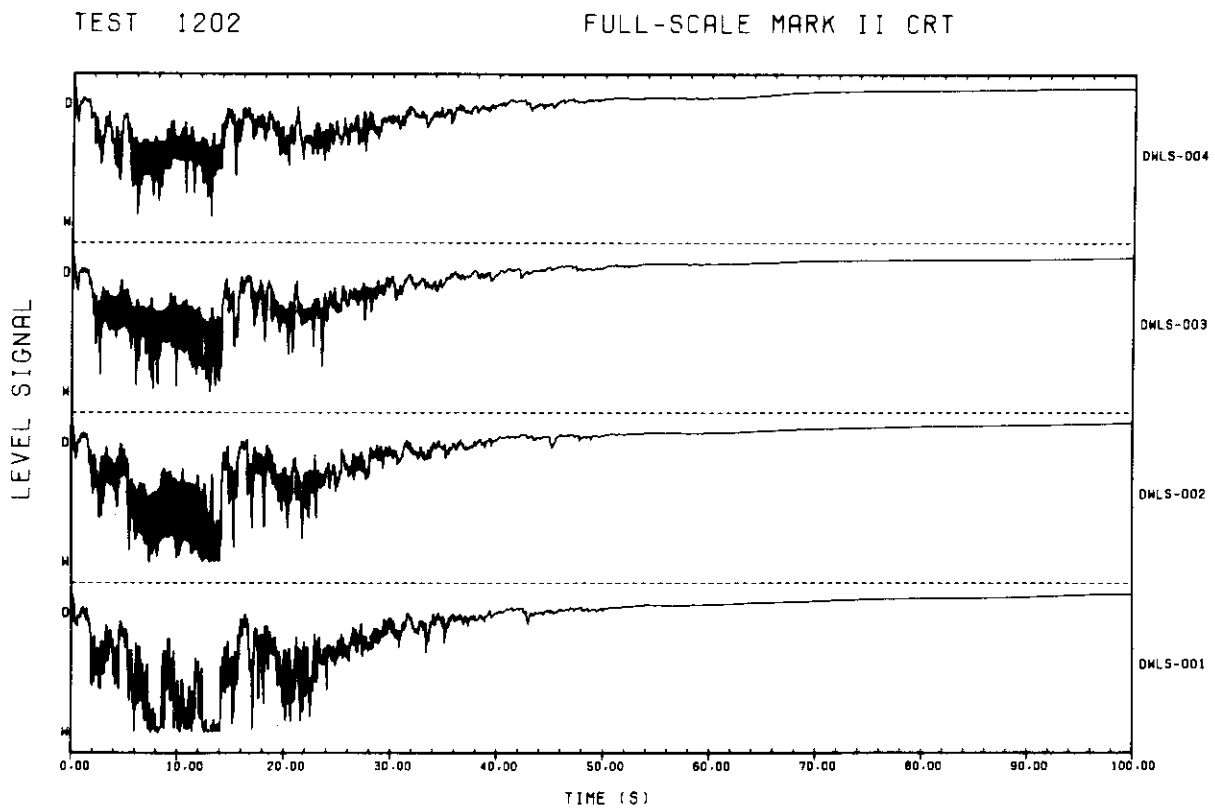
Plot L-O-21 Temperatures in Wetwell



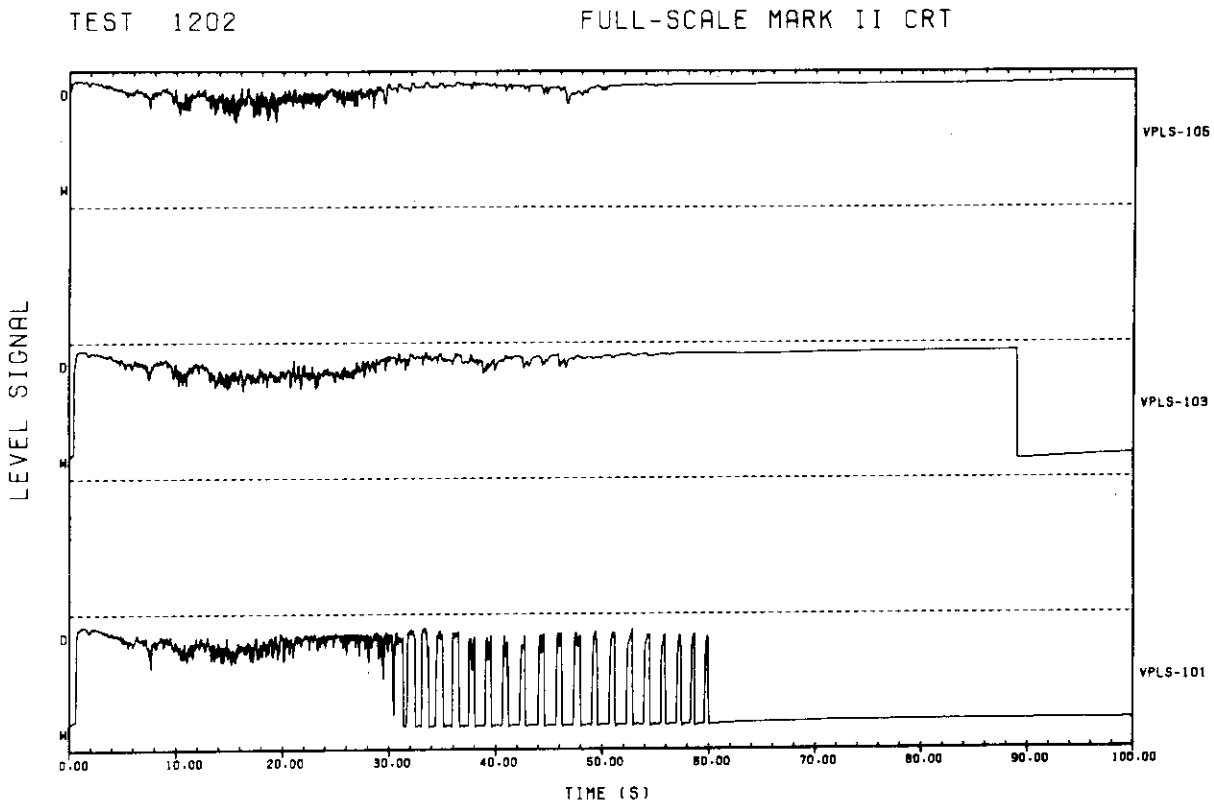
Plot L-O-22 Temperatures in Wetwell



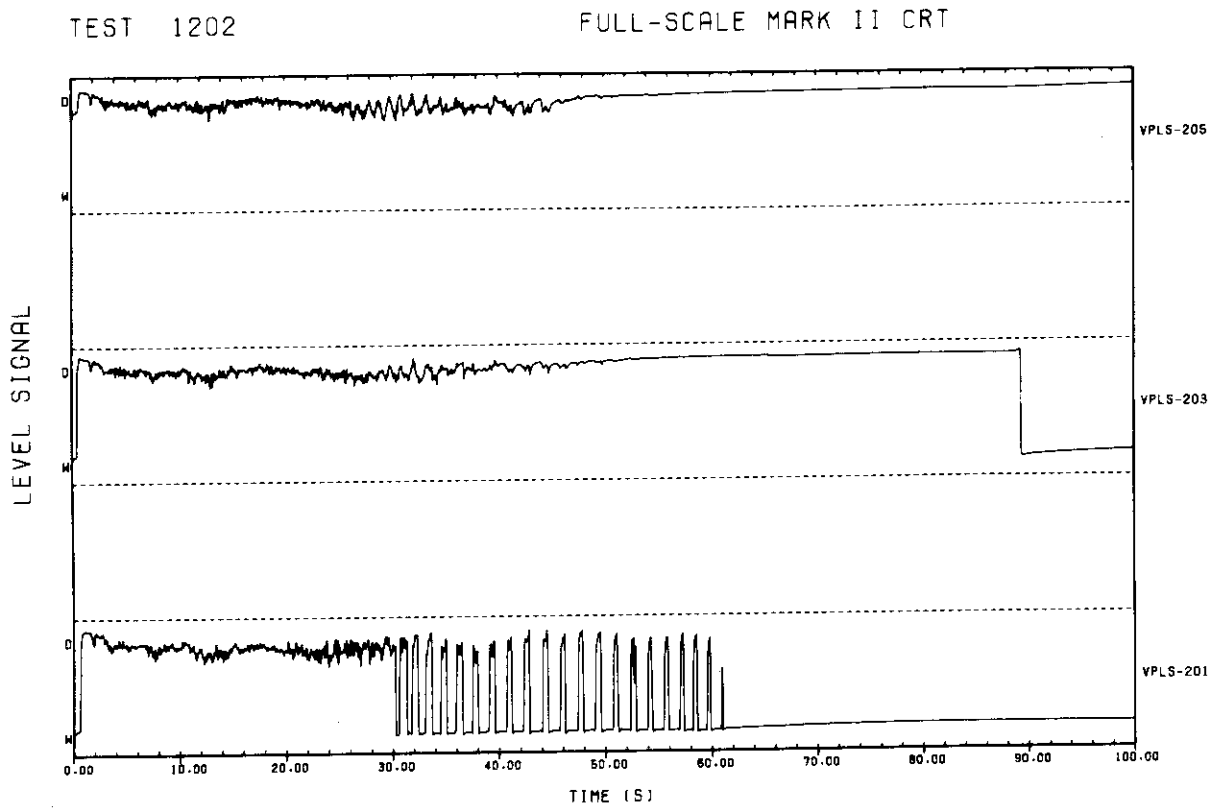
Plot L-O-23 Water Level in Vessel



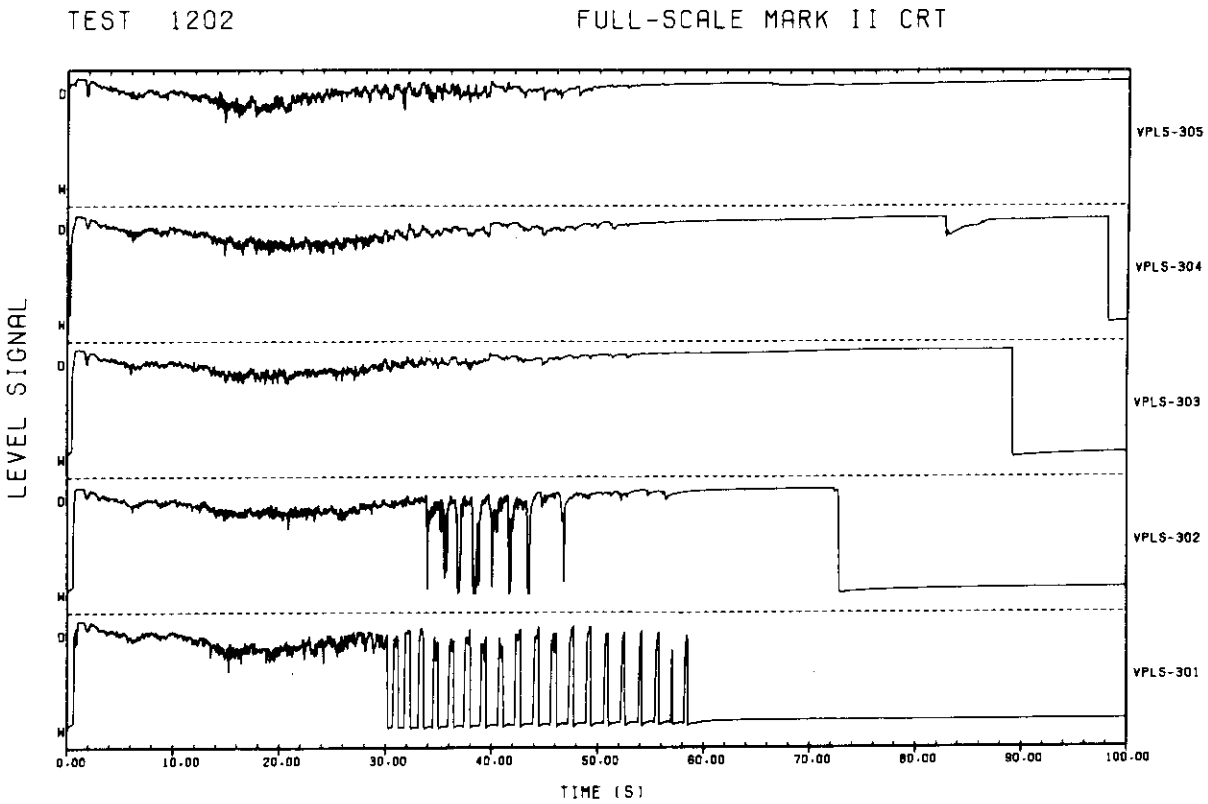
Plot L-O-24 Water Level in Drywell



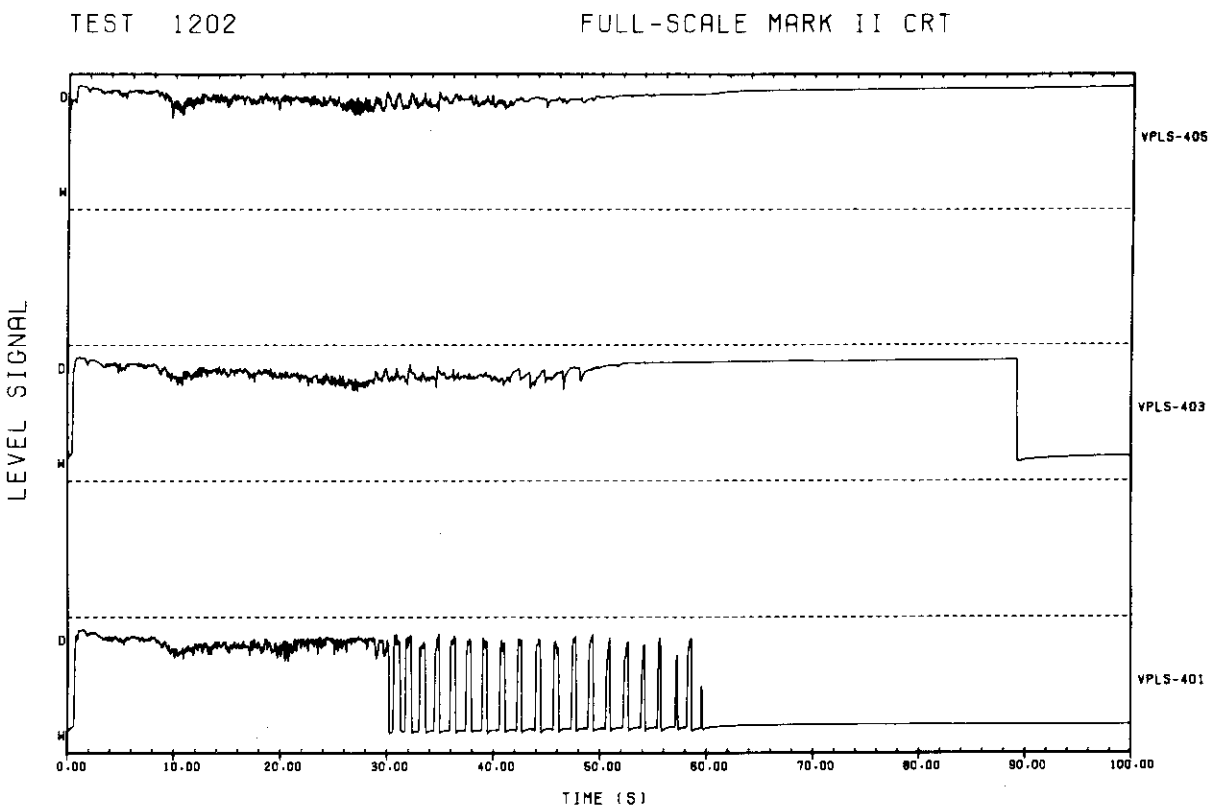
Plot L-O-25 Water Level in Vent Pipe



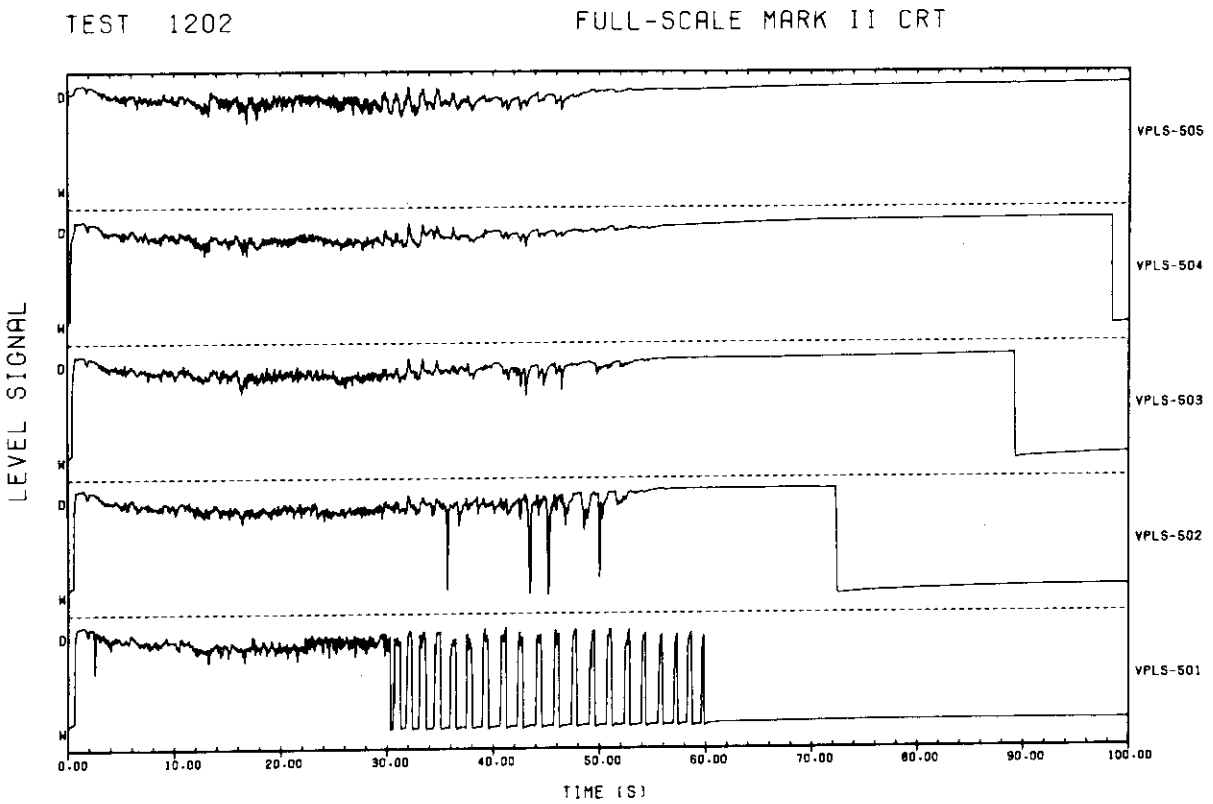
Plot L-O-26 Water Level in Vent Pipe



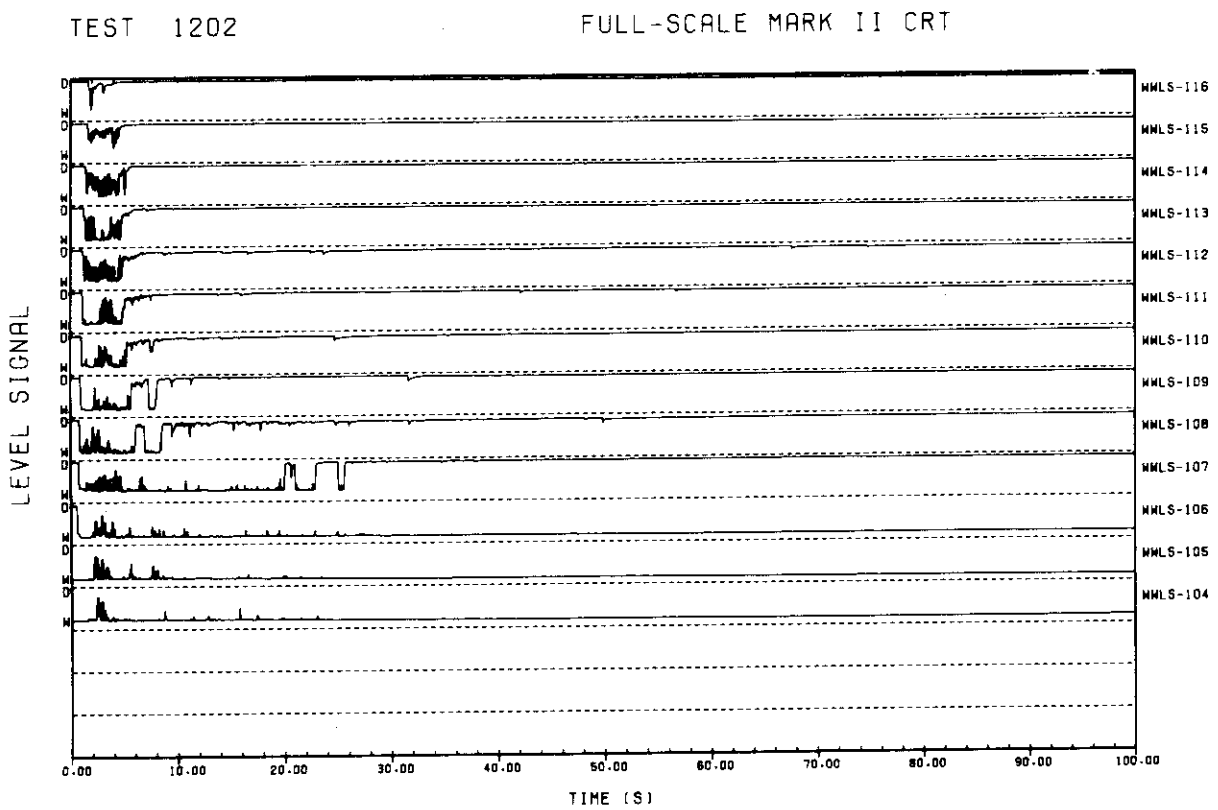
Plot L-O-27 Water Level in Vent Pipe



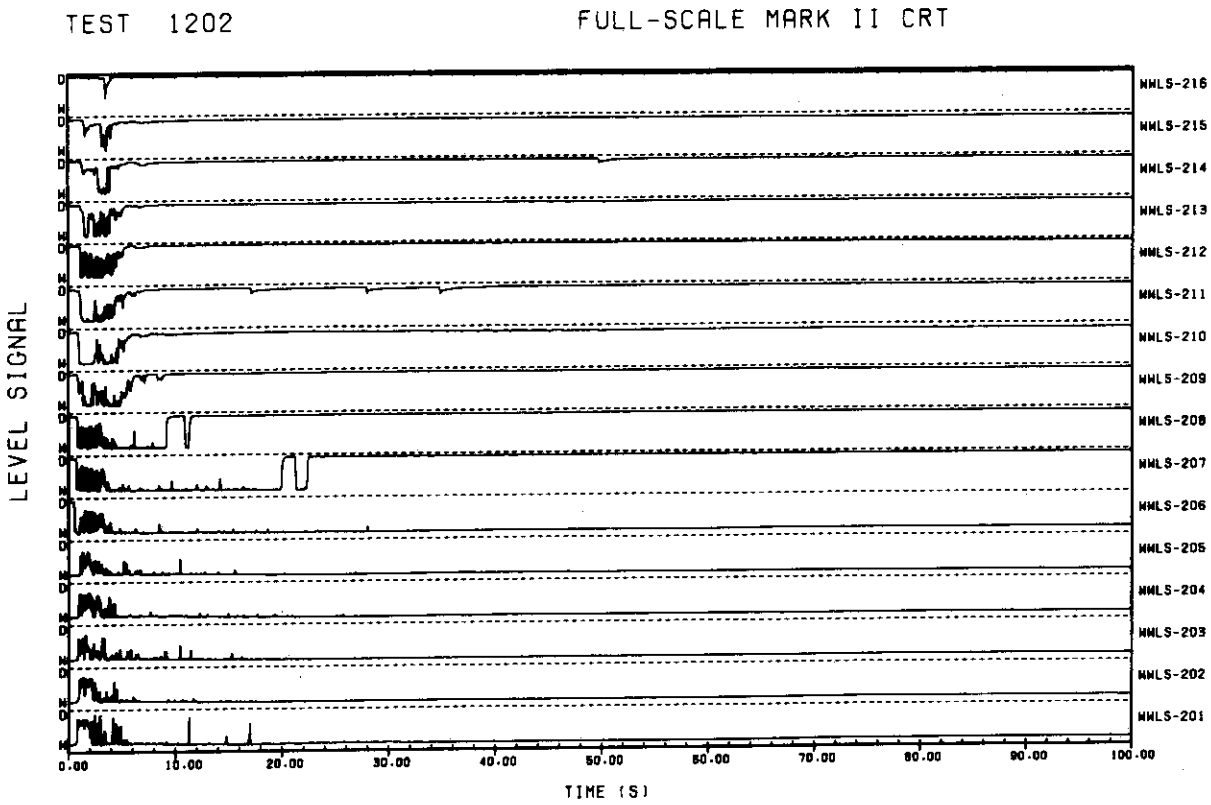
Plot L-O-28 Water Level in Vent Pipe



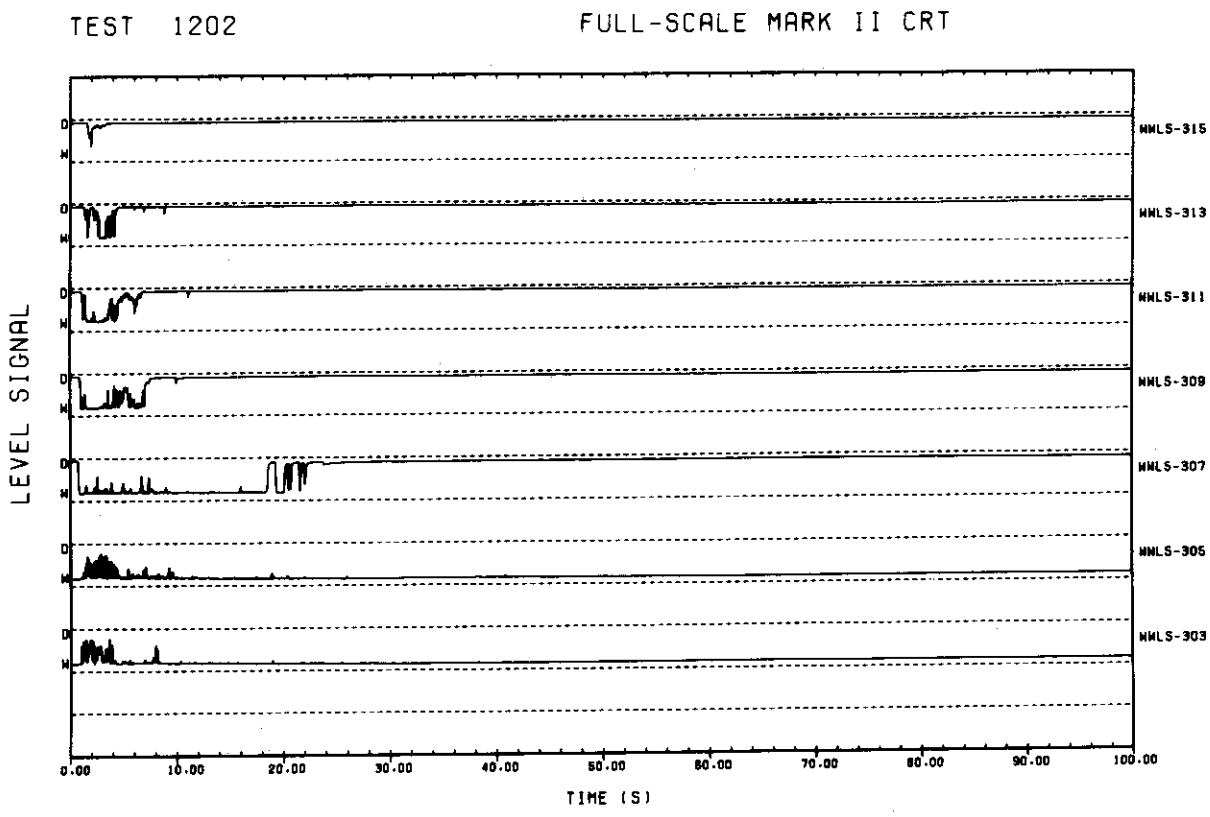
Plot L-O-29 Water Level in Vent Pipe



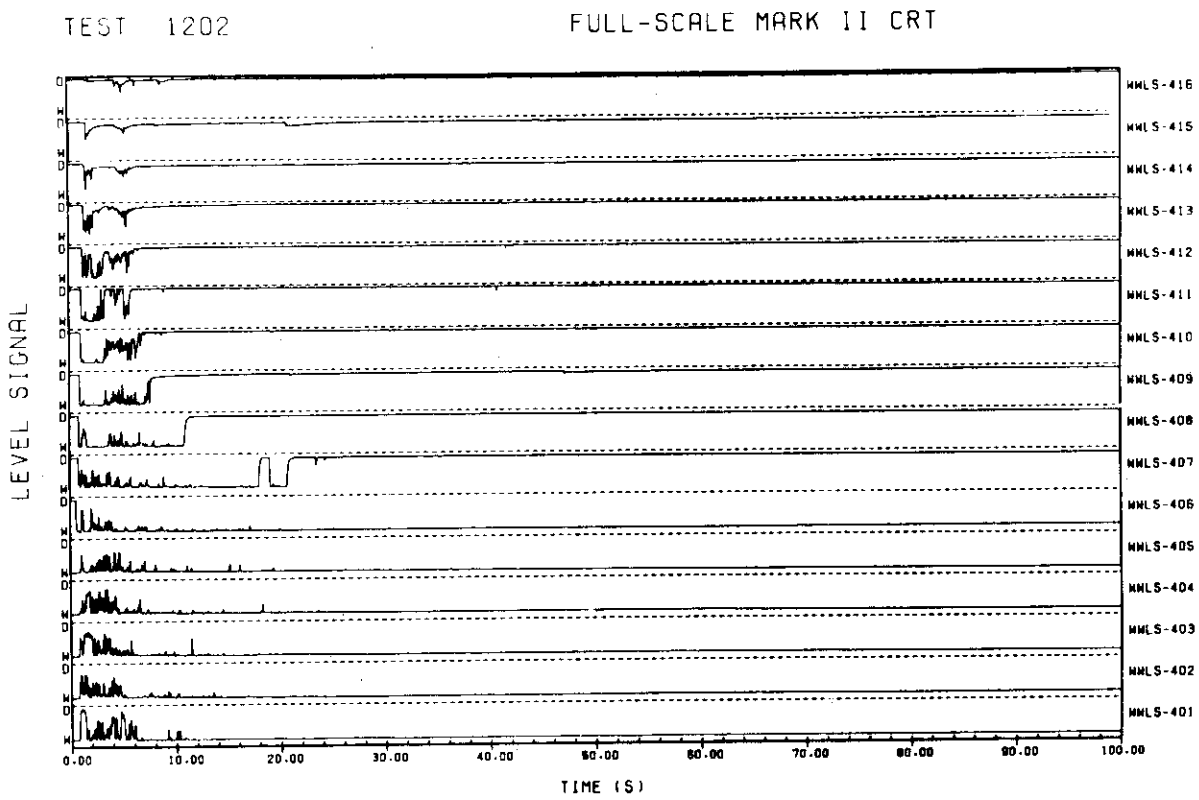
Plot L-O-30 Water Level in Wetwell



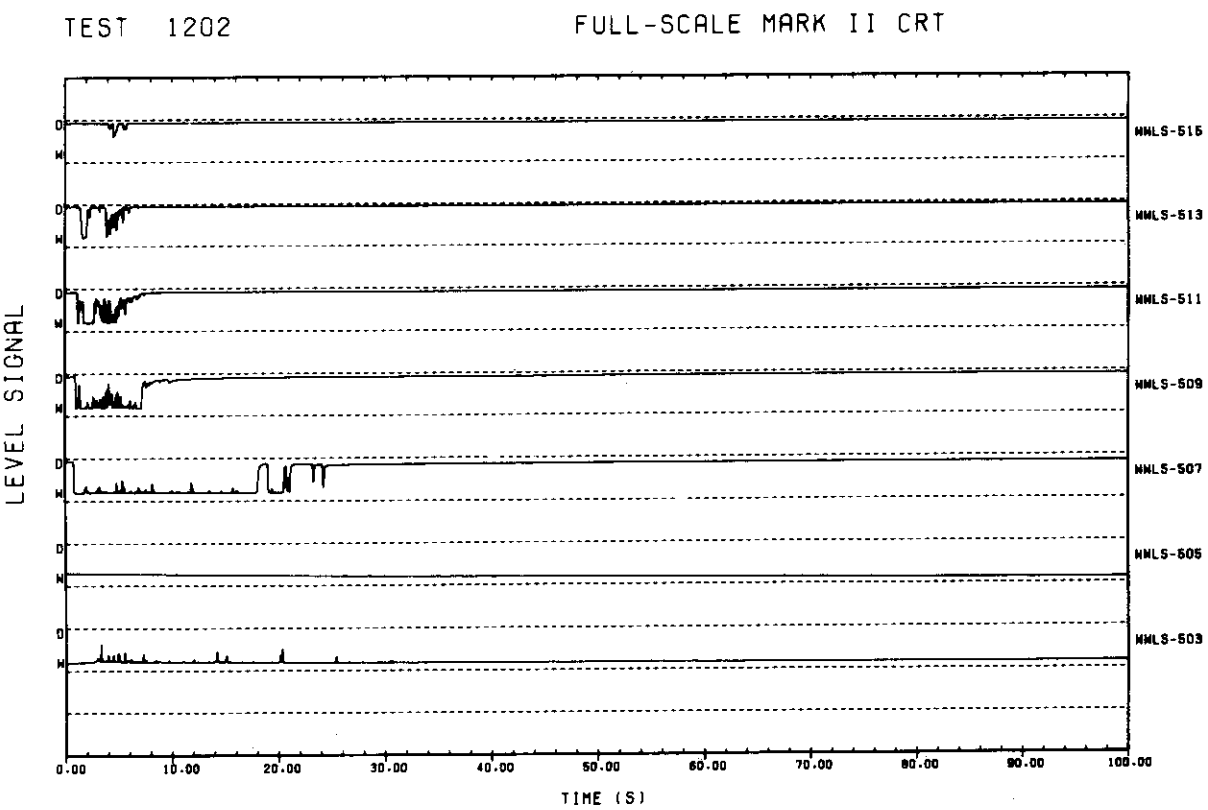
Plot L-O-31 Water Level in Wetwell



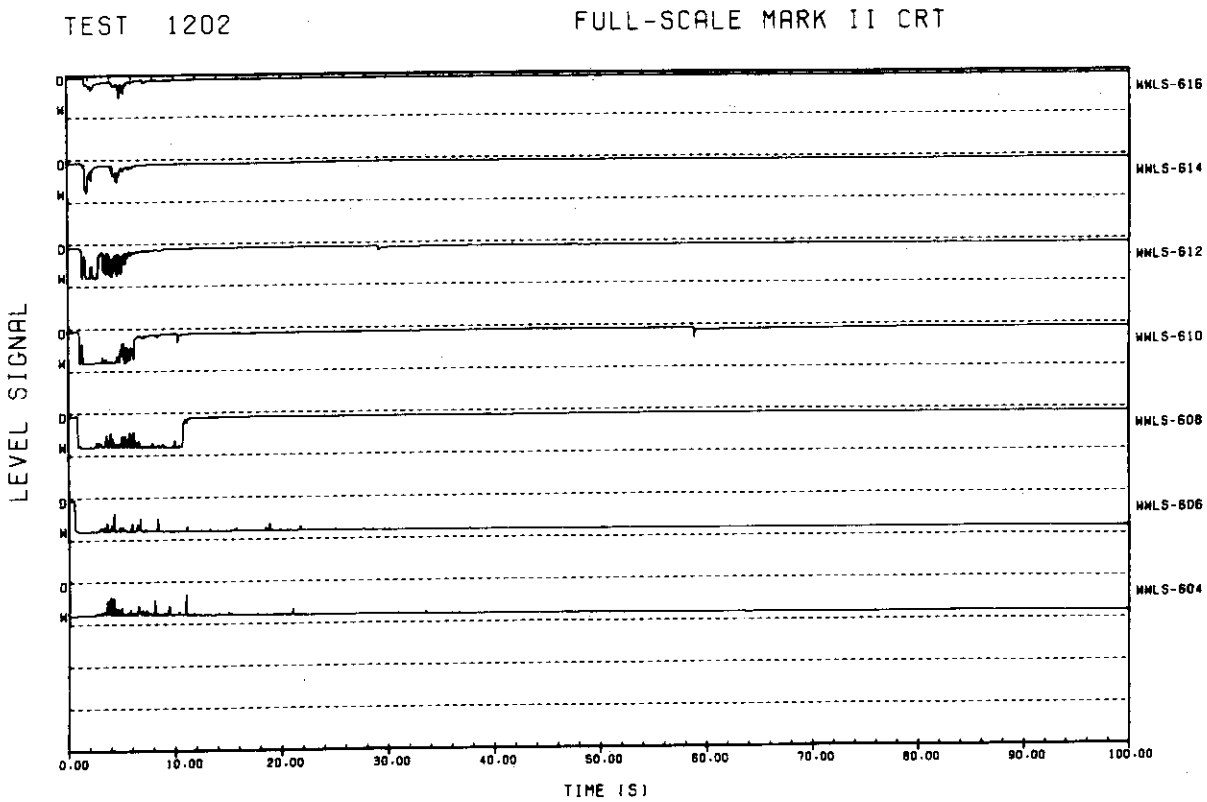
Plot L-O-32 Weter Level in Wetwell



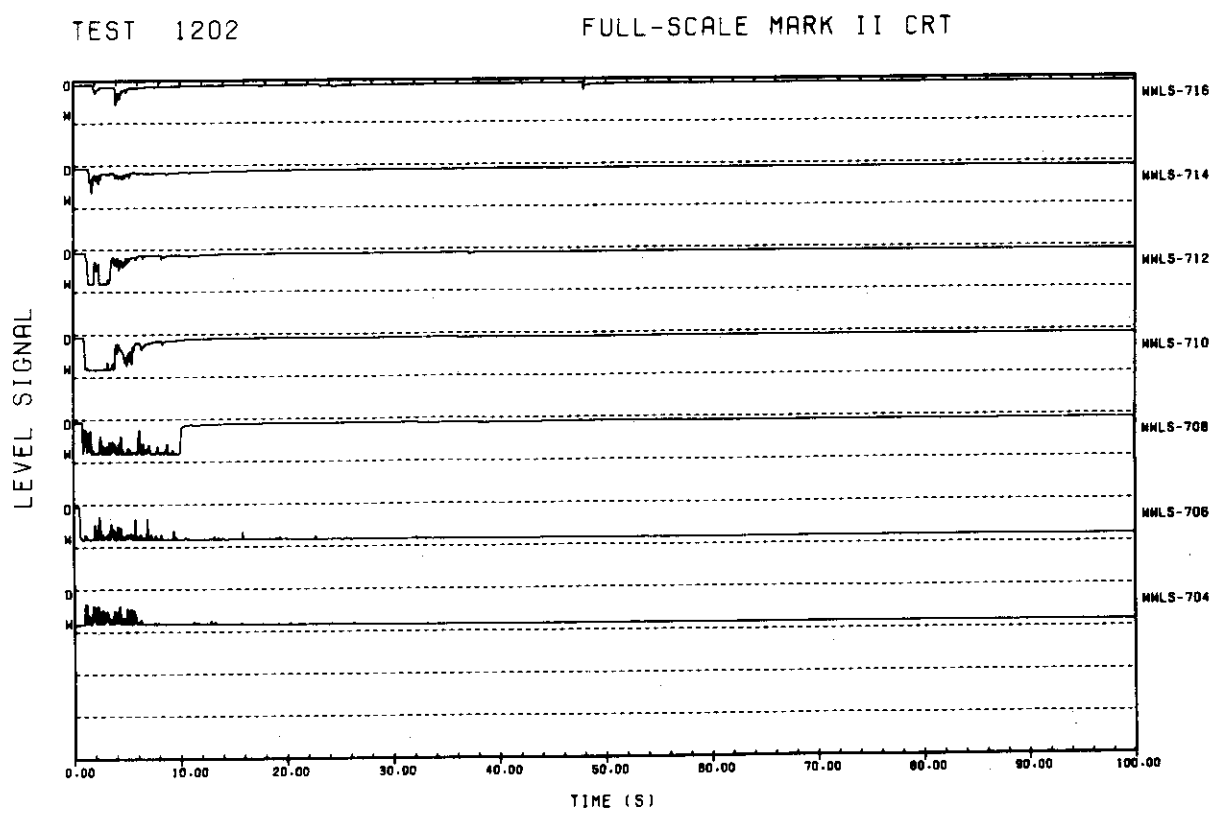
Plot L-O-33 Water Level in Wetwell



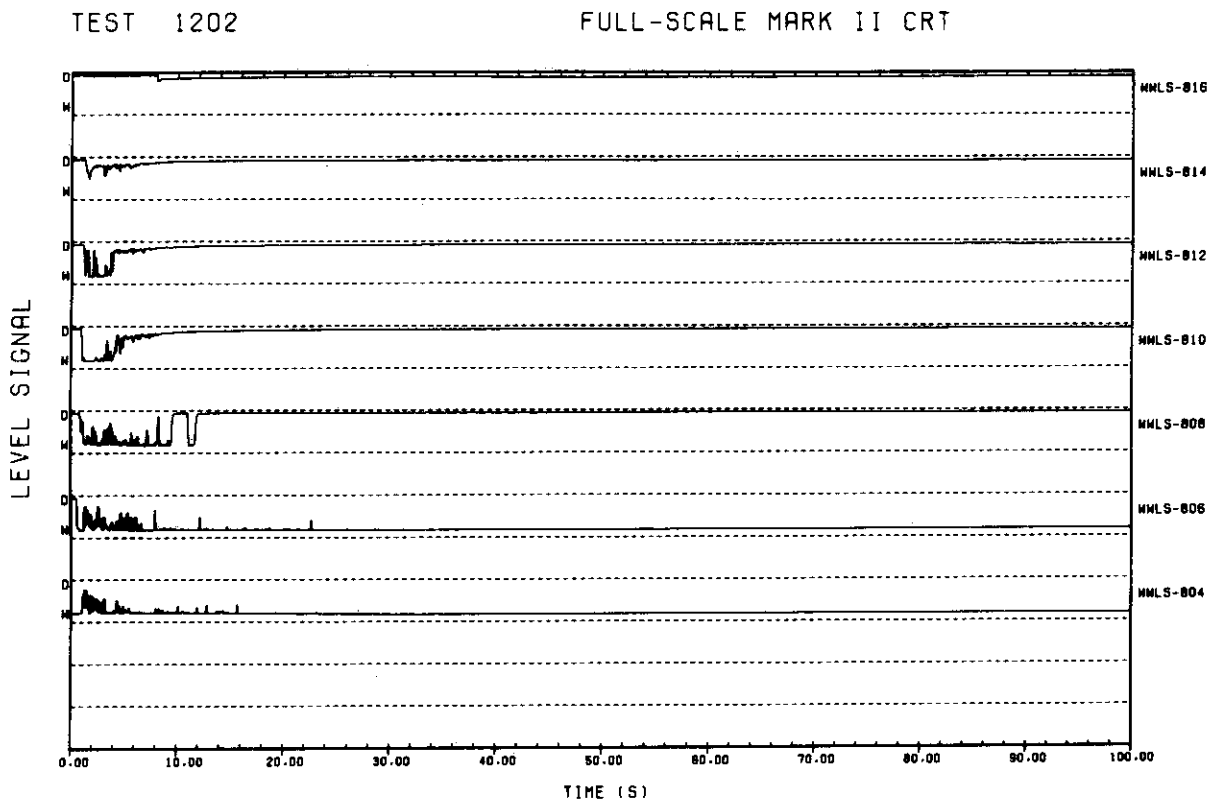
Plot L-O-34 Water Level in Wetwell



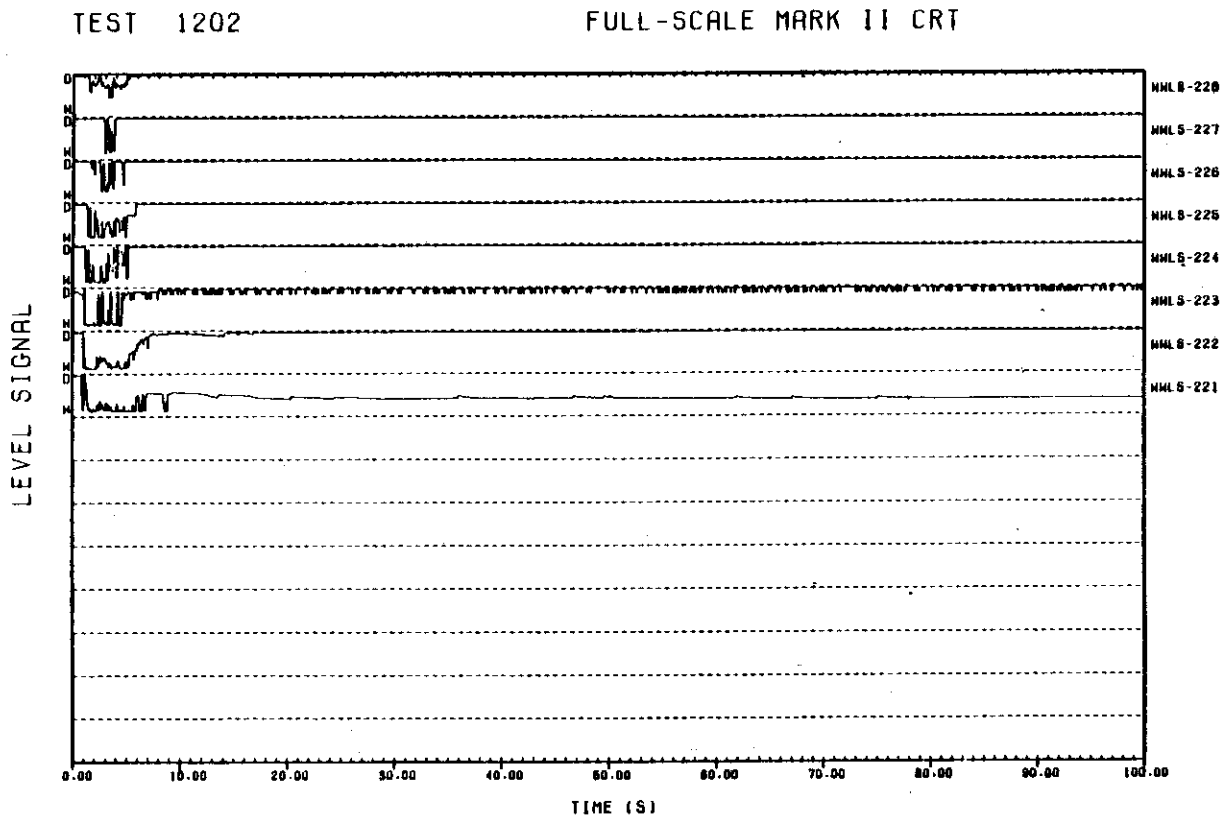
Plot L-O-35 Water Level in Wetwell



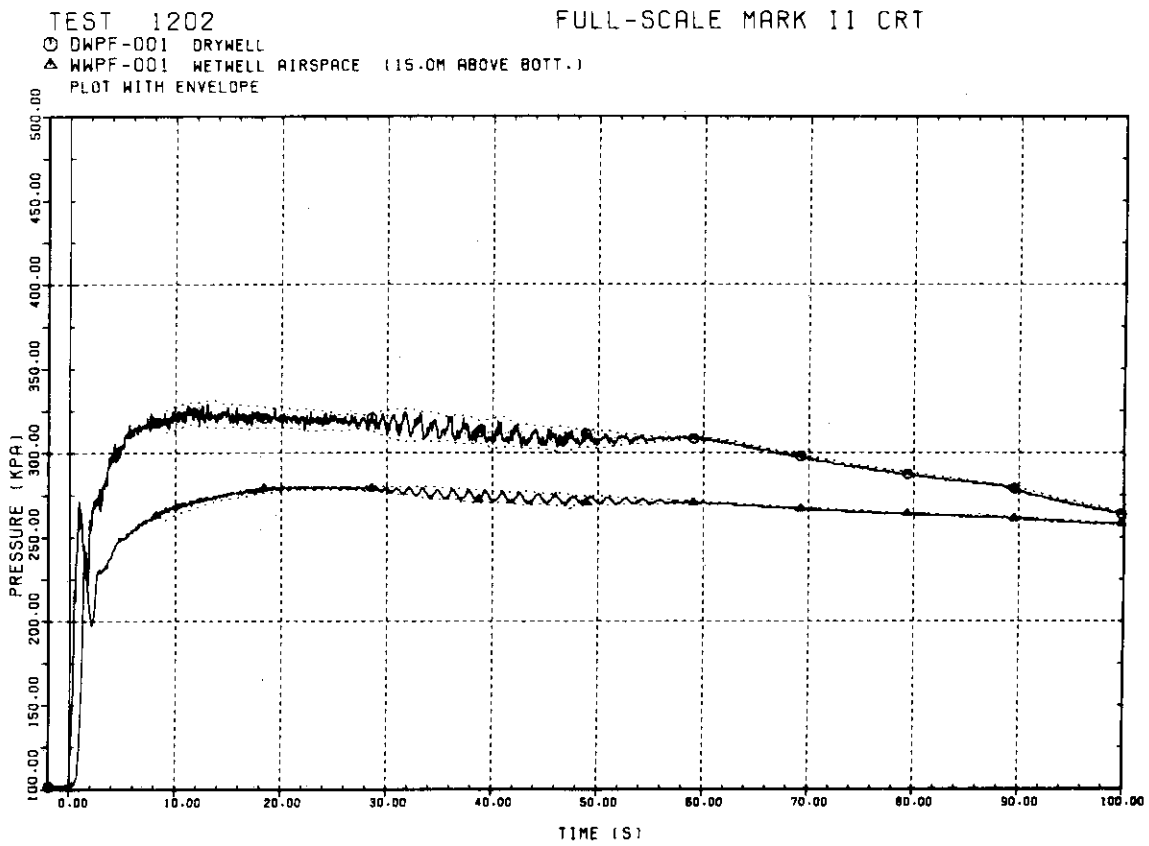
Plot L-O-36 Water Level in Wetwell



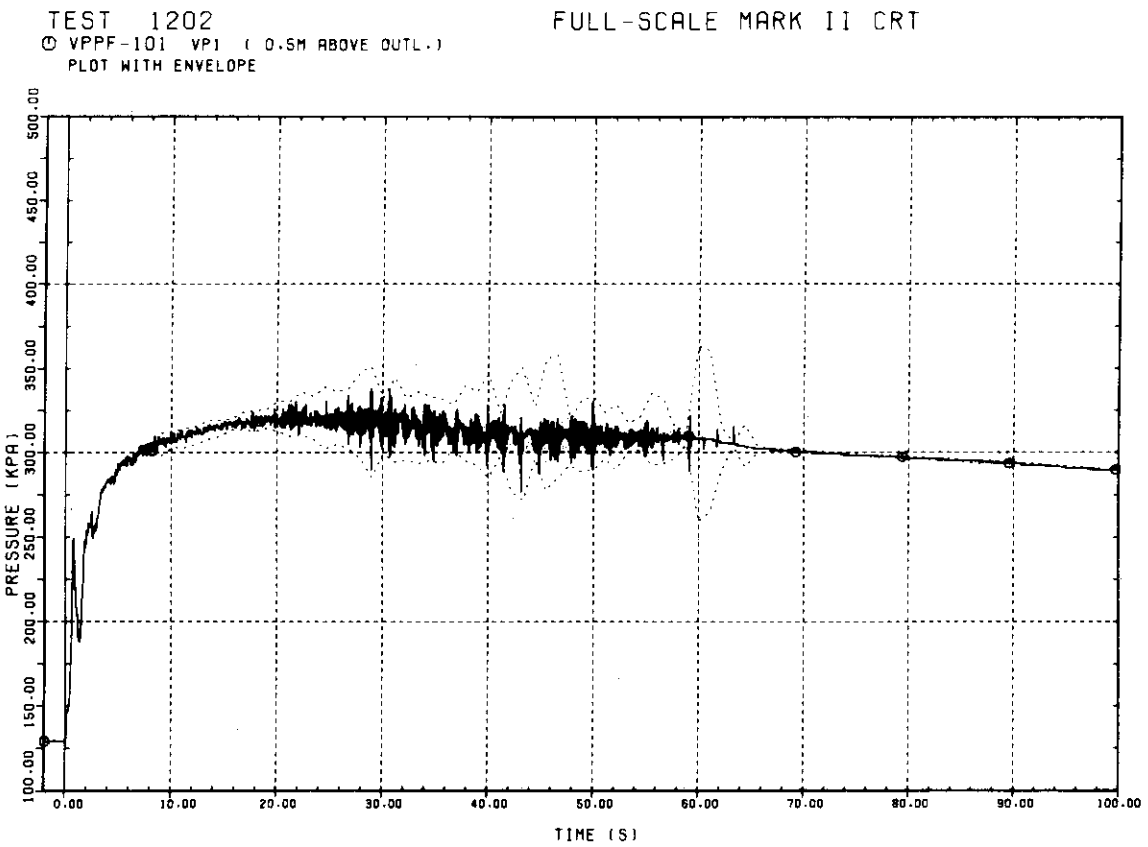
Plot L-O-37 Water Level in Wetwell



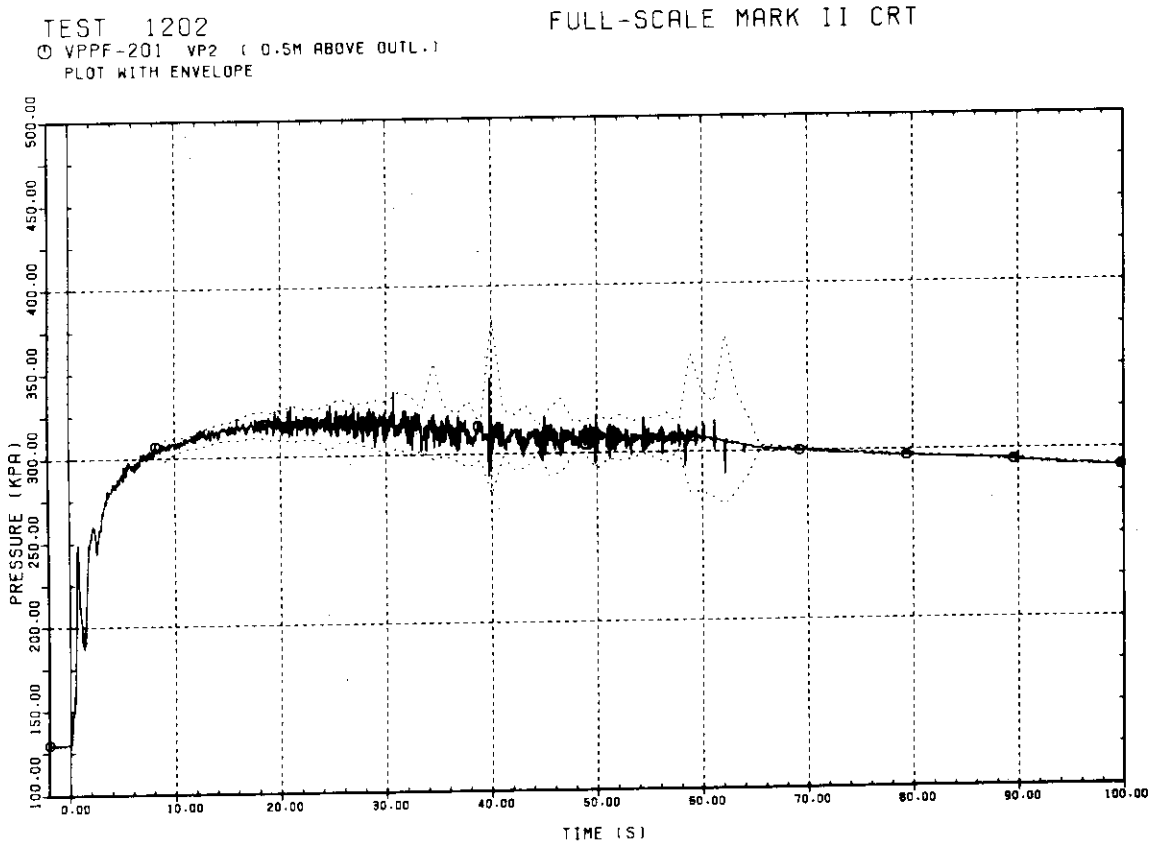
Plot L-O-38 Water Level in Wetwell



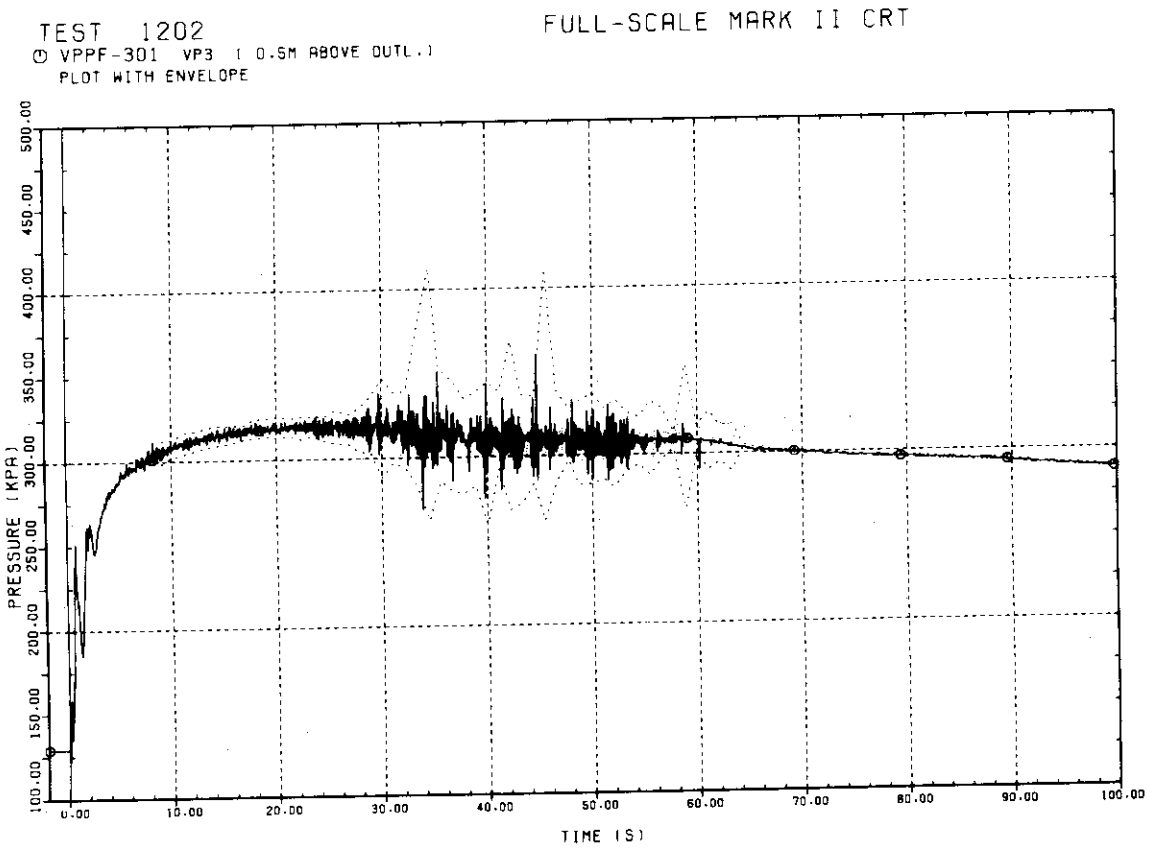
Plot L-1-1 Pressures in Drywell and Wetwell Airspace



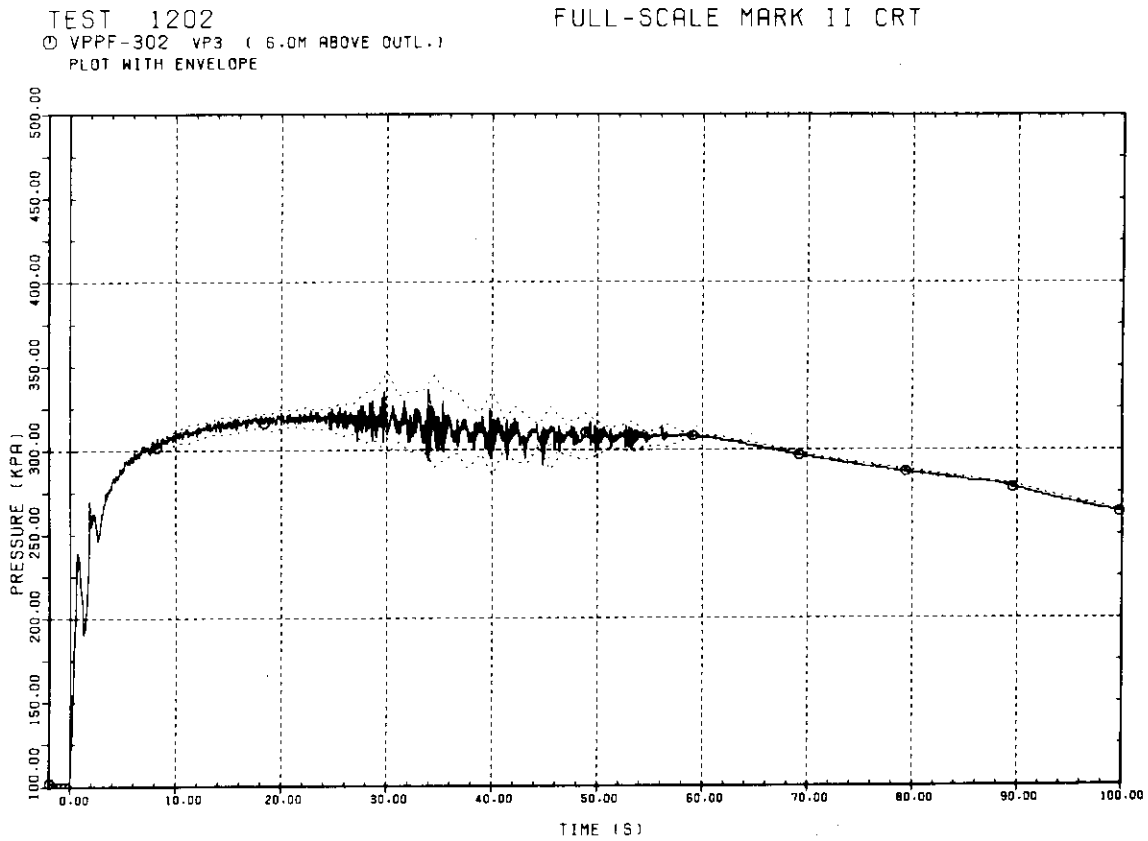
Plot L-1-2 Pressure in Vent Pipe



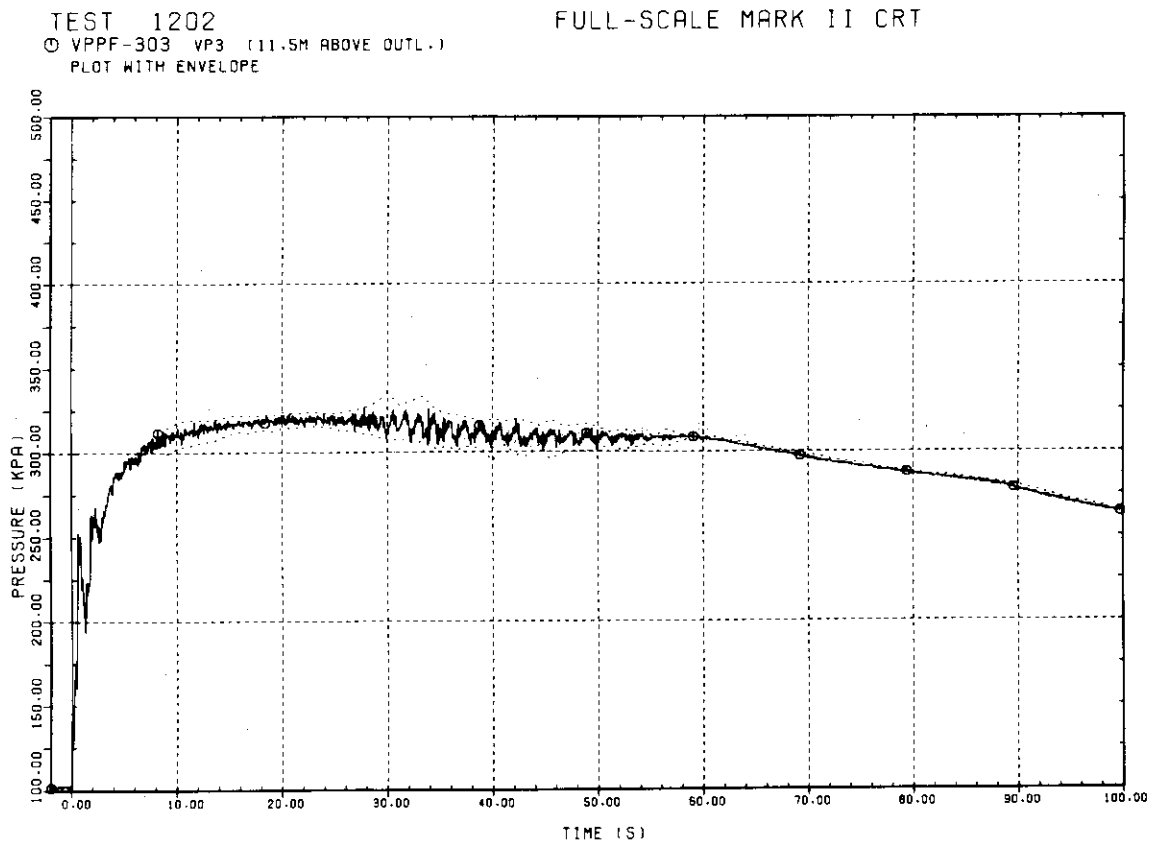
Plot L-1-3 Pressure in Vent Pipe



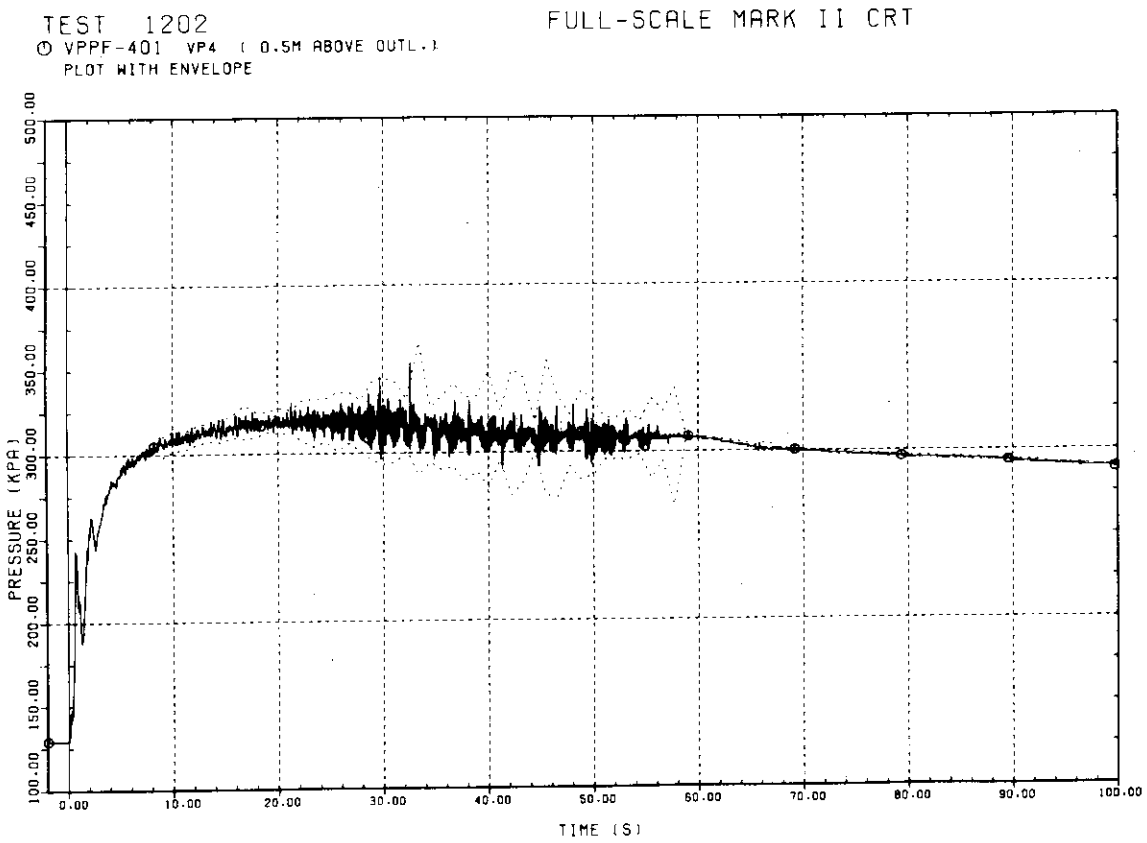
Plot L-1-4 Pressure in Vent Pipe



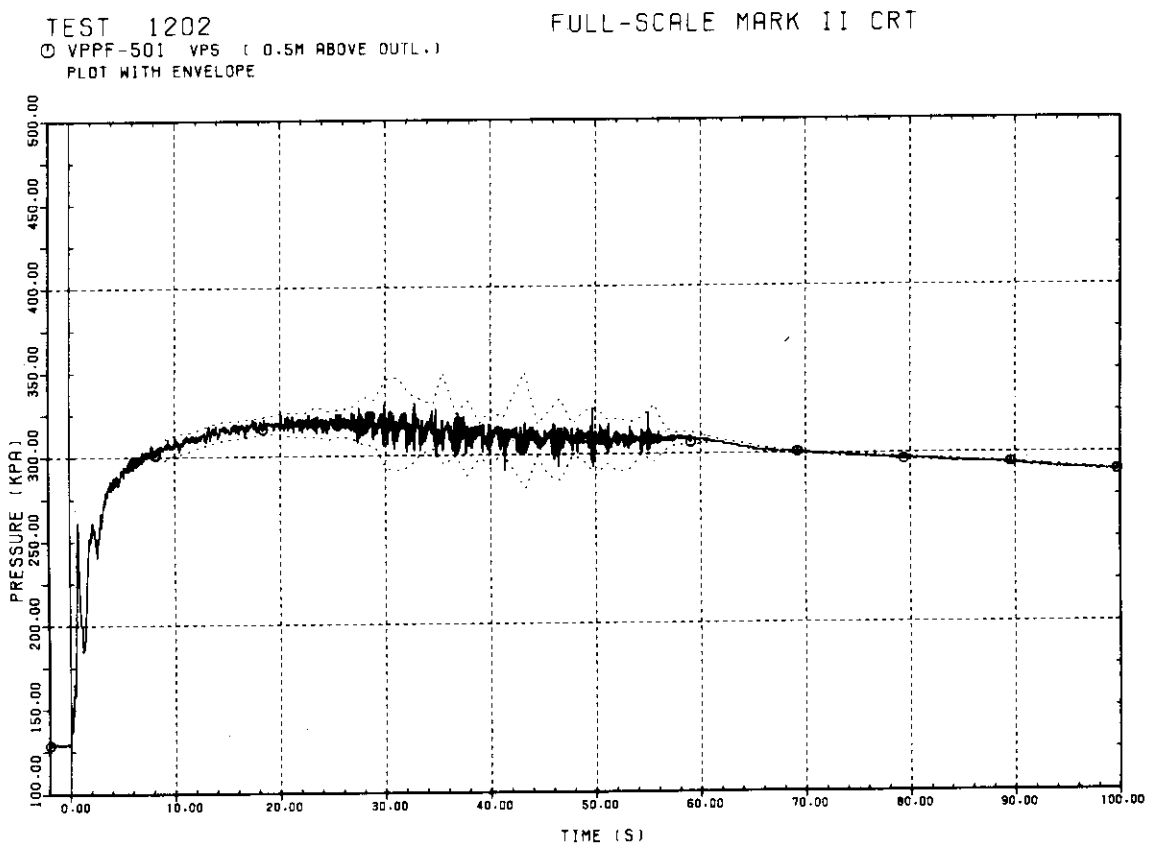
Plot L-1-5 Pressure in Vent Pipe



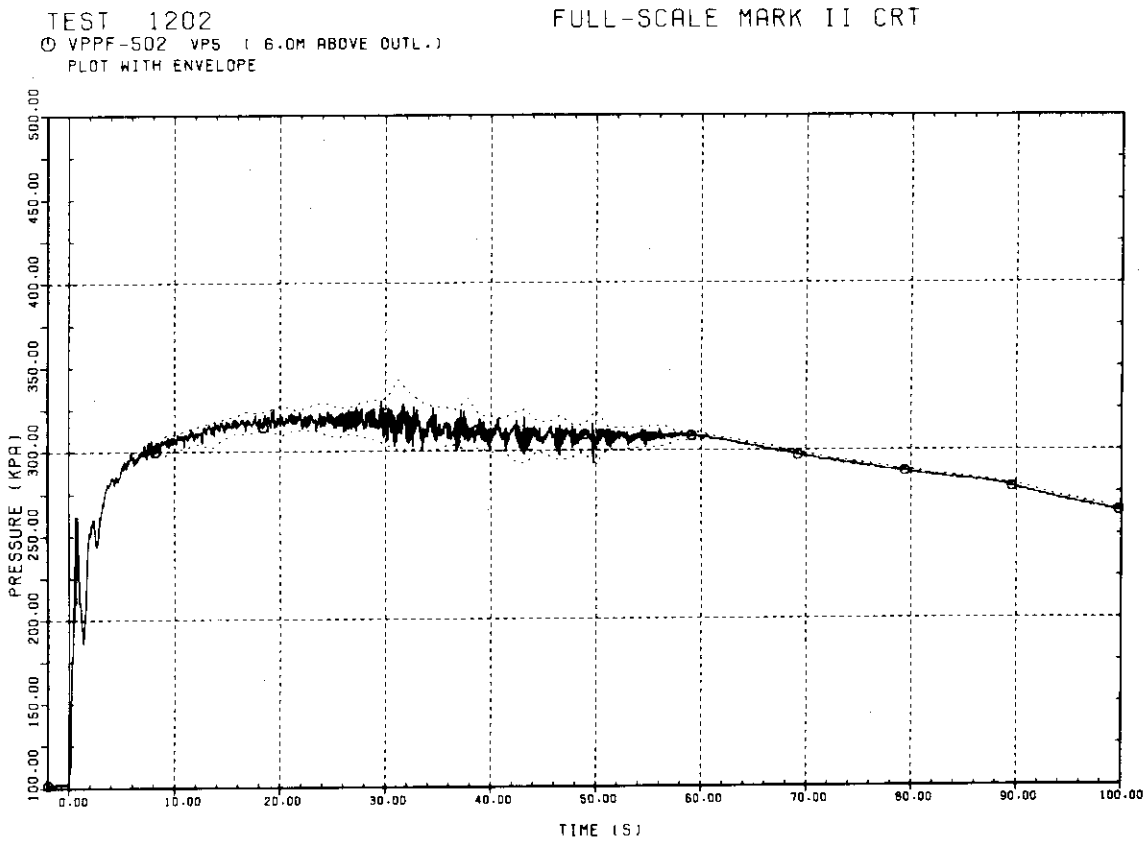
Plot L-1-6 Pressure in Vent Pipe



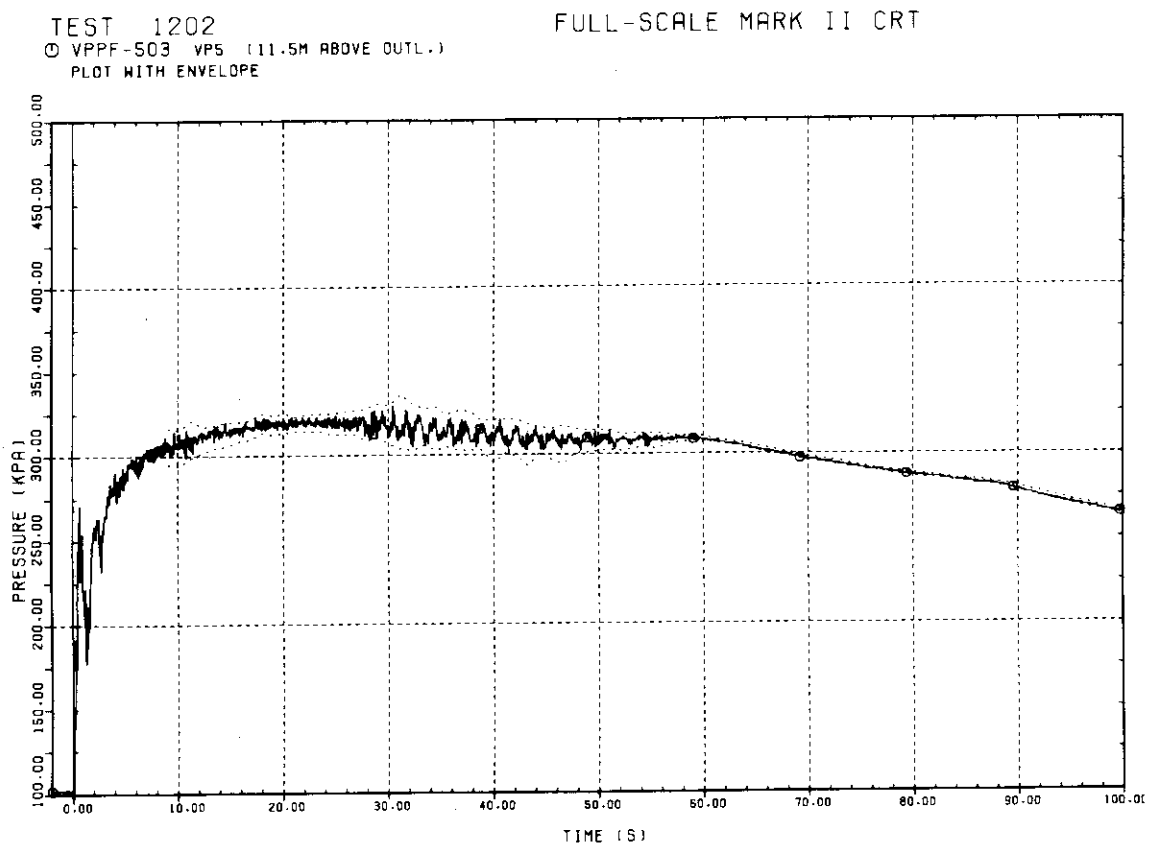
Plot L-1-7 Pressure in Vent Pipe



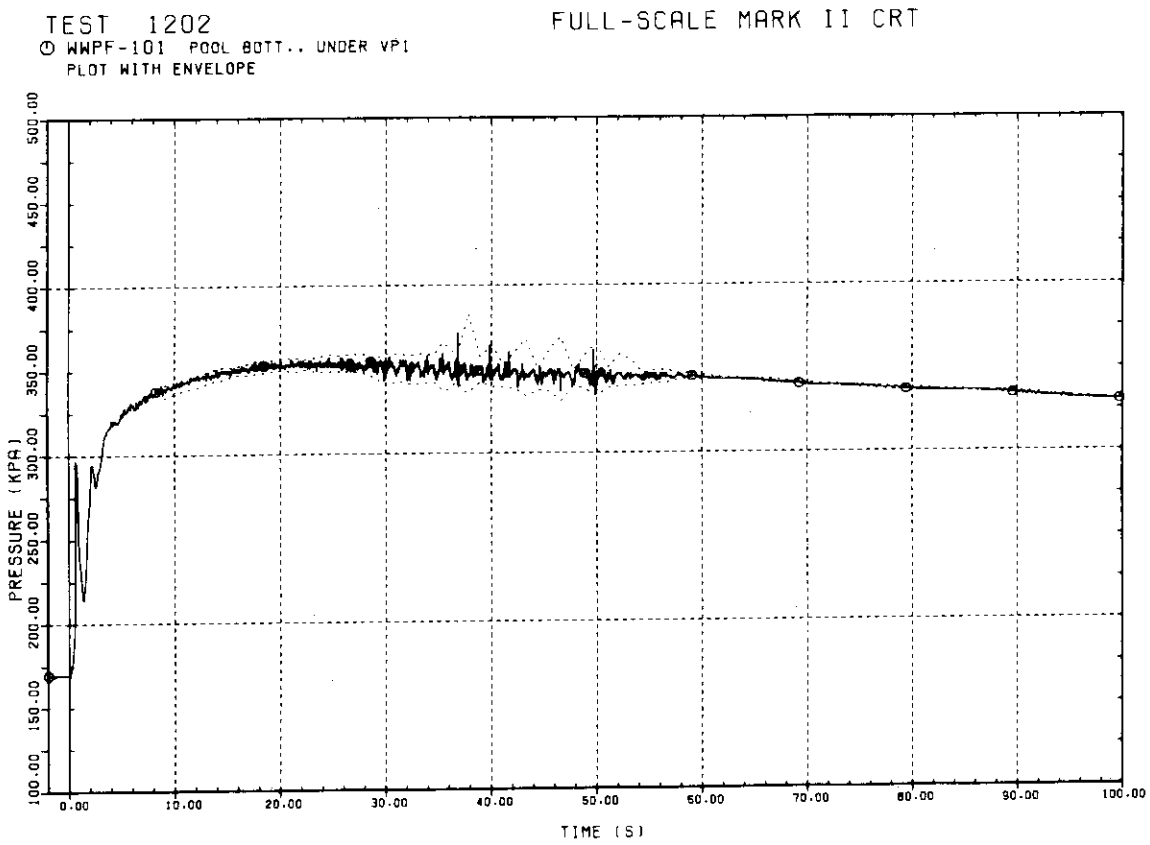
Plot L-1-8 Pressure in Vent Pipe



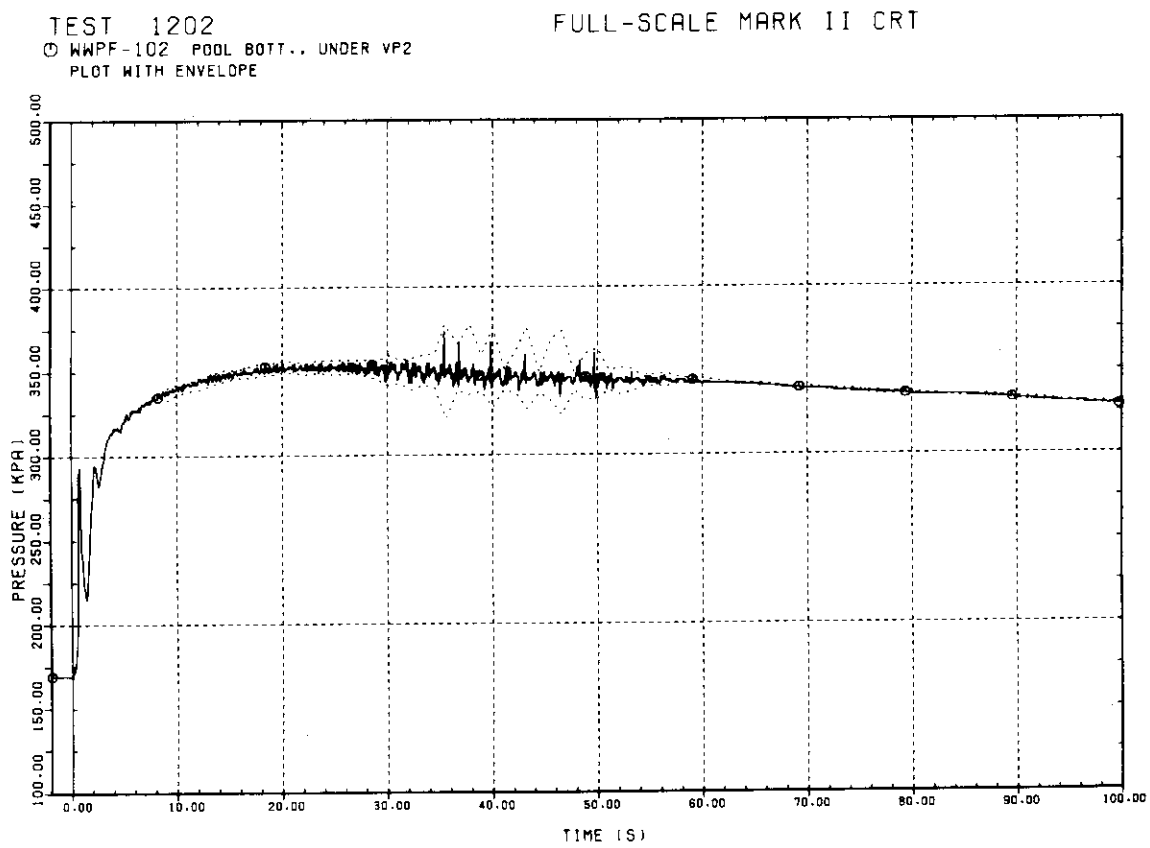
Plot L-1-9 Pressure in Vent Pipe



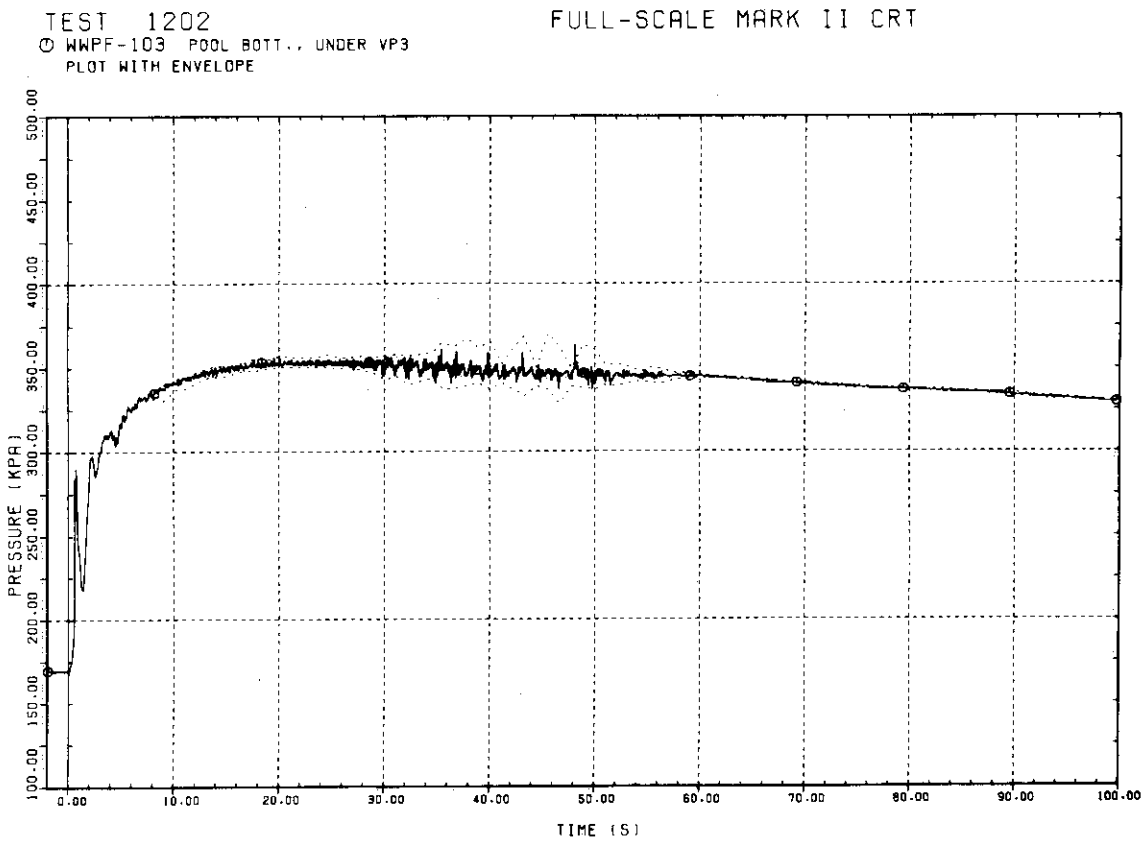
Plot L-1-10 Pressure in Vent Pipe



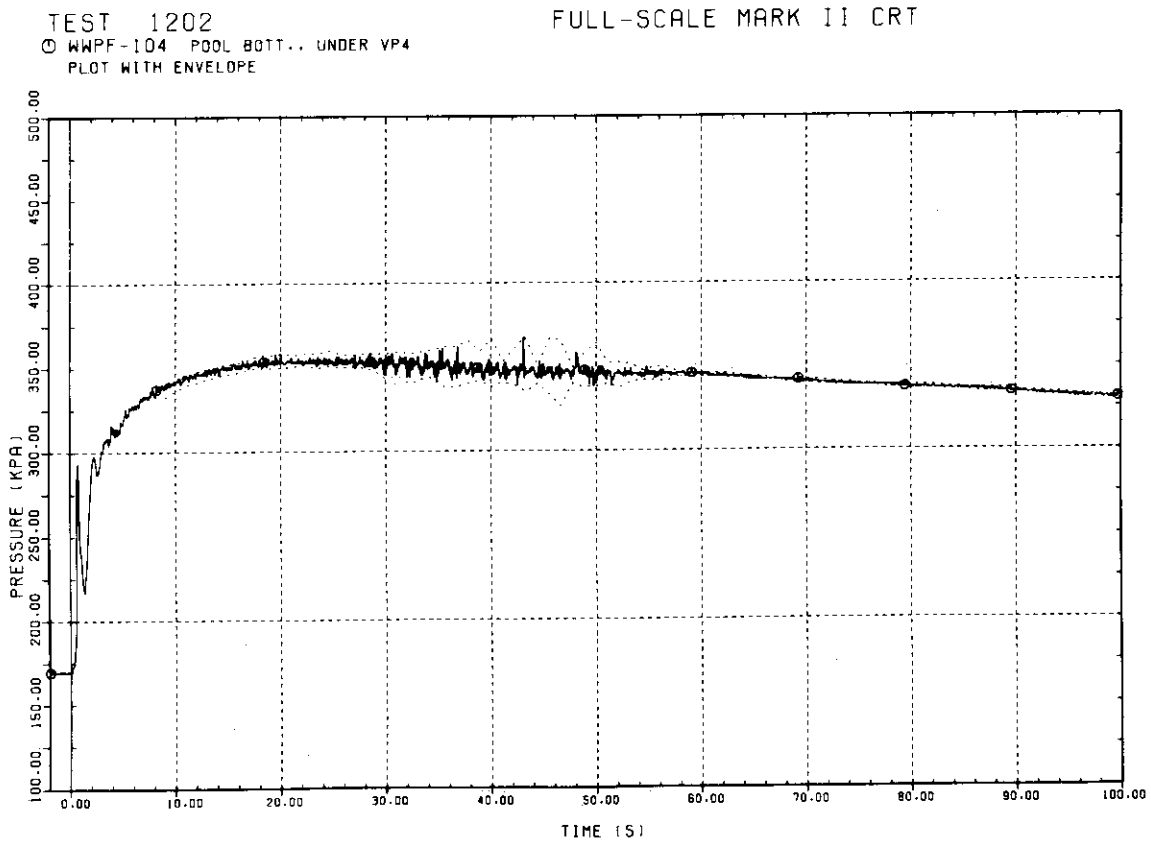
Plot L-1-11 Pressure in Wetwell



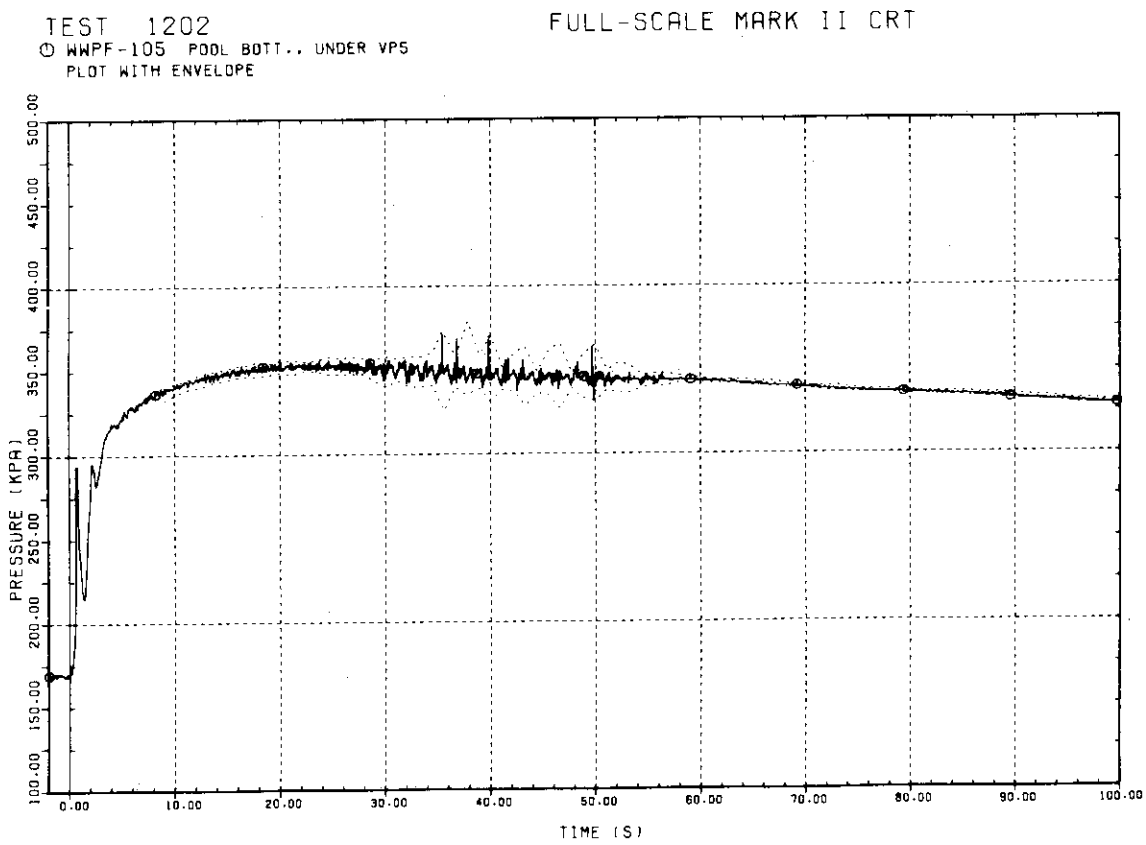
Plot L-1-12 Pressure in Wetwell



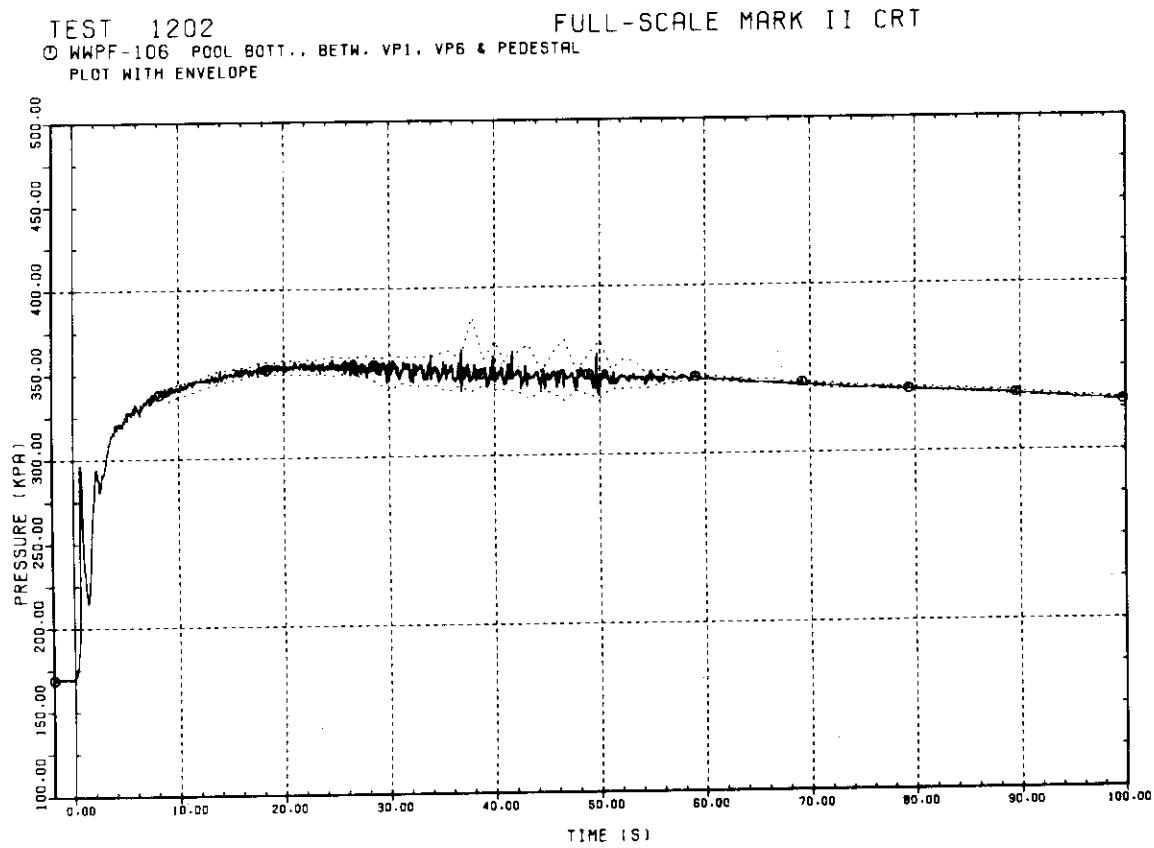
Plot L-1-13 Pressure in Wetwell



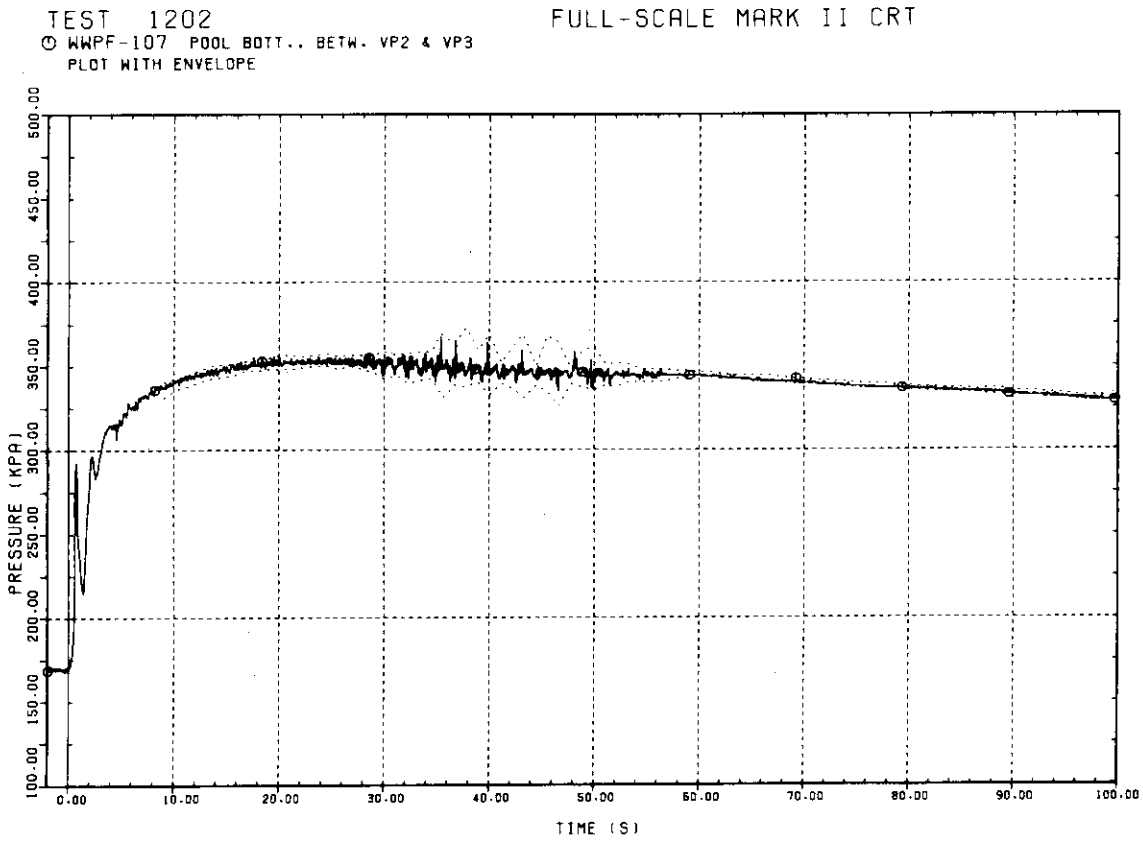
Plot L-1-14 Pressure in Wetwell



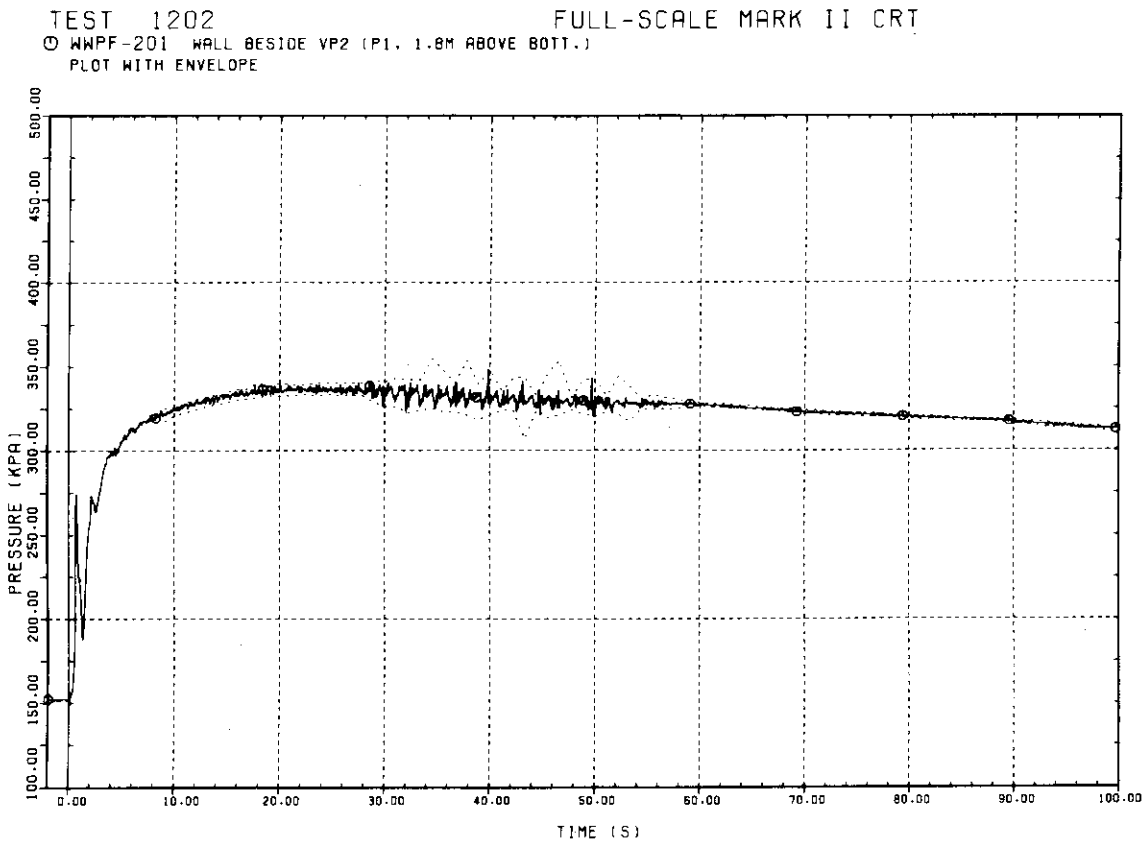
Plot L-1-15 Pressure in Wetwell



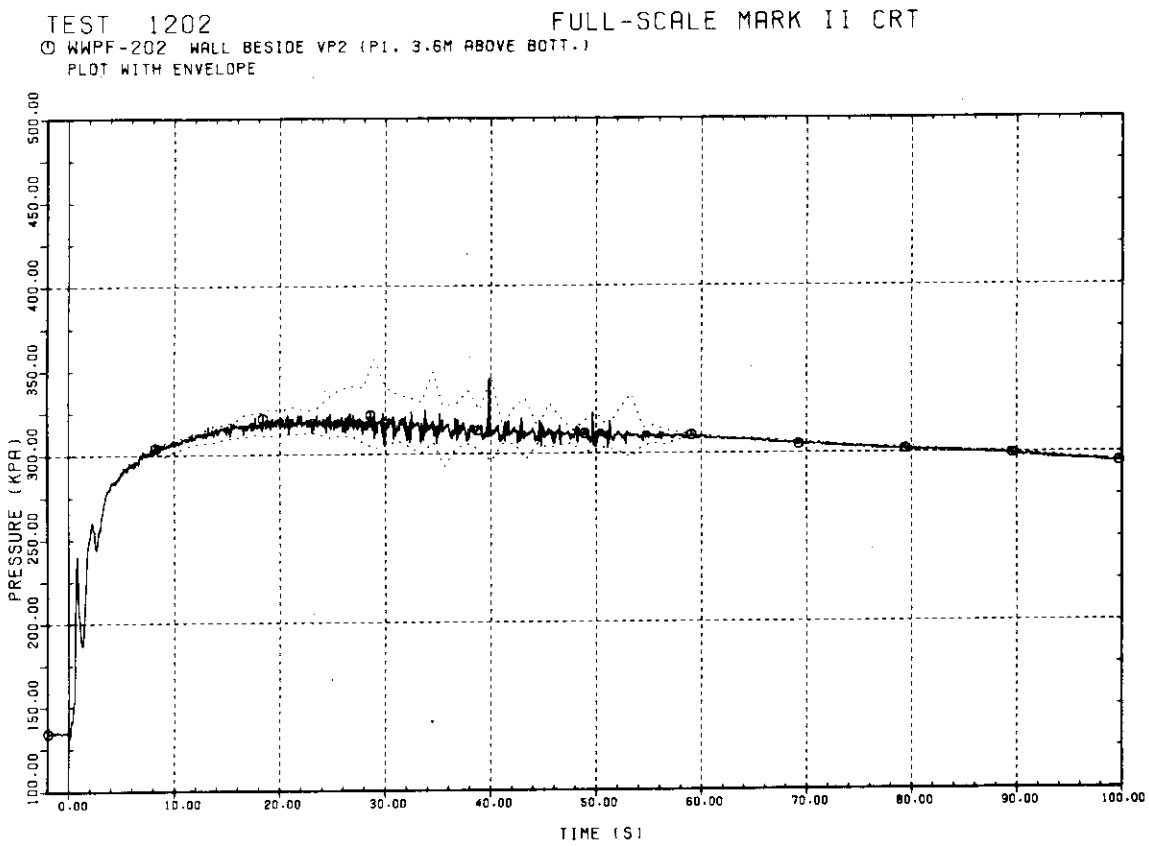
Plot L-1-16 Pressure in Wetwell



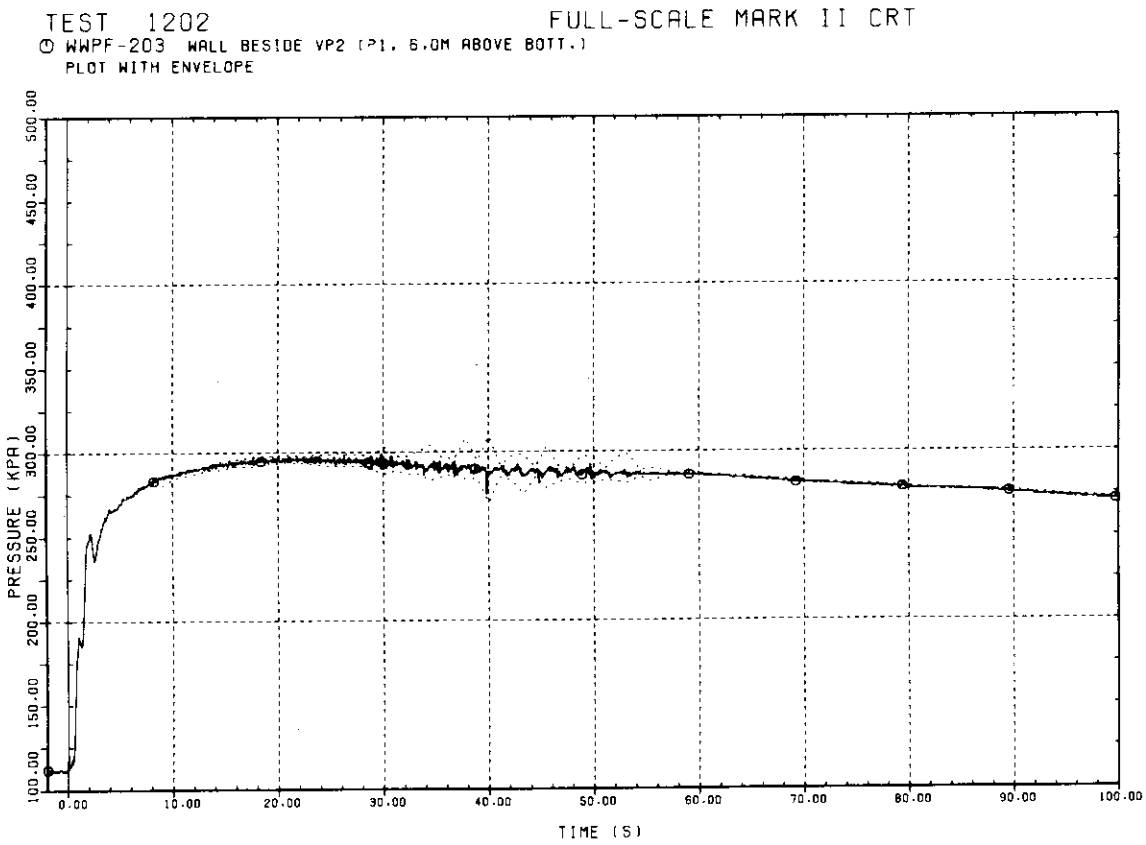
Plot L-1-17 Pressure in Wetwell



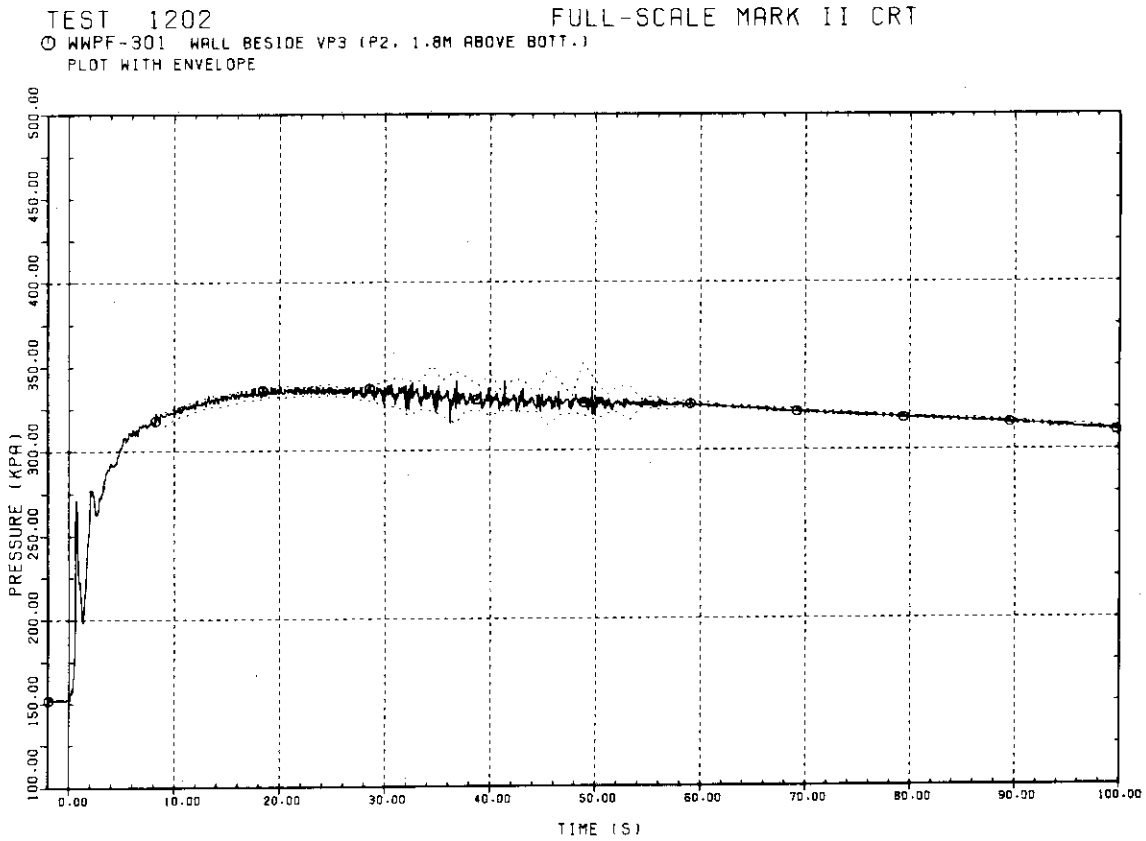
Plot L-1-18 Pressure in Wetwell



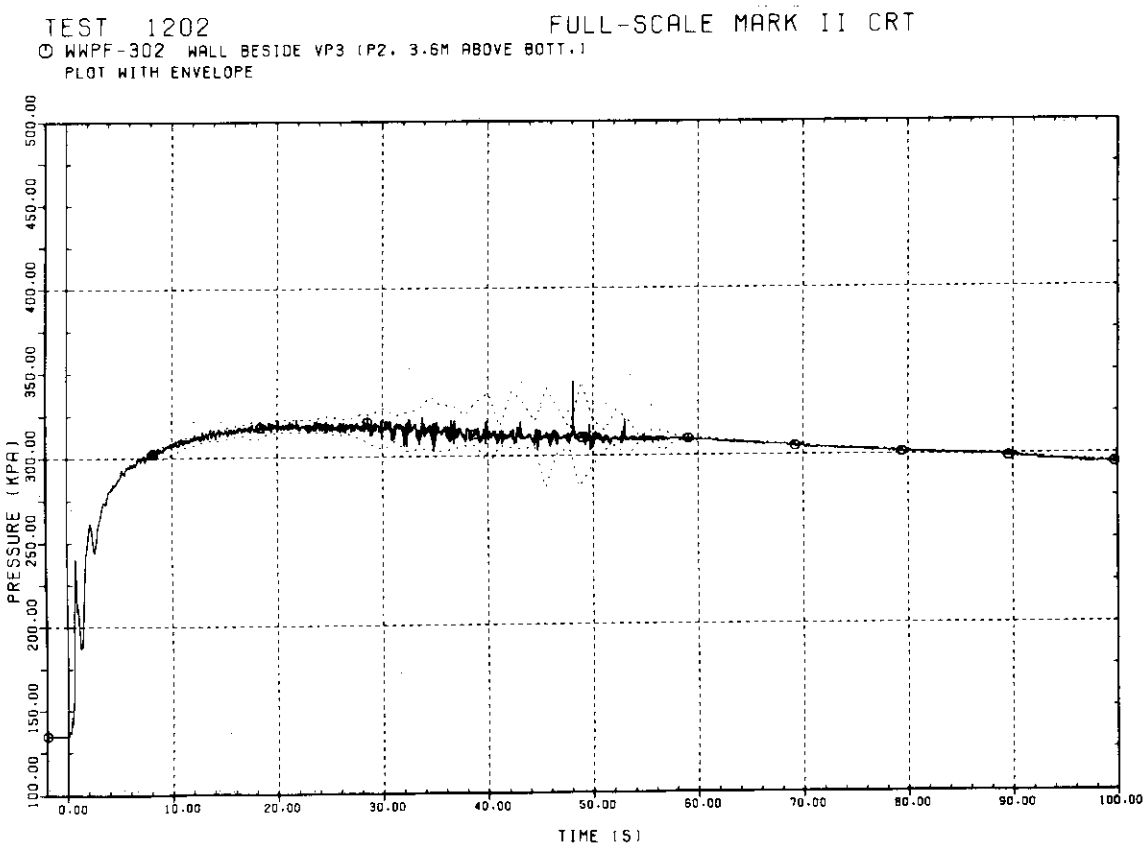
Plot L-1-19 Pressure in Wetwell



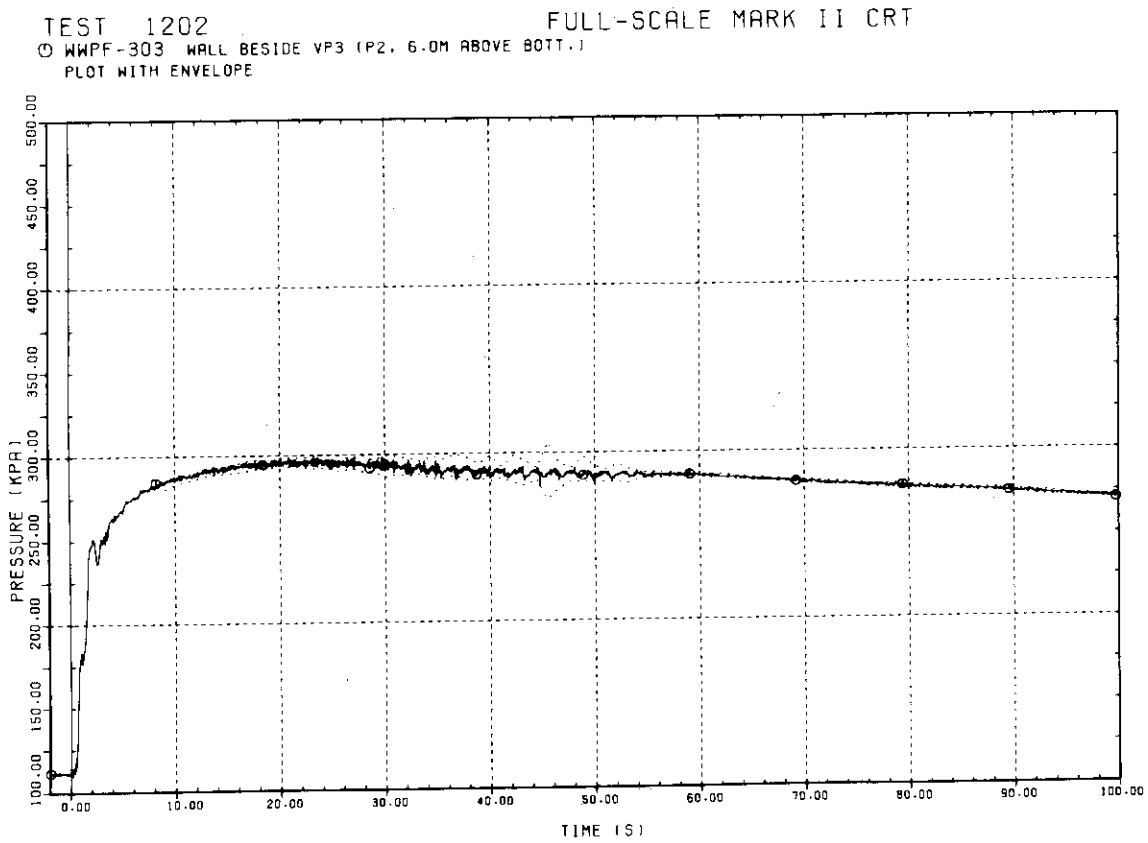
Plot L-1-20 Pressure in Wetwell



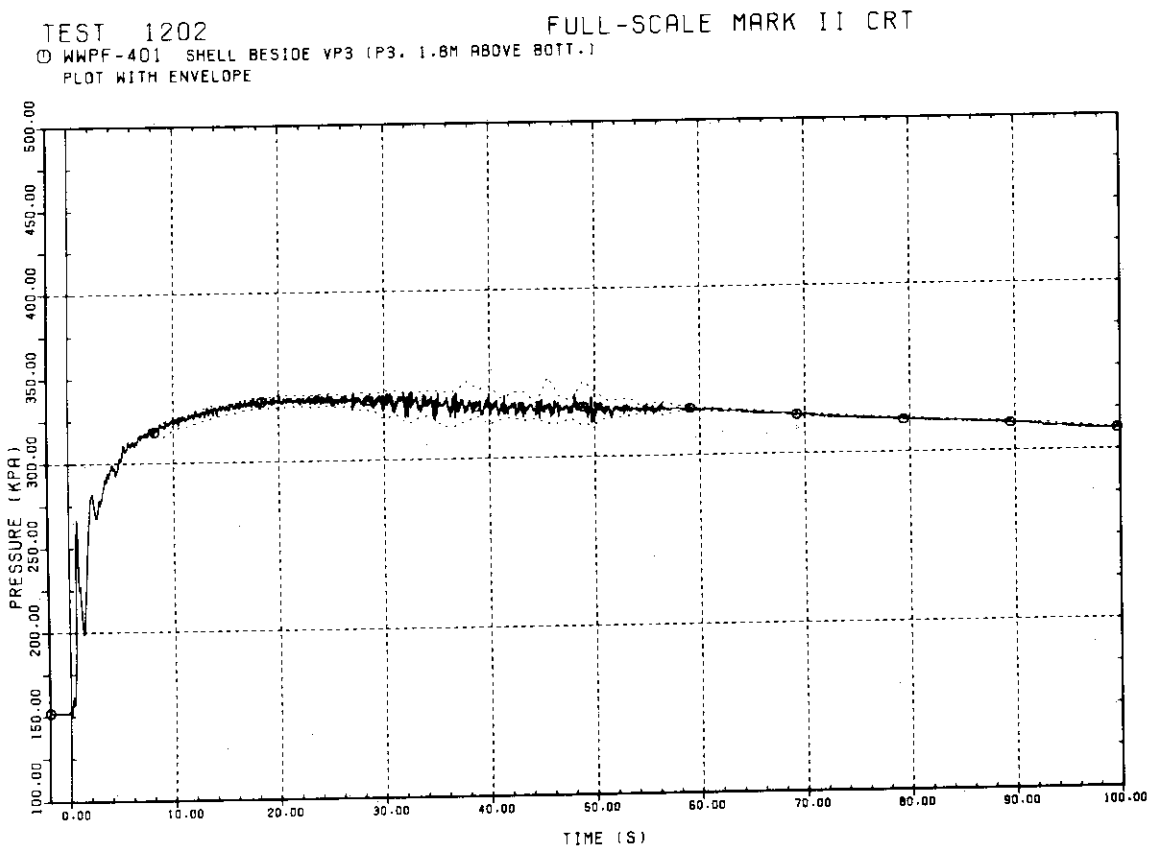
Plot L-1-21 Pressure in Wetwell



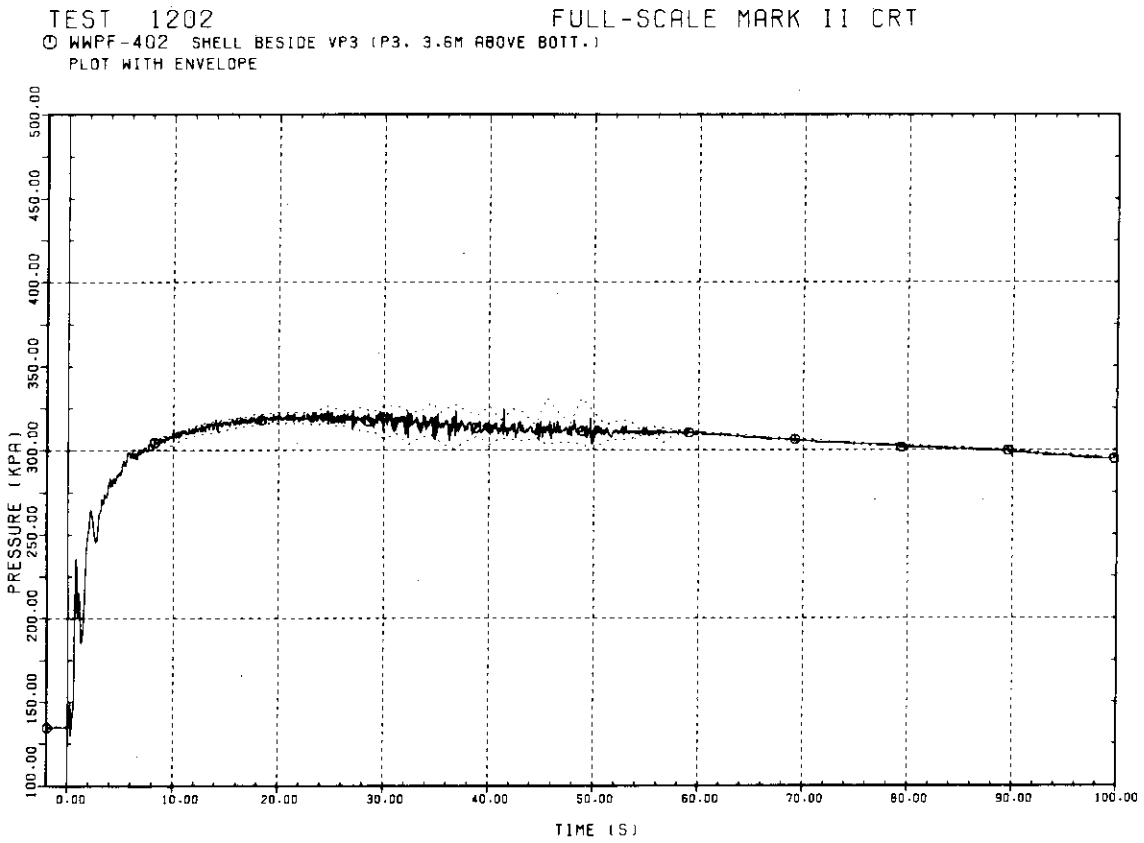
Plot L-1-22 Pressure in Wetwell



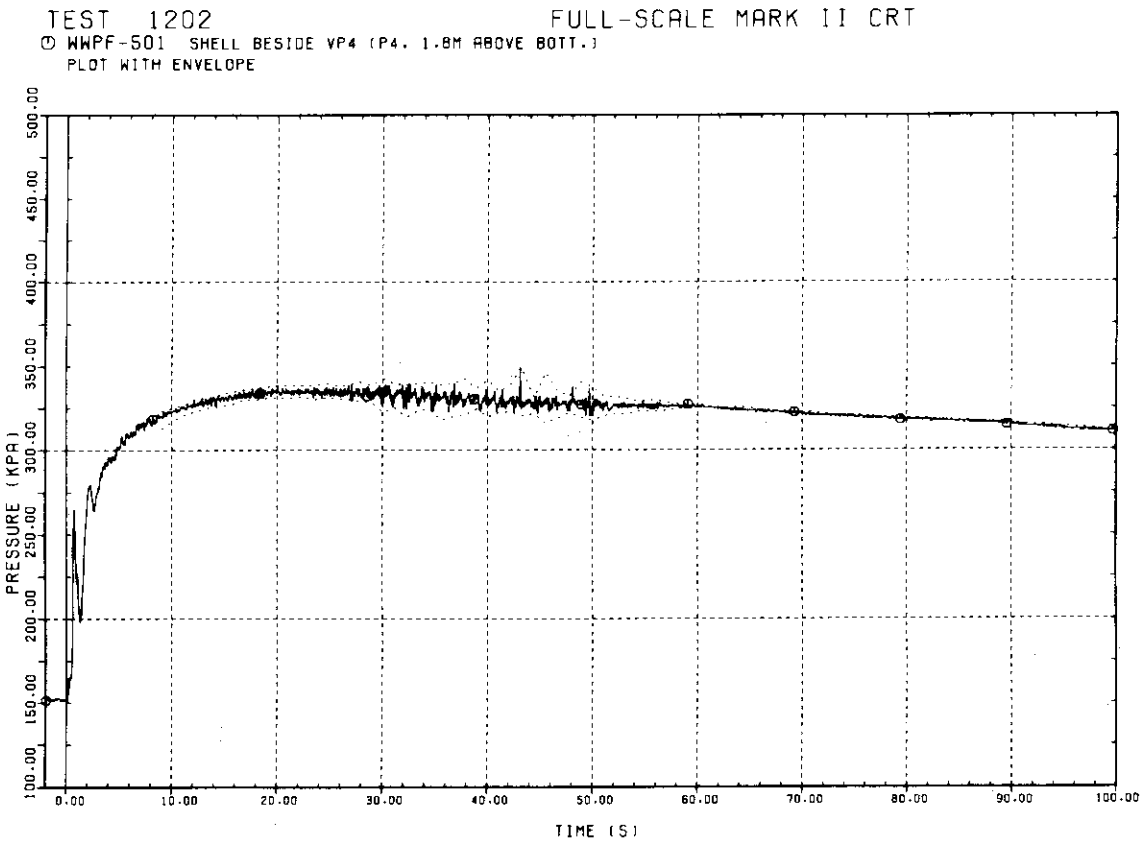
Plot L-1-23 Pressure in Wetwell



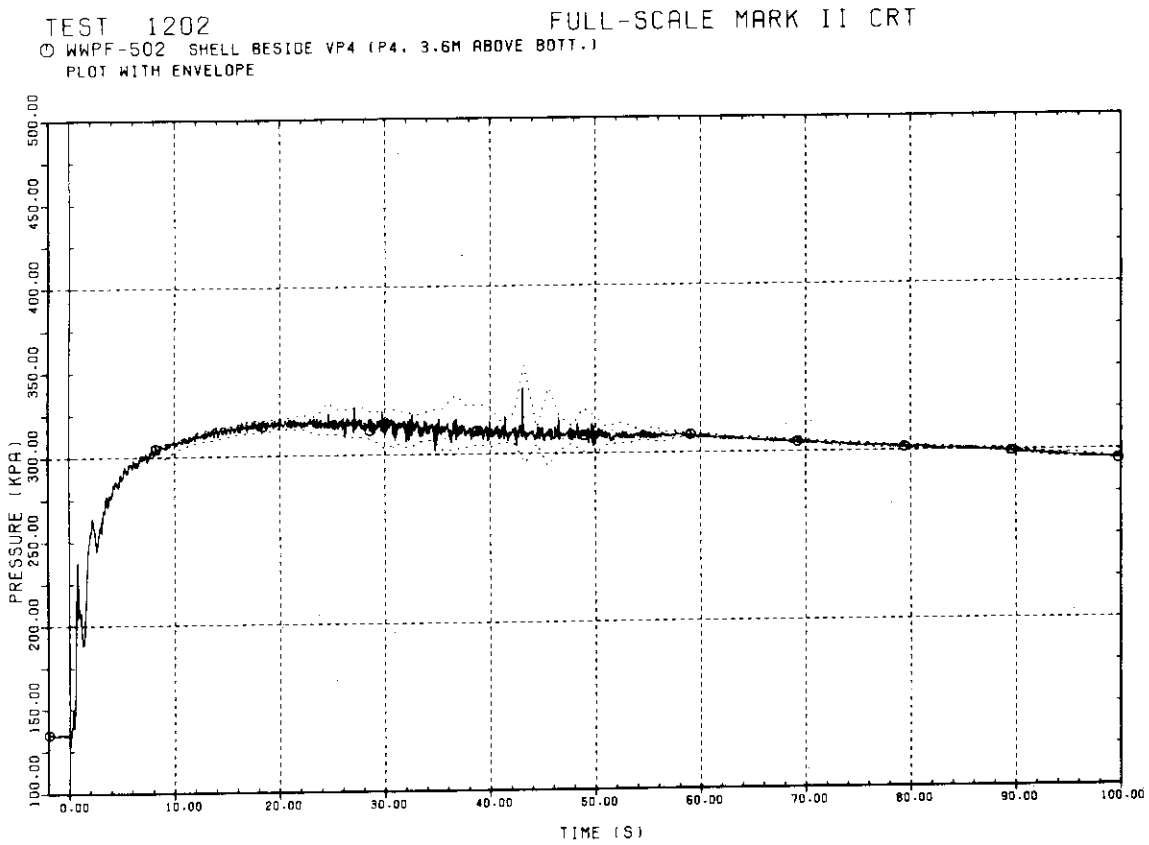
Plot L-1-24 Pressure in Wetwell



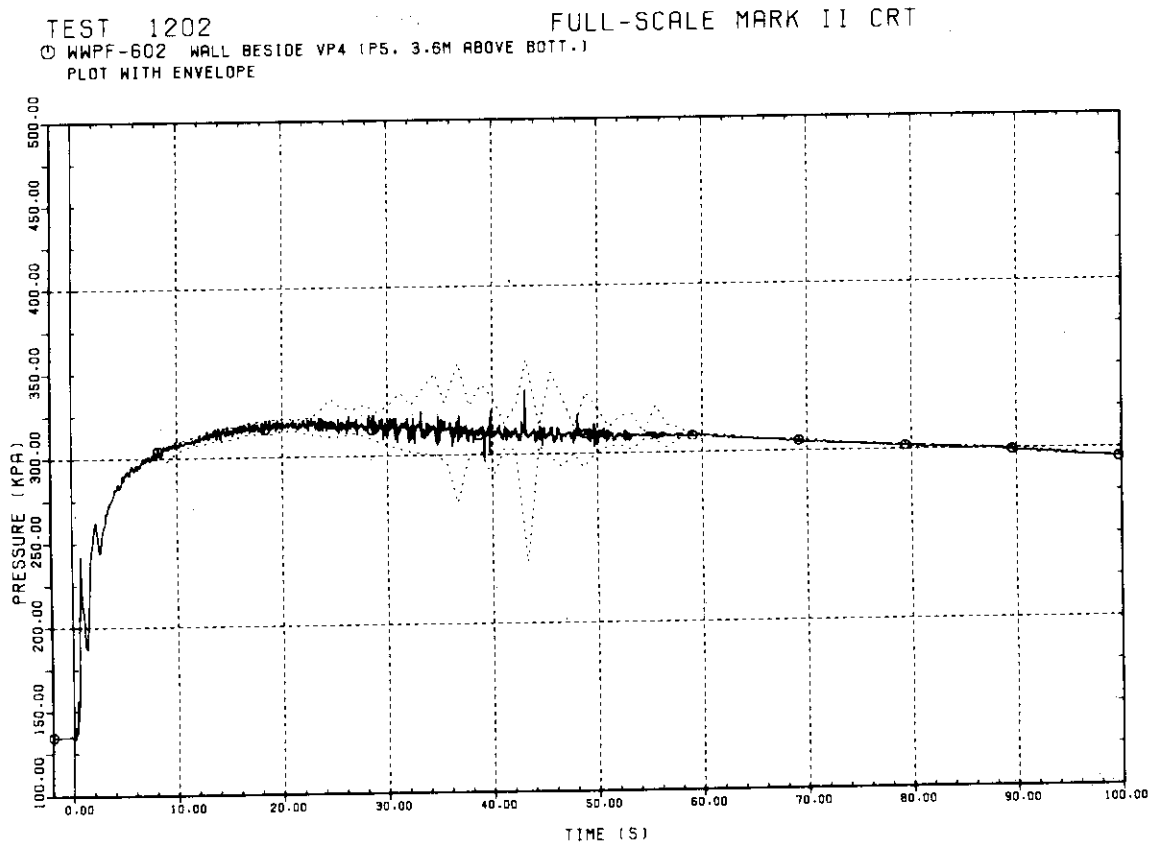
Plot L-1-25 Pressure in Wetwell



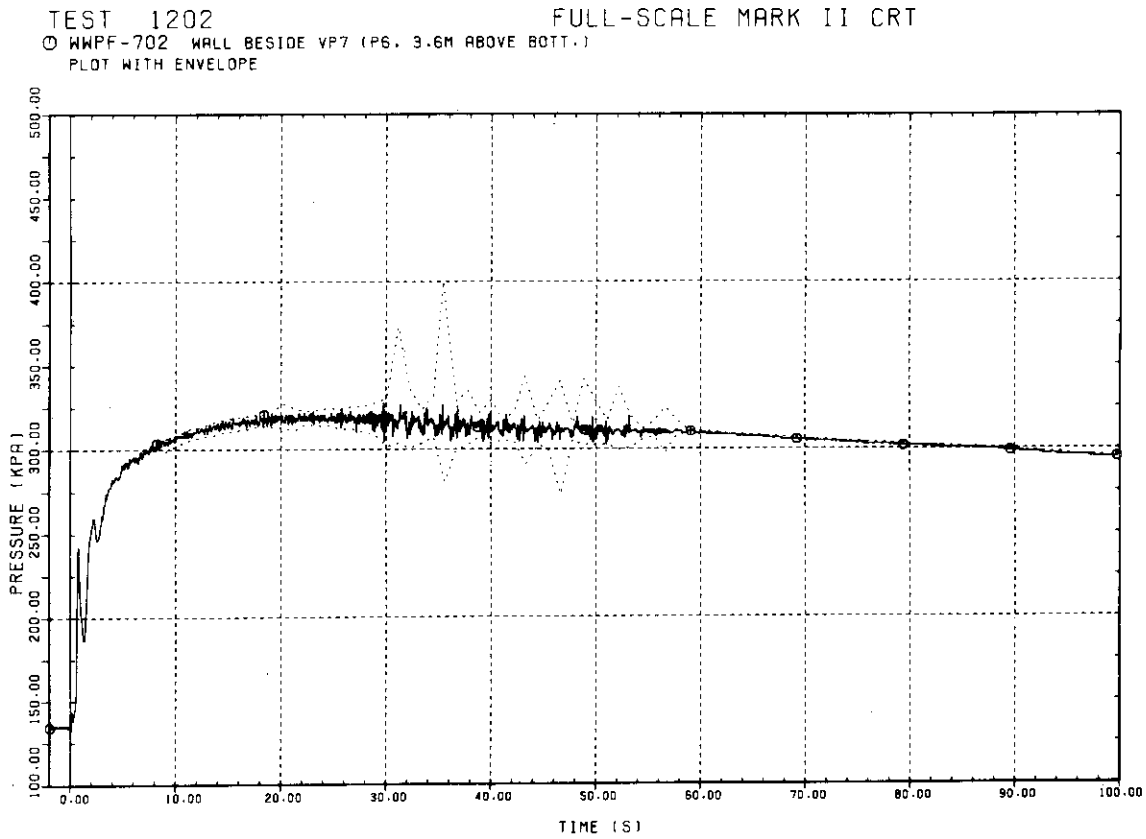
Plot L-1-26 Pressure in Wetwell



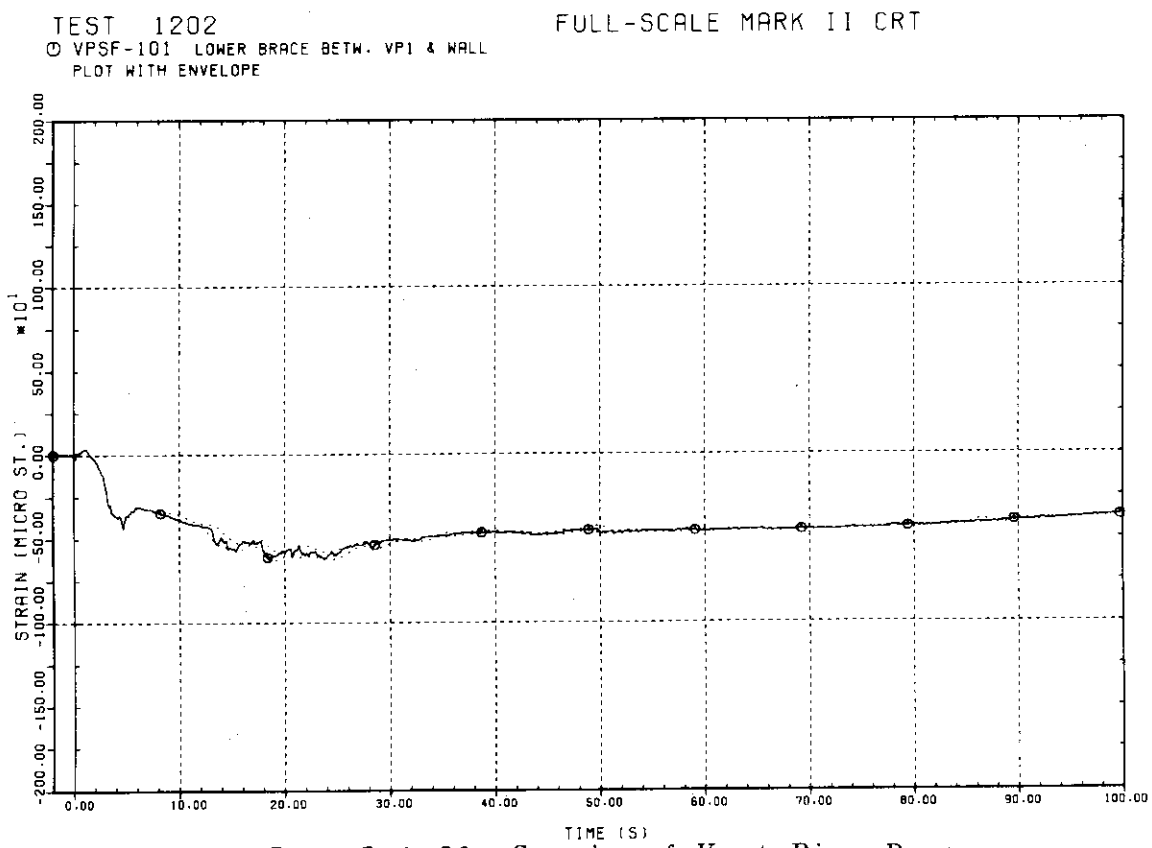
Plot L-1-27 Pressure in Wetwell



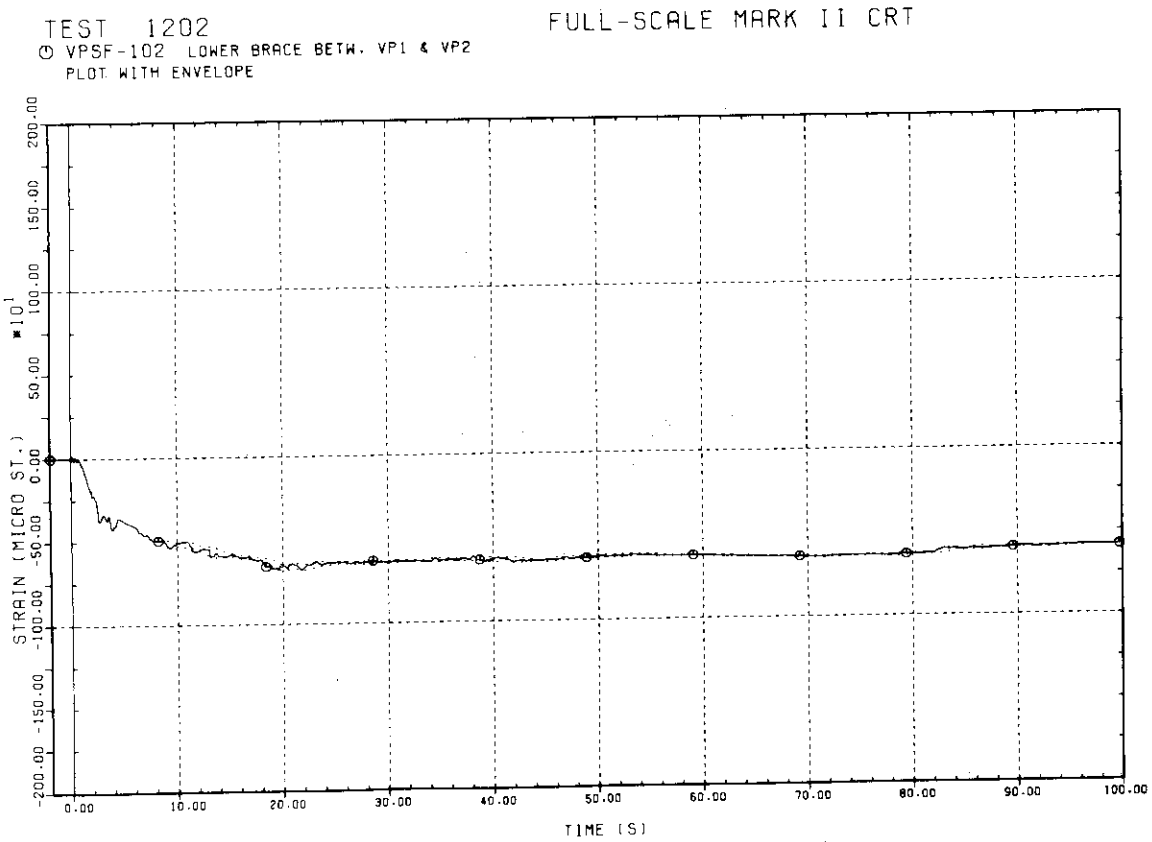
Plot L-1-28 Pressure in Wetwell



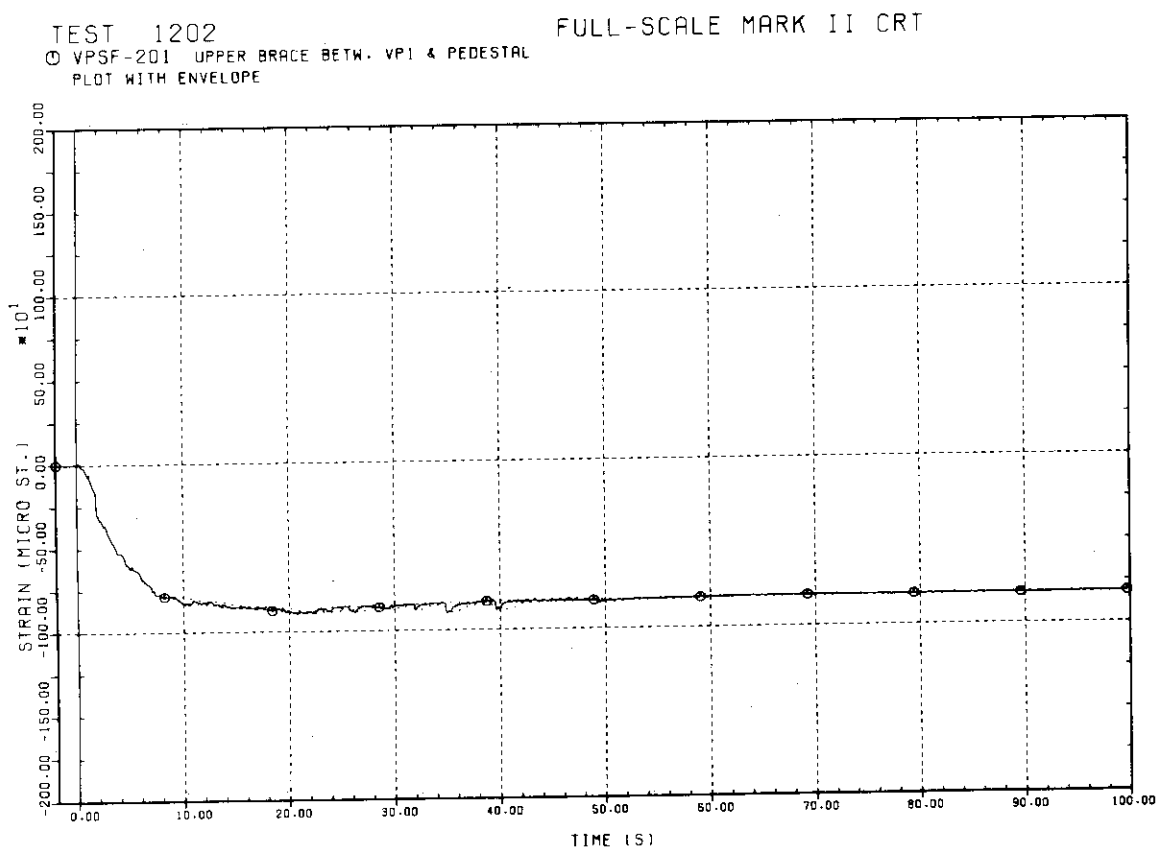
Plot L-1-29 Pressure in Wetwell



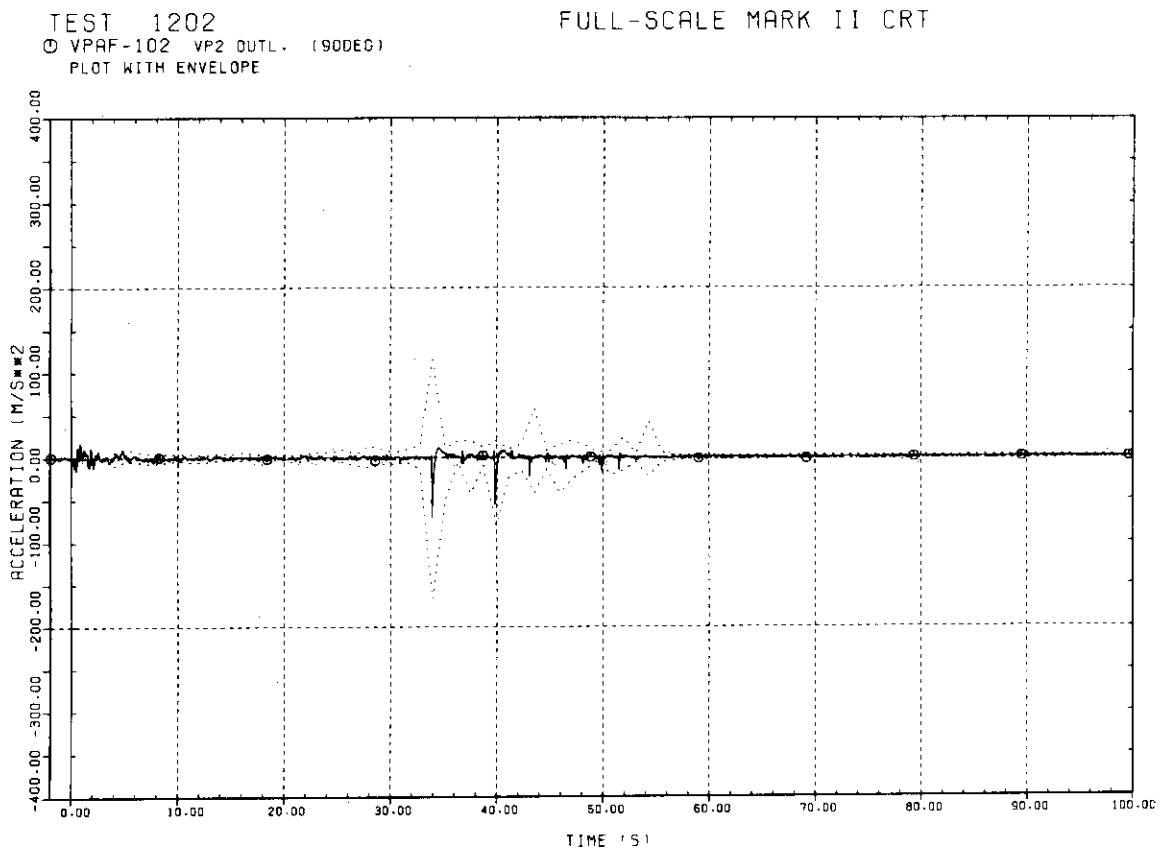
Plot L-1-30 Strain of Vent Pipe Brace



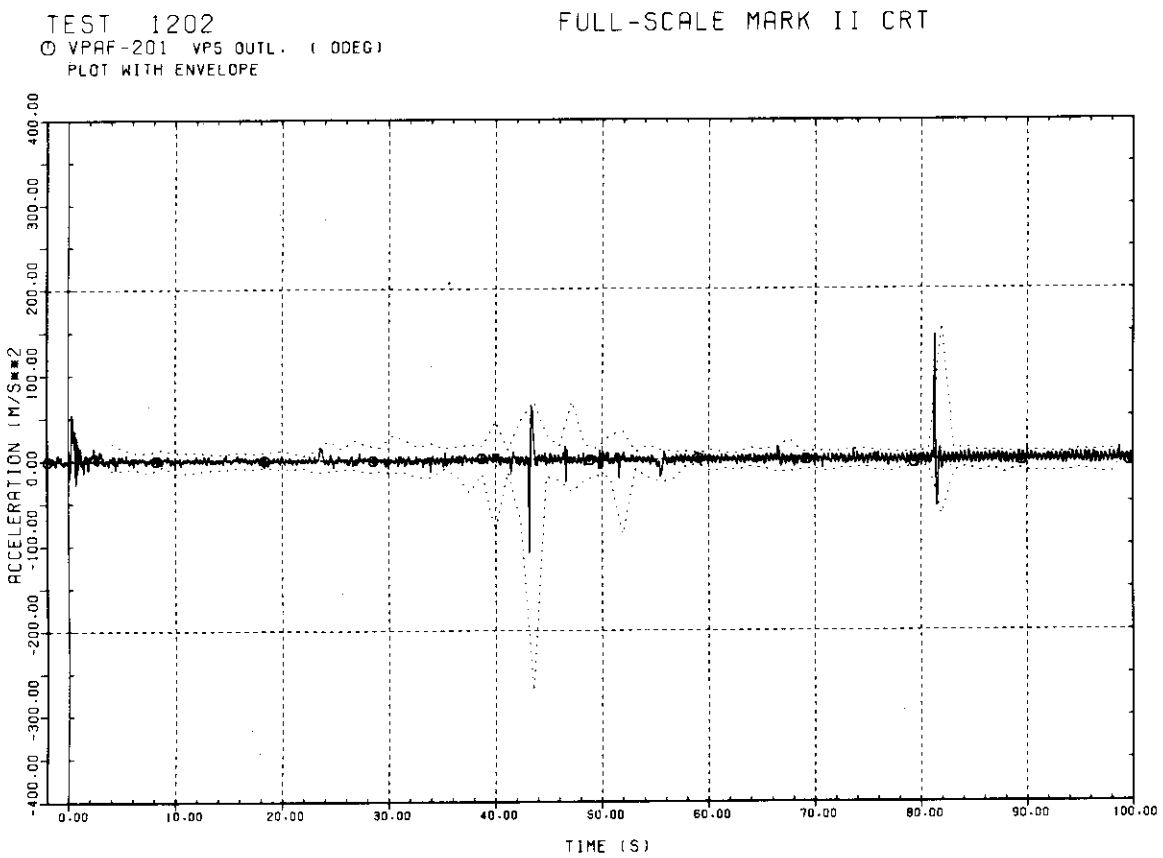
Plot L-1-31 Strain of Vent Pipe Brace



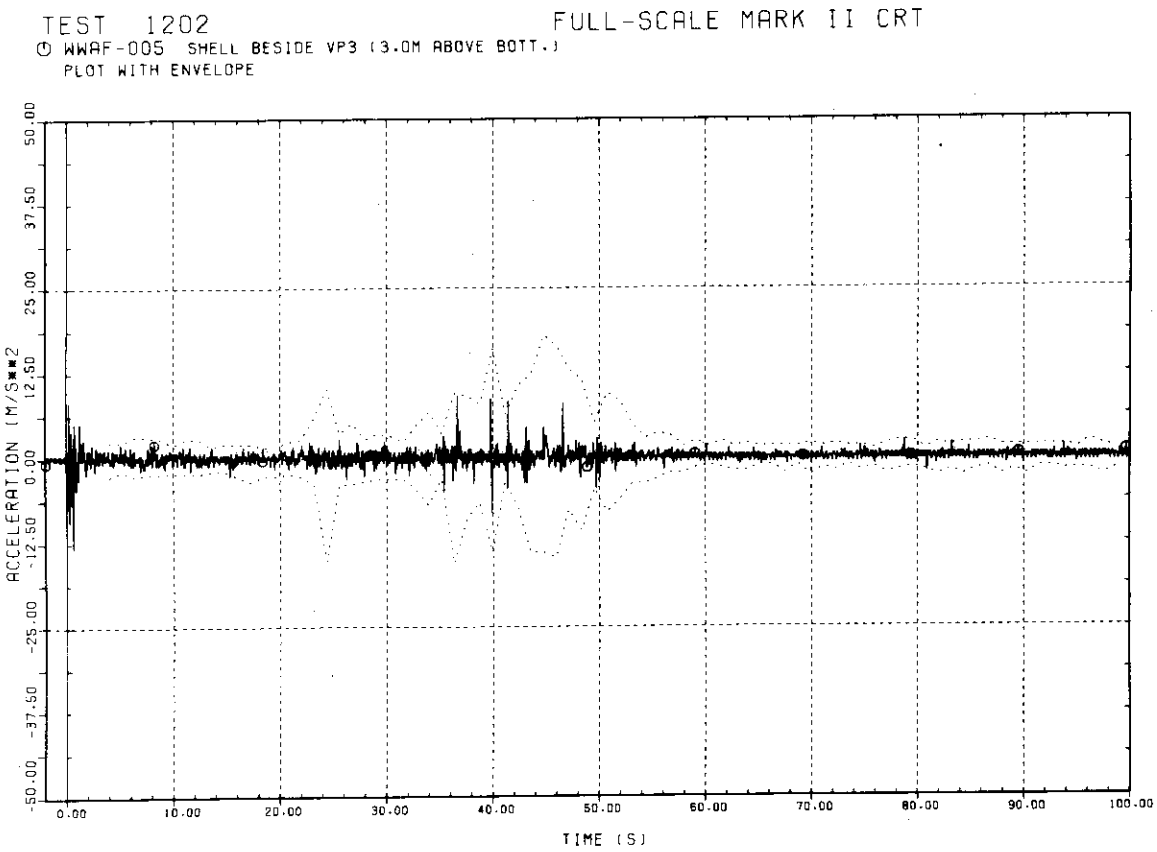
Plot L-1-32 Strain of Vent Pipe Brace



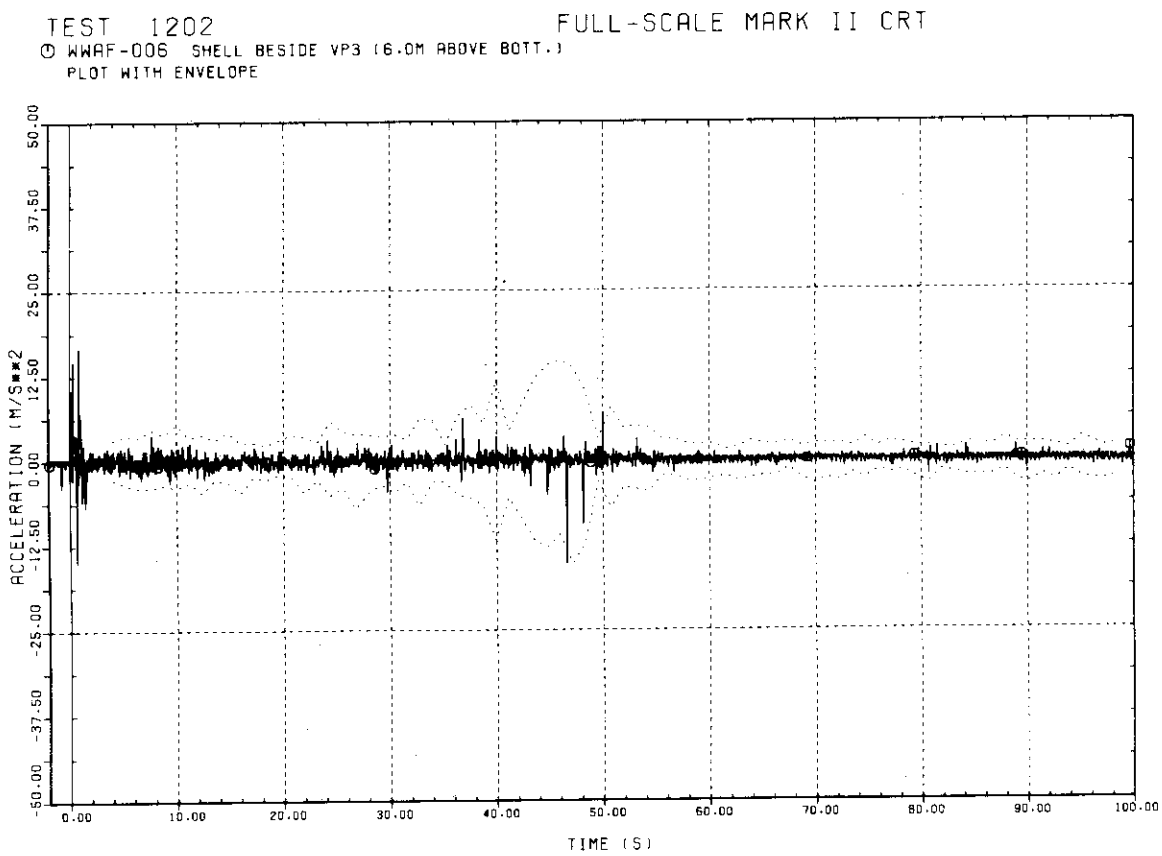
Plot L-2-1 Acceleration of Vent Pipe Outlet



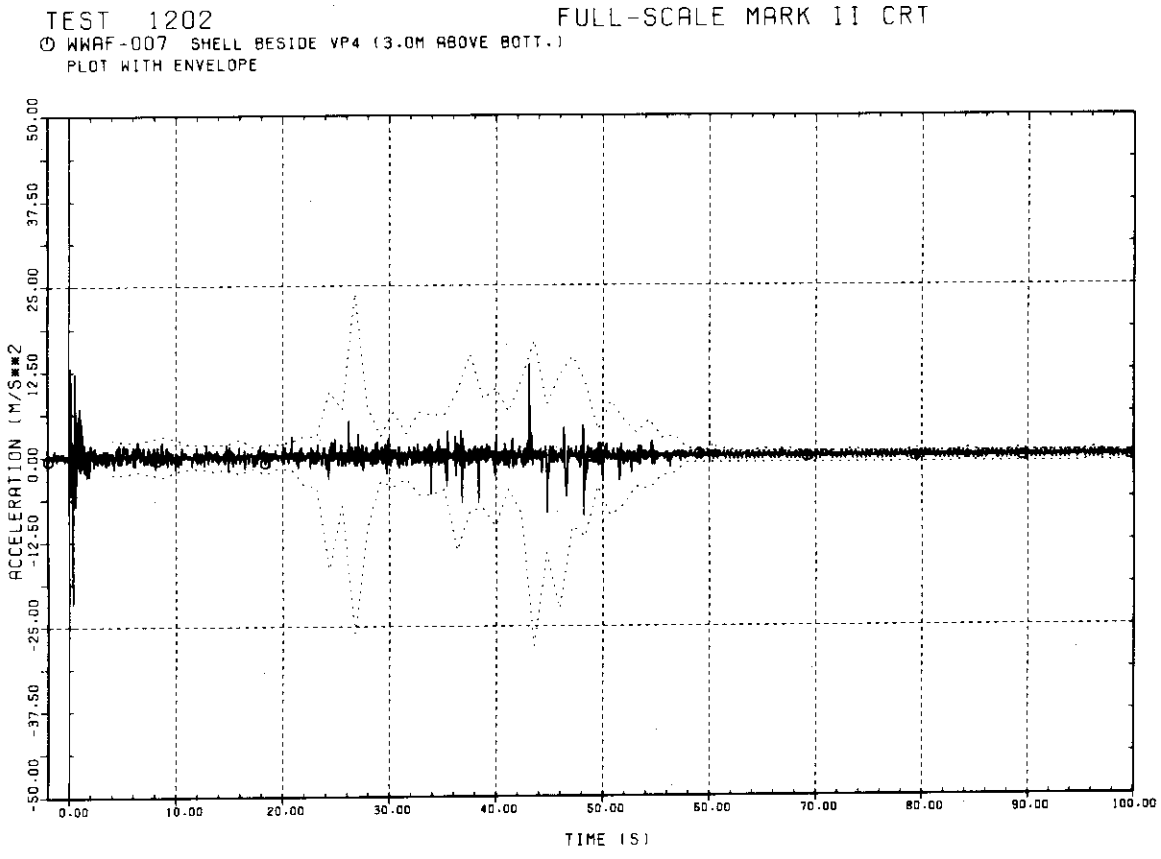
Plot L-2-2 Acceleration of Vent Pipe Outlet



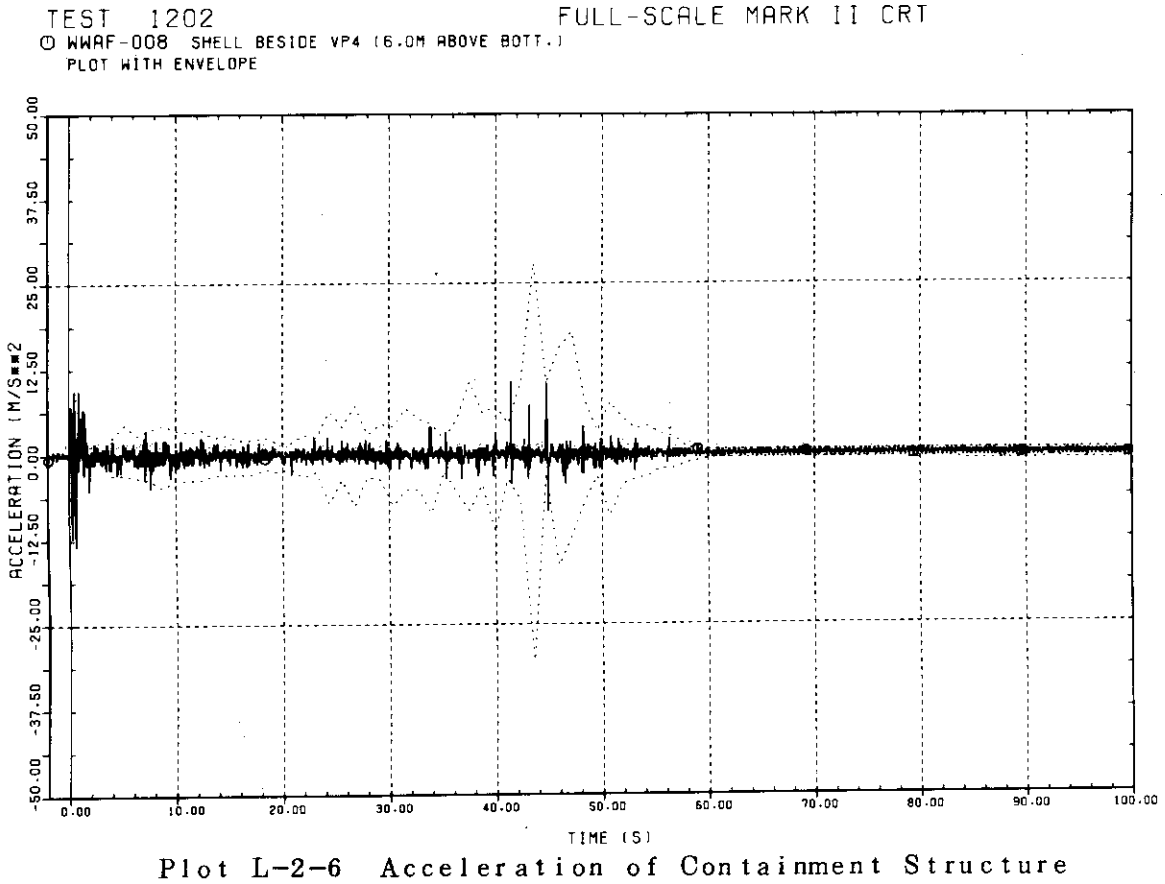
Plot L-2-3 Acceleration of Containment Structure



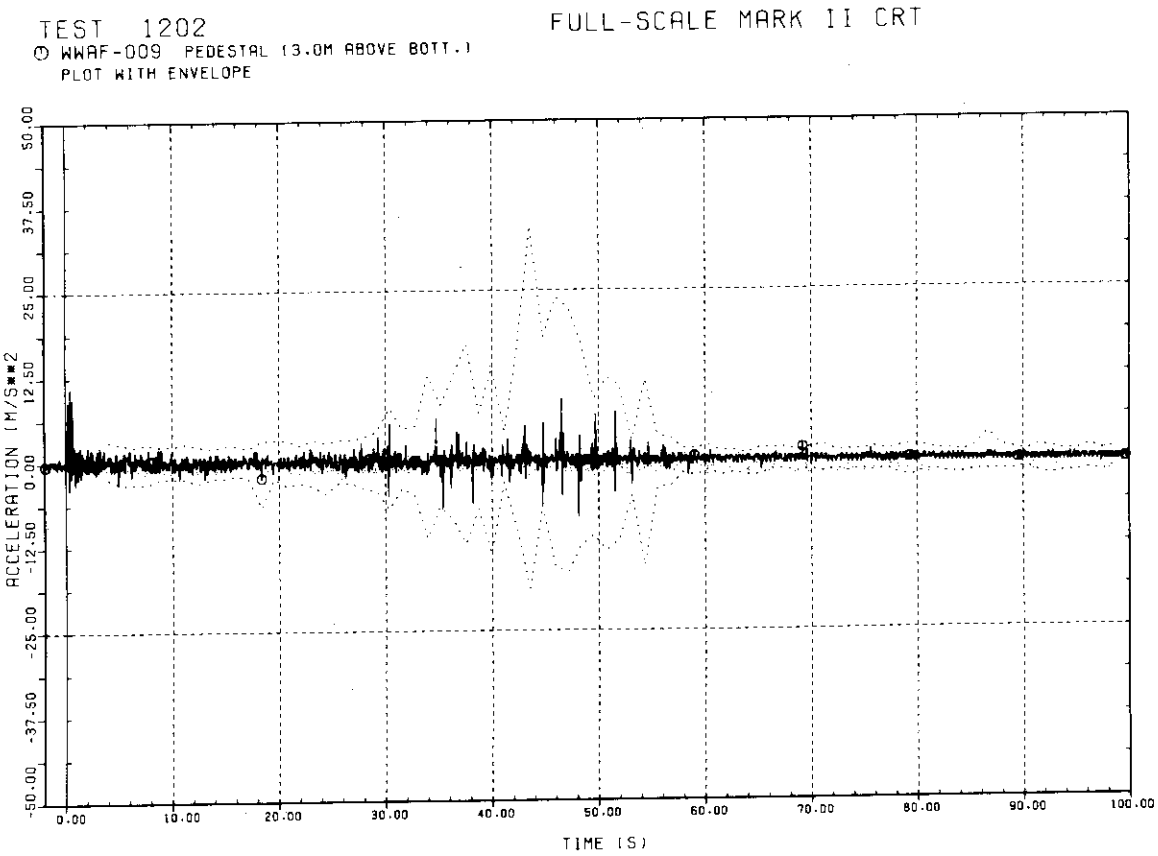
Plot L-2-4 Acceleration of Containment Structure



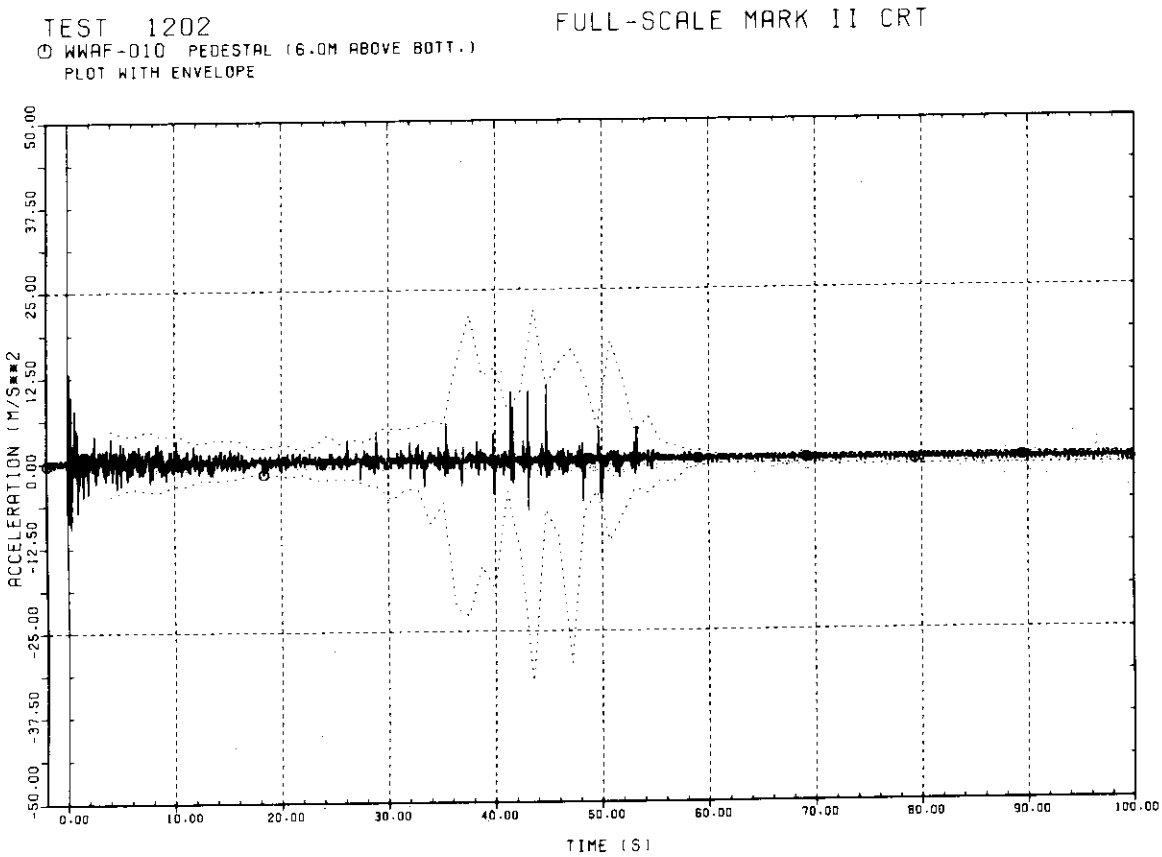
Plot L-2-5 Acceleration of Containment Structure



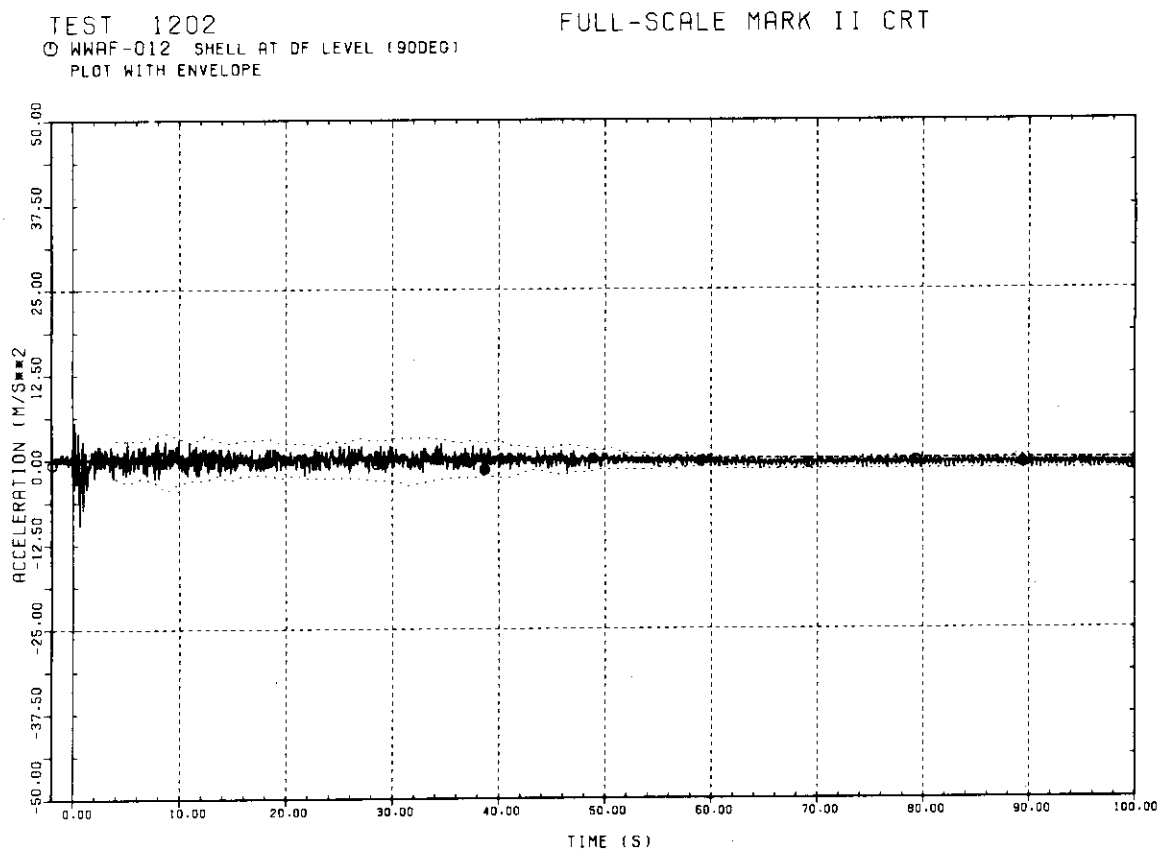
Plot L-2-6 Acceleration of Containment Structure



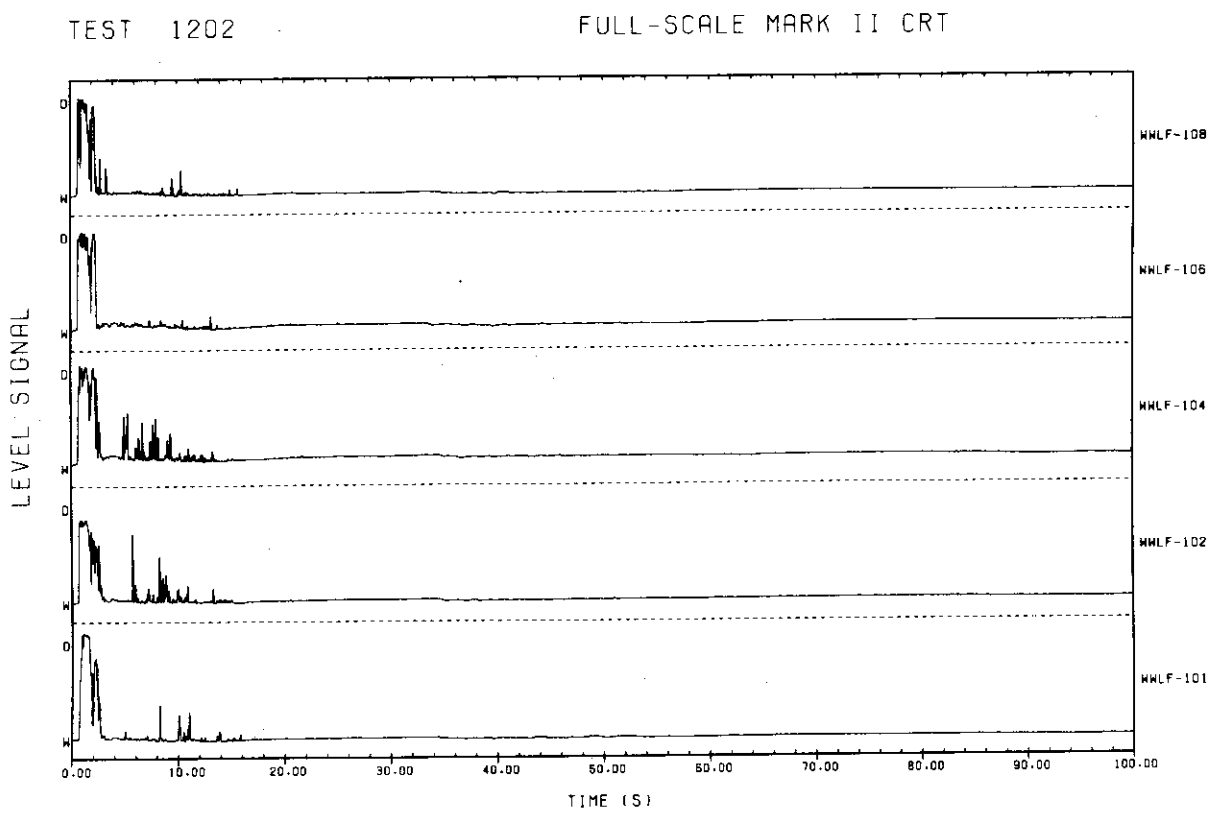
Plot L-2-7 Acceleration of Containment Structure



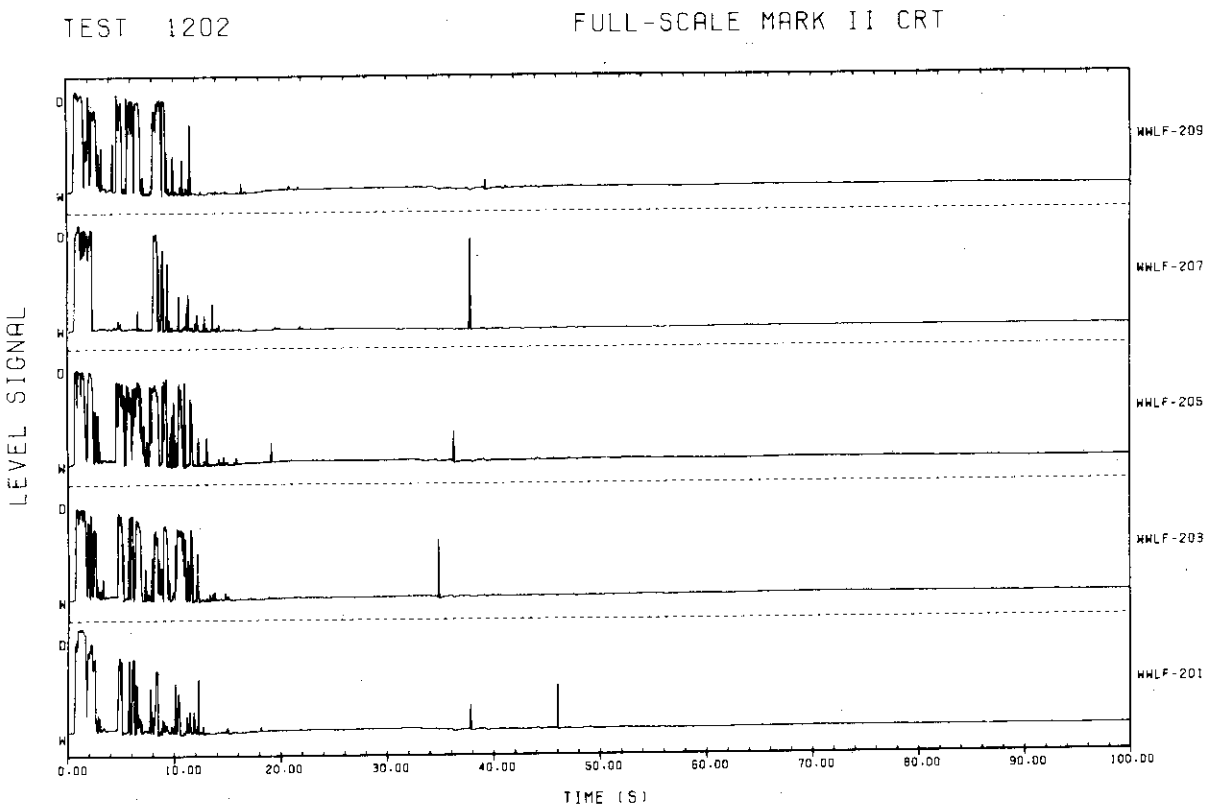
Plot L-2-8 Acceleration of Containment Structure



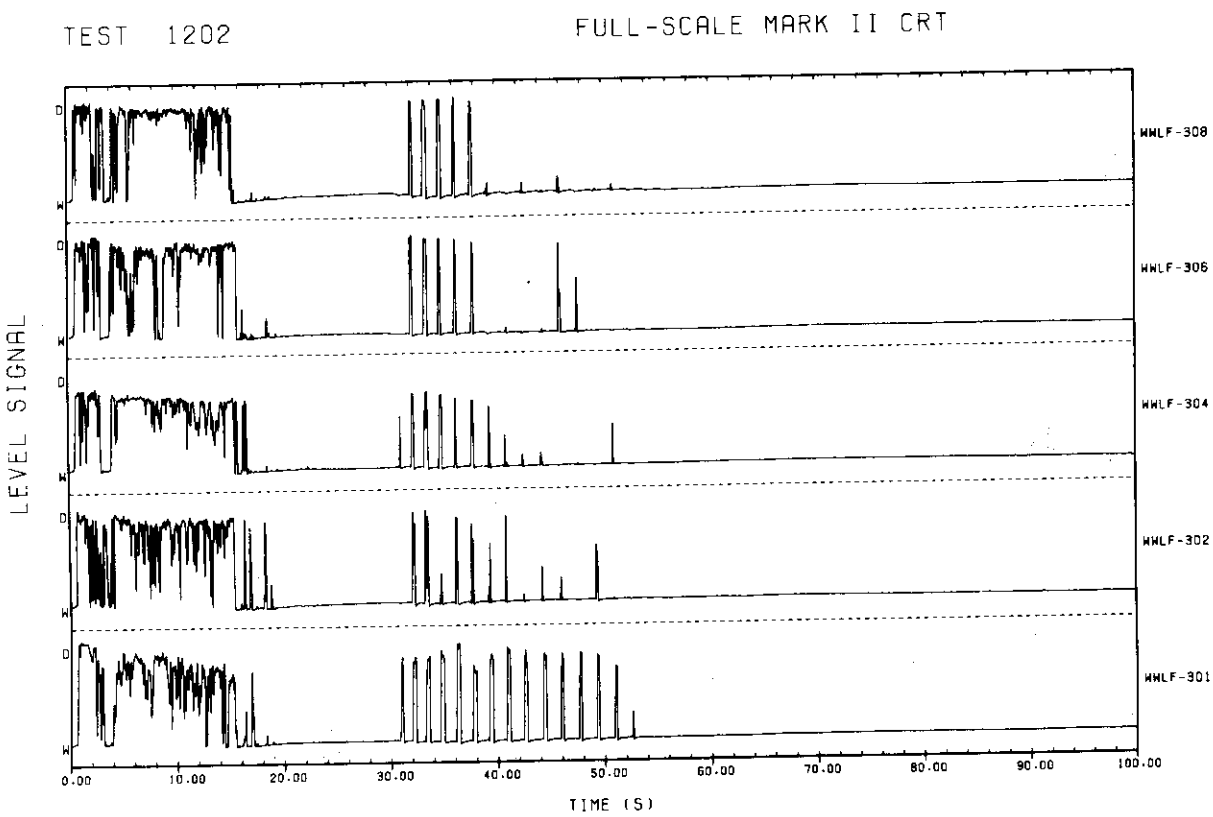
Plot L-2-9 Acceleration of Containment Structure



Plot L-2-10 Phase Boundary Signals



Plot L-2-11 Phase Boundary Signals



Plot L-2-12 Phase Boundary Signals

Short Term Plots of Data

Short Term Plot Specification

Period 0 – 5 s

Objective : Detailed Presentation of (X) Pool Swell.

( ) High and Medium Steam Flux Condensation Oscillation.

( ) Chugging.

Plot No.	Recording System	Recording Rate (data/s)	Sampling Rate for Plots	Remarks
S-0-1 to 29	Computer	50.00	1/1	
S-1-1 to 17	PCM Track-1	455.56	1/1	
S-2-1 to 10	PCM Track-2	455.56	1/1	
Supplement 1	Light Beam Recorder	Continuous		Wetwell water level signals.

List of Short Term Plots

Computer Recorded Channels

Plot	S-0-1	Pressures in Pressure Vessel and Blowdown Pipe	
〃	S-0-2	Pressures in Drywell and Wetwell Airspace	
〃	S-0-3	DP over Pressure Vessel	
〃	S-0-4	Temperatures in Pressure Vessel	
〃	S-0-5	Temperatures in Pressure Vessel and Blowdown Pipe	
〃	S-0-6	Temperatures in Drywell	(DWTS-101 - 103)
〃	S-0-7	Temperatures in Drywell	(DWTS-201 - 203)
〃	S-0-8	Temperatures in Drywell	(DWTS-301 - 302)
〃	S-0-9	Temperatures in Vent Pipe	(VP1)
〃	S-0-10	Temperatures in Vent Pipe	(VP2)
〃	S-0-11	Temperatures in Vent Pipe	(VP3)
〃	S-0-12	Temperatures in Wetwell	(WWTS-101 - 108)
〃	S-0-13	Temperatures in Wetwell	(WWTS-201 - 208)
〃	S-0-14	Temperatures in Wetwell	(WWTS-301 - 308)
〃	S-0-15	Temperatures in Wetwell	(WWTS-401 - 408)
〃	S-0-16	Water Level in Pressure Vessel	
〃	S-0-17	Water Level in Drywell	
〃	S-0-18	Water Level in Vent Pipe	(VP's 1 and 2)
〃	S-0-19	Water Level in Vent Pipe	(VP's 3 and 4)
〃	S-0-20	Water Level in Vent Pipe (VP5) and Vacuum Breaker Actuation Signal	
〃	S-0-21	Water Level in Wetwell	(WWLS-104 - 116)
〃	S-0-22	Water Level in Wetwell	(WWLS-201 - 216)
〃	S-0-23	Water Level in Wetwell	(WWLS-303 - 315)
〃	S-0-24	Water Level in Wetwell	(WWLS-401 - 416)
〃	S-0-25	Water Level in Wetwell	(WWLS-503 - 515)
〃	S-0-26	Water Level in Wetwell	(WWLS-604 - 616)
〃	S-0-27	Water Level in Wetwell	(WWLS-704 - 716)
〃	S-0-28	Water Level in Wetwell	(WWLS-804 - 816)
〃	S-0-29	Water Level in Wetwell	(WWLS-221 - 228)

List of Short Term Plots (Continued)

PCM Track-1 Channels

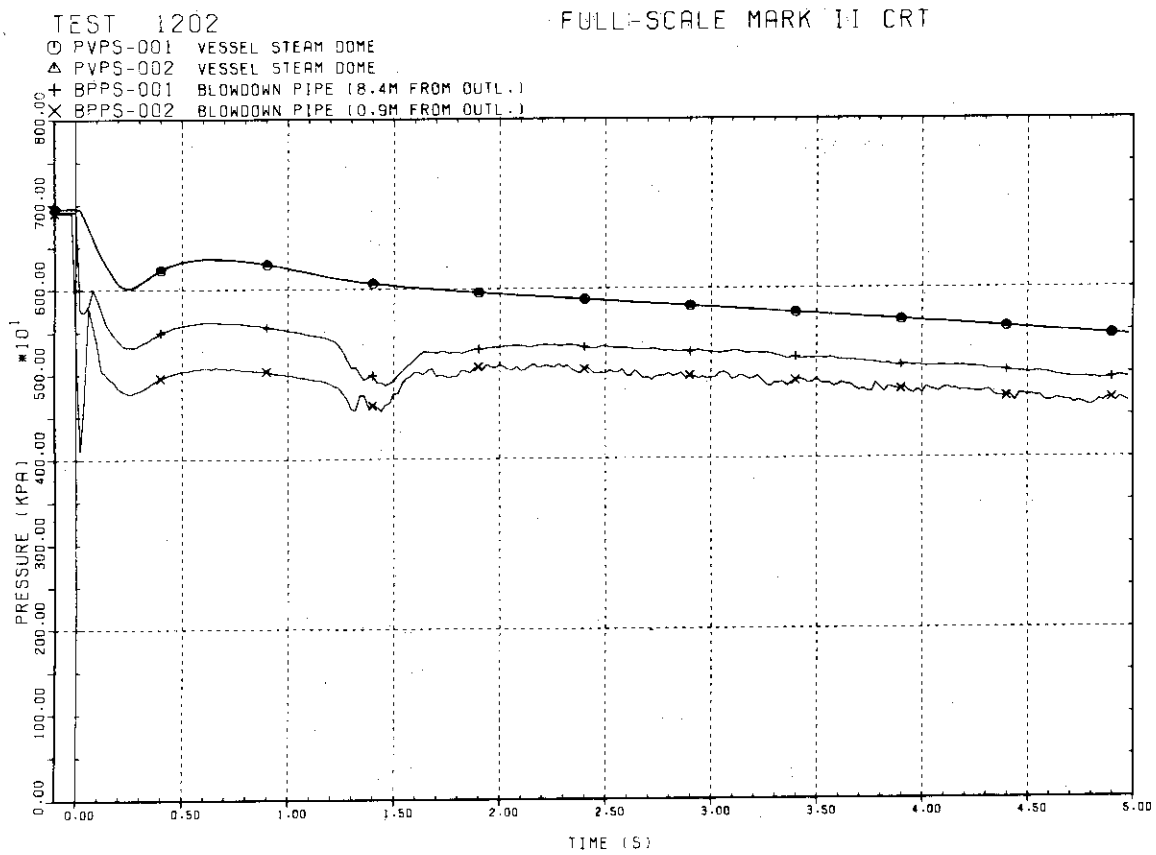
Plot	S-1-1	Pressures in Drywell and Wetwell Airspace	
"	S-1-2	Pressures in Vent Pipe	(VPPF-101, 201, 401)
"	S-1-3	Pressures in Vent Pipe	(VPPF-301, 302, 303)
"	S-1-4	Pressures in Vent Pipe	(VPPF-501, 502, 503)
"	S-1-5	Pressures in Wetwell	(WWPF-101)
"	S-1-6	Pressures in Wetwell	(WWPF-102, 201, 202, 203)
"	S-1-7	Pressures in Wetwell	(WWPF-103, 301, 302, 303)
"	S-1-8	Pressures in Wetwell	(WWPF-103, 401, 402)
"	S-1-9	Pressures in Wetwell	(WWPF-104, 501, 502)
"	S-1-10	Pressures in Wetwell	(WWPF-105)
"	S-1-11	Pressures in Wetwell	(WWPF-106)
"	S-1-12	Pressures in Wetwell	(WWPF-107)
"	S-1-13	Pressures in Wetwell	(WWPF-602)
"	S-1-14	Pressures in Wetwell	(WWPF-702)
"	S-1-15	Strain of Vent Pipe Brace	(VPSF-101)
"	S-1-16	Strain of Vent Pipe Brace	(VPSF-102)
"	S-1-17	Strain of Vent Pipe Brace	(VPSF-201)

PCM Track-2 Channels

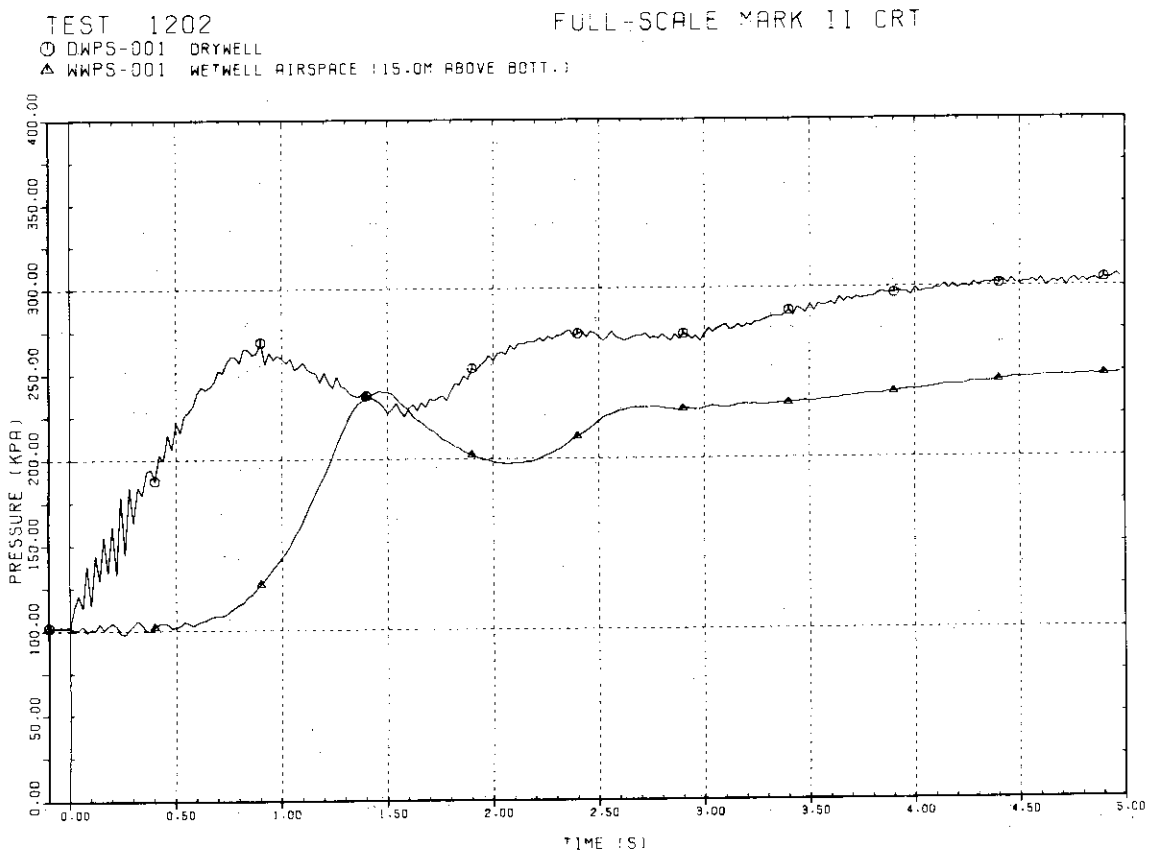
Plot	S-2-1	Acceleration of Containment Structure	(WWAF-005)
"	S-2-2	Acceleration of Containment Structure	(WWAF-006)
"	S-2-3	Acceleration of Containment Structure	(WWAF-007)
"	S-2-4	Acceleration of Containment Structure	(WWAF-008)
"	S-2-5	Acceleration of Containment Structure	(WWAF-009)
"	S-2-6	Acceleration of Containment Structure	(WWAF-010)
"	S-2-7	Acceleration of Containment Structure	(WWAF-012)
"	S-2-8	Phase Boundary Signals	(WWLF-101 - 108)
"	S-2-9	Phase Boundary Signals	(WWLF-201 - 209)
"	S-2-10	Phase Boundary Signals	(WWLF-301 - 308)

Supplement

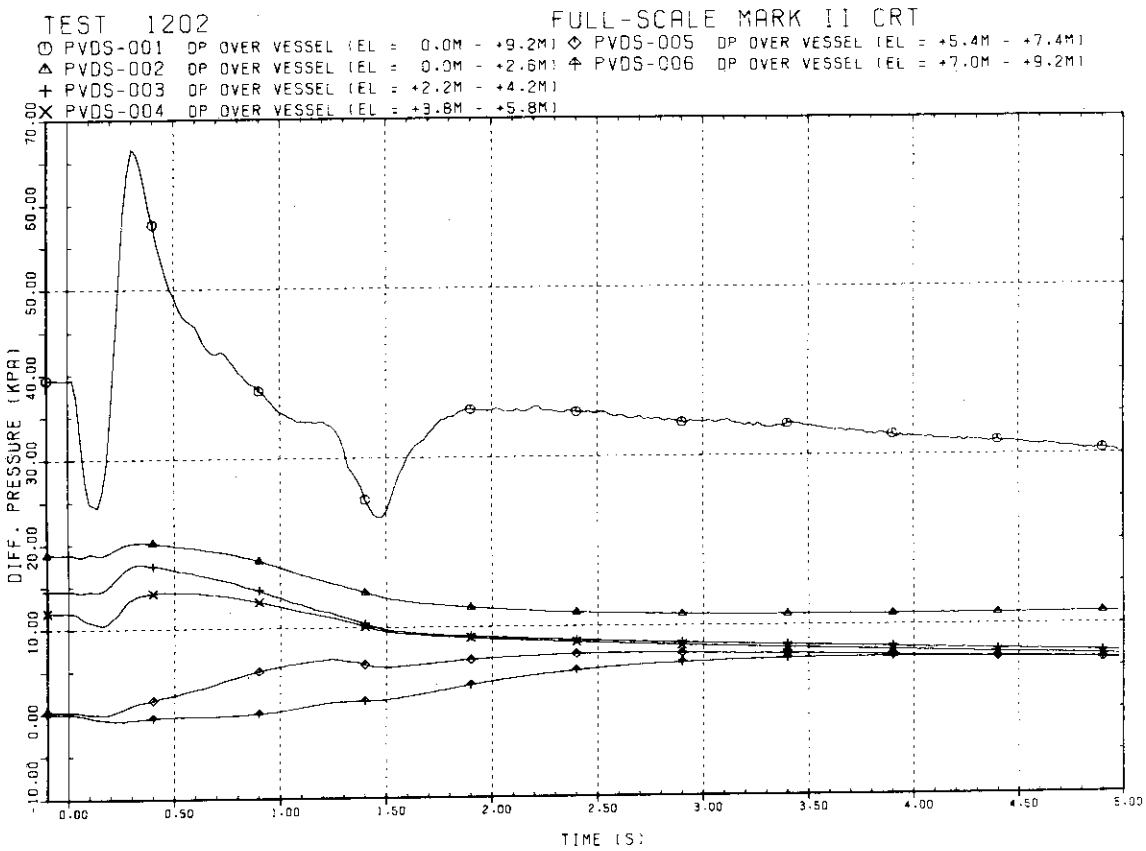
Supplement 1 Water Level in Wetwell (Light Beam Records)



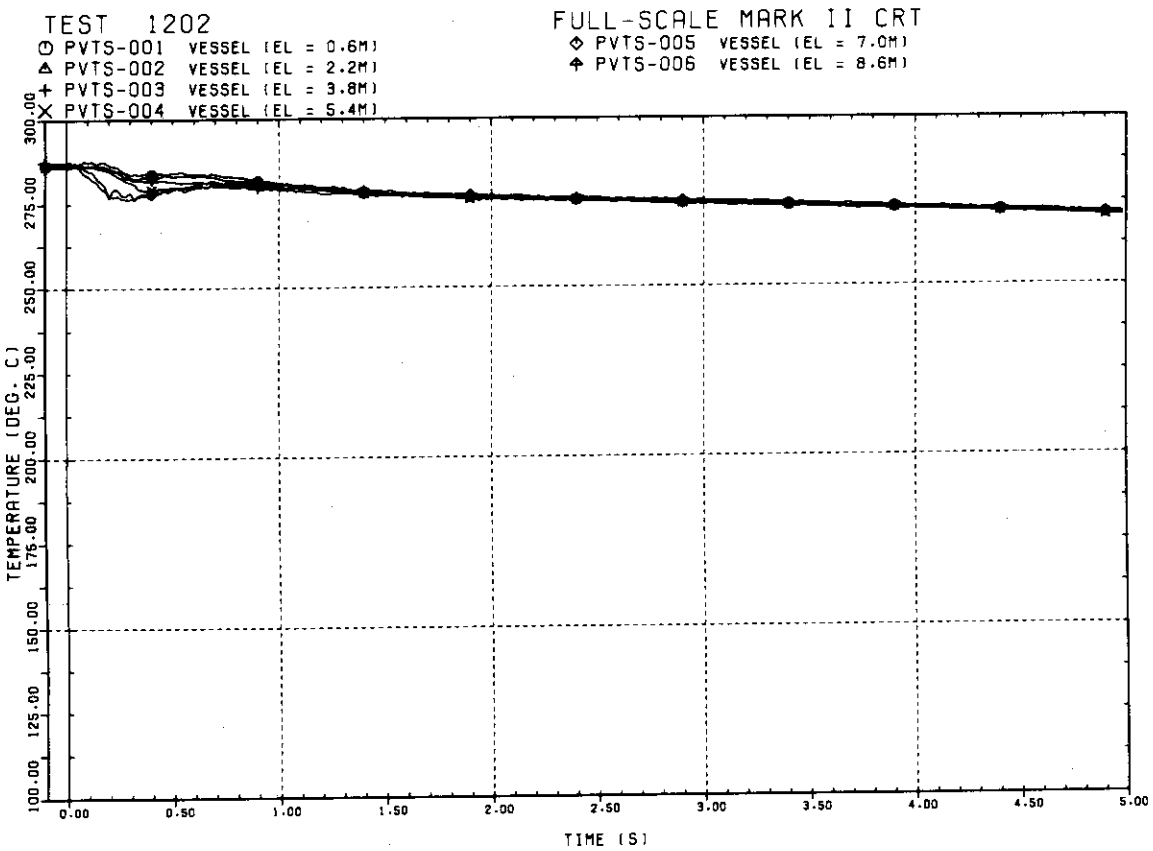
Plot S-0-1 Pressures in Vessel and Blowdown Pipe



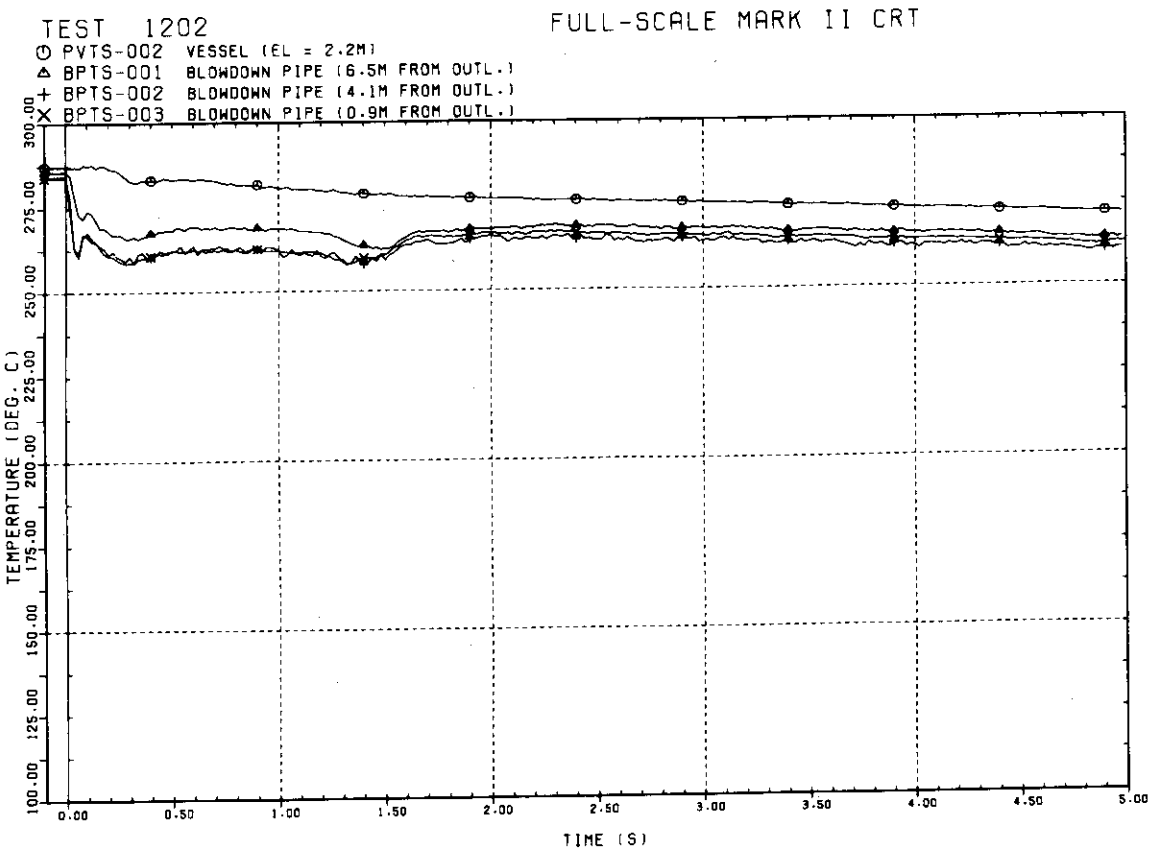
Plot S-0-2 Pressures in Drywell and Wetwell Airspace



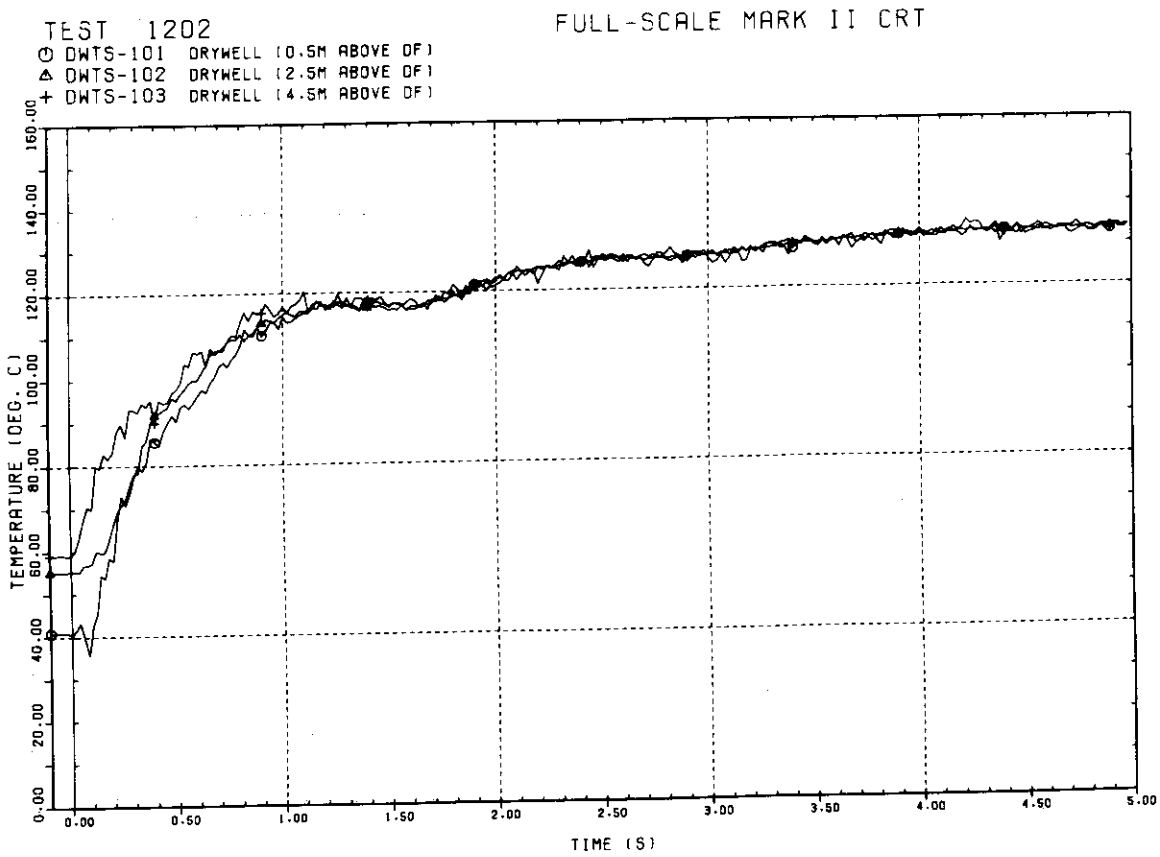
Plot S-0-3 Differential Pressures Over Vessel



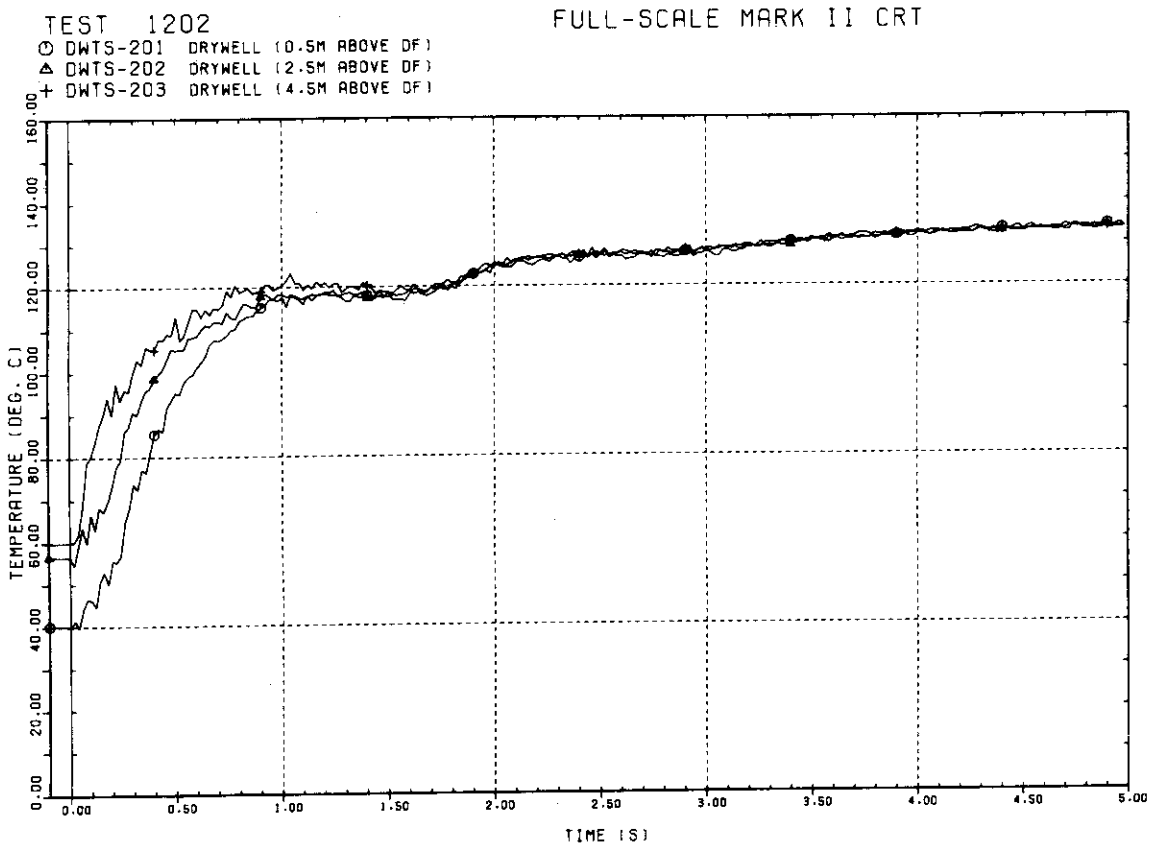
Plot S-0-4 Temperatures in Vessel



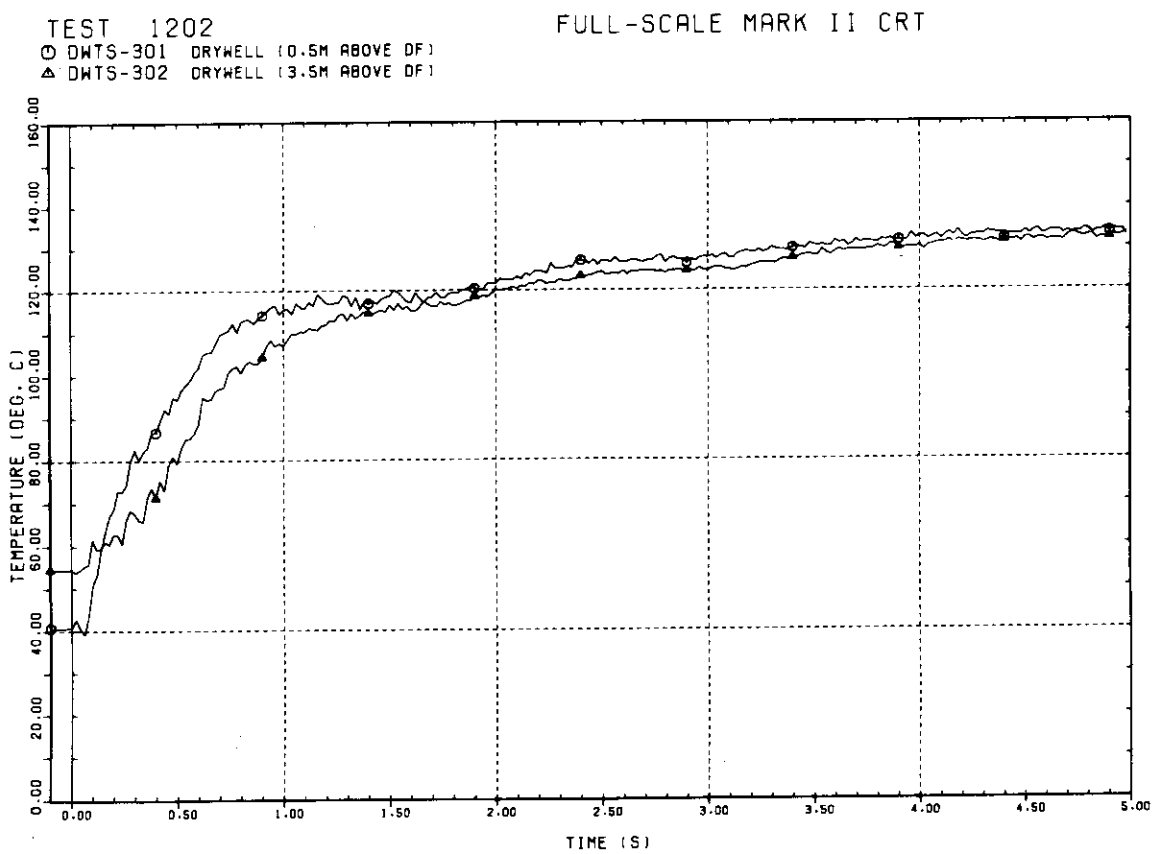
Plot S-0-5 Temperatures in Vessel and Blowdown Pipe



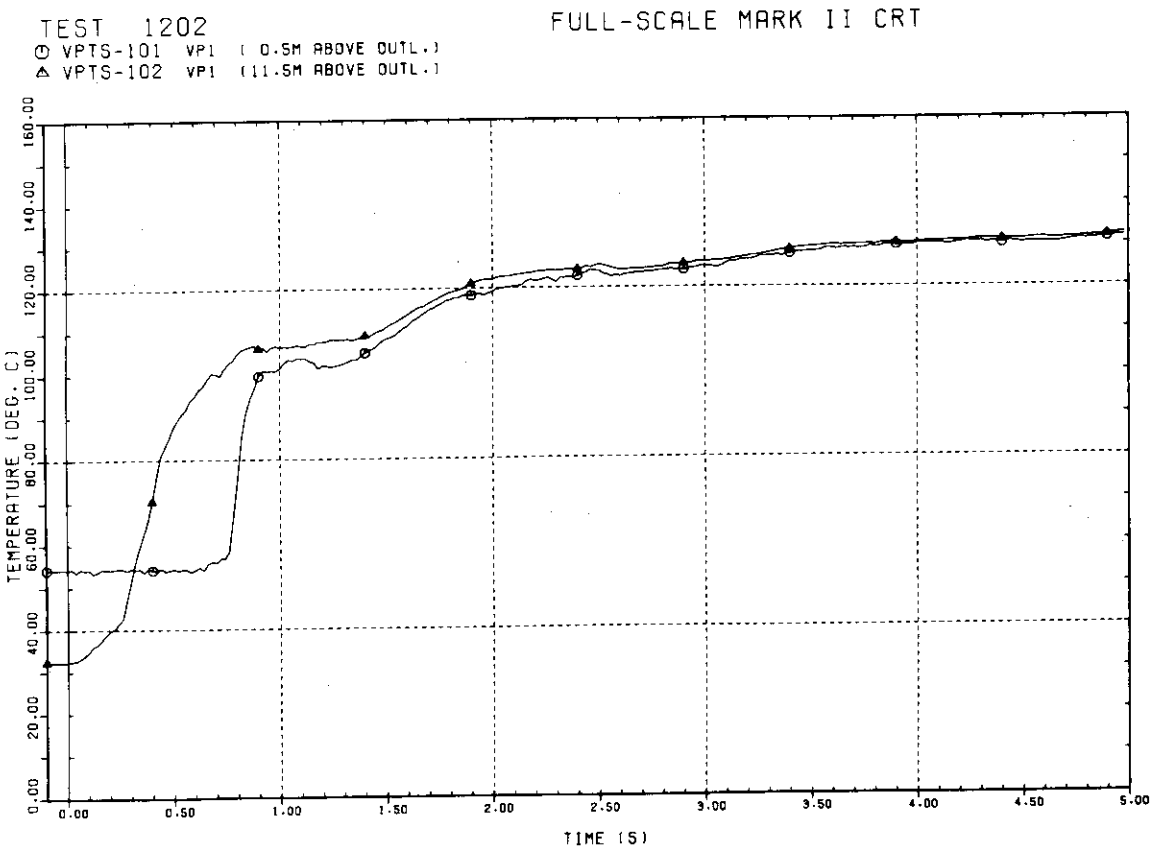
Plot S-0-6 Temperatures in Drywell



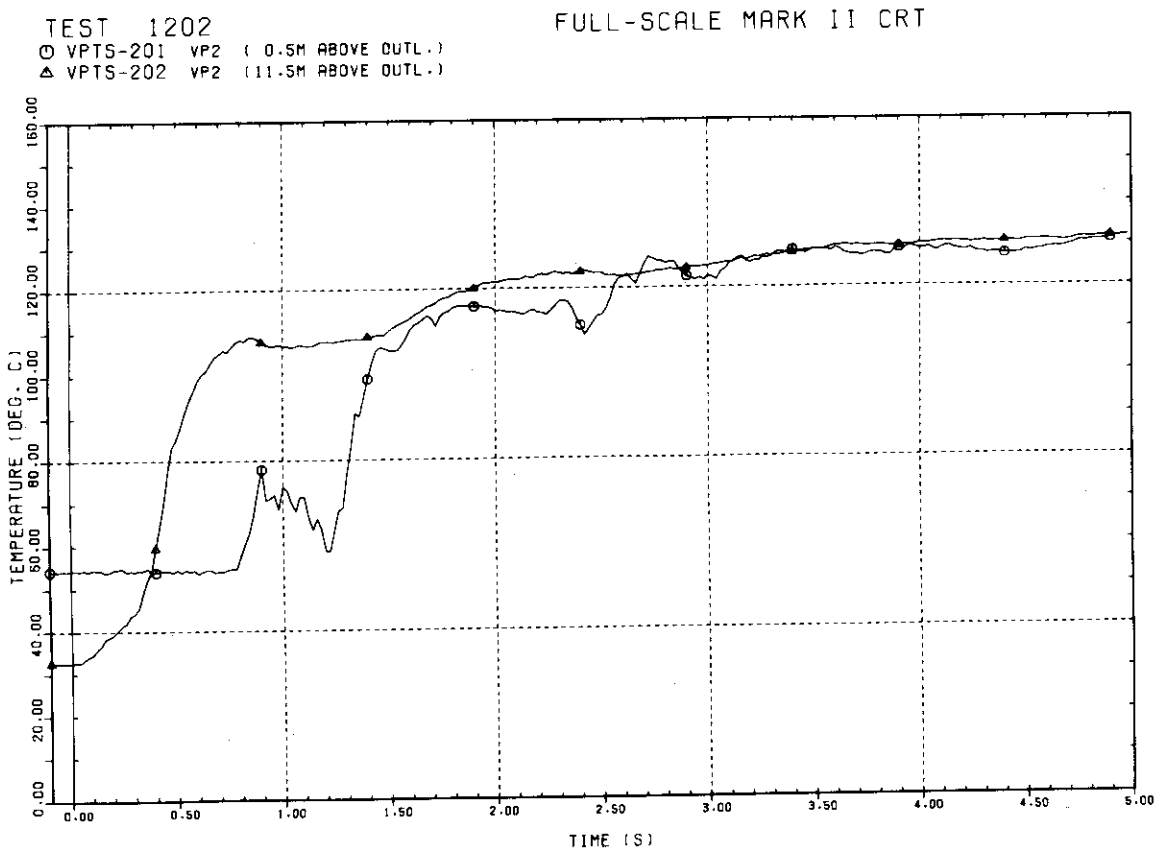
Plot S-0-7 Temperatures in Drywell



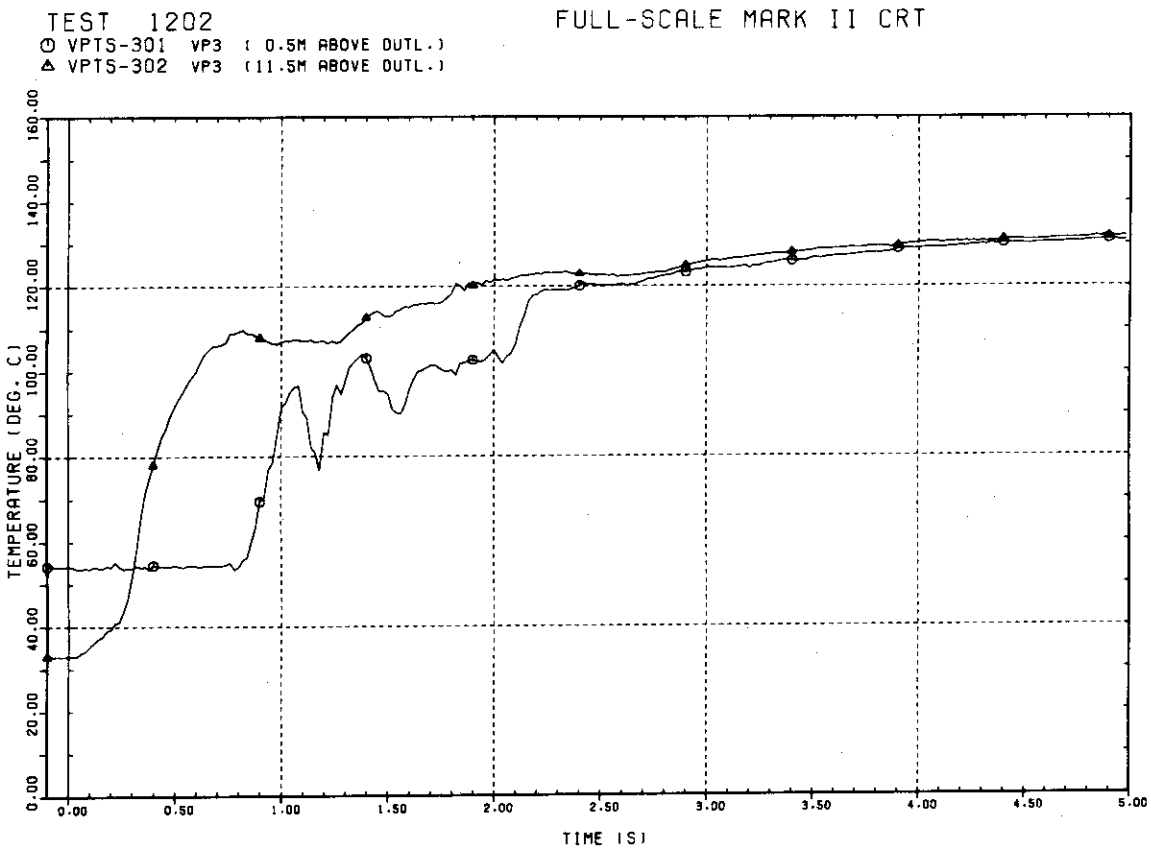
Plot S-0-8 Temperatures in Drywell



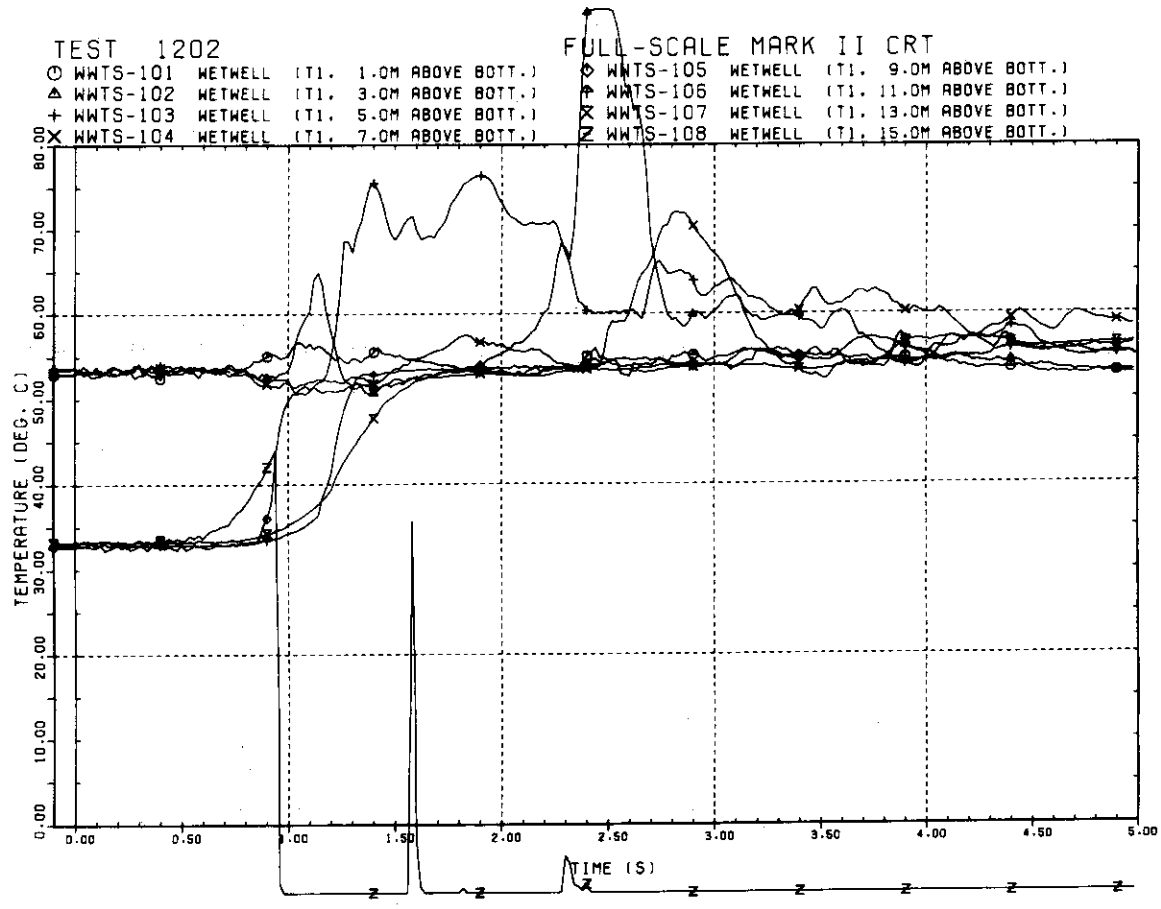
Plot S-0-9 Temperatures in Vent Pipe



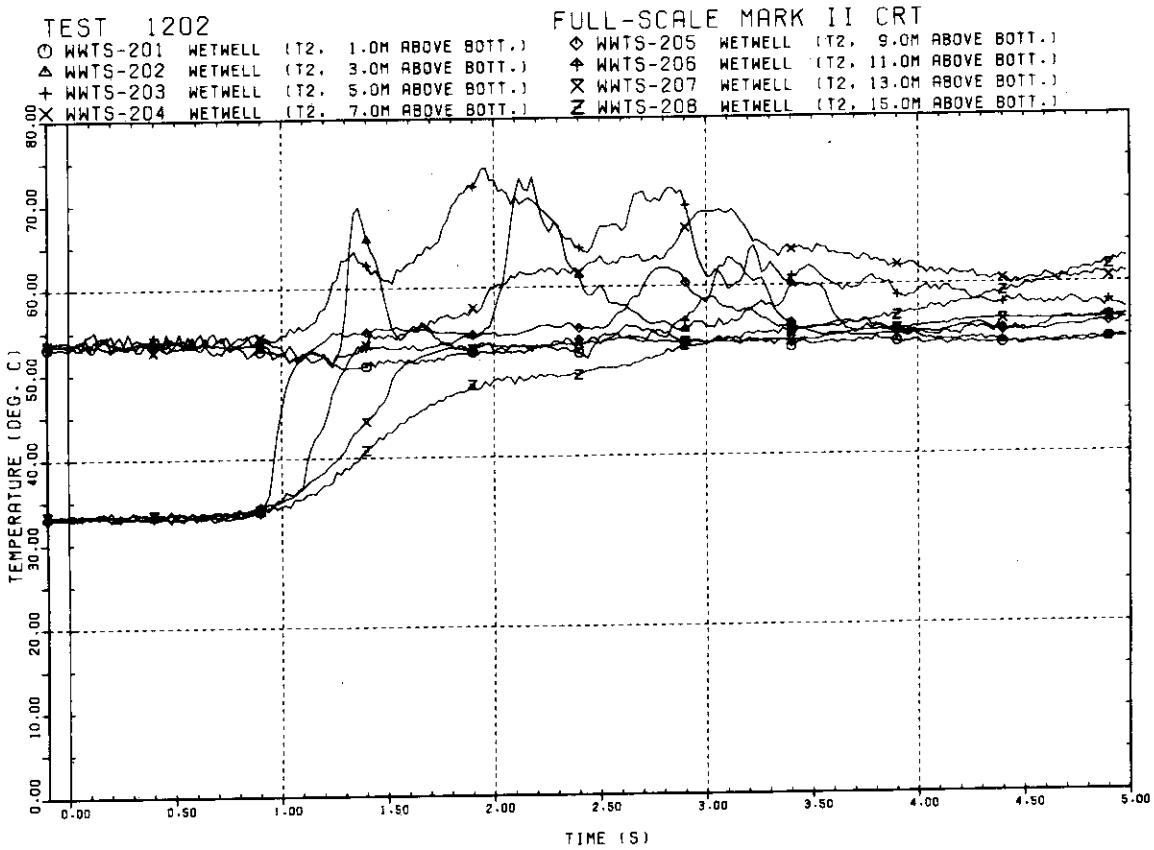
Plot S-0-10 Temperatures in Vent Pipe



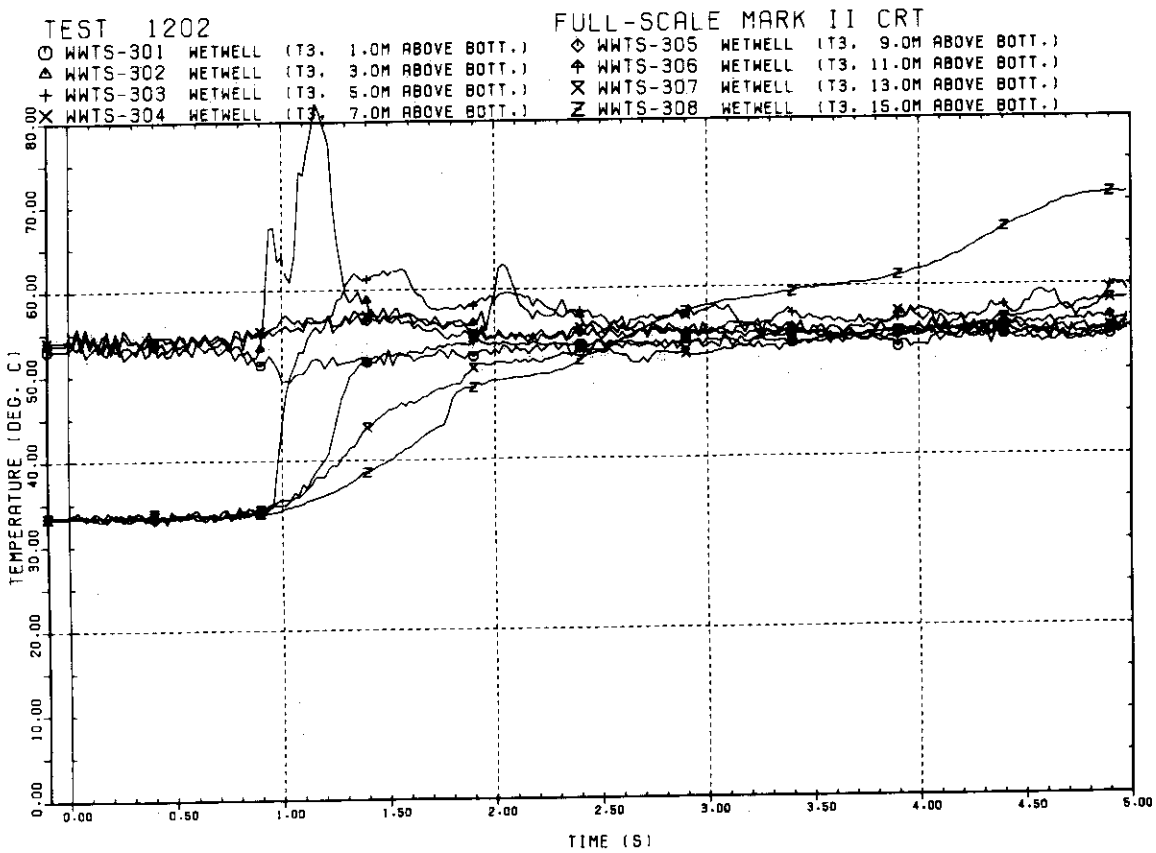
Plot S-0-11 Temperatures in Vent Pipe



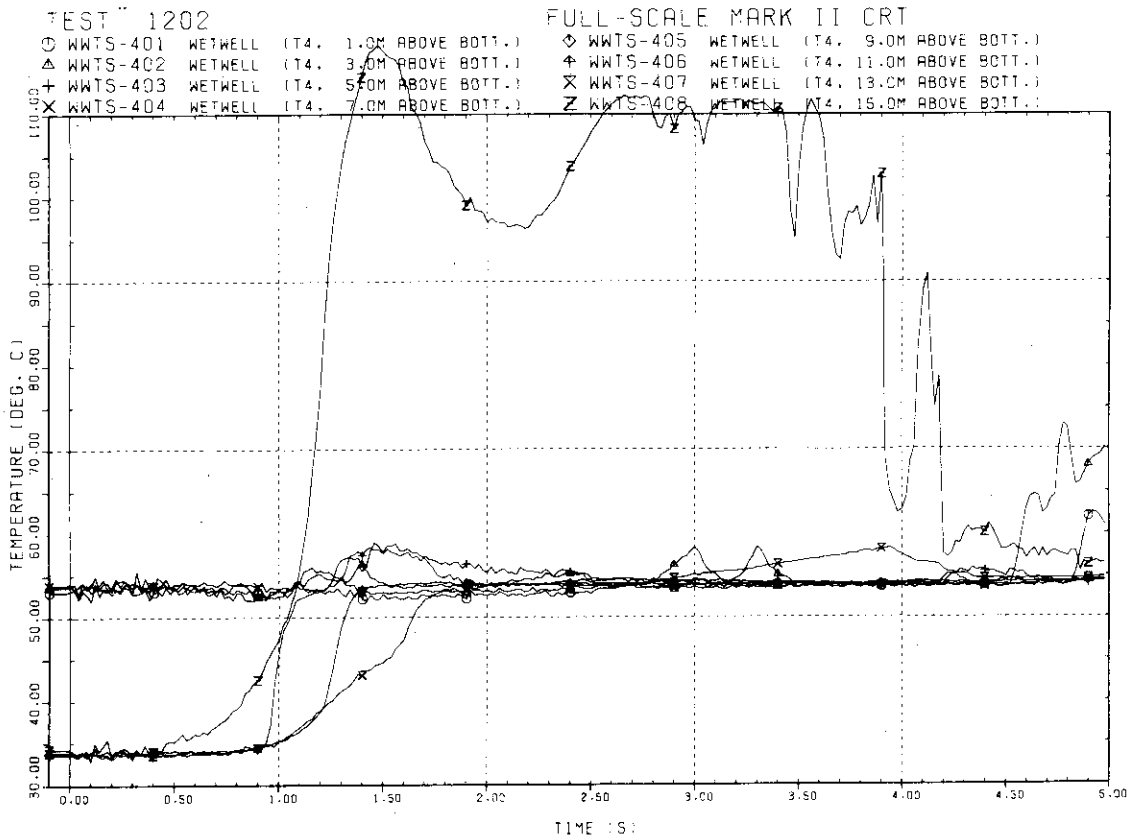
Plot S-0-12 Temperatures in Wetwell



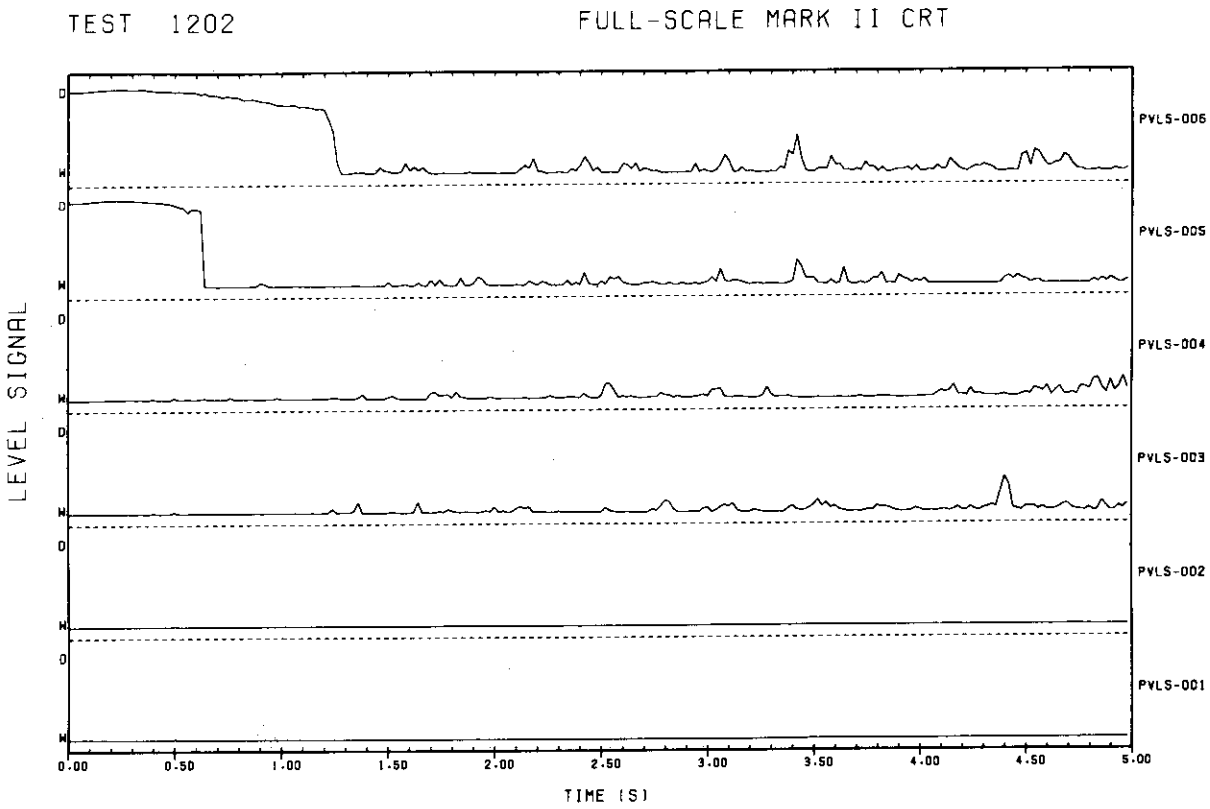
Plot S-0-13 Temperatures in Wetwell



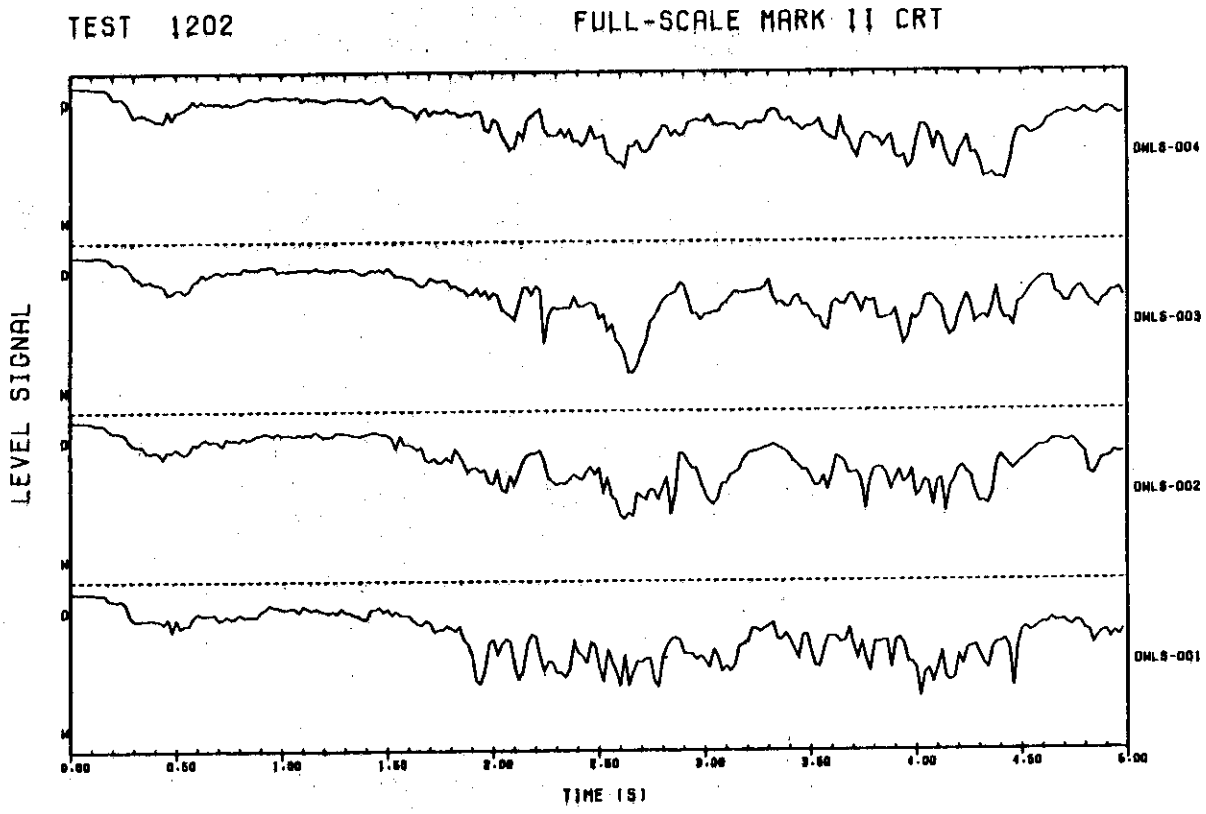
Plot S-0-14 Temperatures in Wetwell



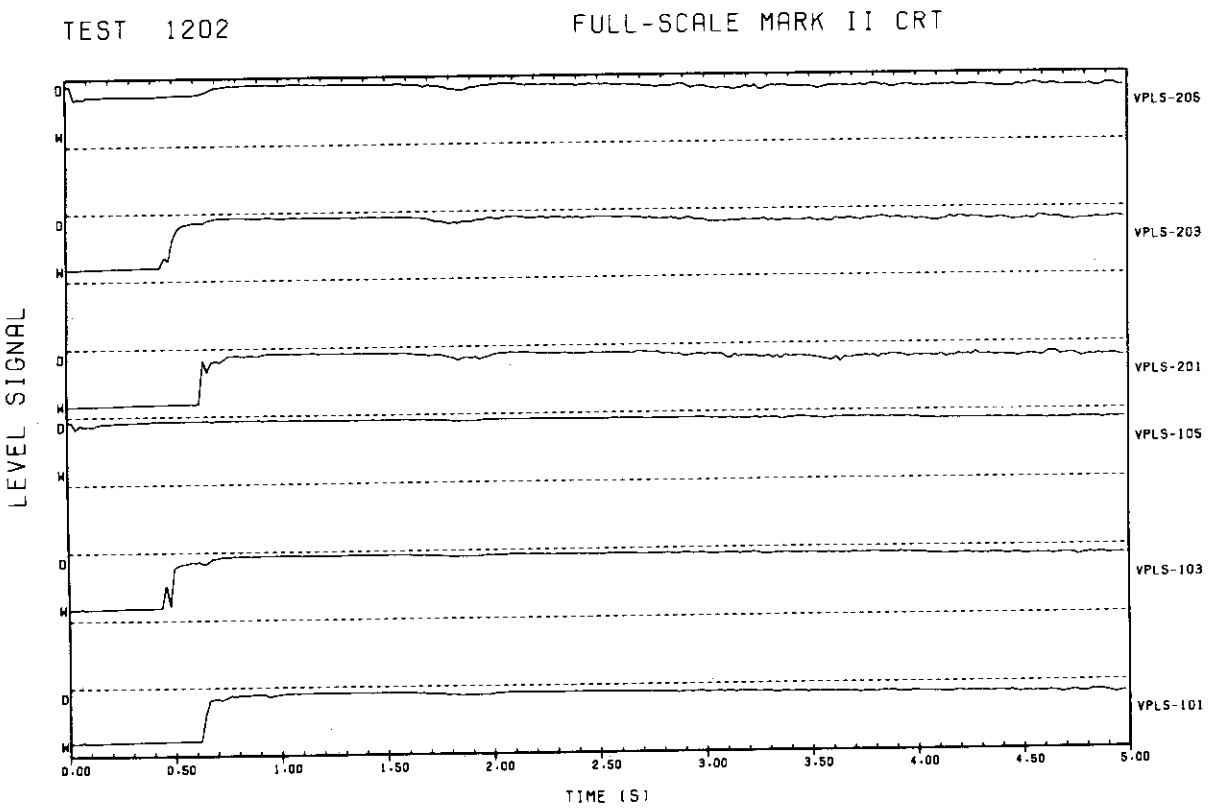
Plot S-0-15 Temperatures in Wetwell



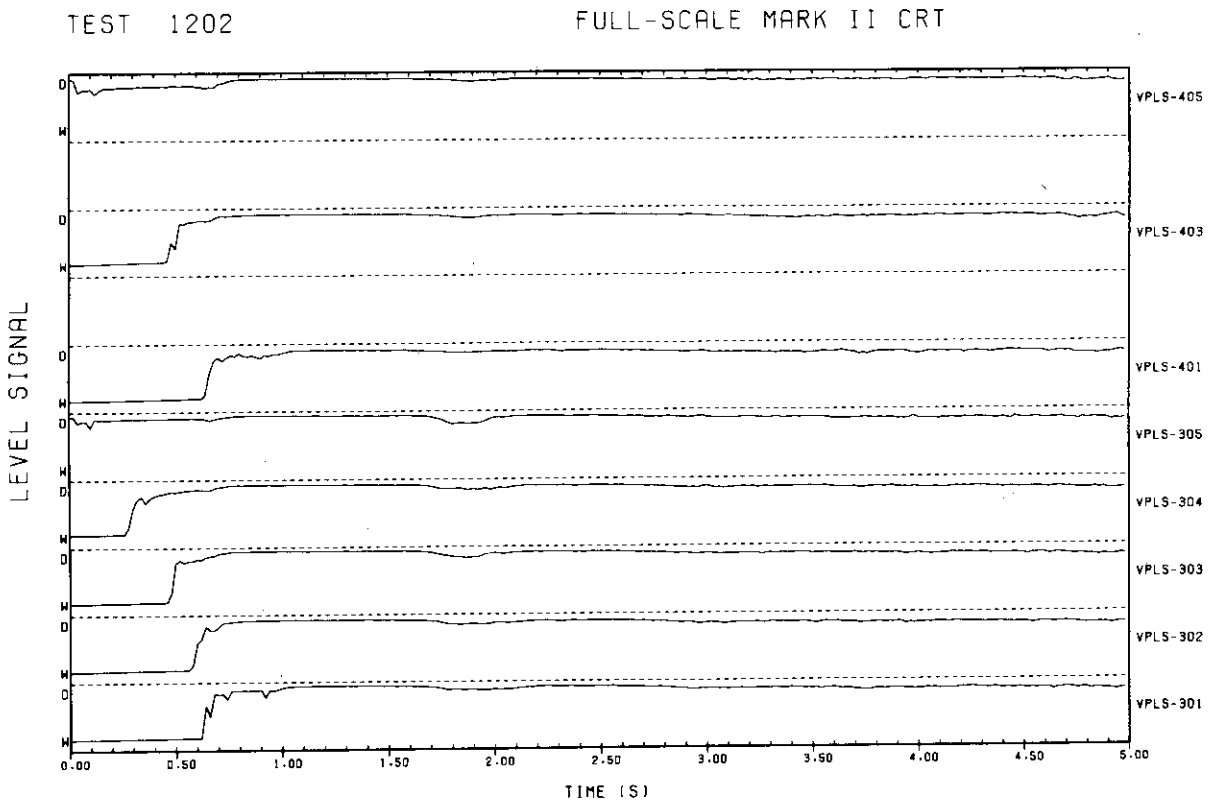
Plot S-0-16 Water Level in Vessel



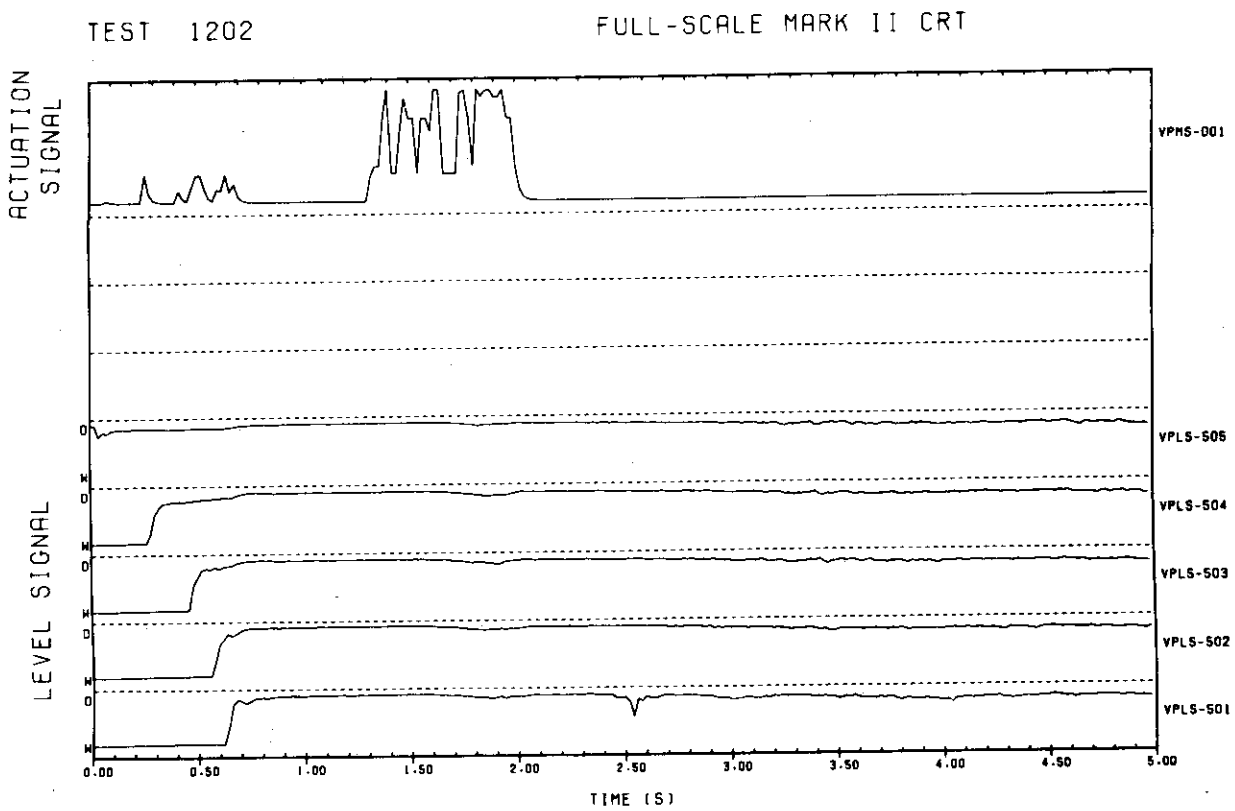
Plot S-0-17 Water Level in Drywell



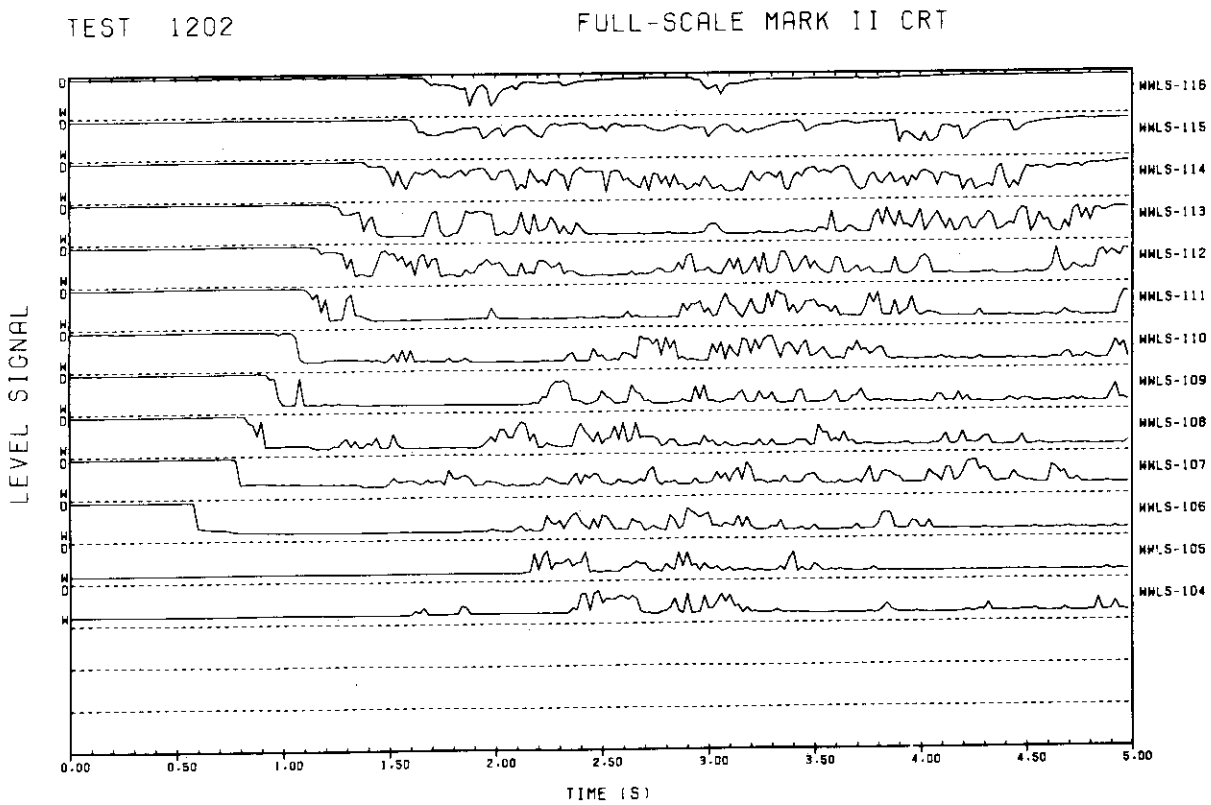
Plot S-0-18 Water Level in Vent Pipe



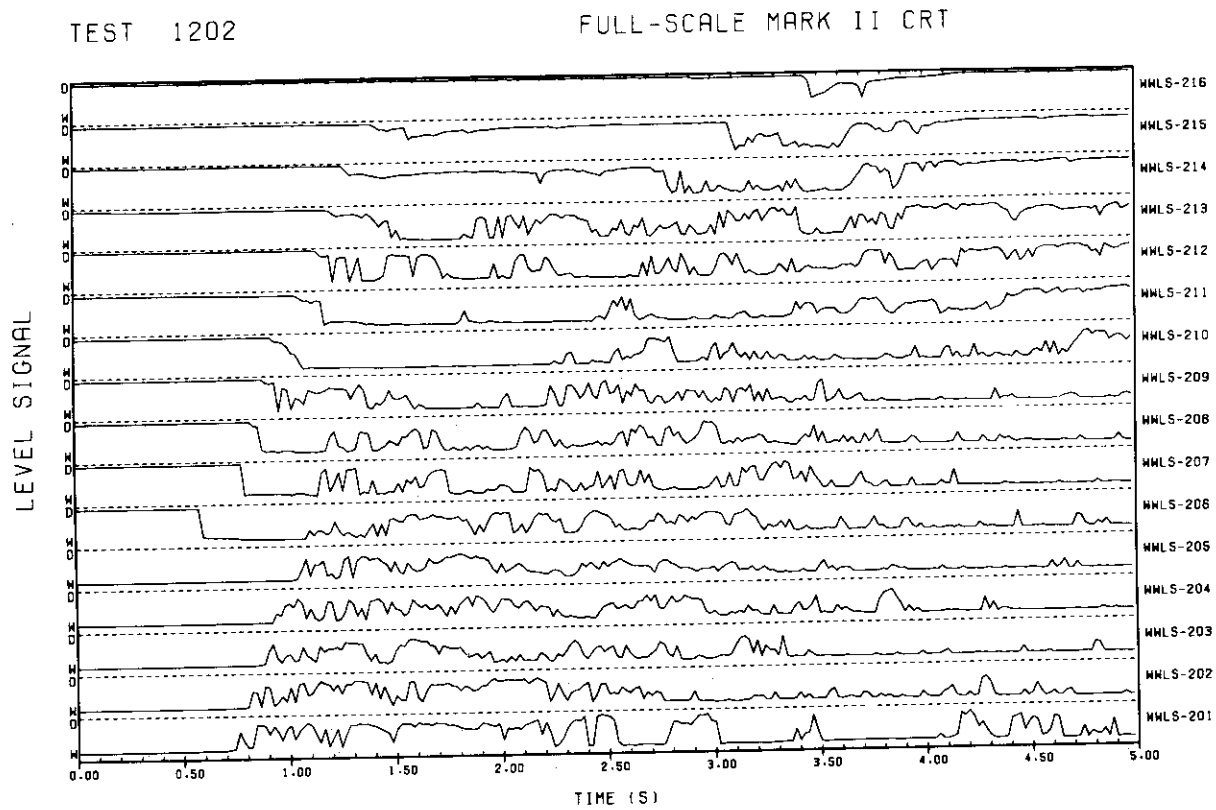
Plot S-0-19 Water Level in Vent Pipe



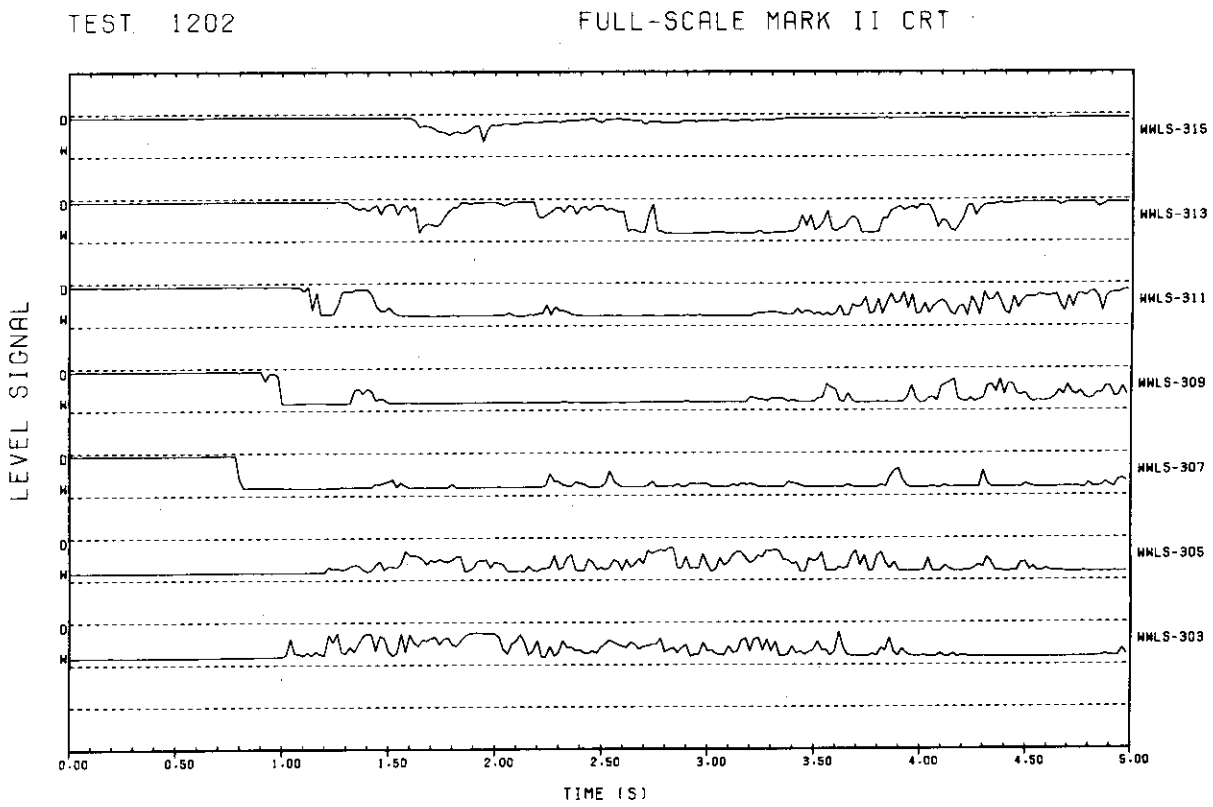
Plot S-0-20 Water Level in Vent Pipe and Vacuum Breaker Actuation Signal



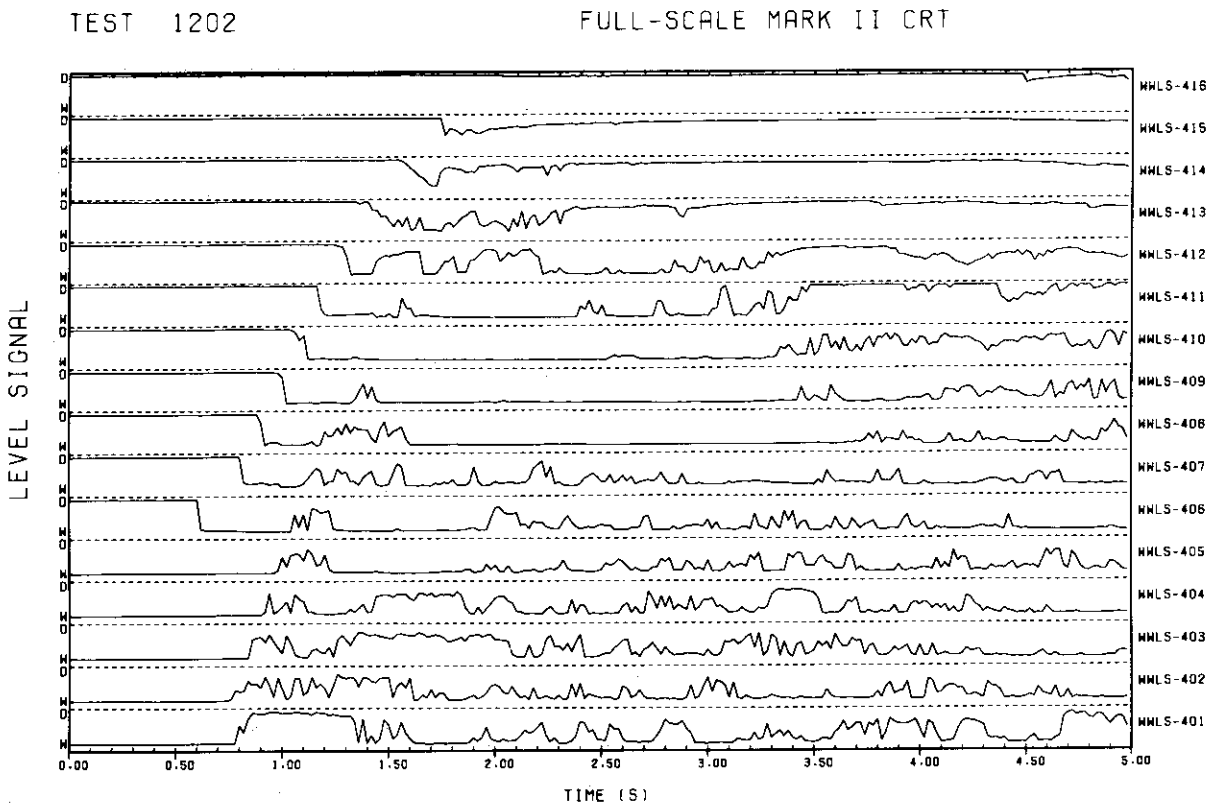
Plot S-0-21 Water Level in Wetwell



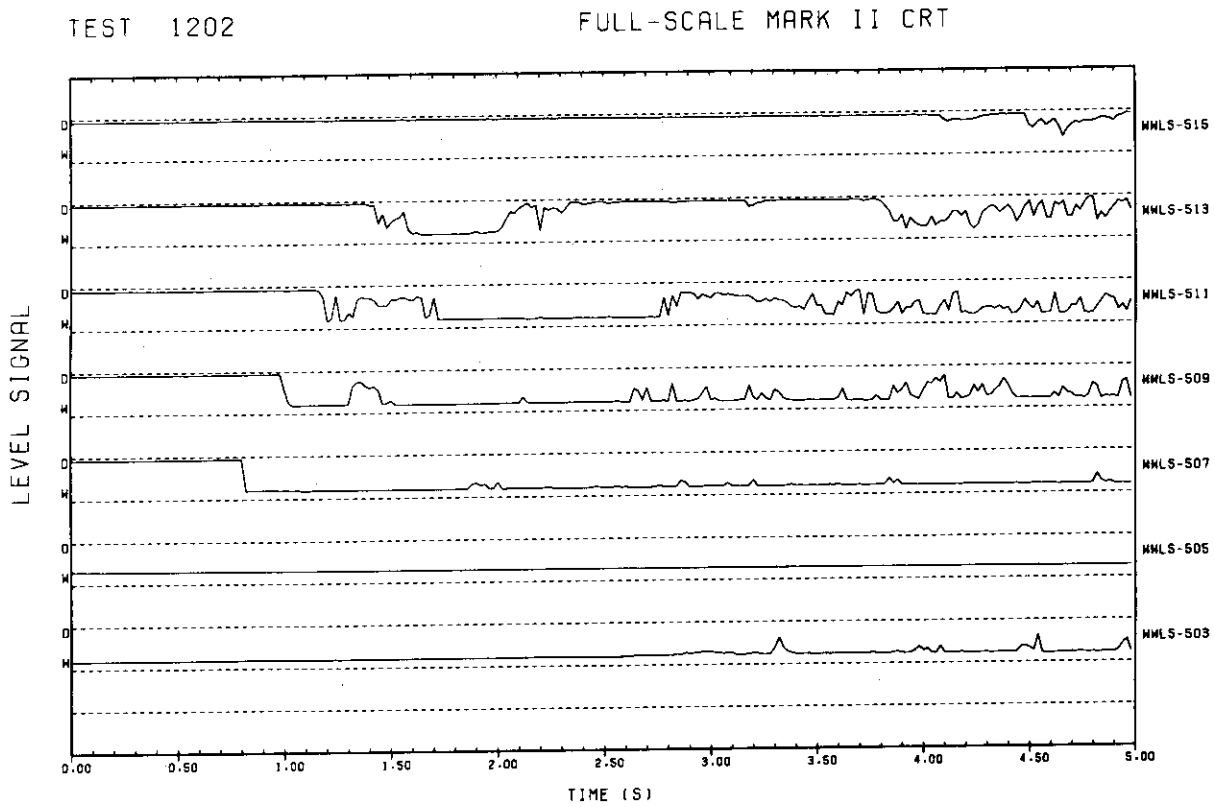
Plot S-0-22 Water Level in Wetwell



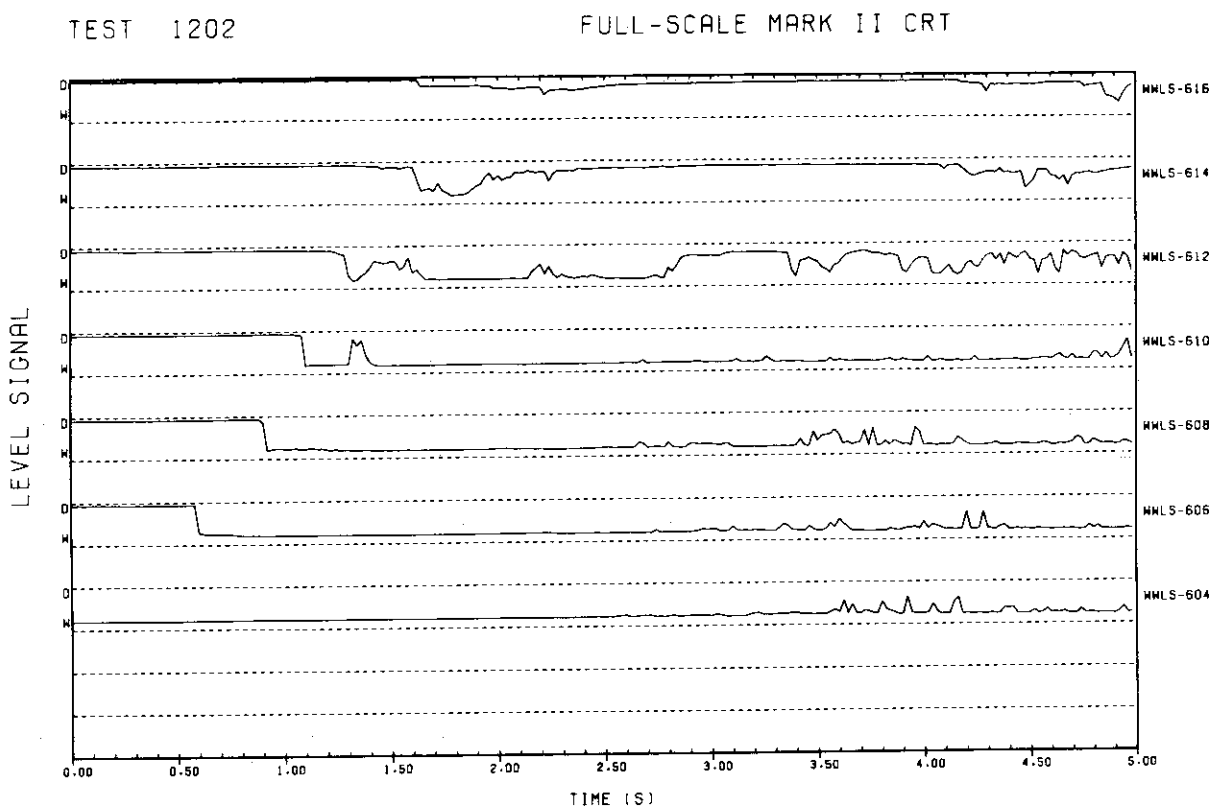
Plot S-0-23 Water Level in Wetwell



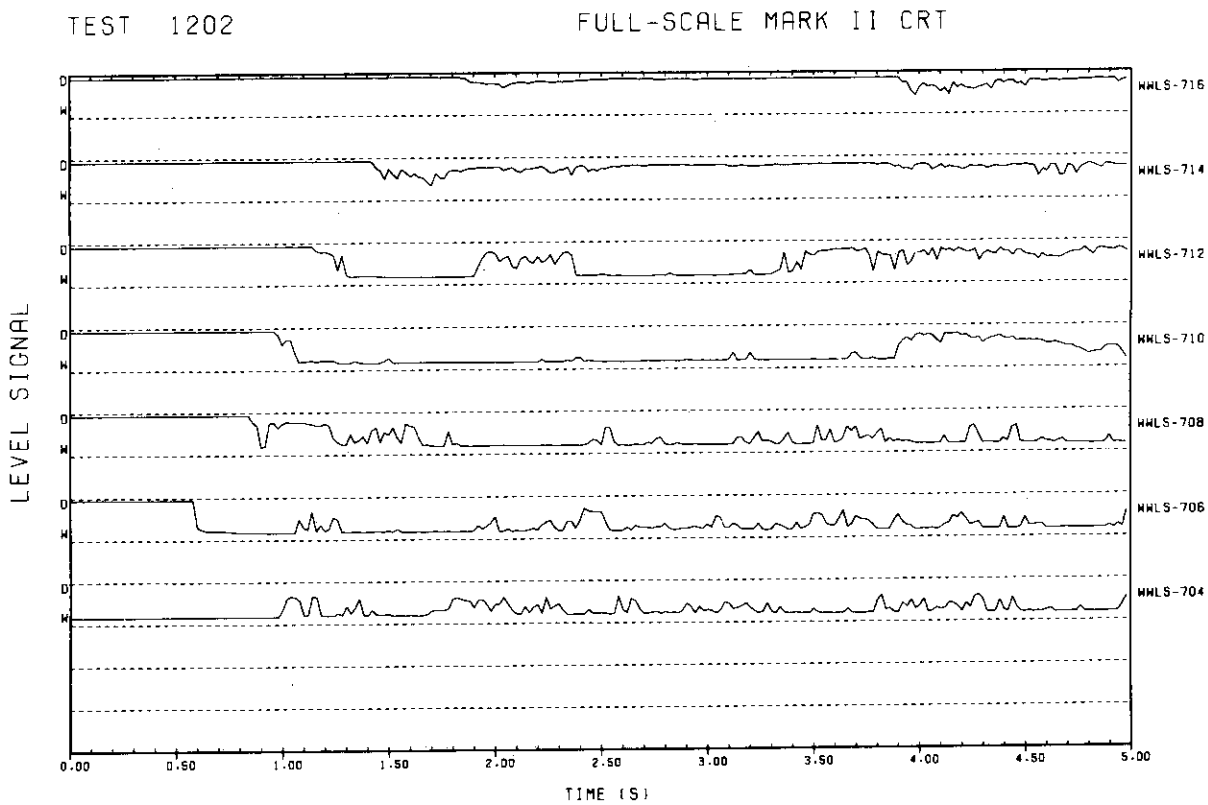
Plot S-0-24 Water Level in Wetwell



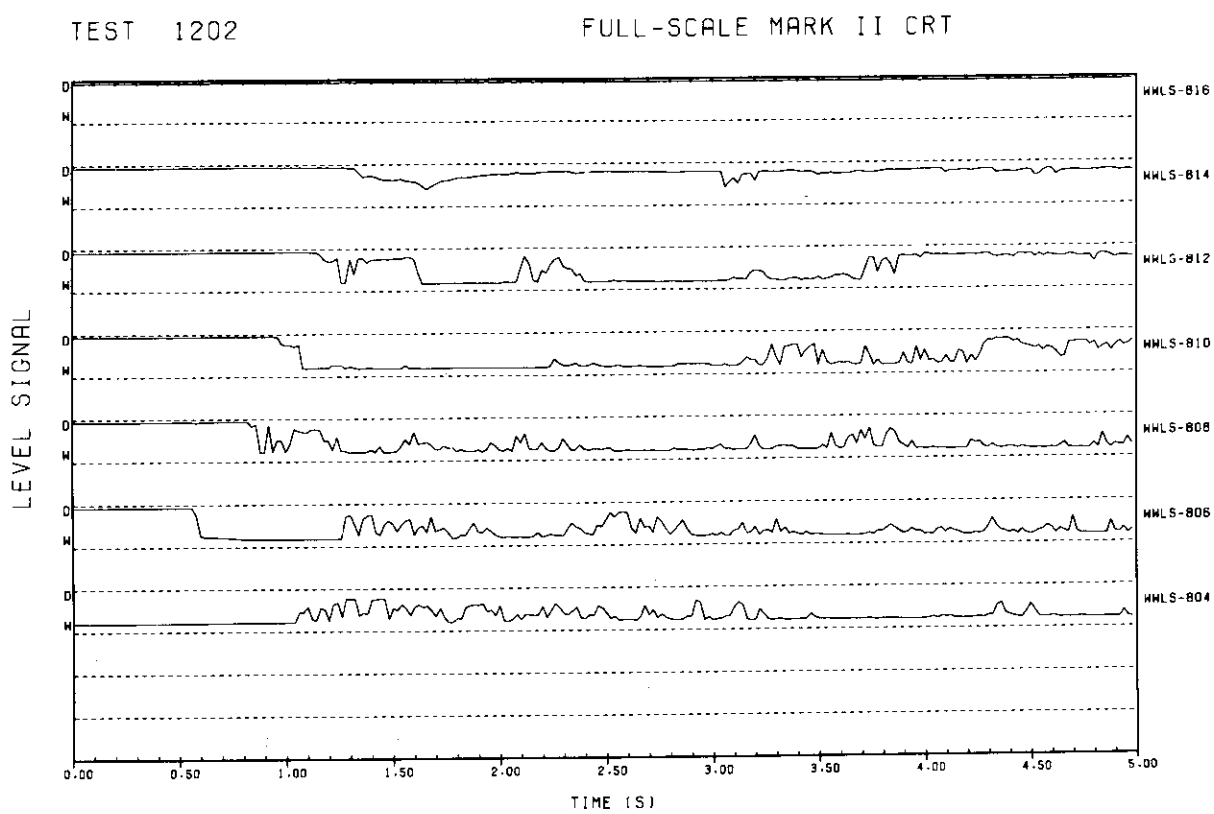
Plot S-0-25 Water Level in Wetwell



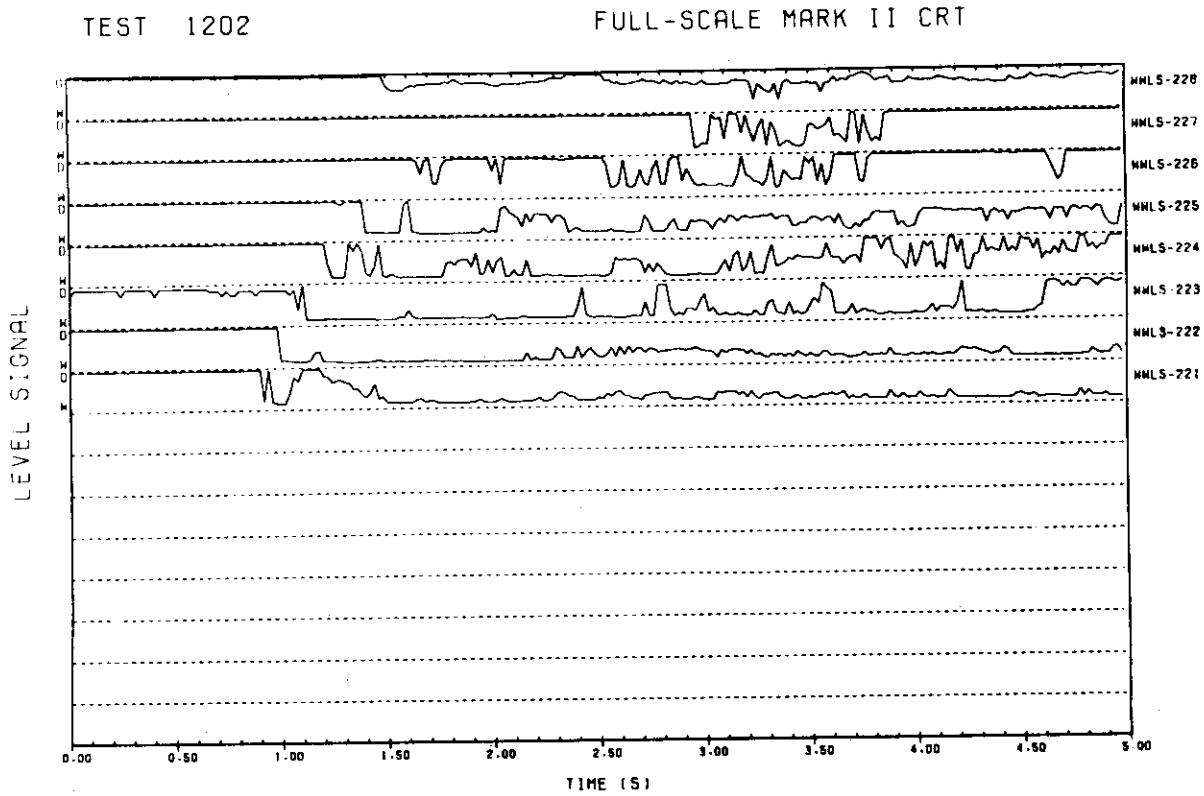
Plot S-0-26 Water Level in Wetwell



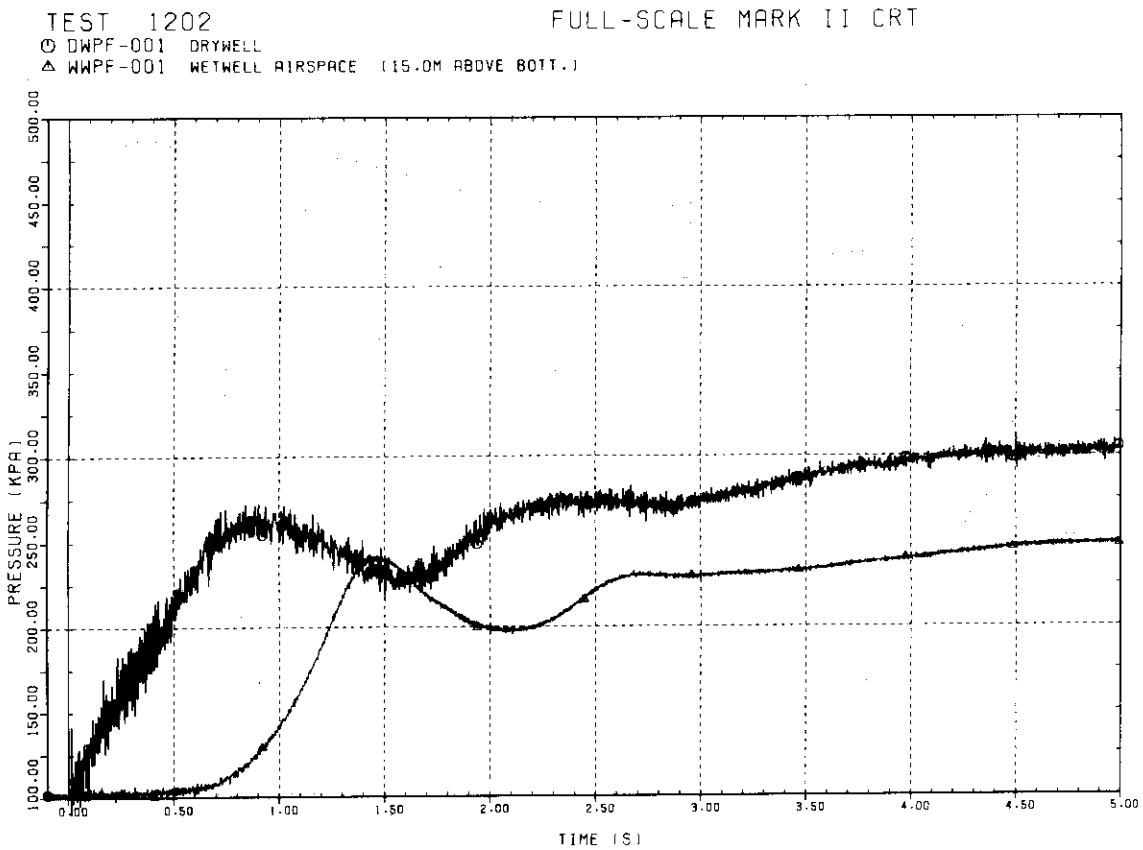
Plot S-0-27 Water Level in Wetwell



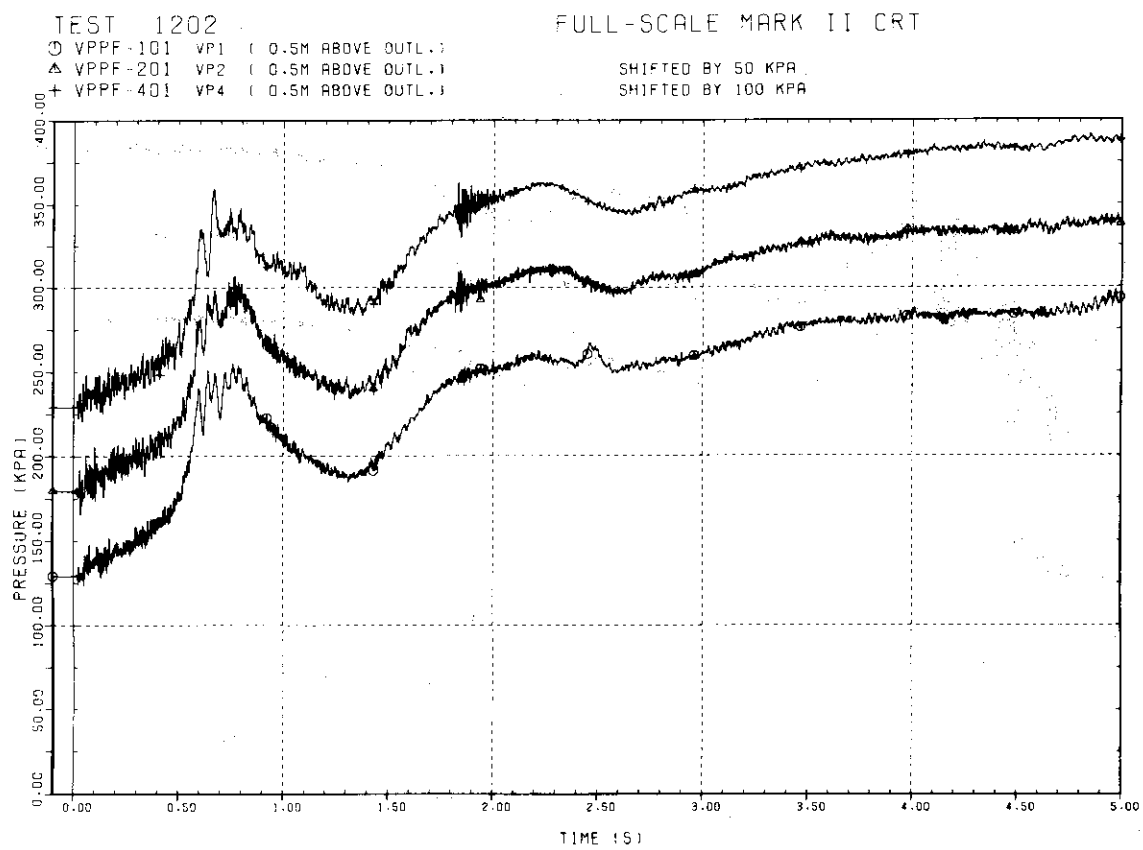
Plot S-0-28 Water Level in Wetwell



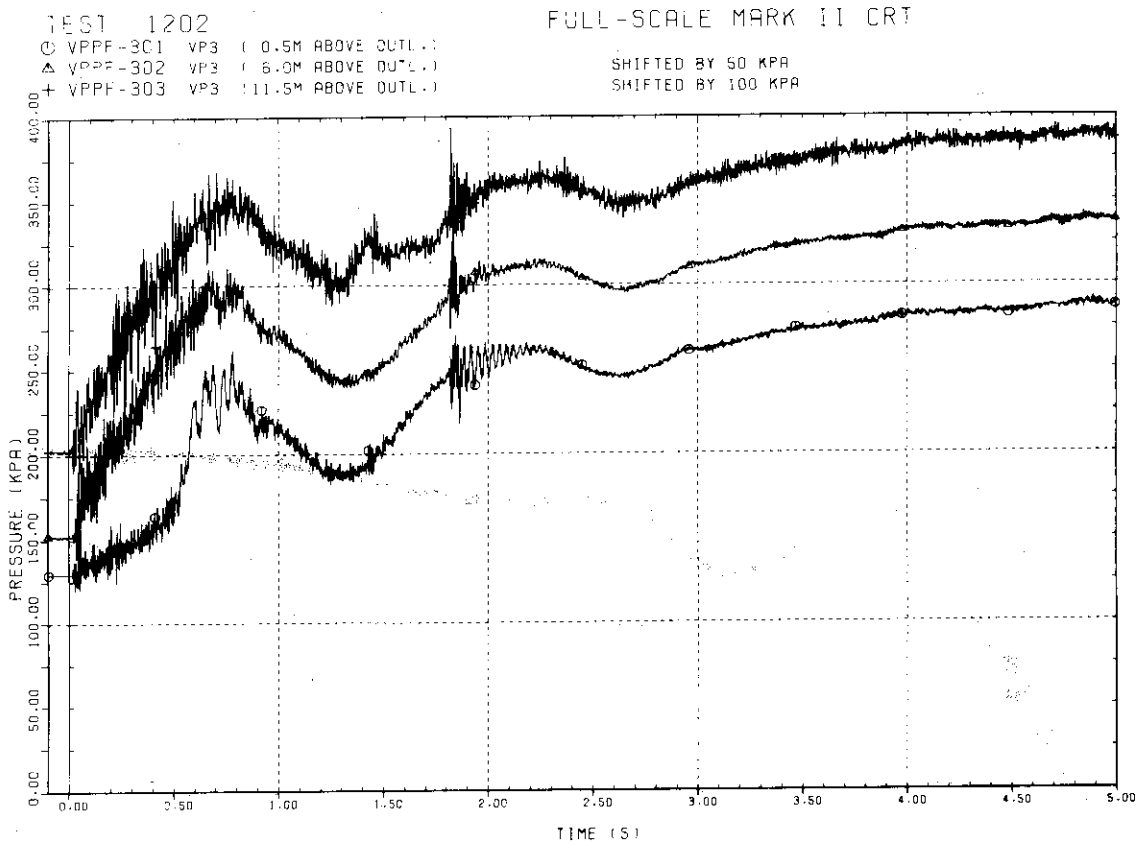
Plot S-0-29 Water Level in Wetwell



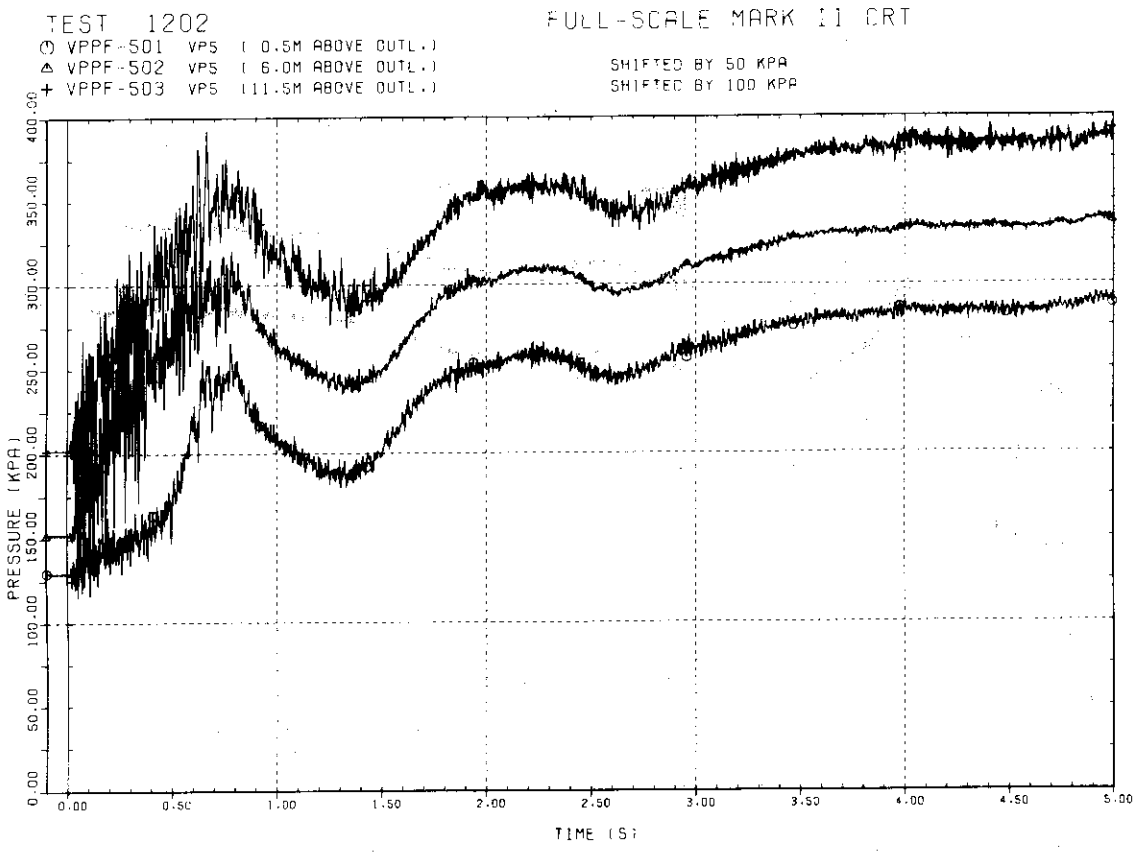
Plot S-1-1 Pressures in Drywell and Wetwell Airspace



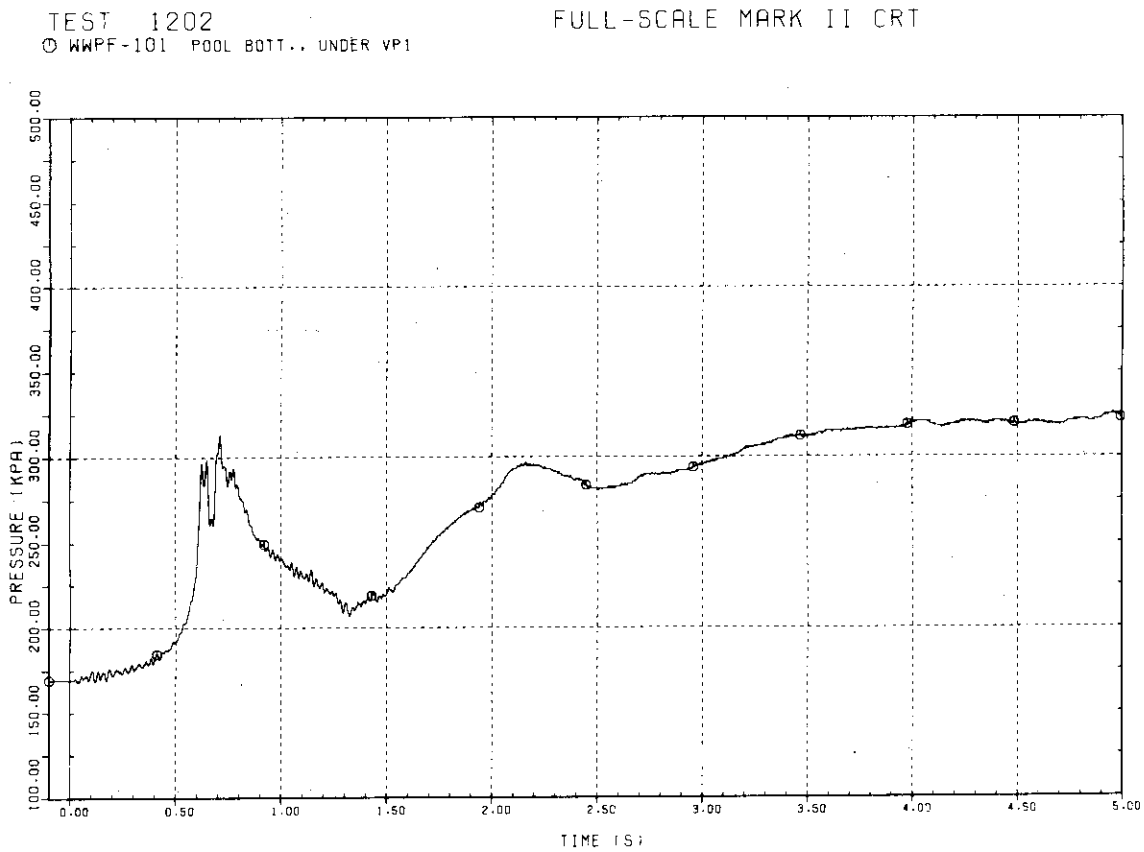
Plot S-1-2 Pressures in Vent Pipe



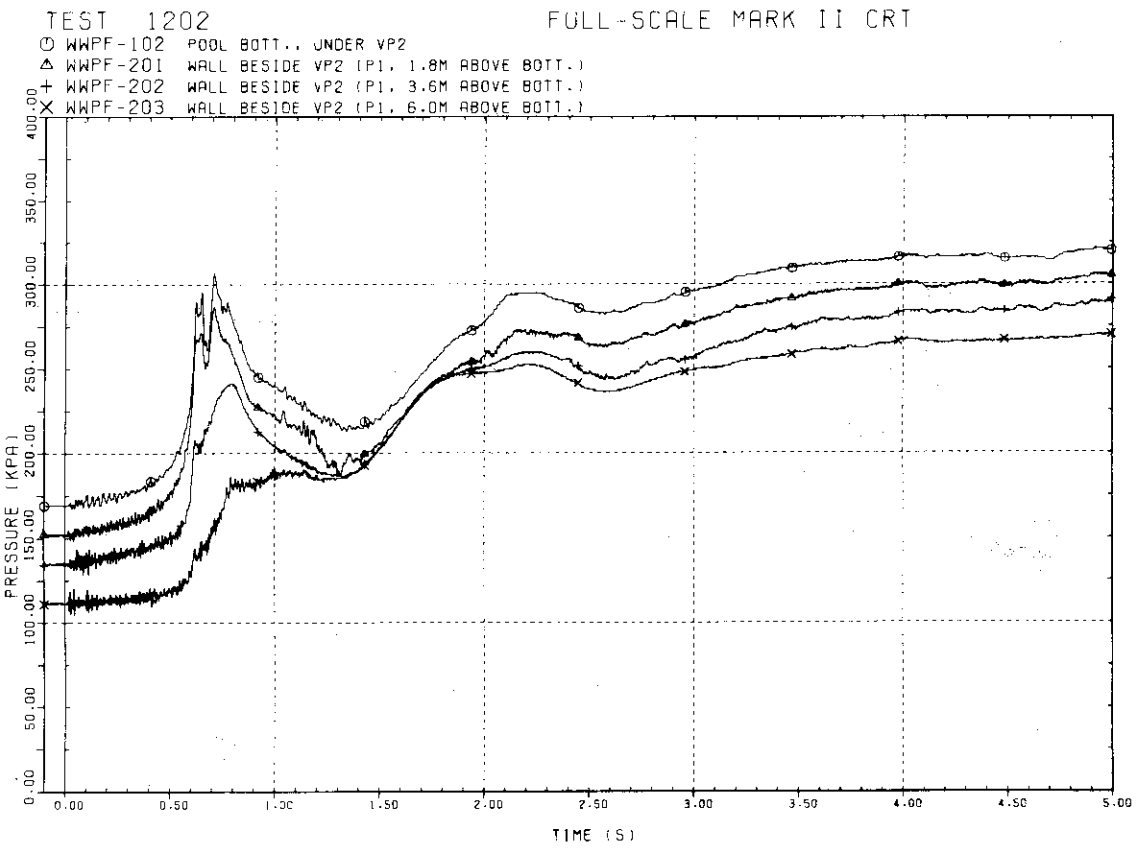
Plot S-1-3 Pressures in Vent Pipe



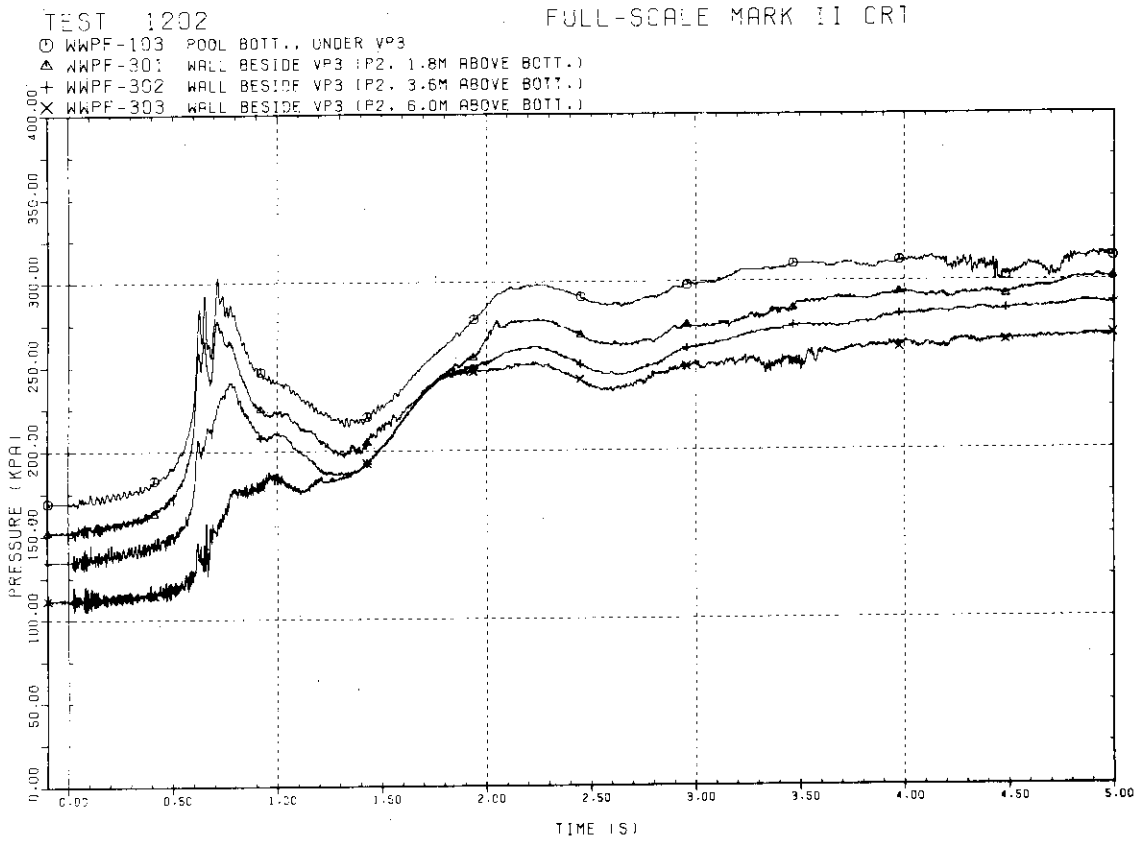
Plot S-1-4 Pressures in Vent Pipe



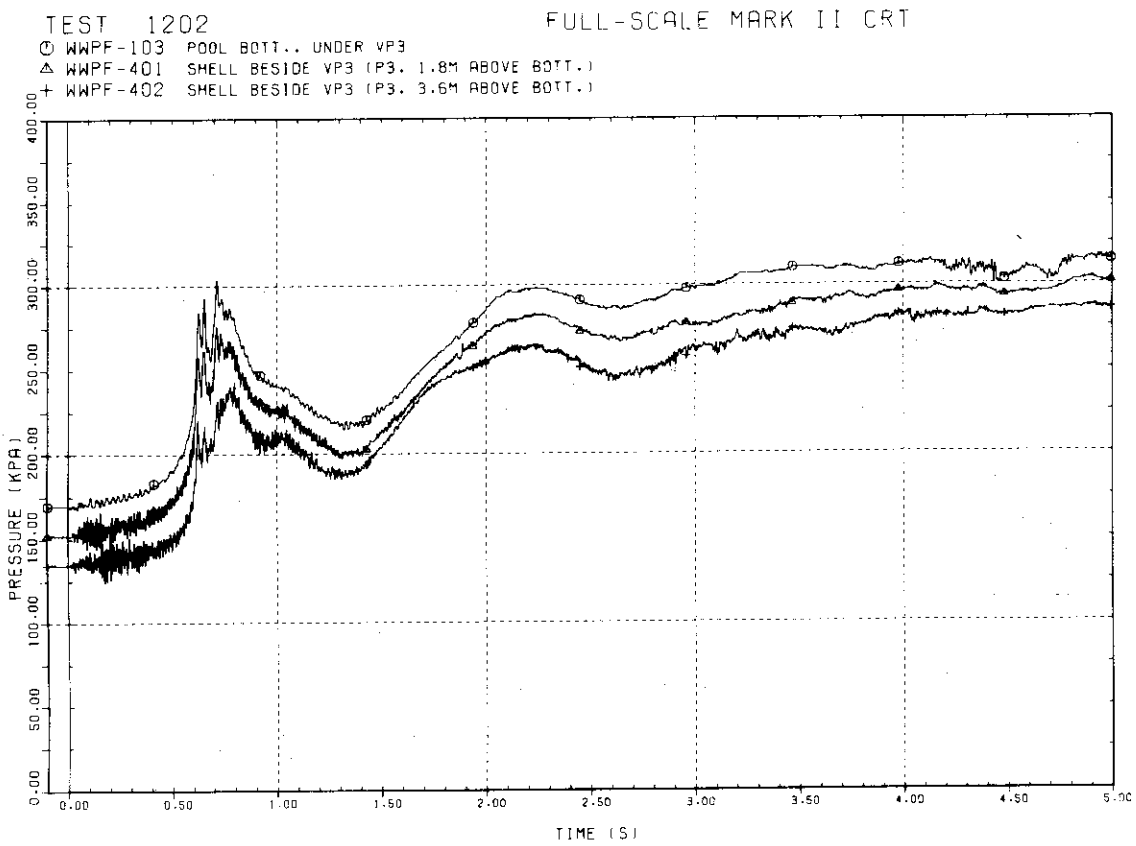
Plot S-1-5 Pressure in Wetwell



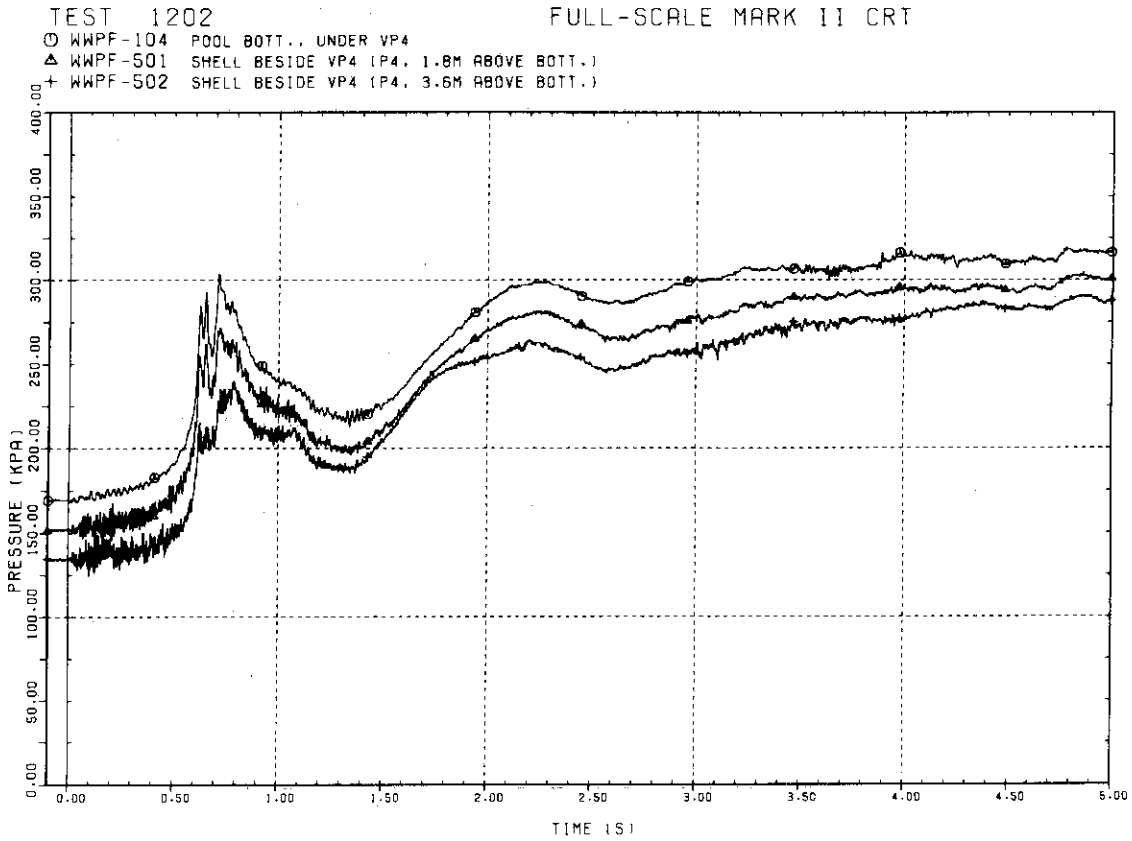
Plot S-1-6 Pressures in Wetwell



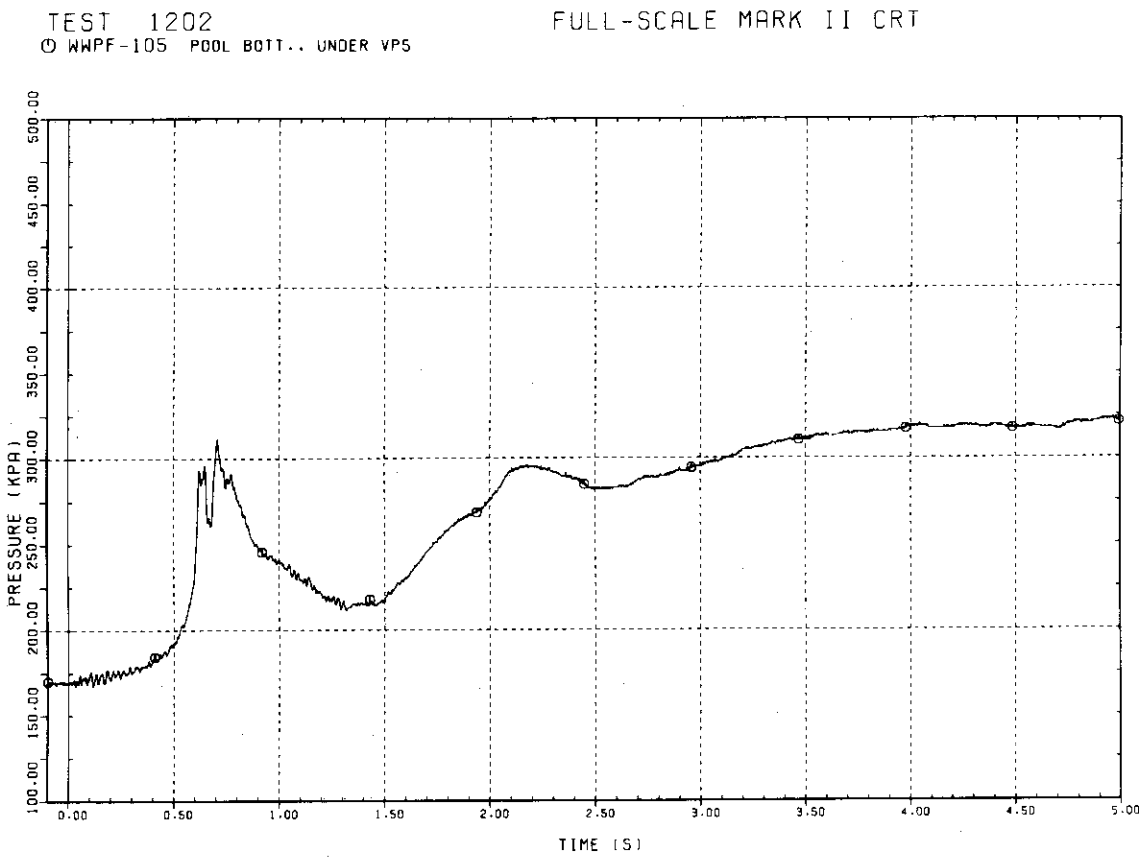
Plot S-1-7 Pressures in Wetwell



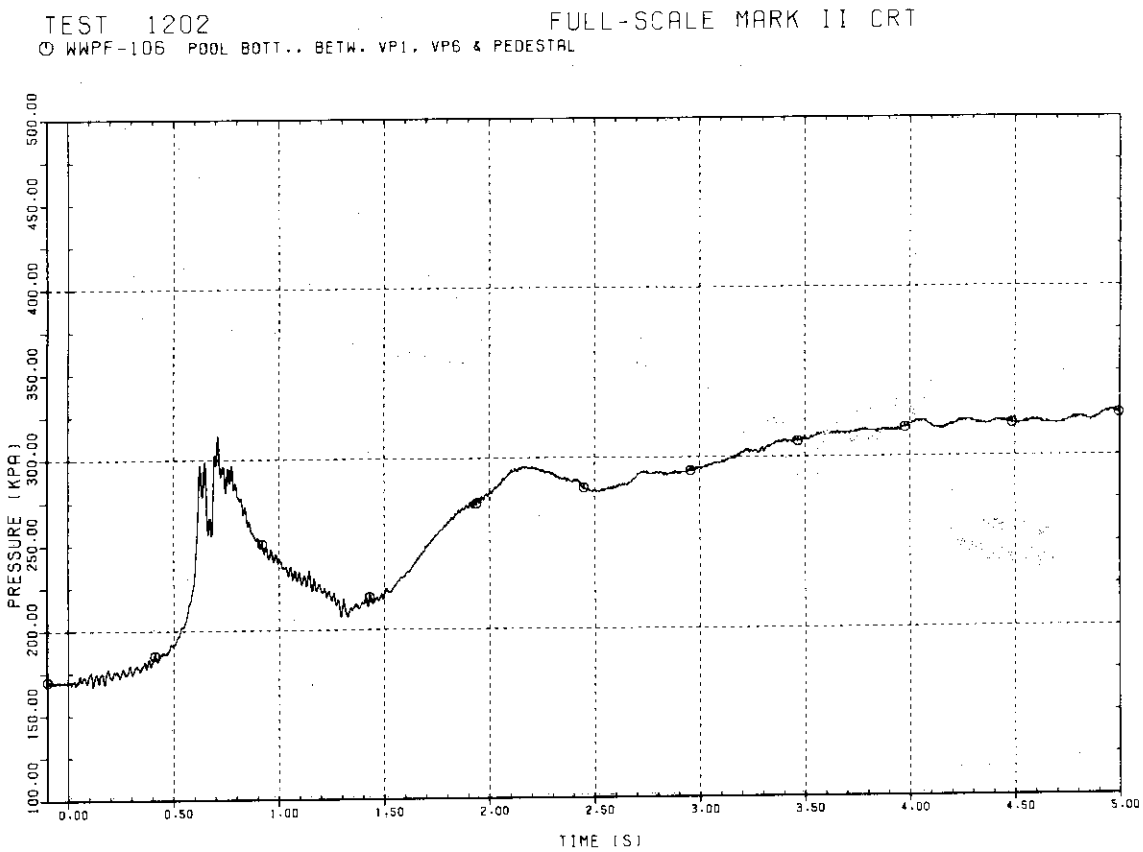
Plot S-1-8 Pressures in Wetwell



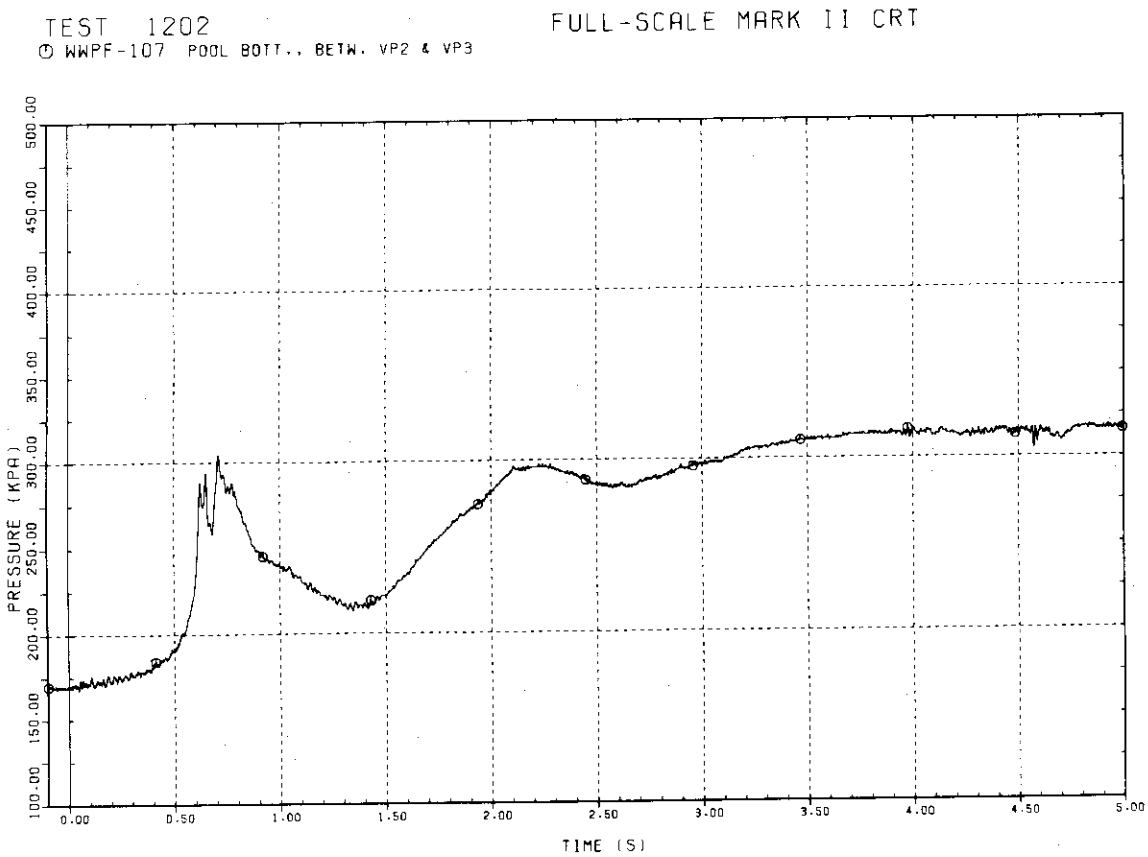
Plot S-1-9 Pressures in Wetwell



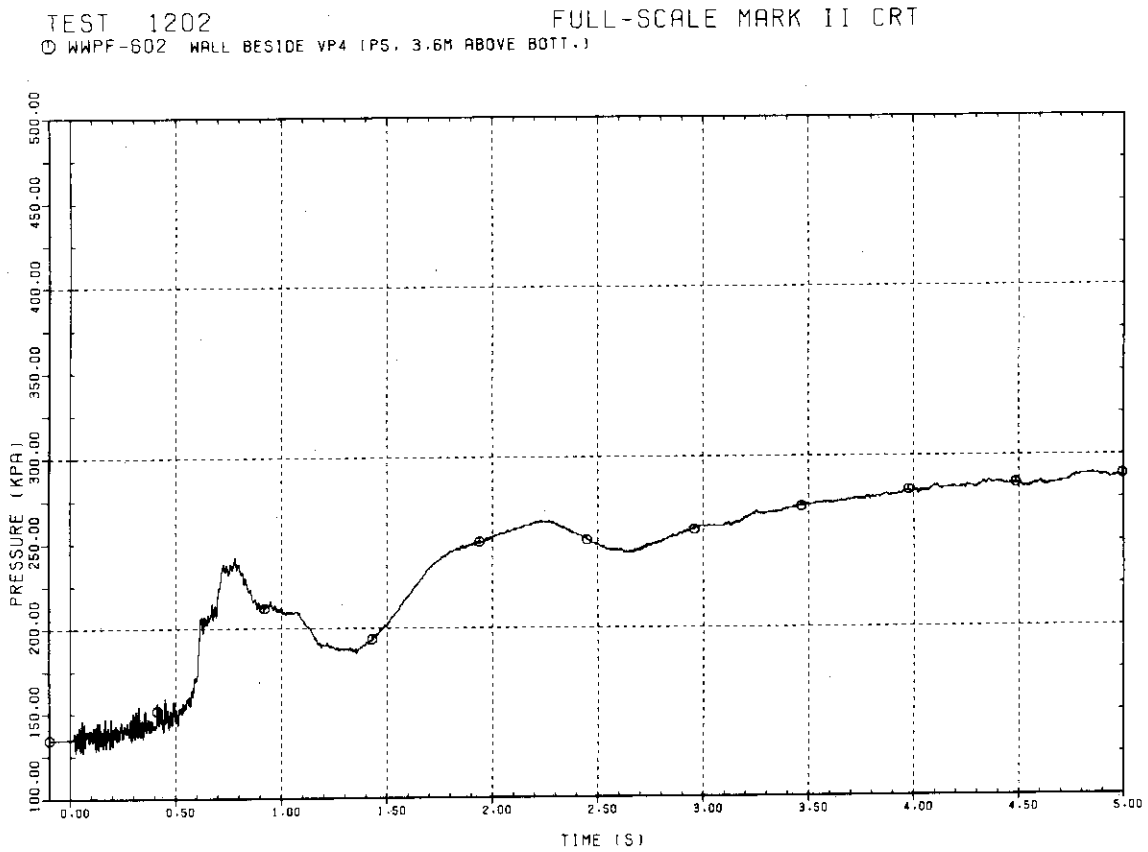
Plot S-1-10 Pressure in Wetwell



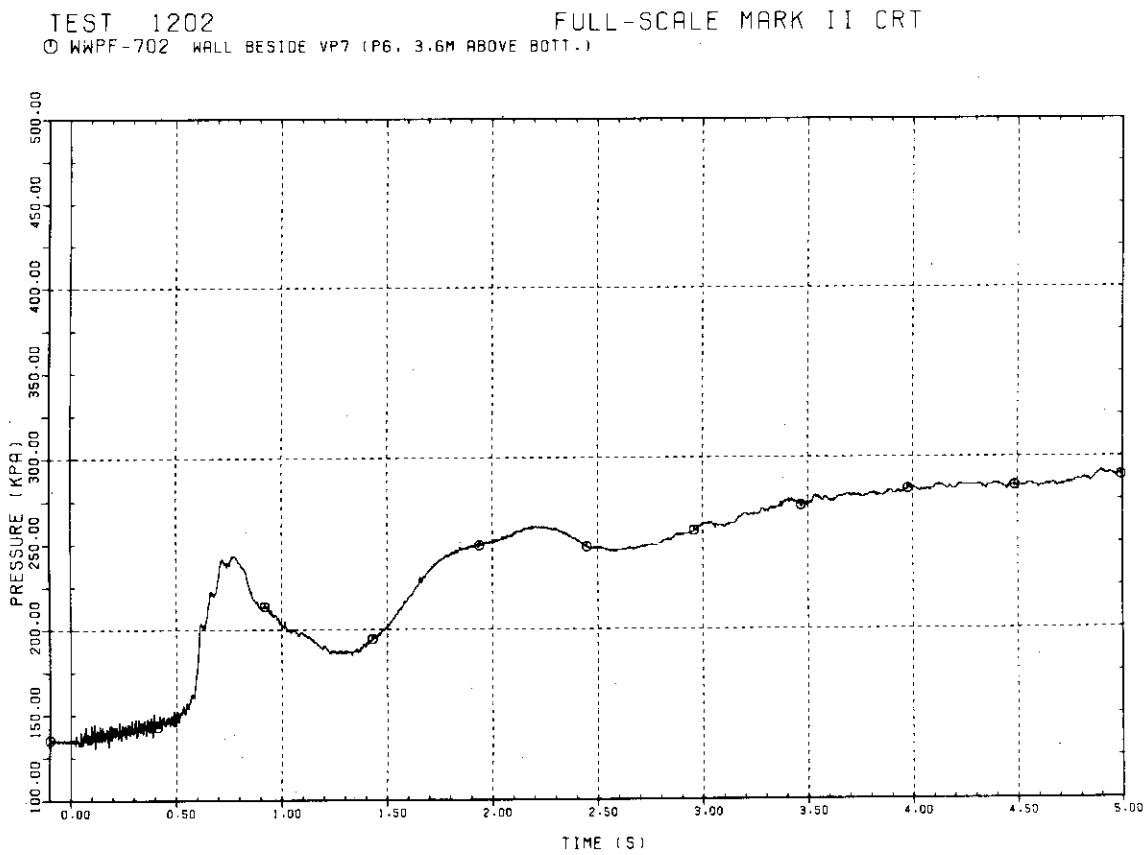
Plot S-1-11 Pressure in Wetwell



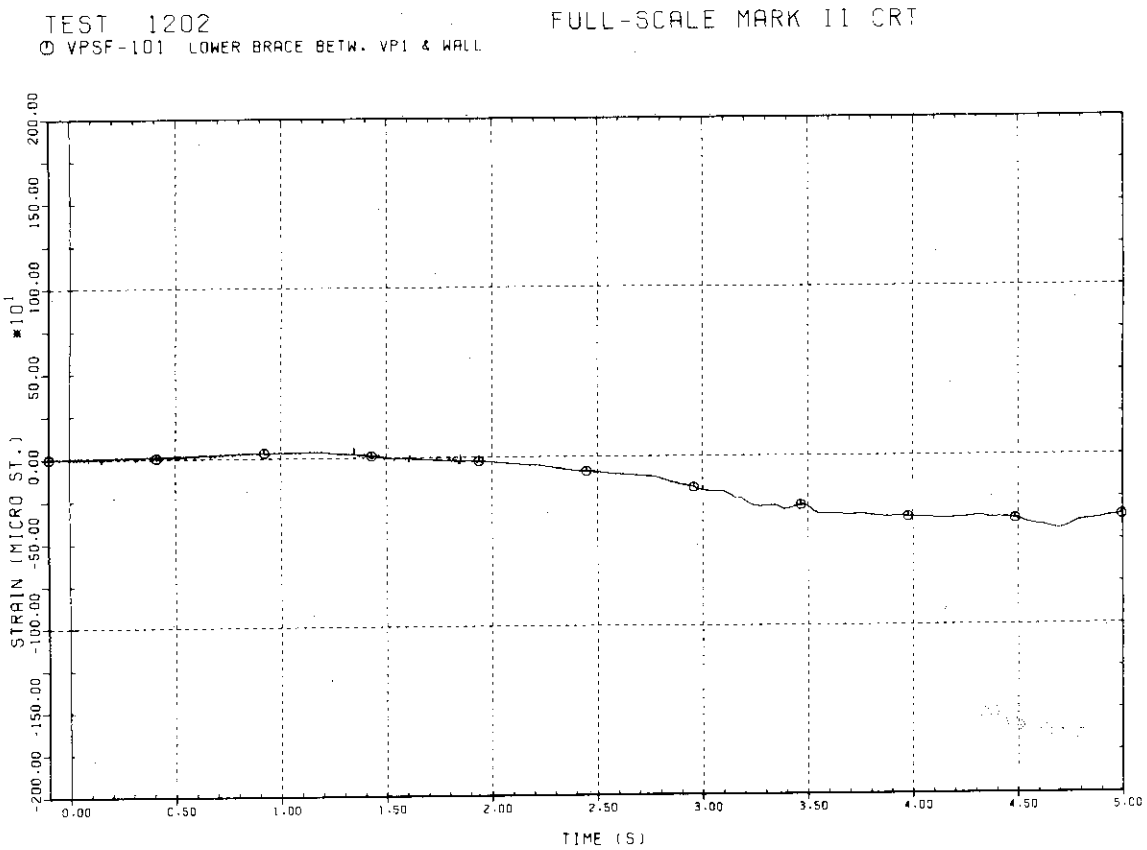
Plot S-1-12 Pressure in Wetwell



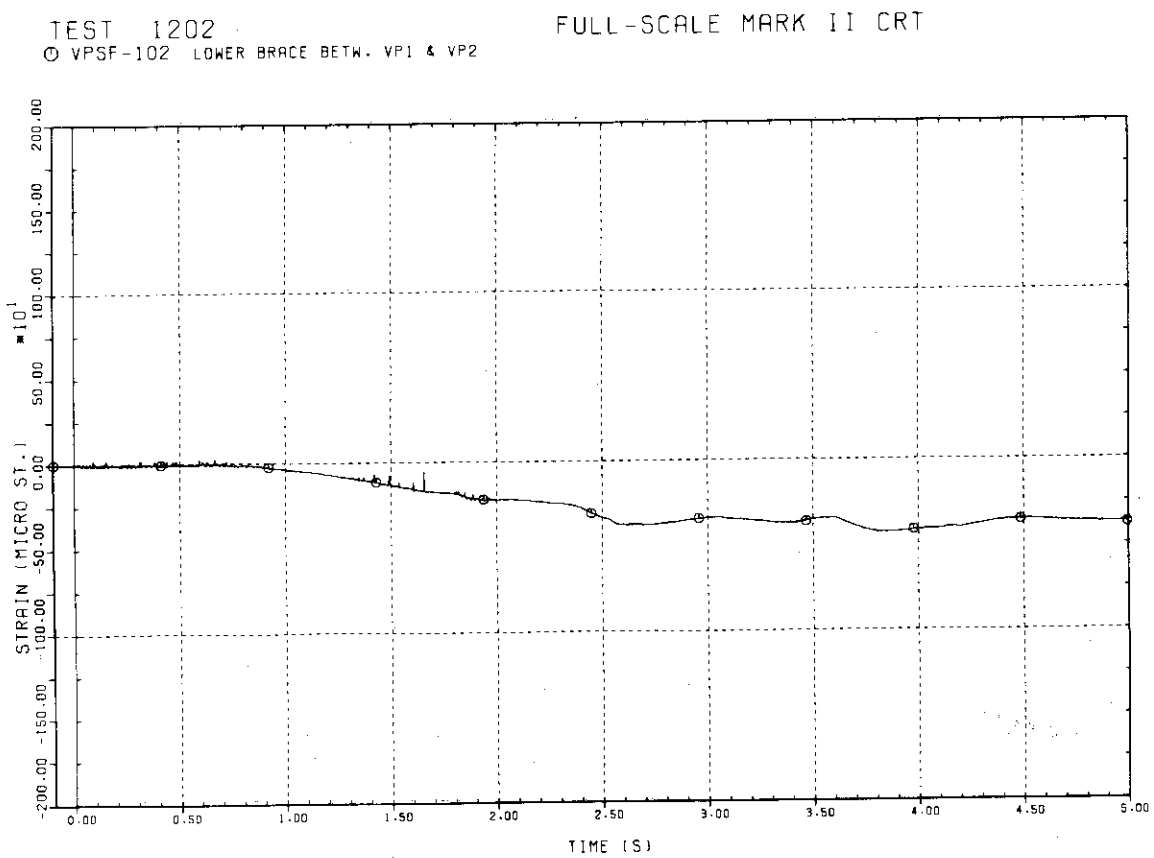
Plot S-1-13 Pressure in Wetwell



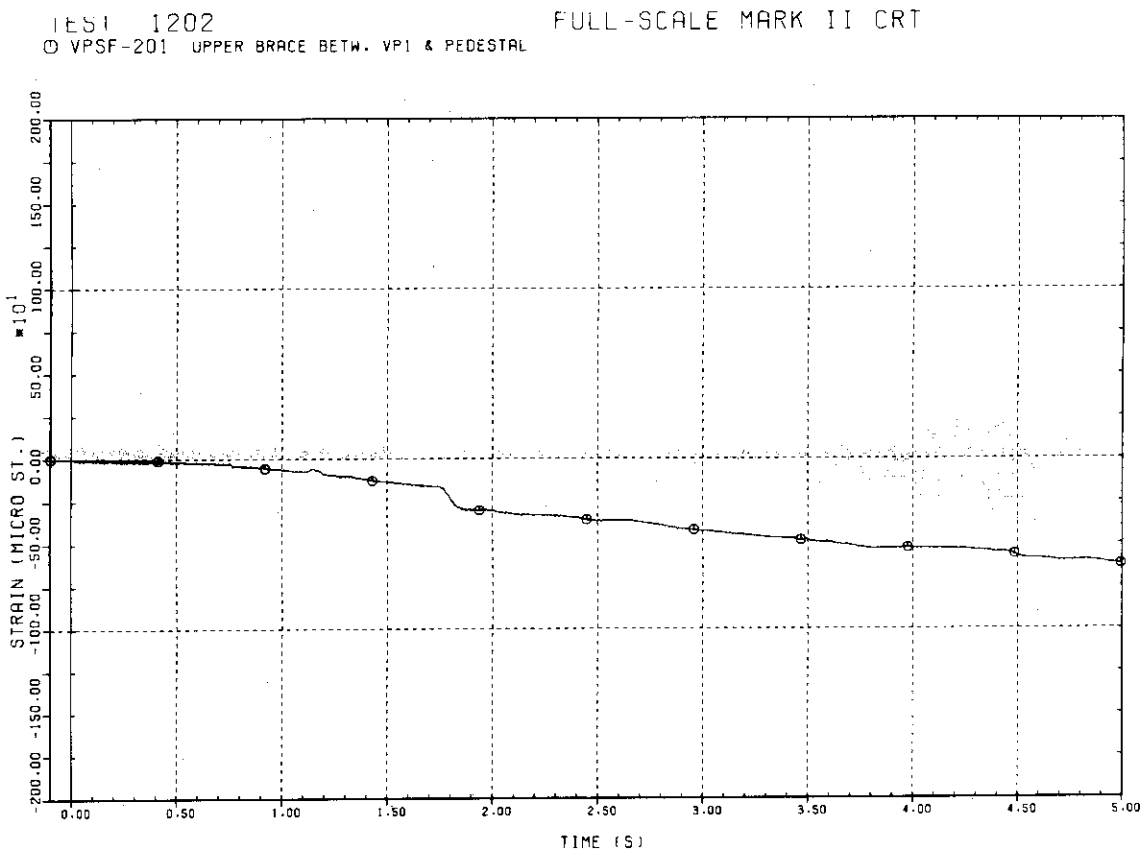
Plot S-1-14 Pressure in Wetwell



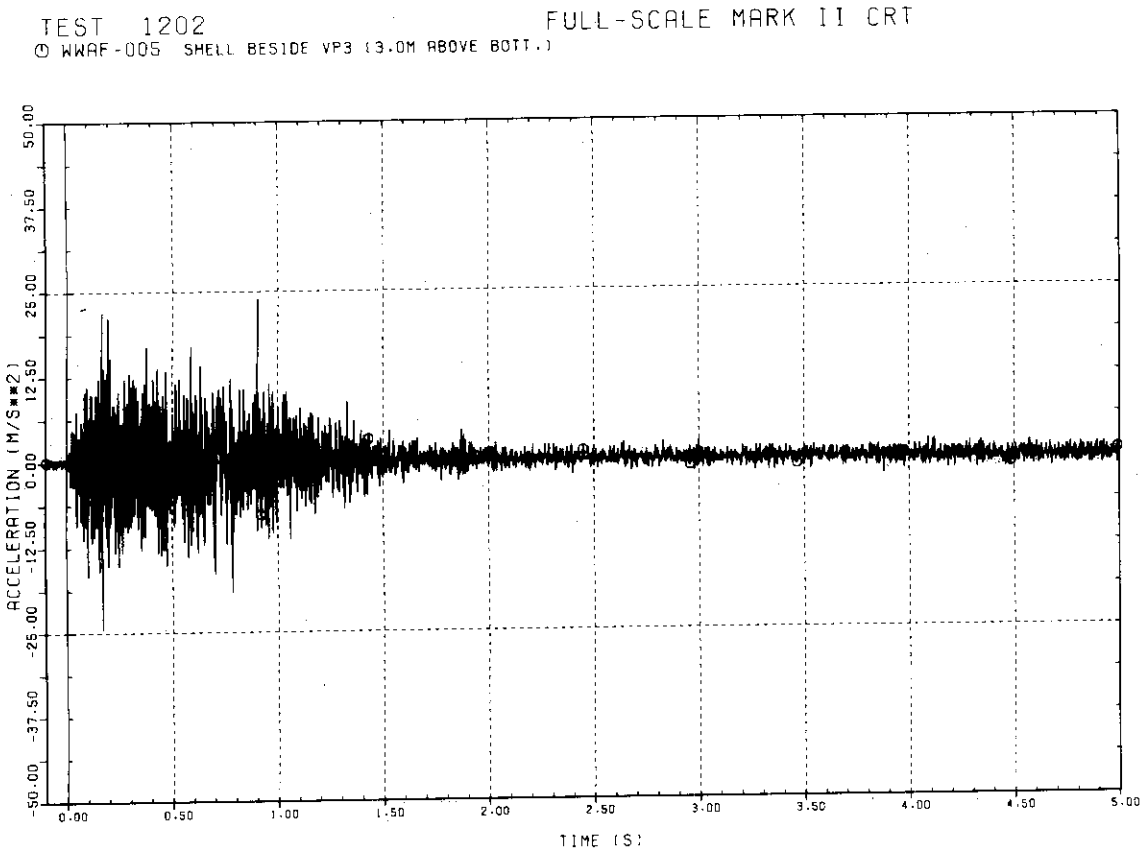
Plot S-1-15 Strain of Vent Pipe Brace



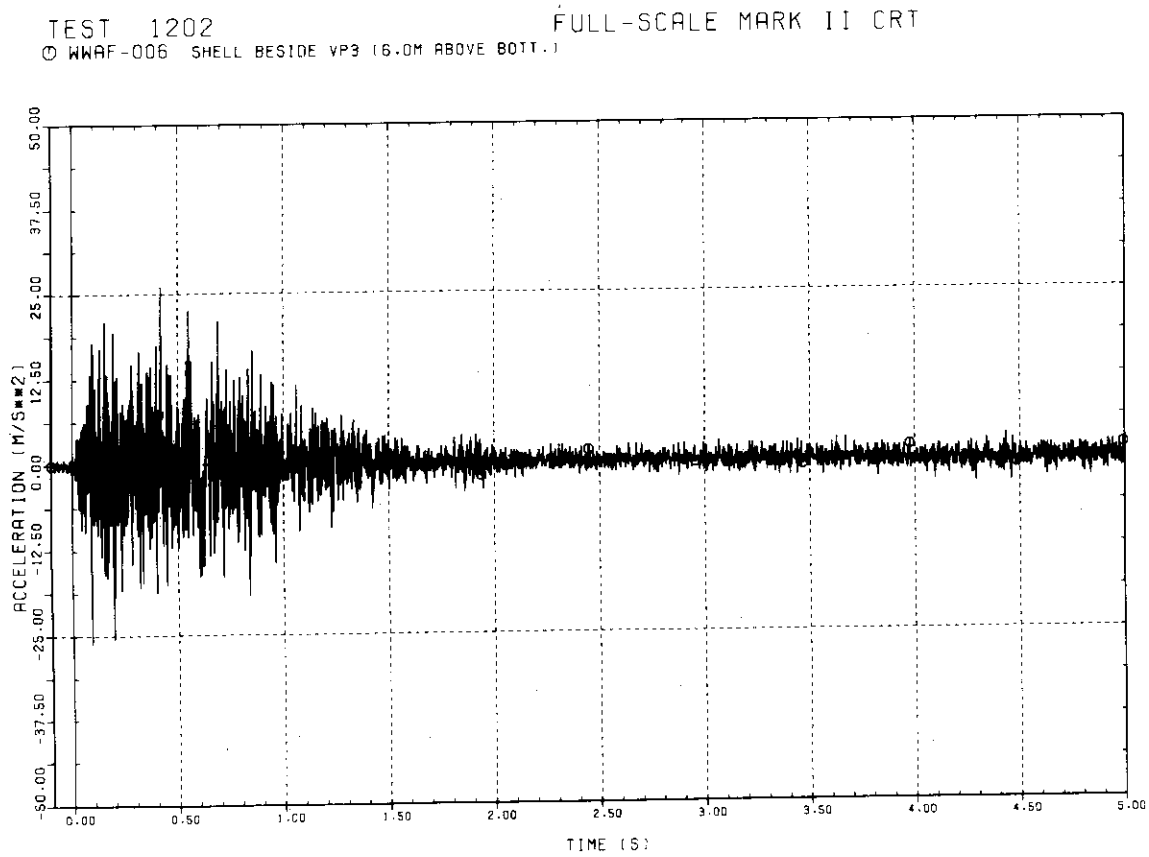
Plot S-1-16 Strain of Vent Pipe Brace



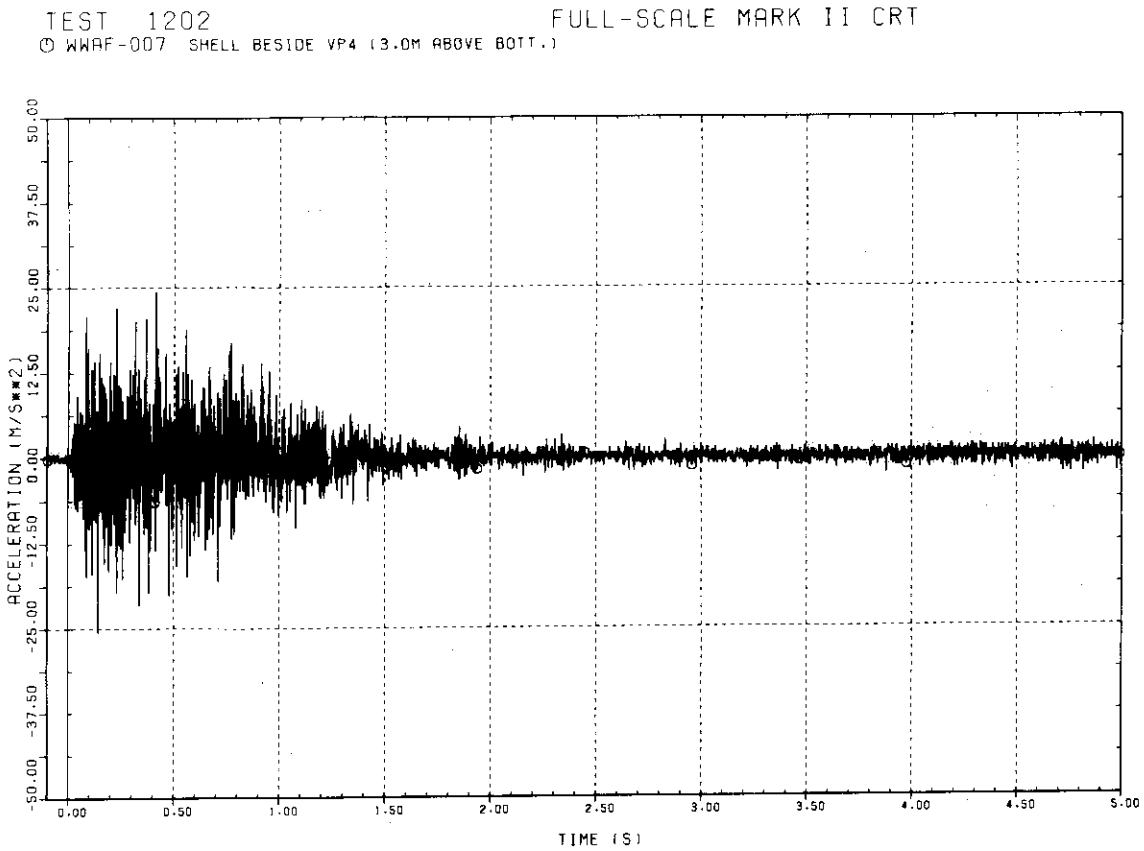
Plot S-1-17 Strain of Vent Pipe Brace



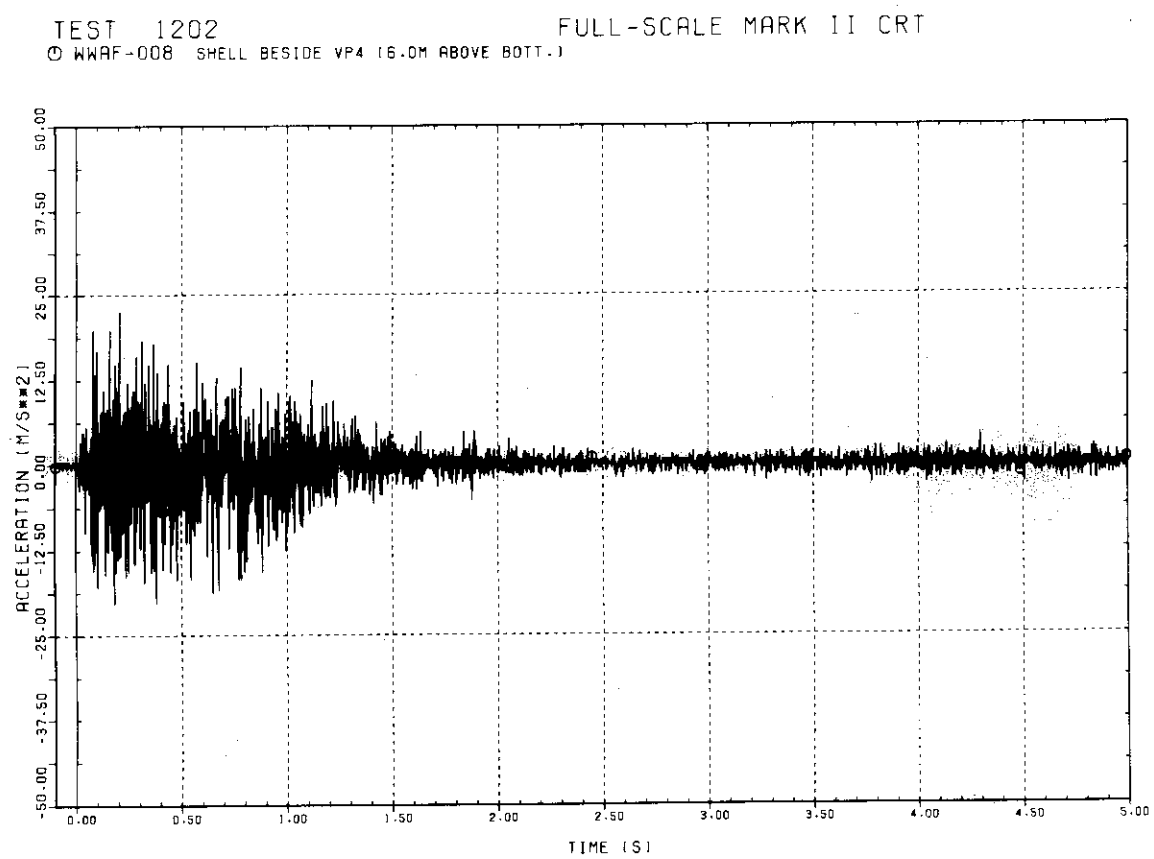
Plot S-2-1 Acceleration of Containment Structure



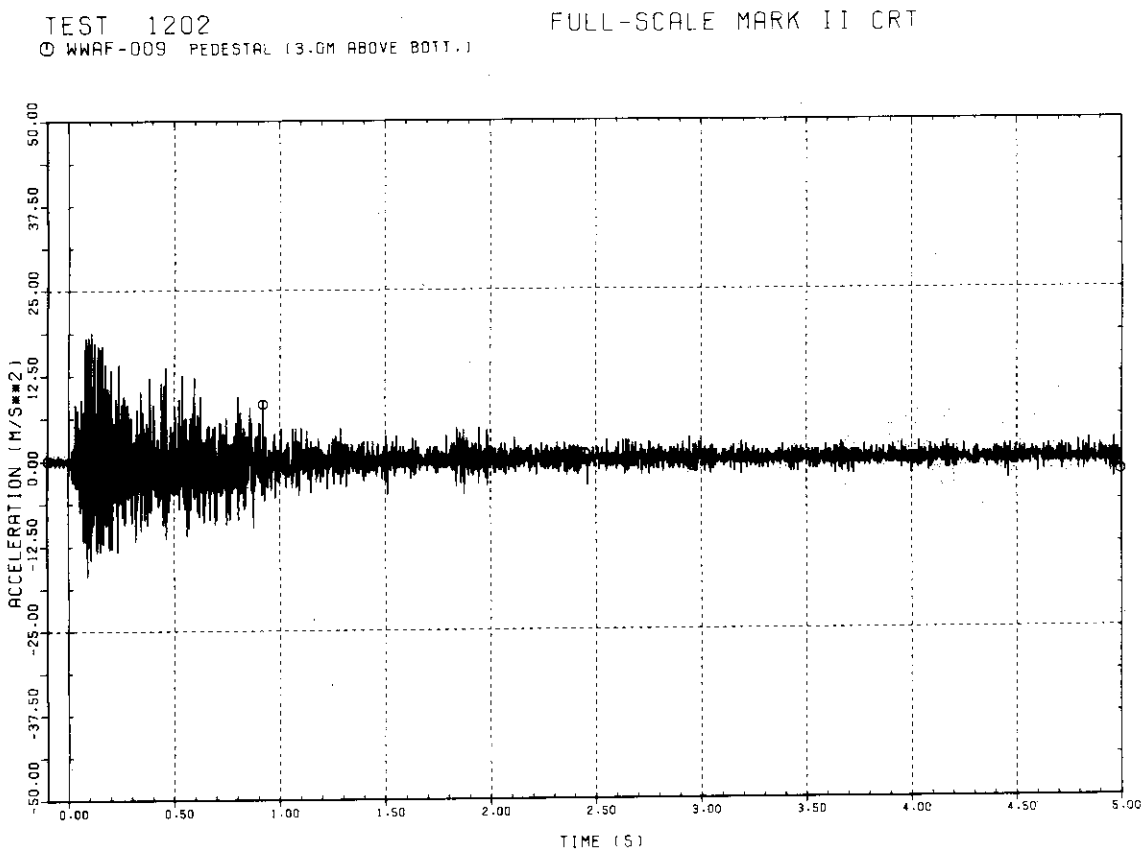
Plot S-2-2 Acceleration of Containment Structure



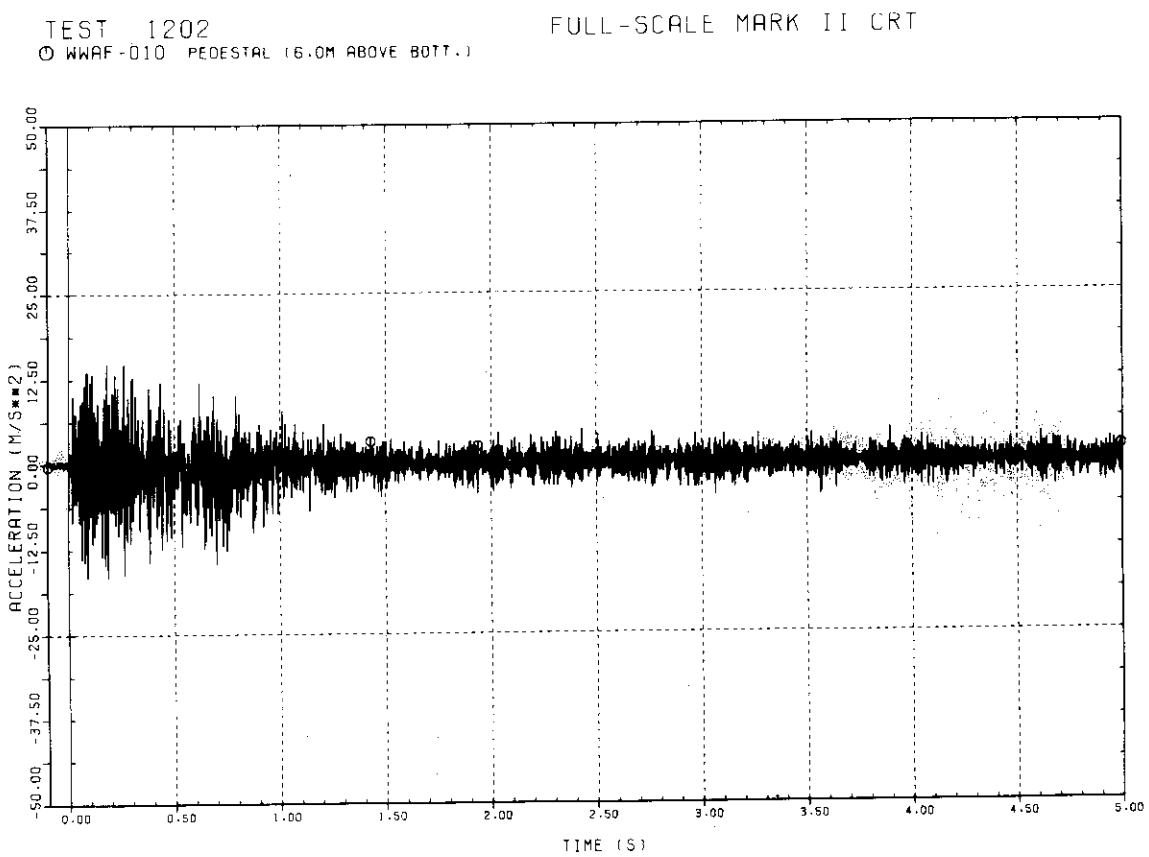
Plot S-2-3 Acceleration of Containment Structure



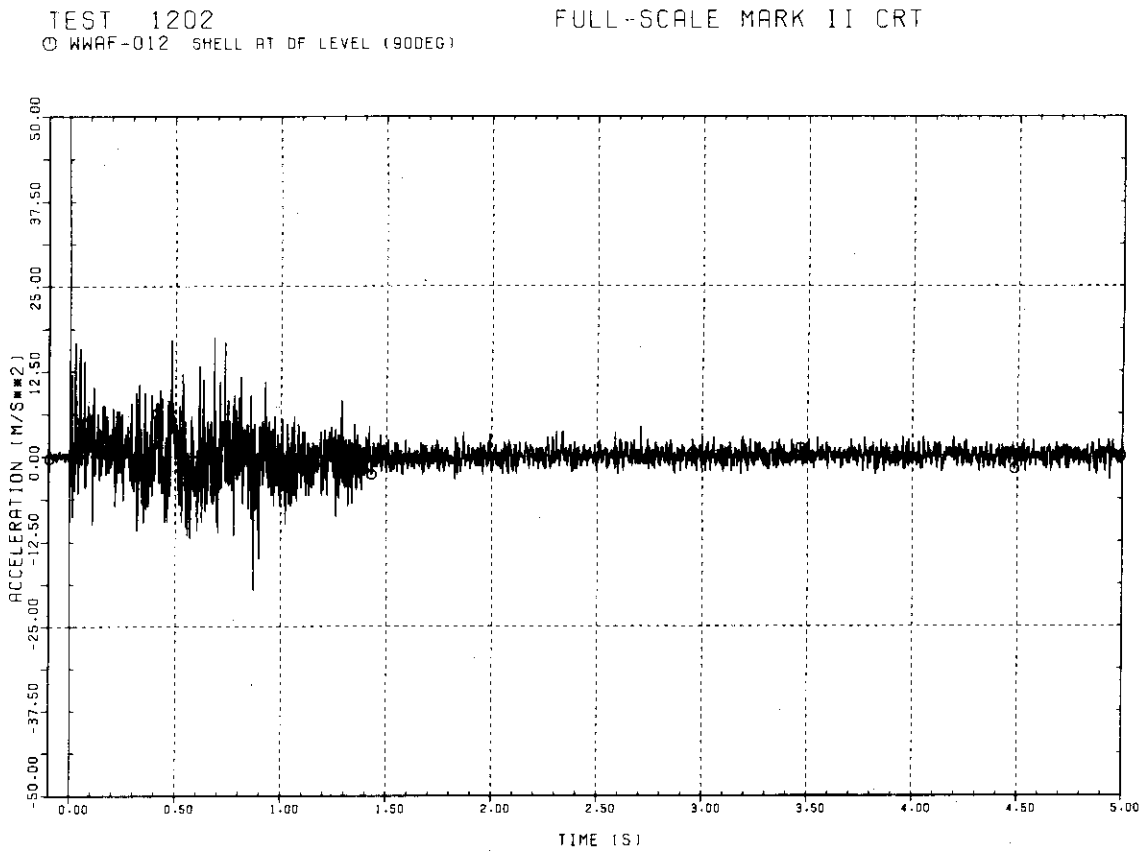
Plot S-2-4 Acceleration of Containment Structure



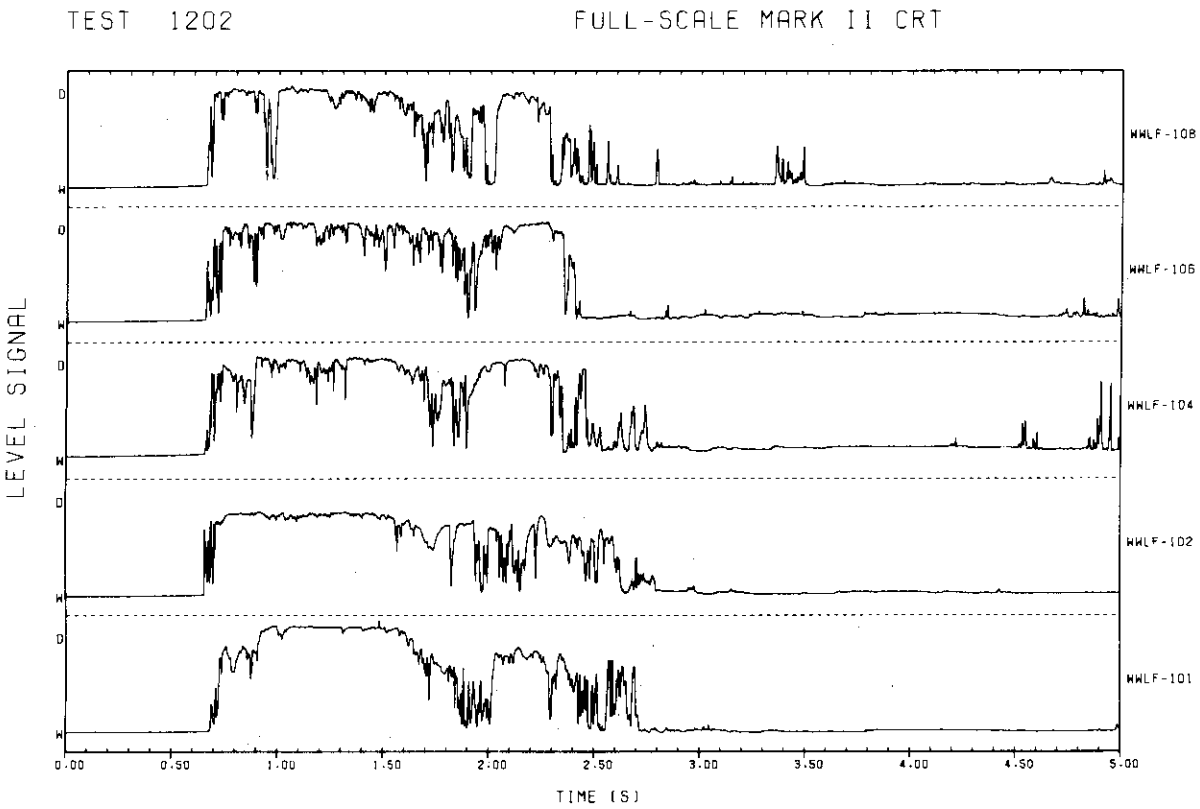
Plot S-2-5 Acceleration of Containment Structure



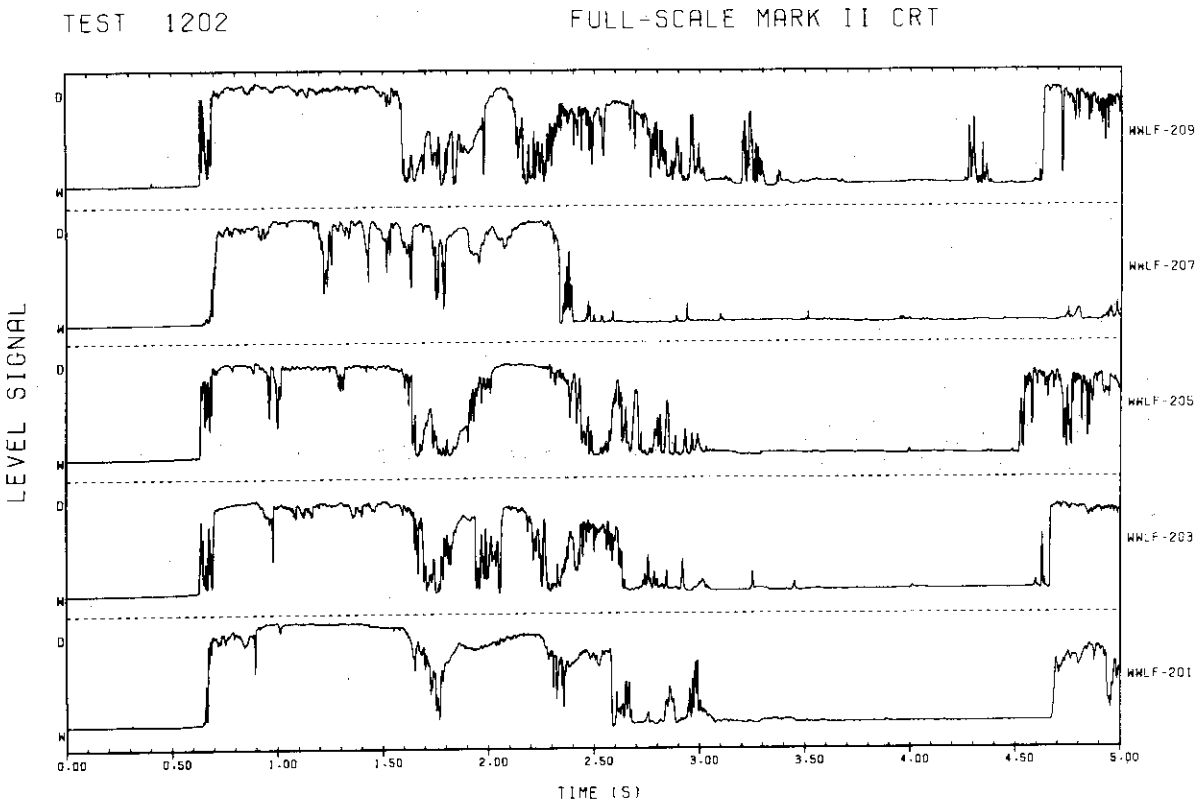
Plot S-2-6 Acceleration of Containment Structure



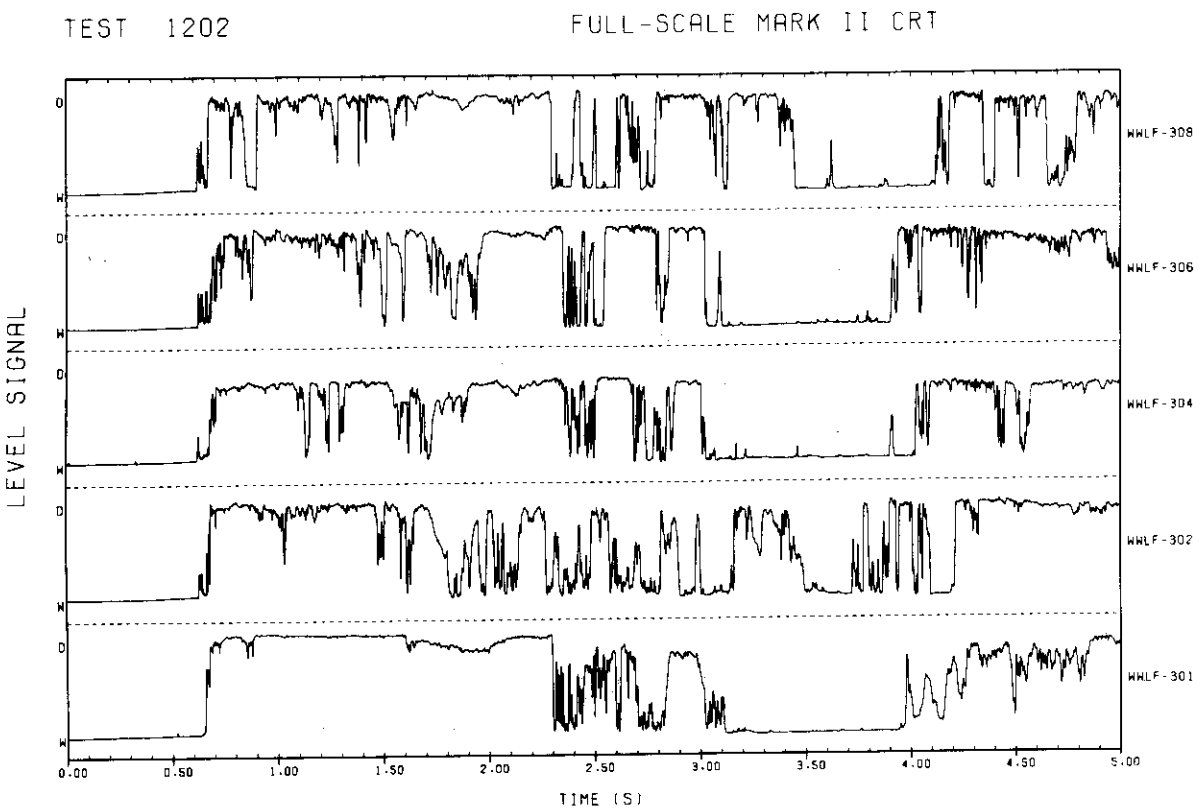
Plot S-2-7 Acceleration of Containment Structure



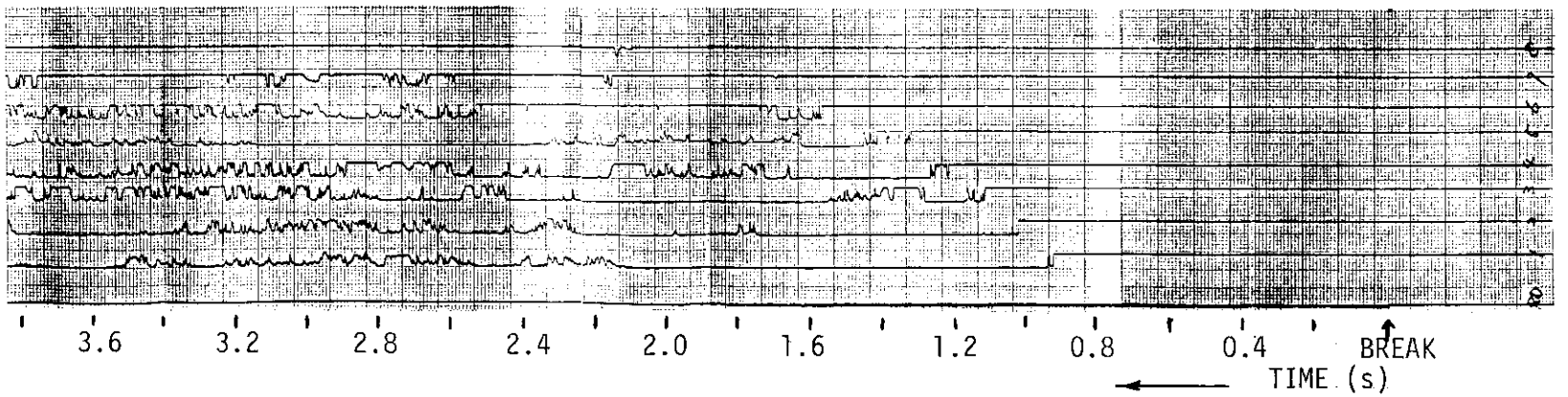
Plot S-2-8 Phase Boundary Signals



Plot S-2-9 Phase Boundary Signals



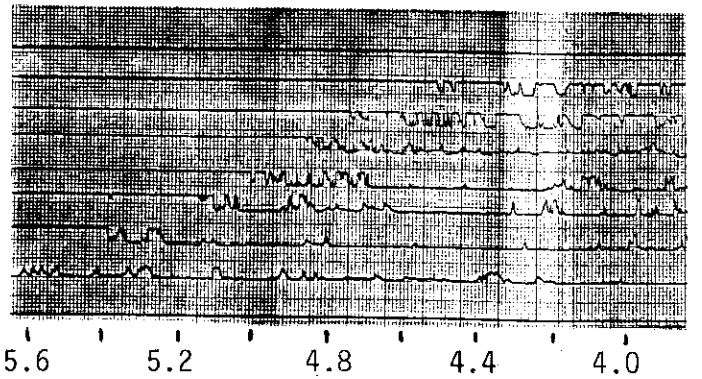
Plot S-2-10 Phase Boundary Signals



Supplemeatary Water Level Probes
along Line L1.

From Bottom to Top :

Rupture Disc Break Signal,
9.125 m above Pool Bottom,
9.875 m " ,
10.625 m " ,
11.375 m " ,
12.125 m " ,
12.875 m " ,
13.625 m " ,
14.375 m " .



Supplement 1 Water Level in Wetwell (Light Beam Records)