

07-~~91~~-917
AUG 14 1991
26.

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT NUCLEAR STATION UNIT 2
OPERATIONS SURVEILLANCE PROCEDURE

N2-OSP-RCS-001

REVISION 06

RCS PRESSURE/TEMPERATURE VERIFICATION

THIS PROCEDURE IS SAFETY-RELATED

M. J. McCormick, Jr.
CONTROLLED COPY

Approved By:
M. J. McCormick, Jr.

Plant Manager, Unit 2

4/5/91
Date

Effective Date: 4/12/91

NOT TO BE USED AFTER April 1993
SUBJECT TO PERIODIC REVIEW

CONTROLLED WORKING COPY
VERIFIED BY *DB*
NOT TO BE USED AFTER 8-16-91 *CLL*
DATE/TIME

9304290222 911031
PDR ADDCK 05000410
S PDR

9304290222

118

118

118

LIST OF EFFECTIVE PAGES

<u>Page No.</u>	<u>Change No.</u>	<u>Page No.</u>	<u>Change No.</u>	<u>Page No.</u>	<u>Change No.</u>
1		23			
11		24			
111		25			
1		26			
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

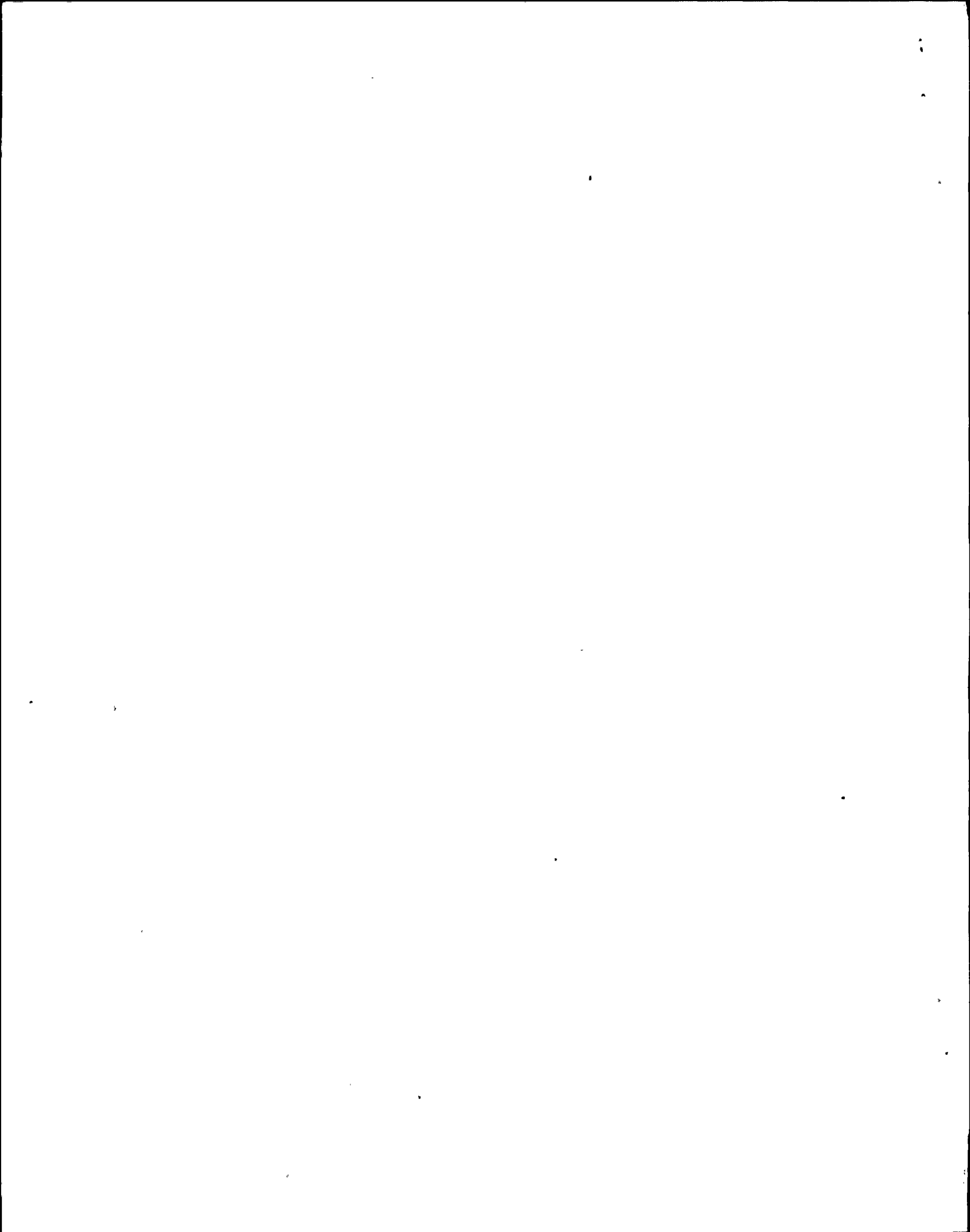


TABLE OF CONTENTS

<u>SECTION</u>		<u>PAGE</u>
1.0	PURPOSE.....	1
2.0	TECHNICAL SPECIFICATIONS.....	1
3.0	REFERENCES AND COMMITMENTS.....	1
4.0	GENERAL TEST METHODS.....	2
5.0	TEST EQUIPMENT.....	3
6.0	PRECAUTIONS AND LIMITATIONS.....	3
7.0	PREREQUISITES.....	5
8.0	PROCEDURE.....	6
	8.1 Rx Startup/Shutdown (Heatup/Cooldown).....	6
	8.2 Non-Nuclear Heatup.....	6
	8.3 Inservice Hydrostatic Test or Inservice Leak Test.....	7
	8.4 Low Power Physics Testing.....	7
9.0	RETURN TO NORMAL.....	8
10.0	ACCEPTANCE CRITERIA.....	8
	Attachment 1: Test Personnel Signature and Initial Log.....	10
	Attachment 2: Inservice Hydrostatic and Inservice Leak Rate Test Curve.	11
	Attachment 2A: Non-Critical Hydrotest Table.....	12
	Attachment 3: Non-nuclear Heatup.....	13
	Attachment 3A: Non-Critical Heatup Table.....	14
	Attachment 4: Cooldown and Low Power Physics Testing.....	16
	Attachment 4A: Non-Critical Cooldown Table.....	17
	Attachment 5: Core Critical Curve - Heatup.....	18
	Attachment 5A: Critical Heatup Table.....	19

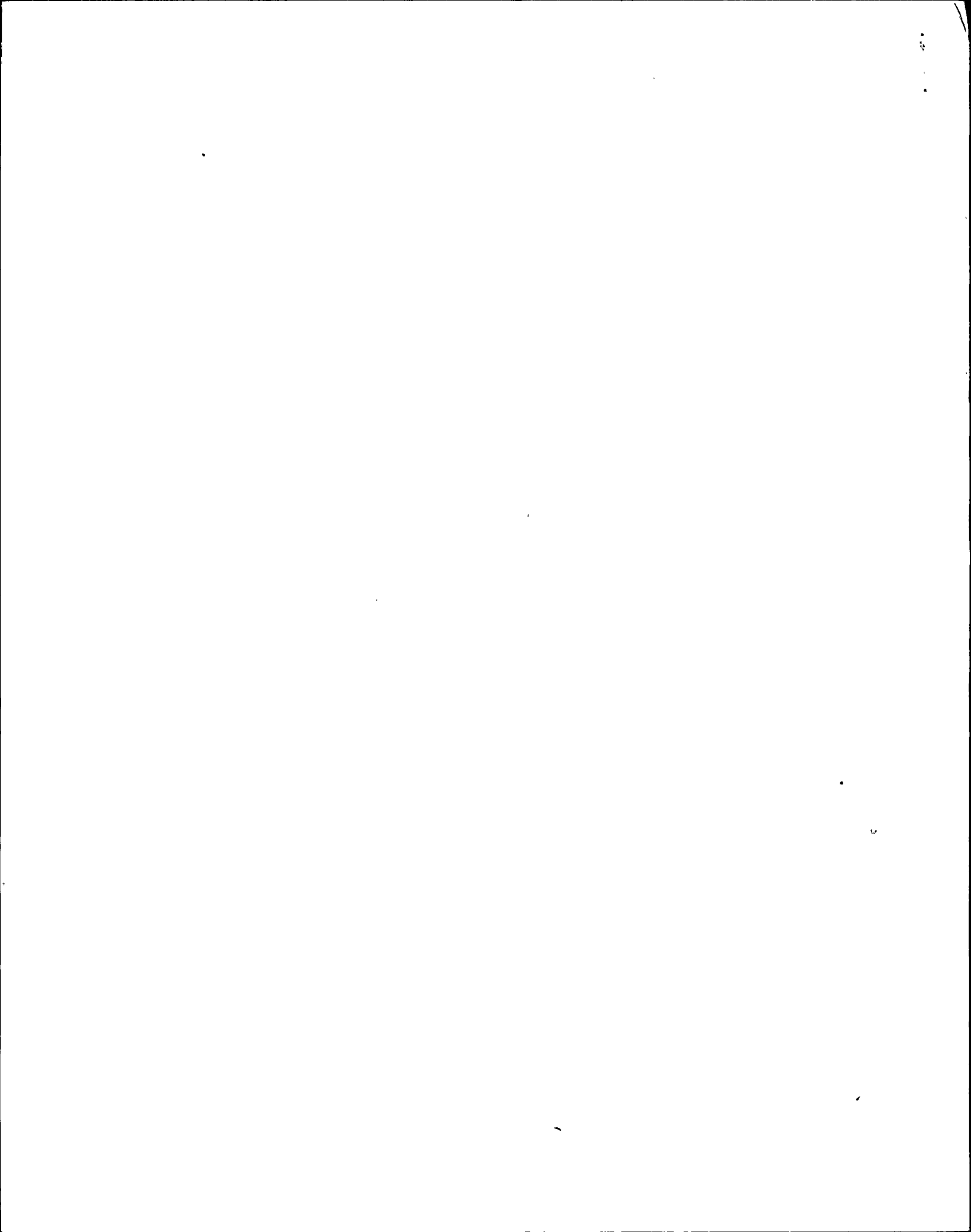
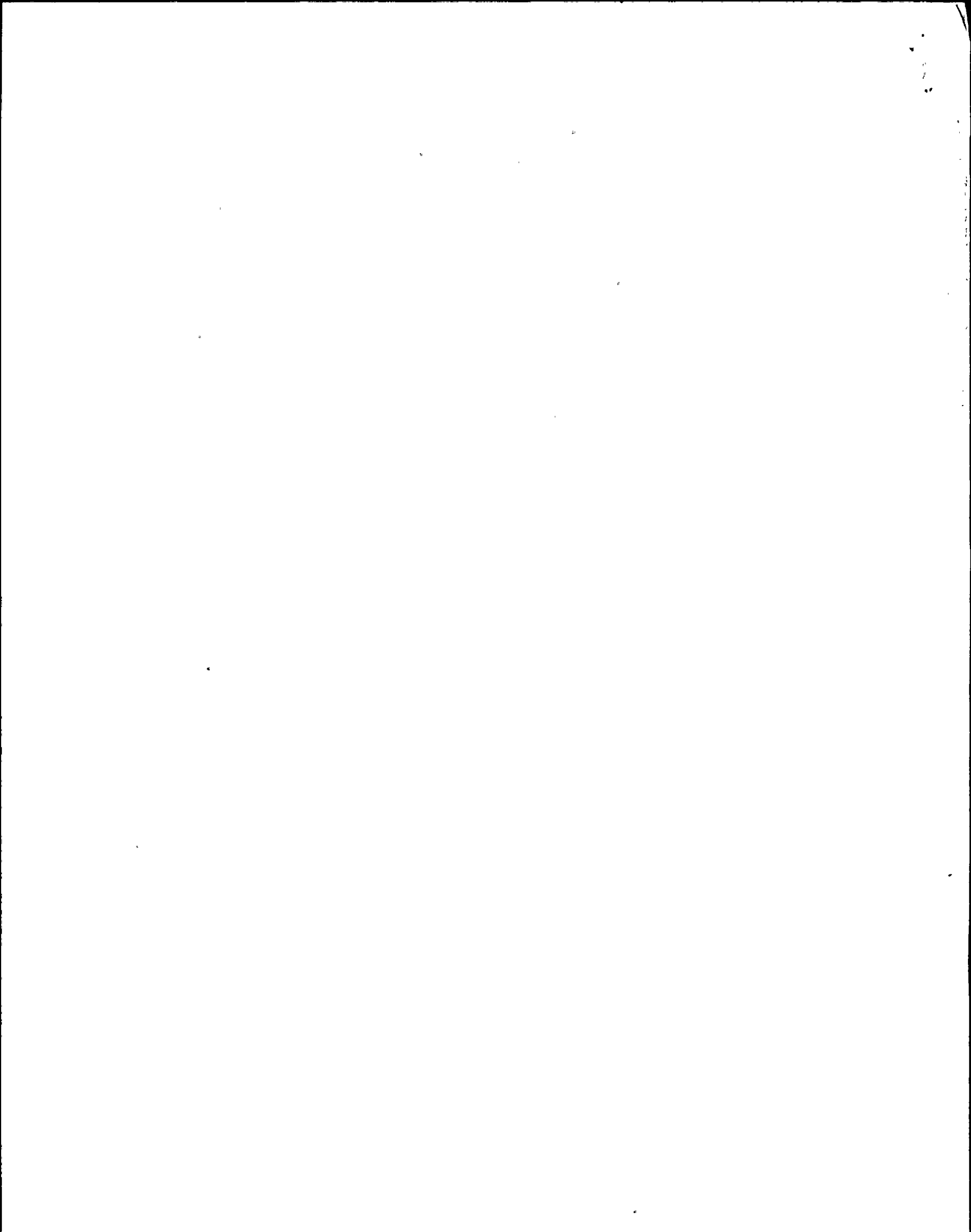


TABLE OF CONTENTS (Cont)

<u>SECTION</u>	<u>PAGE</u>
Attachment 6: Core Critical Curve - Cooldown.....	21
Attachment 6A: Critical Cooldown Table.....	22
Attachment 7: Heatup/Cooldown Data Sheet.....	24
Attachment 8: Saturated Steam Tables.....	25



1.0 PURPOSE

Provide instructions for monitoring reactor coolant pressure and temperature during heatup and cooldown to ensure Technical Specification heatup and cooldown limits are met.

Provide instructions for monitoring reactor vessel pressure and metal temperature during heatup and cooldown to ensure critical operation pressure limits and vessel thermal limits meet Technical Specifications.

2.0 TECHNICAL SPECIFICATIONS

2.1 Surveillance Requirements

4.4.6.1.1, Pressure/Temperature Limits, Reactor Coolant System

4.4.6.1.2, Pressure/Temperature Limits, Reactor Coolant System

2.2 Limiting Condition for Operation (LCO)

3.4.6.1, Pressure/Temperature Limits, Reactor Coolant System

2.3 Frequency

This procedure shall be performed during the following operations:

- Heatup
- Cooldown
- Inservice Hydrostatic Test above the normal heatup/cooldown limits
- Inservice Leak Test above the normal heatup/cooldown limits
- Lower Power Physics Testing

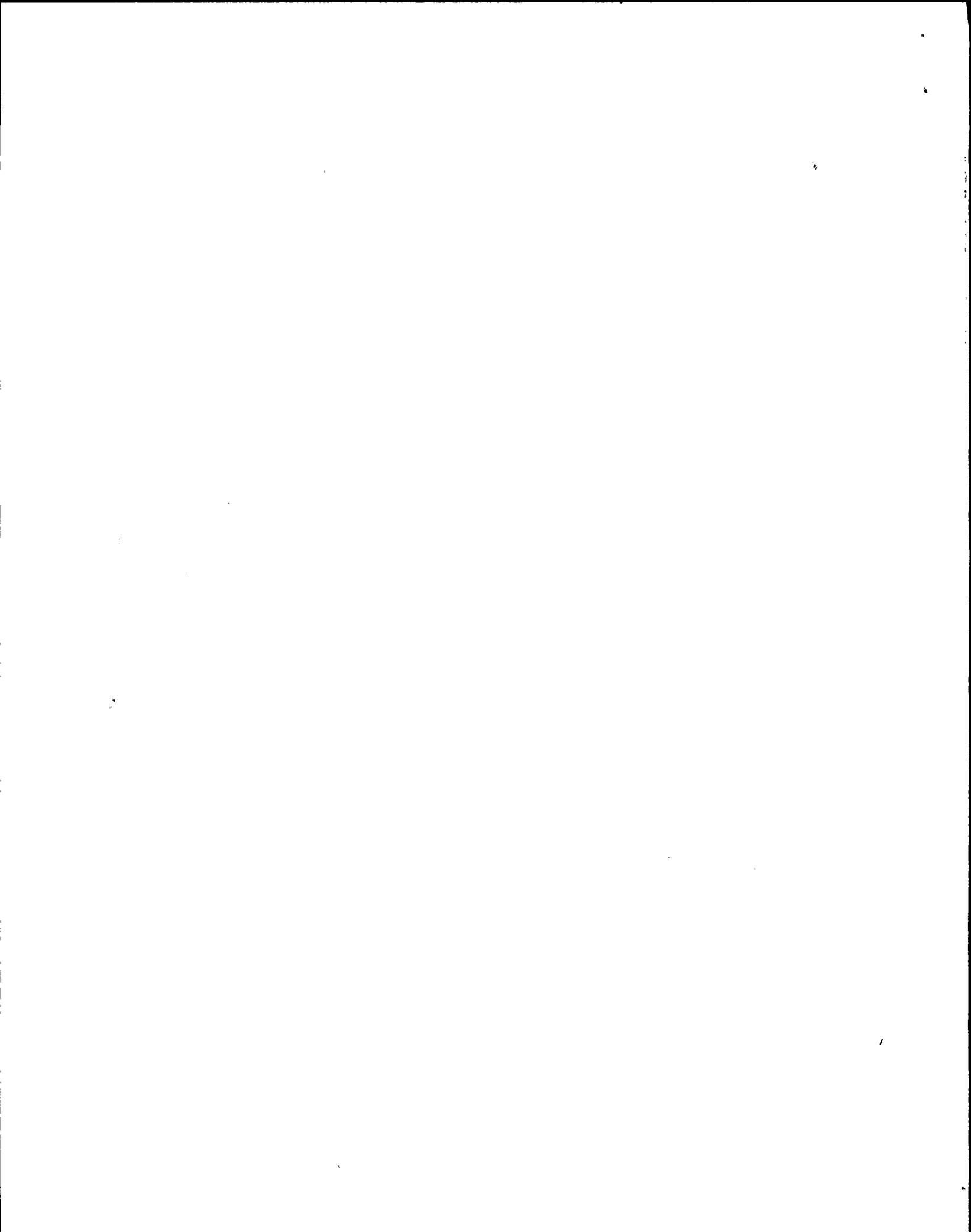
3.0 REFERENCES AND COMMITMENTS

Licensee Documentation

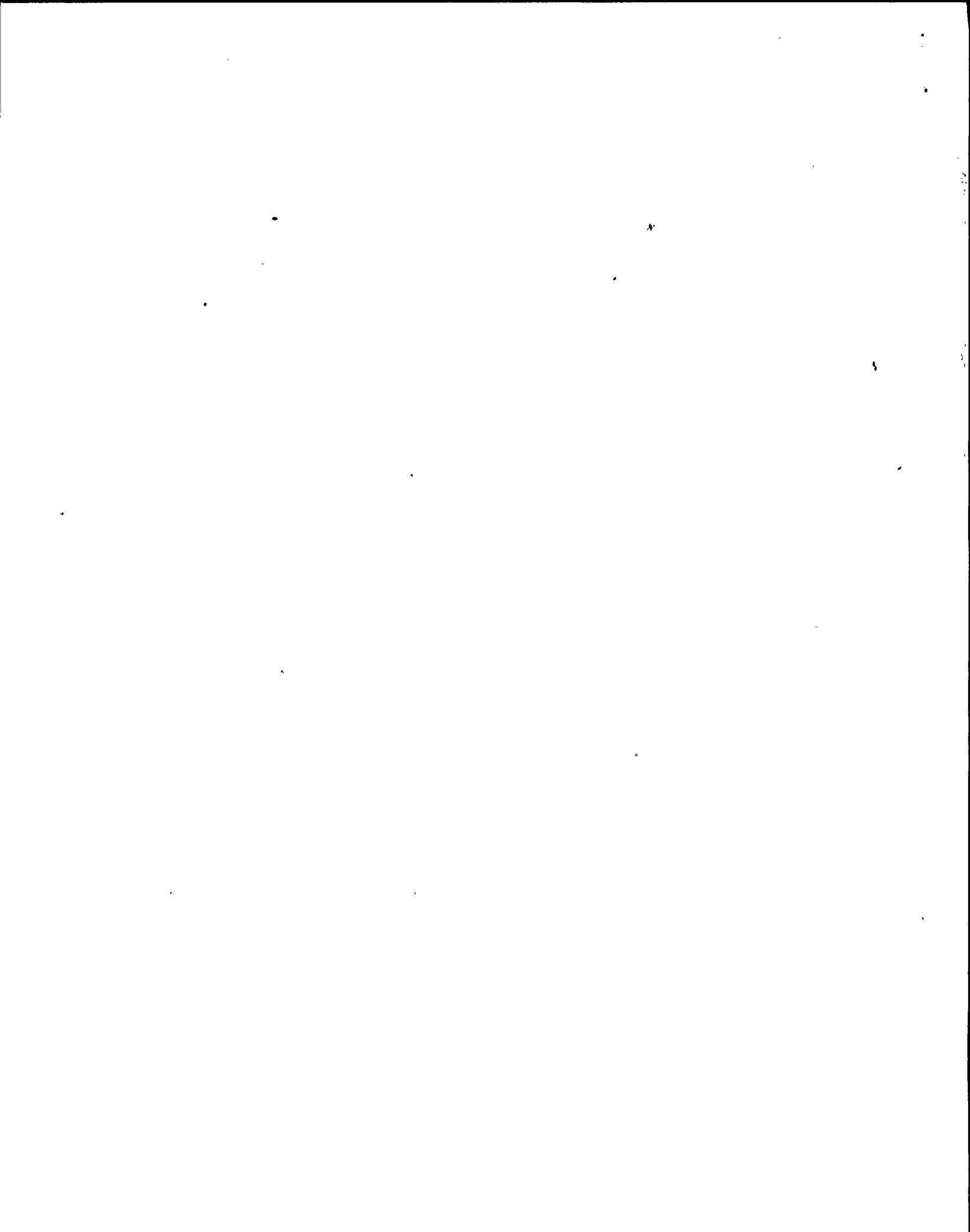
USAR Volume 13, Section 5.3.2

Commitments

None



- 4.0 GENERAL TEST METHODS
- 4.1 Perform only the section applicable to the evolution being performed:
- | | |
|--|-------------|
| Rx Startup/Shutdown (Heatup/Cooldown) | Section 8.1 |
| Non-nuclear heatup | Section 8.2 |
| Inservice Hydrostatic Test or
Inservice Leak Test | Section 8.3 |
| Low Power Physics Testing | Section 8.4 |
- 4.2 Read reactor vessel pressure using only one of the following instruments:
- Pressure Recorder C33-R609, REACTOR PRESSURE, on P603
 - Pressure Indicator C33-R605, RX PRESS WIDE RANGE, on P603
 - Computer Point FWSPA101
- 4.3 To obtain reactor coolant temperature (Downcomer Water Temp) read operating recirc loop temperature using the following data points on Temperature Recorder B35-R650 at P602. If both loops are operating, use only one instrument. Recirc suction temp is the preferred monitoring point for determining Downcomer Water Temperature.
- Loop A: Channel 1, RCS LOOP A SUCTION
 - Loop B: Channel 6, RCS LOOP B SUCTION
- 4.4 IF Residual Heat Removal is operating, and there is no Rx Recirc pump running, read operating RHR loop temperature using the following data points on Temperature Recorder E12-R601 at P601.
- Loop A: Point 1, RHR INLET TO HX A
 - Loop B: Point 2, RHR INLET TO HX B
- 4.5 If there are no Rx Recirc or Shutdown Cooling Pumps in operation and reactor coolant temperature is greater than or equal to 212°F, record temperature by converting the reactor vessel pressure reading to temperature using Attachment 8 - Saturated Steam Table.



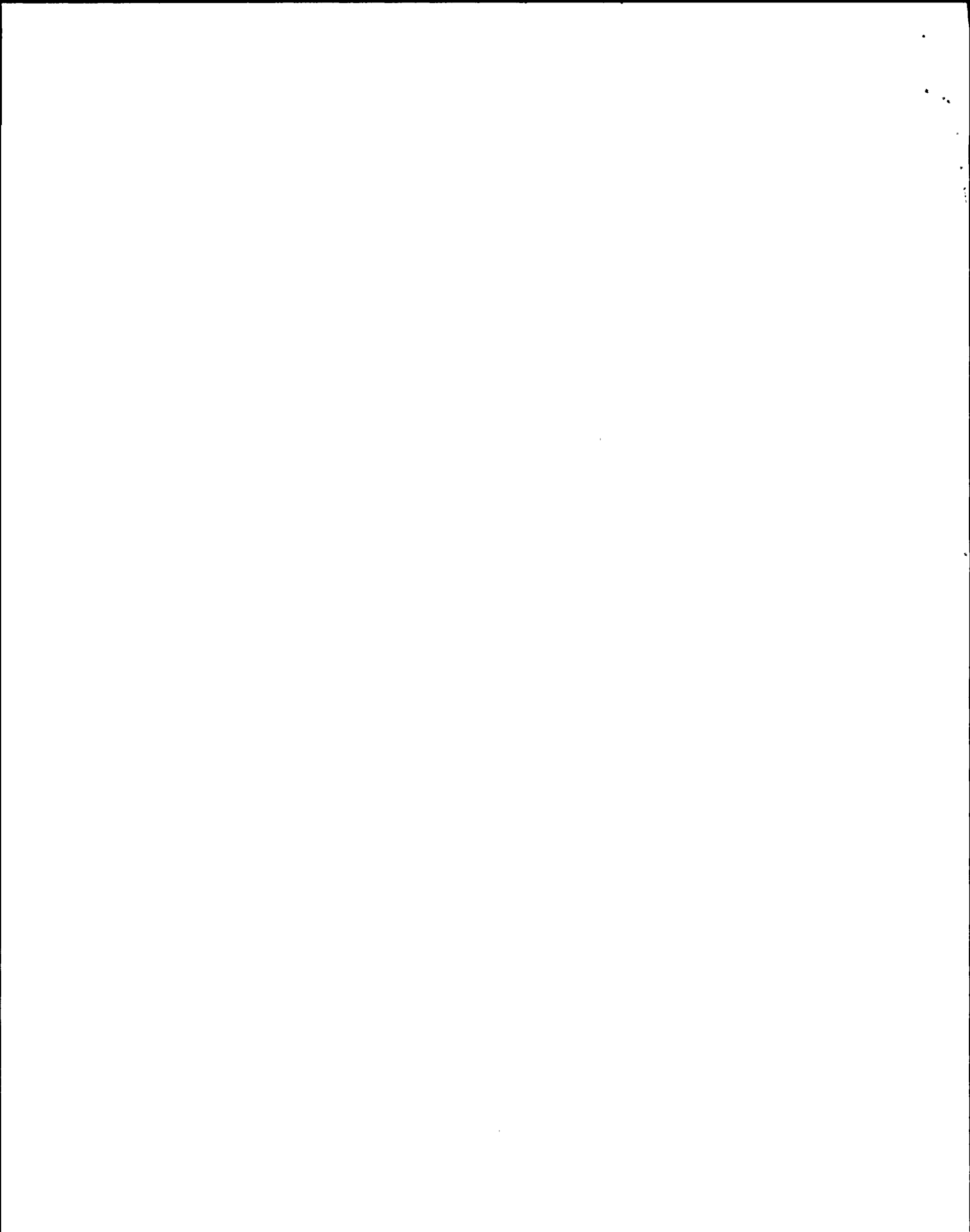
- 4.6 Downcomer Water Temperature as used on Attachments 2 thru 6A shall be - in order of preference:
- a. Rx Recirc Suction temperature
 - b. RHS SDC Inlet temperature
 - c. Rx Pressure Saturation temperature
- 4.7 Calculate heatup and cooldown rates by dividing the change in temperature from the last data entry by the elapsed time in fractions of an hour.
- 4.8 Use of Not Applicable (N/A) or Not Required (N/R) for Procedure Steps
- 4.9 N/A or N/R may be used where the procedure specifically allows it; or,
- 4.10 N/A or N/R may be used to eliminate steps not applicable to the evolution specified in Section 7.0. Document the reason for using N/A or N/R in Remarks.

5.0 TEST EQUIPMENT

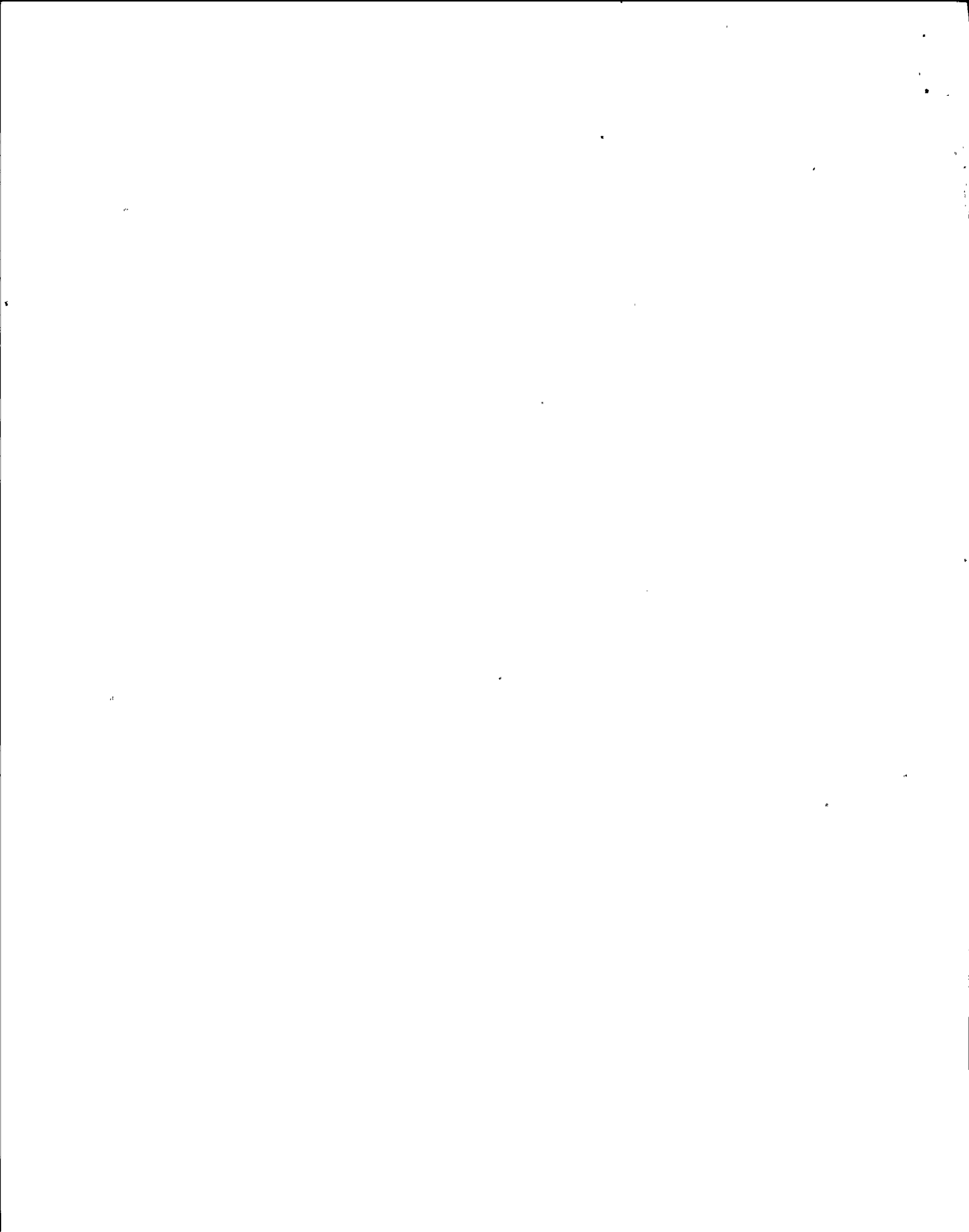
None

6.0 PRECAUTIONS AND LIMITATIONS

- 6.1 Heatup and cooldown rates shall be maintained within the following limits:
- Maximum heatup of 100°F in any one hour
 - Maximum cooldown of 100°F in any one hour
 - Maximum temperature change of 20°F in any one hour during Inservice Hydrostatic or Inservice Leak Rate tests.
- 6.2 Reactor coolant pressure and temperature shall be maintained to the right of the pressure/temperature curve for the associated evolution shown on Attachments 2, 3, 4, 5, and 6. Attachments 2A, 3A, 4A, 5A, and 6A are tabular representations of the associated pressure/temperature curves and may be used to more accurately determine the curve location.
- 6.3 The Station Shift Supervisor (SSS) shall be notified immediately when a step cannot be completed as stated or if acceptance criteria are not met.
- 6.4 All personnel involved in test shall fill out Attachment 1, Test Personnel Signature and Initial Log.



- 6.5 Provided the water level is in the range for power operation (178.3" - 187.3" NR indication) the core may be critical when left of the criticality limit line if the pressure is maintained below 312 psig (see cross-hatched region in Attachments 5 and 6). In this case, the reactor coolant temperature and pressure shall be determined to be within the cross-hatched region of Attachments 5 and 6 within 15 minutes before withdrawal of control rods to bring the reactor to criticality and at least once per 30 minutes during system heatup.
- 6.6 Only those parameters described in Steps 4.3 - 4.5 shall be used to measure Rx Coolant temperature (Downcomer water temp.).



Initials/Date

7.0 PREREQUISITES

7.1 Specify the reason for test performance:

Plant C/P Following Rx SCRATCH

MSJ 12/13/91

7.2 Personnel responsible for the performance of this test have read and thoroughly understand its contents prior to taking data or performing calculations.

R 12/13/91
CSO

7.3 Verify permanent plant instrumentation is calibrated. Mark unused instruments N/A.

<u>Parameter</u>	<u>Instrument ID Number</u>	<u>Cal: Due Date</u>	
REACTOR PRESSURE	C33-R609	<u>6/10/92</u>	
REACTOR PRESSURE WIDE RANGE	C33-R605	<u>11/6/92</u>	
RCS LOOP A SUCTION	B35-R650 Channel 1	<u>8/29/94</u>	
RCS LOOP B SUCTION	B35-R650 Channel 6	<u>8/29/94</u>	
RHR INLET TO HX A	E12-R601 Point 1	<u>11/04/92</u>	
RHR INLET TO HX B	E12-R601 Point 2	<u>11/04/92</u>	<u>R 12/14/91</u>

7.4 Obtain Station Shift Supervisor (SSS) permission to perform this test and log

MSJ 12/13/91
SSS

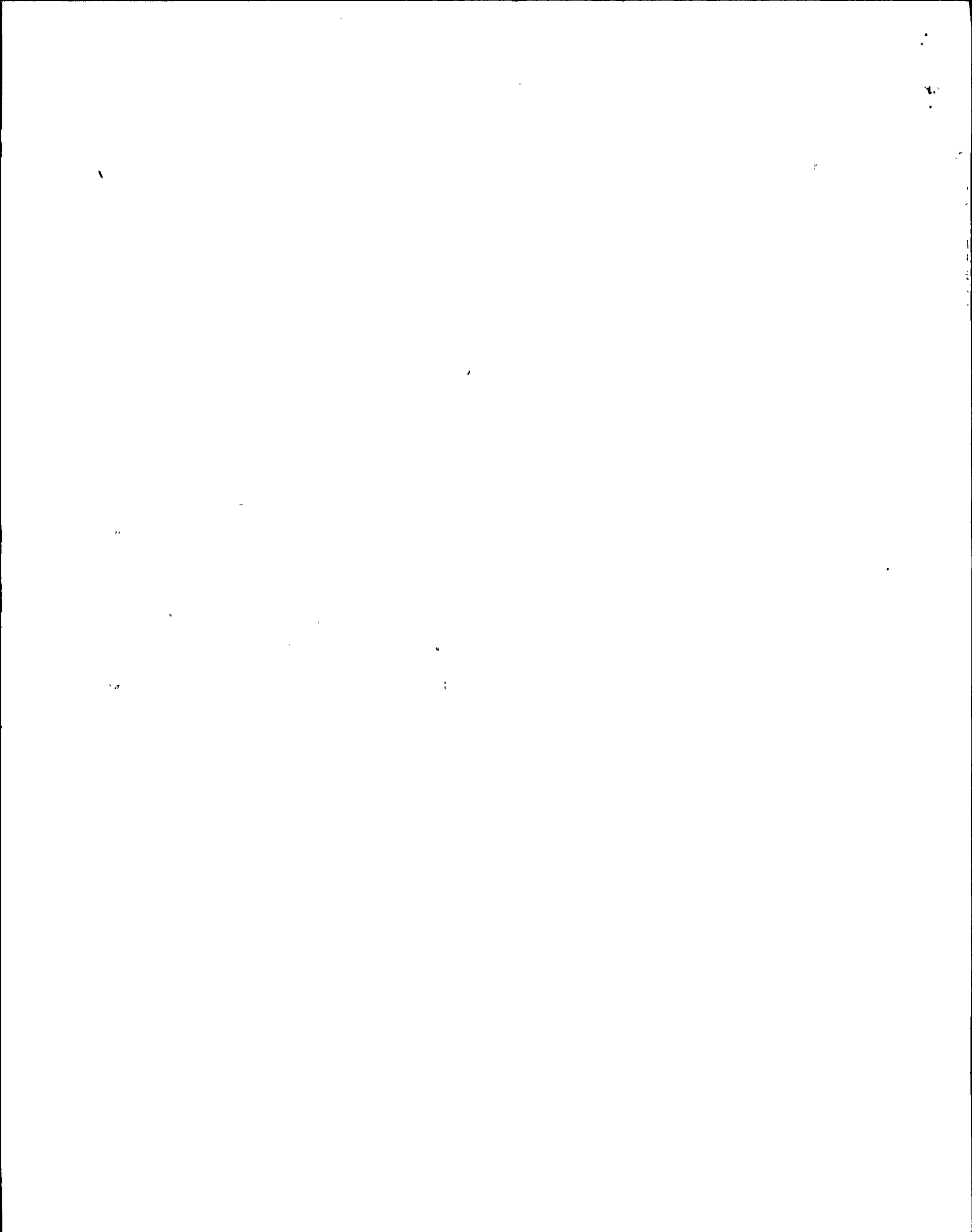
PLANT IMPACT: NONE

7.5 Notify Chief Shift Operator (CSO) of start of test.

MSJ 12/13/91
CSO

7.6 Record test start date and time.

8/13/91 0615
Date Time



8.0 PROCEDURE

8.1 Rx Startup/Shutdown (Heatup/Cooldown)

NOTE: Refer to Section 4 for data requirements.

8.1.1 Record the required data on Attachment 7, Heatup/Cooldown Data Sheet.

8.1.2 Record data at the following times:

- a. Within 15 minutes prior to withdrawal of control rods to bring the reactor critical.
- b. At the beginning of heatup or cooldown.
- c. At least once every 30 minutes during heatup or cooldown.

8.1.3 WHEN data is recorded, calculate heatup rate and record.

8.1.4 Ensure the following acceptance criteria are met:

- a. Downcomer Water Temperatures are to the right of the criticality limit line on Attachments 5, 5A or 6, 6A as applicable.
- b. Heatup rate is less than or equal to 100°F/hr.

8.1.5 Initial and date Attachment 7 to indicate acceptance criteria is met.

8.2 Non-Nuclear Heatup

NOTE: Refer to Section 4 for data requirements.

8.2.1 Record the required data on Attachment 7, Heatup/Cooldown Data Sheet.

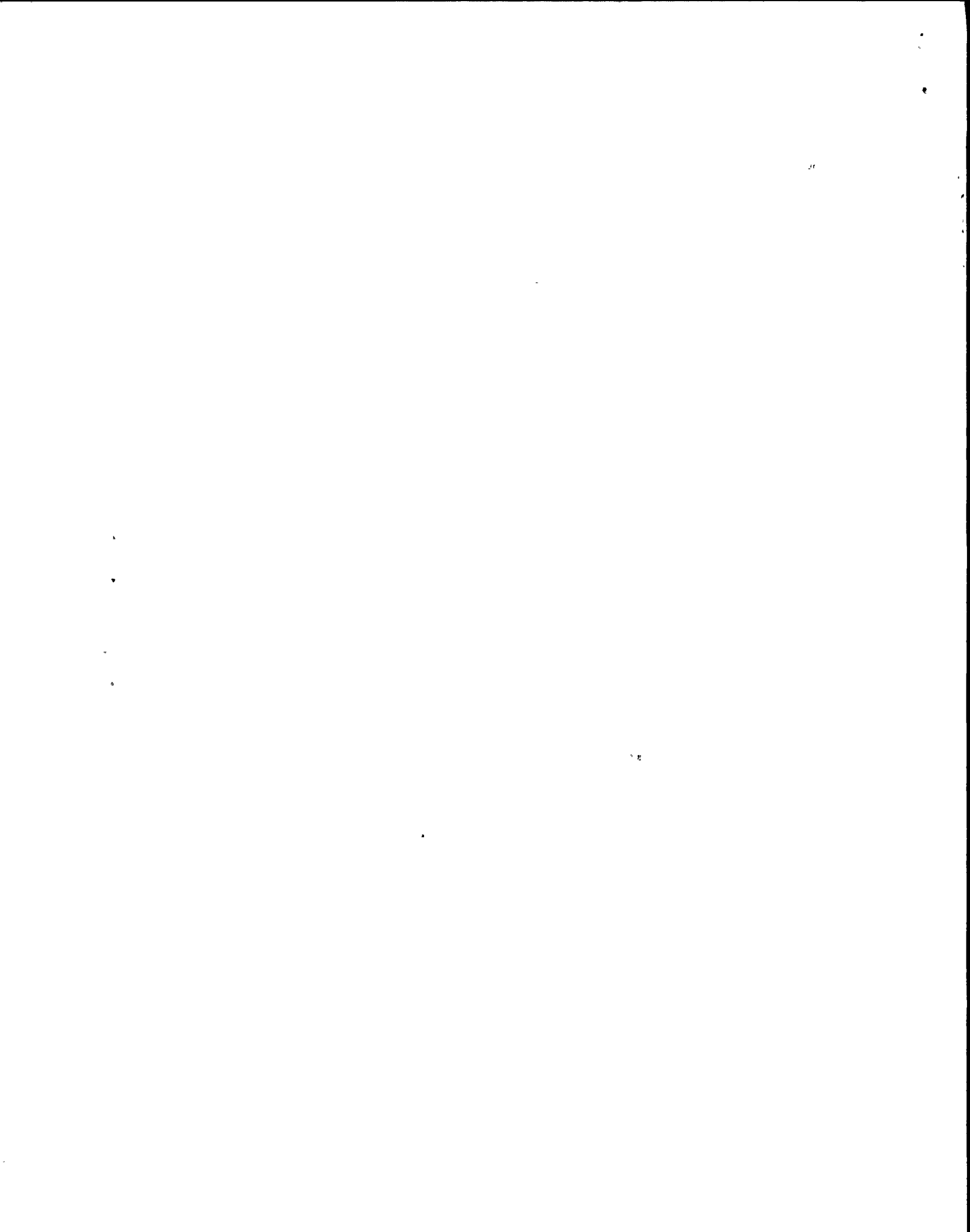
8.2.2 Record data at the following times:

- a. At least once every 30 minutes
- b. At the beginning of heatup or cooldown.
- c. At least once every 30 minutes during heatup or cooldown.

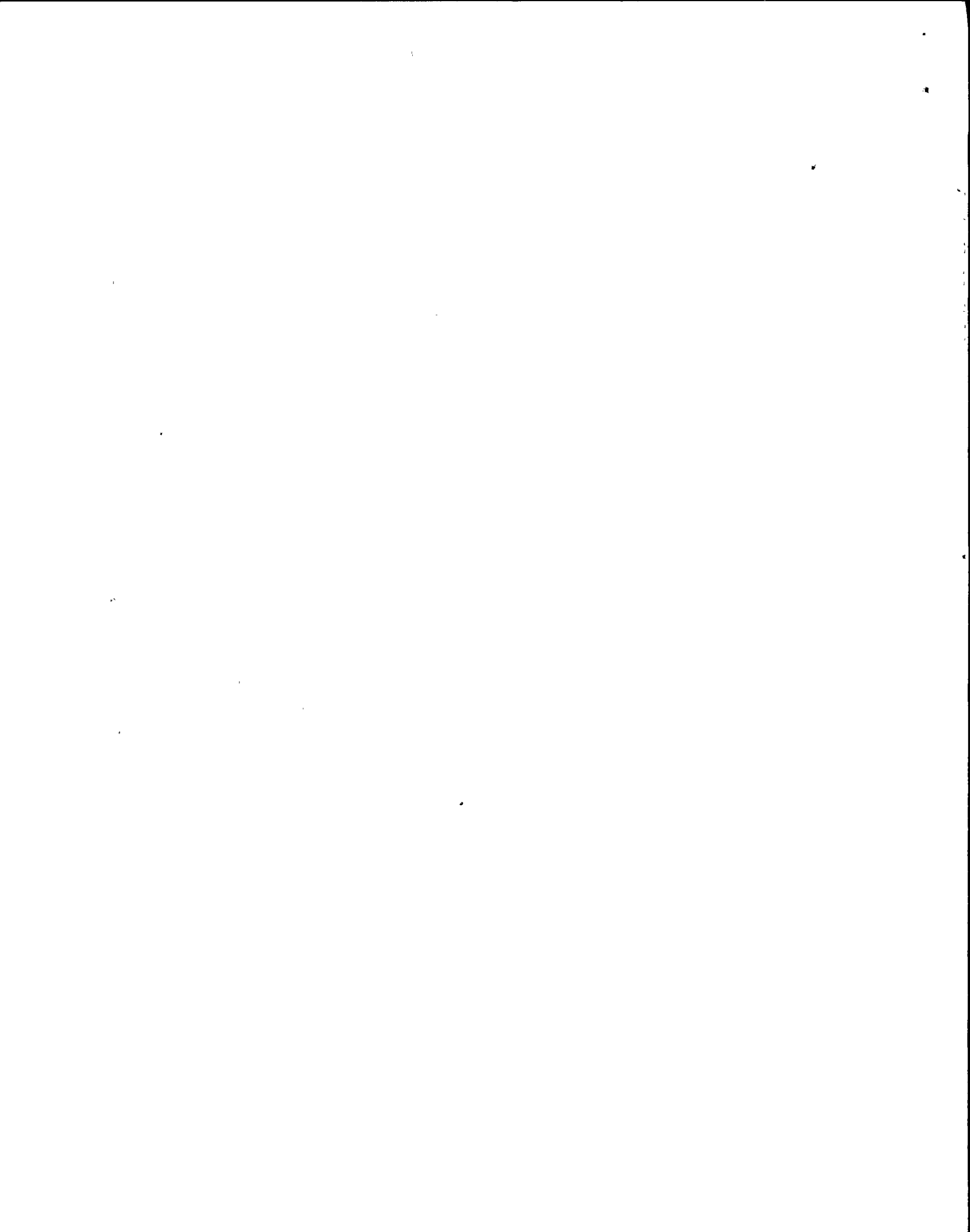
8.2.3 WHEN data is recorded, calculate heatup or cooldown rate and record.

8.2.4 Ensure the following acceptance criteria are met:

- a. Downcomer Water Temperatures are to the right of the minimum temperature line on Attachment 3, 3A, Non-nuclear Heatup.
- b. Heatup or cooldown rate is less than or equal to 100°F/hr.



- 8.2.5 Initial and date Attachment 7 to indicate acceptance criteria is met.
- 8.3 Inservice Hydrostatic Test or Inservice Leak Test
- NOTE: Refer to Section 4 for data requirements.
- 8.3.1 Record the required data on Attachment 7, Heatup/Cooldown Data Sheet.
- 8.3.2 Record data at the following times:
- At the beginning of heatup or cooldown.
 - At least once every 30 minutes during heatup or cooldown.
- 8.3.3 WHEN data is recorded, calculate heatup or cooldown rate and record.
- 8.3.4 Ensure the following acceptance criteria are met:
- Downcomer Water Temperatures are to the right of the minimum temperature line on Attachment 2, 2A, Inservice Hydrostatic and Inservice Leak Rate Test Curve.
 - Heatup or cooldown rate is less than or equal to 20°F/hr.
- 8.3.5 Initial and date Attachment 7 to indicate acceptance criteria is met.
- 8.4 Low Power Physics Testing
- NOTE: Refer to Section 4 for data requirements.
- 8.4.1 Record the required data on Attachment 7, Heatup/Cooldown Data Sheet.
- 8.4.2 Record data at the following times:
- At least once every 30 minutes during Low Power Physics testing.
 - At the beginning of heatup or cooldown.
 - At least once every 30 minutes during heatup or cooldown.
- 8.4.3 When data is recorded, calculate heatup or cooldown rate and record.
- 8.4.4 Ensure the following acceptance criteria are met:
- Downcomer Water Temperature is to the right of the minimum temperature line on Attachment 4, 4A, Cooldown Core Not Critical.
 - Heatup or Cooldown rate is less than or equal to 100°F/hr.
- 8.4.5 Initial and date Attachment 7 to indicate acceptance criteria is met.



Initials/Date

9.0 RETURN TO NORMAL

9.1 Ensure all test personnel have signed Attachment 1, Test Personnel Signature and Initial Log.

Q- 18/14/91
R 18/14/91
CSO

9.2 Notify CSO of test completion.

9.3 Record test stop date and time.

18/14/91 02:13
Date Time

10.0 ACCEPTANCE CRITERIA

10.1 If any acceptance criteria is exceeded, enter Action Statement required by Technical Specifications.

10.2 For Section 8.1, 8.2 and 8.4, heatup/cooldown rates are less than or equal to 100°F/hr for each data entry. Mark N/A if performing Section 8.3.

SATISFACTORY ^{NOTE 1} UNSATISFACTORY N/A

10.3 For Section 8.3, heatup/cooldown rates are less than or equal to 20°F/hr for each data entry. Mark N/A if performing Section 8.1, 8.2, or 8.4.

SATISFACTORY UNSATISFACTORY N/A

10.4 Downcomer Water Temperatures are to the right of the minimum temperature line for the associated pressure/temperature curve for each day entry.

SATISFACTORY UNSATISFACTORY N/A

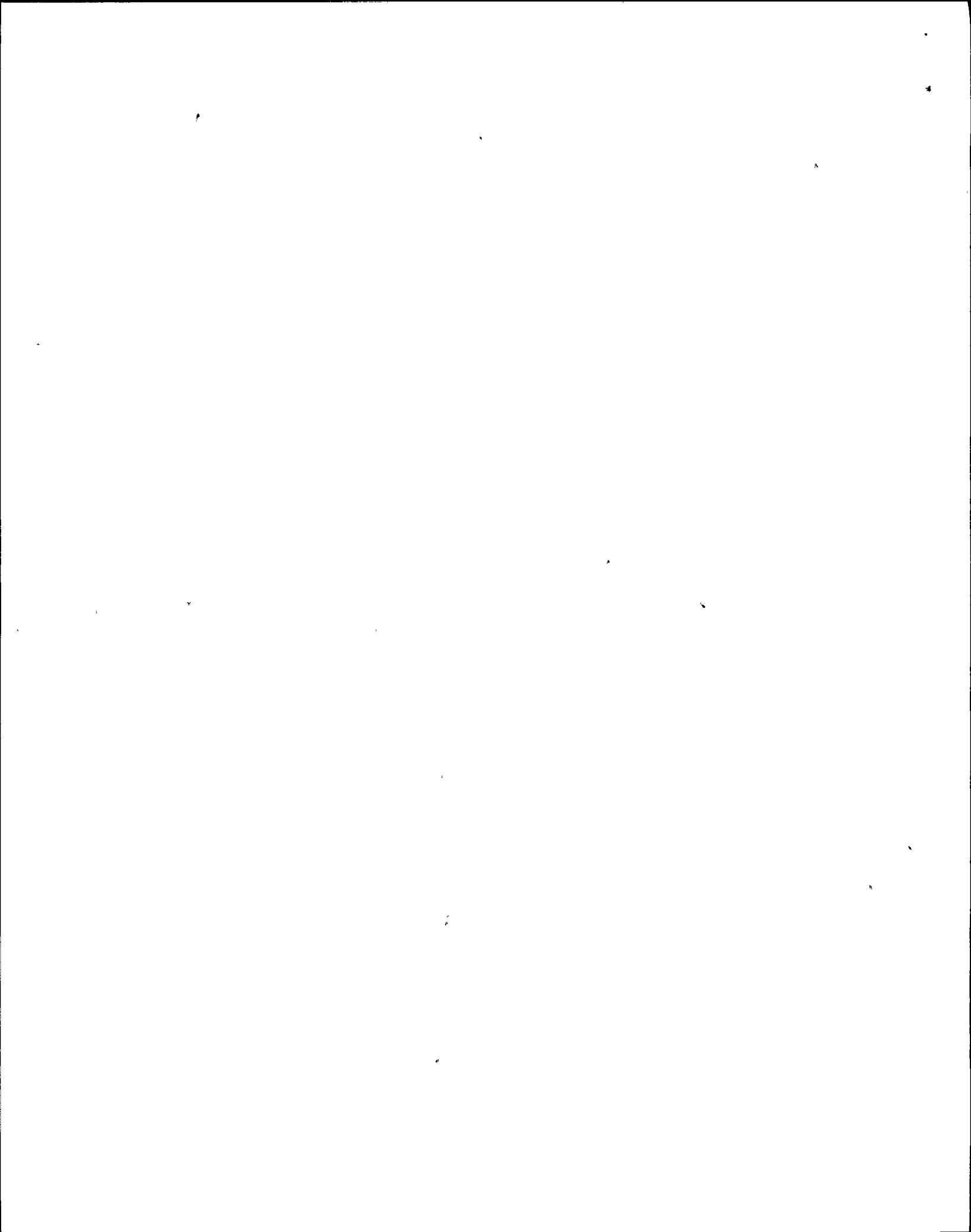
10.5 SSS Review

All test documentation completed

Satisfactory

Unsatisfactory (Immediately notify Operations Manager or alternate. Record explanation in Remarks.

Person Notified: _____



10.5 (Cont)

Remarks: NOTE 1: SEVERAL EARLYS INDICATE >100°/MIN. ROLLOFF.
3.4.6.1 COOLDOWN² WAS <100 IN ANY 1 HOUR THROUGHOUT
THE COOLDOWN

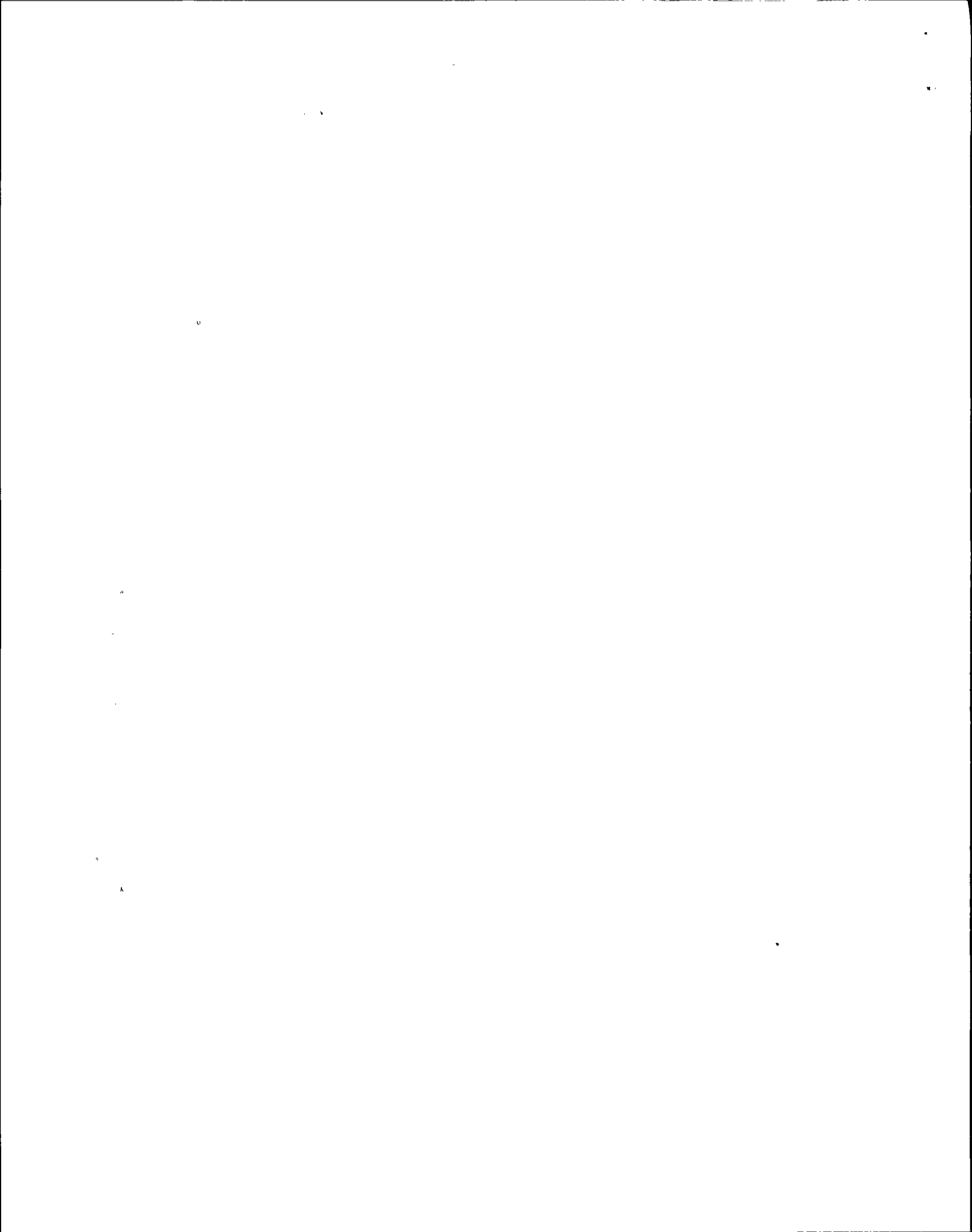
J. Romi
SSS Signature

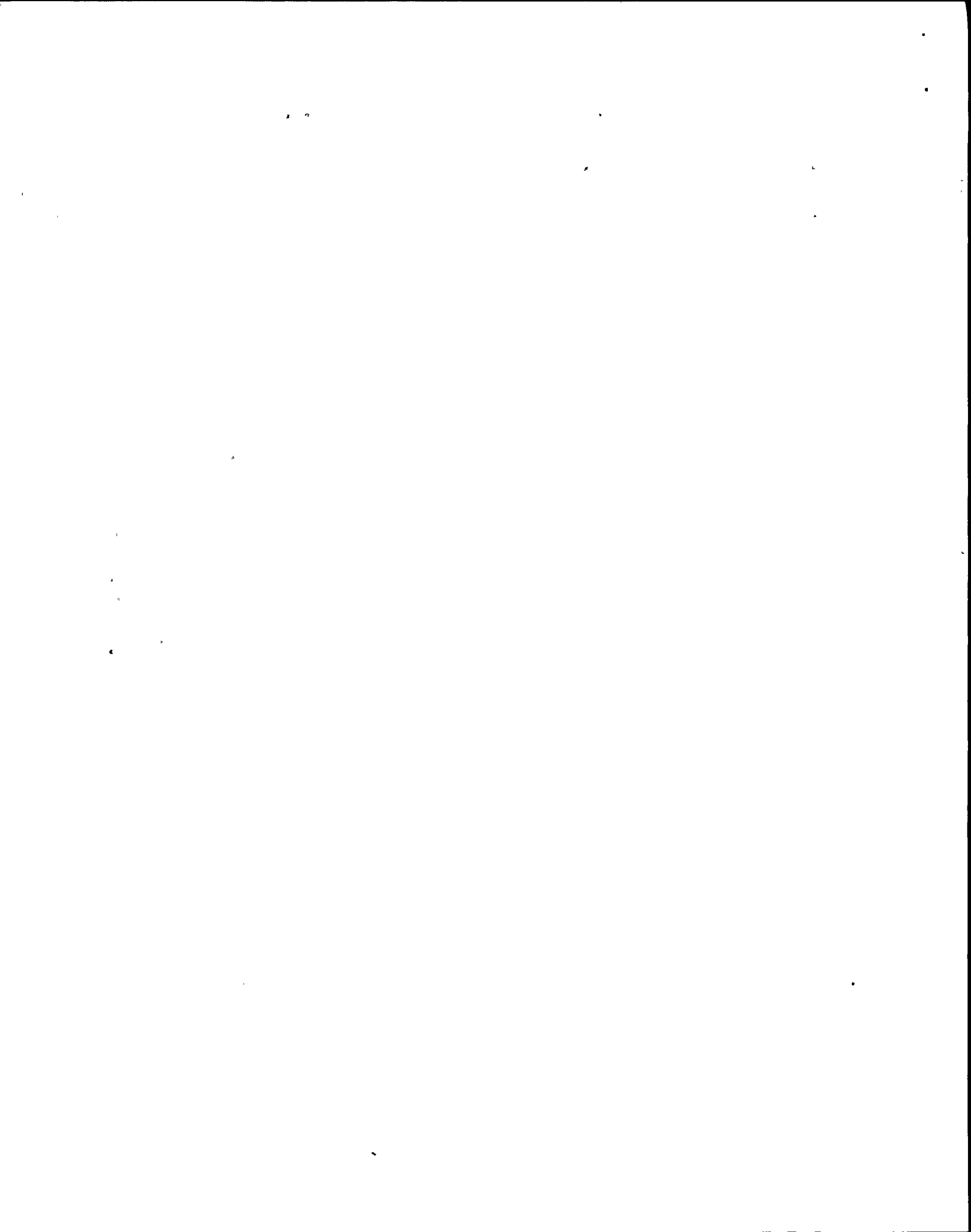
8-15-21
Date

10.6 Second SRO Review

Henry E. May
Second SRO Signature

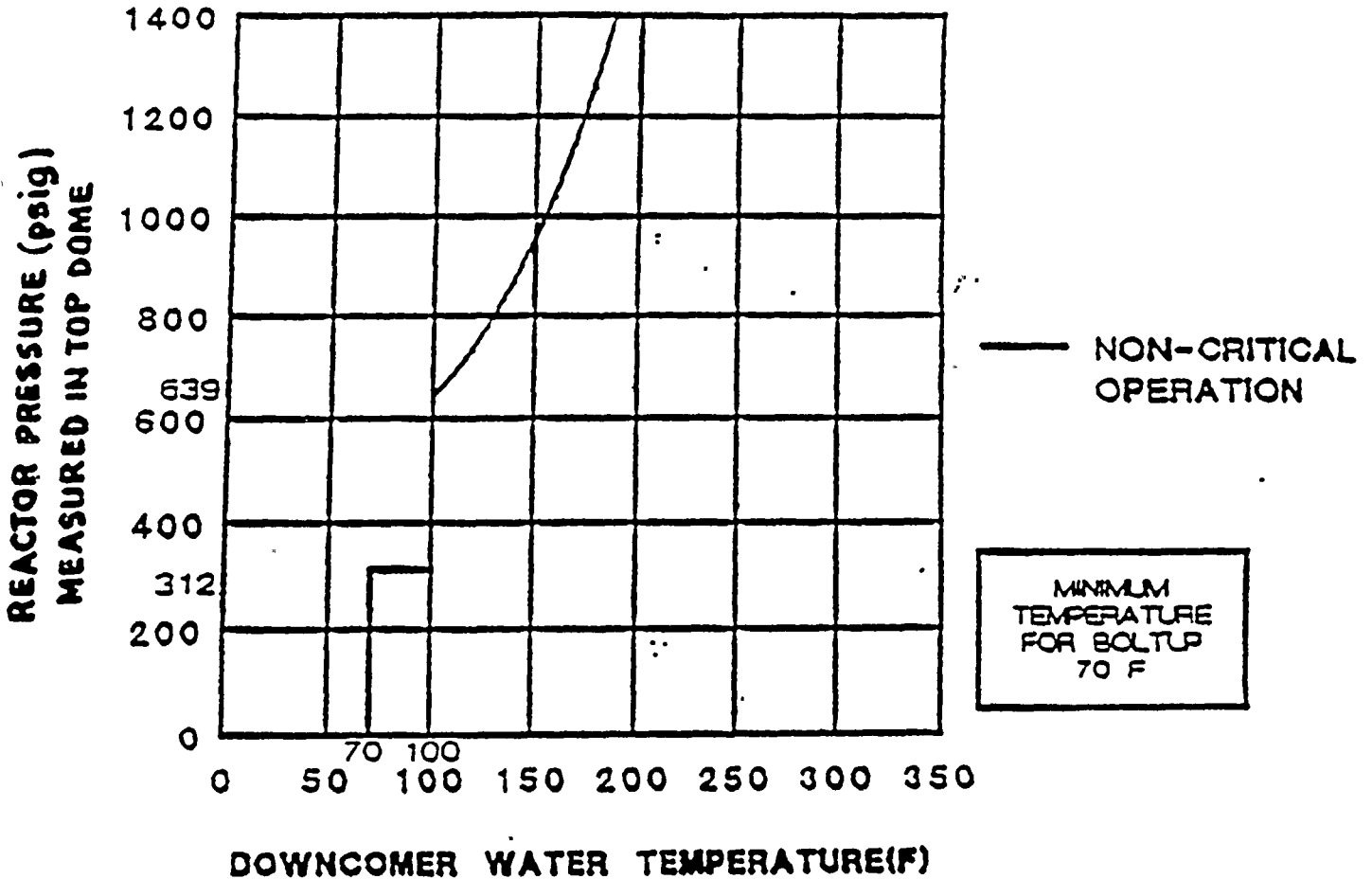
8/15/21
Date



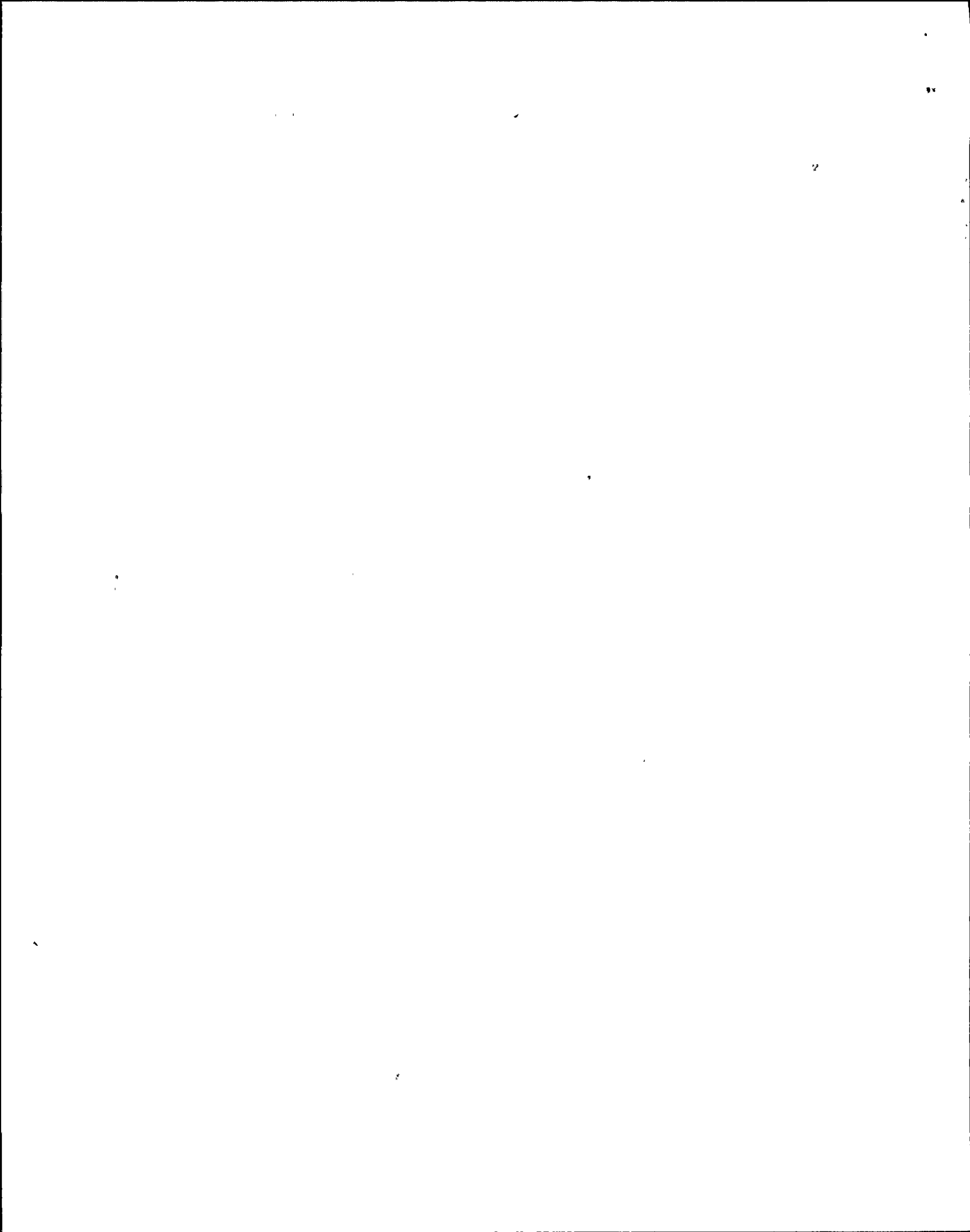


ATTACHMENT 2
INSERVICE HYDROSTATIC AND INSERVICE LEAK RATE TEST CURVE

NINE MILE POINT UNIT 2
NON-CRITICAL HYDROTEST

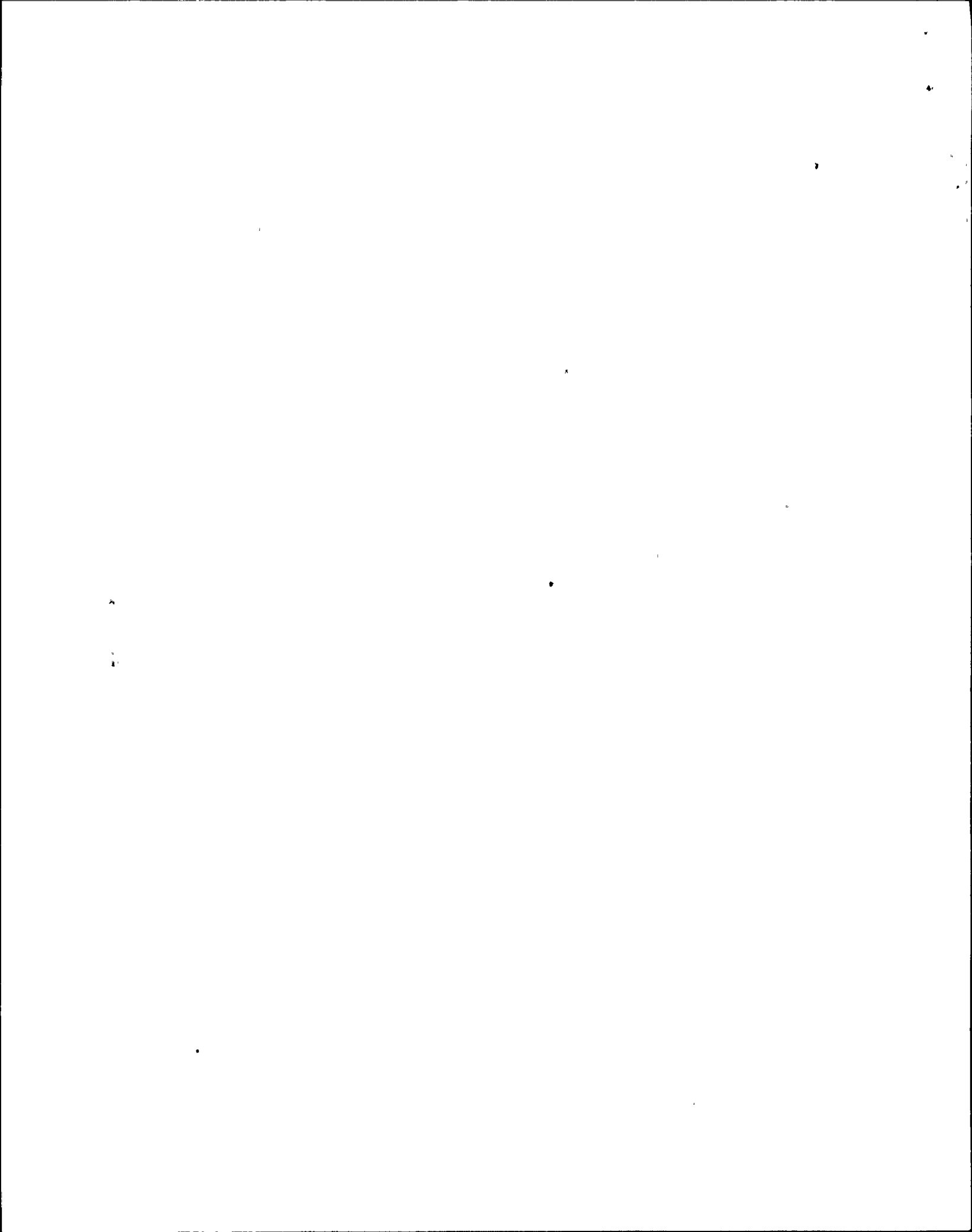


MINIMUM BELTLINE DOWNCOMER WATER TEMPERATURE FOR PRESSURIZATION DURING IN-SERVICE HYDROSTATIC TESTING AND LEAK TESTING (REACTOR NOT CRITICAL) FOR UP TO 12.8 EFFECTIVE FULL POWER YEARS OF OPERATION



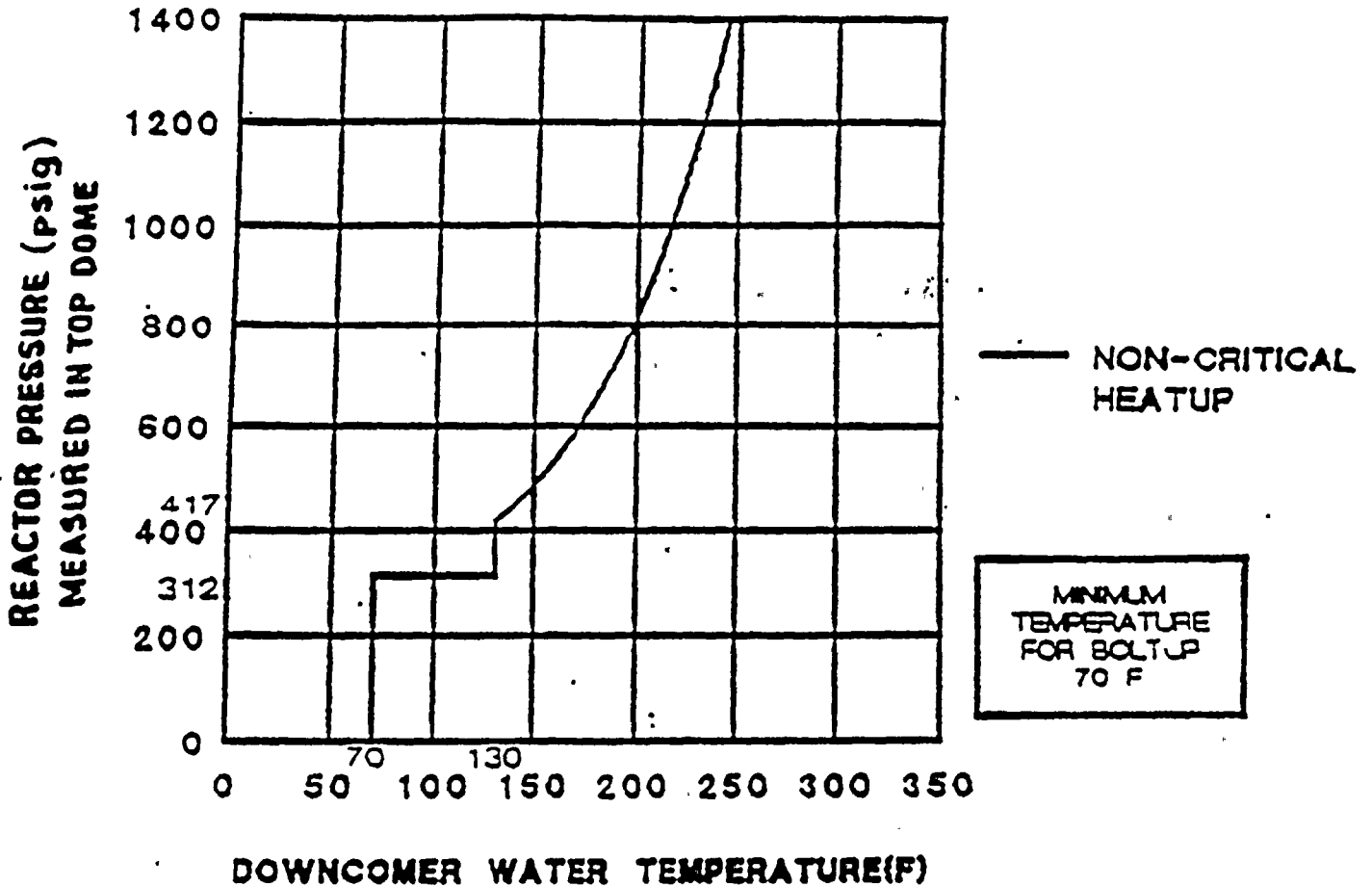
ATTACHMENT 2A
NON-CRITICAL HYDROTEST TABLE

Coolant Temperature (F)	Steam Dome Pressure (psig)	Coolant Temperature (F)	Steam Dome Pressure (psig)	Coolant Temperature (F)	Steam Dome Pressure (psig)
70	0	114	706	162	1068
70	312	115	712	163	1079
71	312	116	717	164	1090
72	312	117	722	165	1101
73	312	118	728	166	1111
74	312	119	733	167	1122
75	312	120	738	168	1133
76	312	121	745	169	1144
77	312	122	751	170	1155
78	312	123	757	171	1166
79	312	124	763	172	1179
80	312	125	769	173	1192
81	312	126	775	174	1204
82	312	127	781	175	1217
83	312	128	788	176	1229
84	312	129	794	177	1241
85	312	130	800	178	1254
86	312	131	807	179	1266
87	312	132	814	180	1279
88	312	133	821	181	1293
89	312	134	828	182	1307
90	312	135	835	183	1321
91	312	136	842	184	1335
92	312	137	850	185	1350
93	312	138	857	186	1364
94	312	139	864	187	1378
95	312	140	871	188	1392
96	312	141	879	189	1406
97	312	142	887	190	1421
98	312	143	895	191	1437
99	312	144	904	192	1453
100	639	145	912	193	1469
101	643	146	920	194	1486
102	648	147	928	195	1502
103	653	148	936	196	1518
104	657	149	944	197	1534
105	662	150	953	198	1551
106	667	151	962	199	1567
107	671	152	971	200	1583
108	676	153	981	201	1602
109	680	154	990	202	1620
110	685	155	1000	203	1638
111	690	156	1009	204	1657
112	696	157	1018	205	1675
113	701	158	1028	206	1694
		159	1037	207	1712
		160	1047	208	1731
		161	1057	209	1749

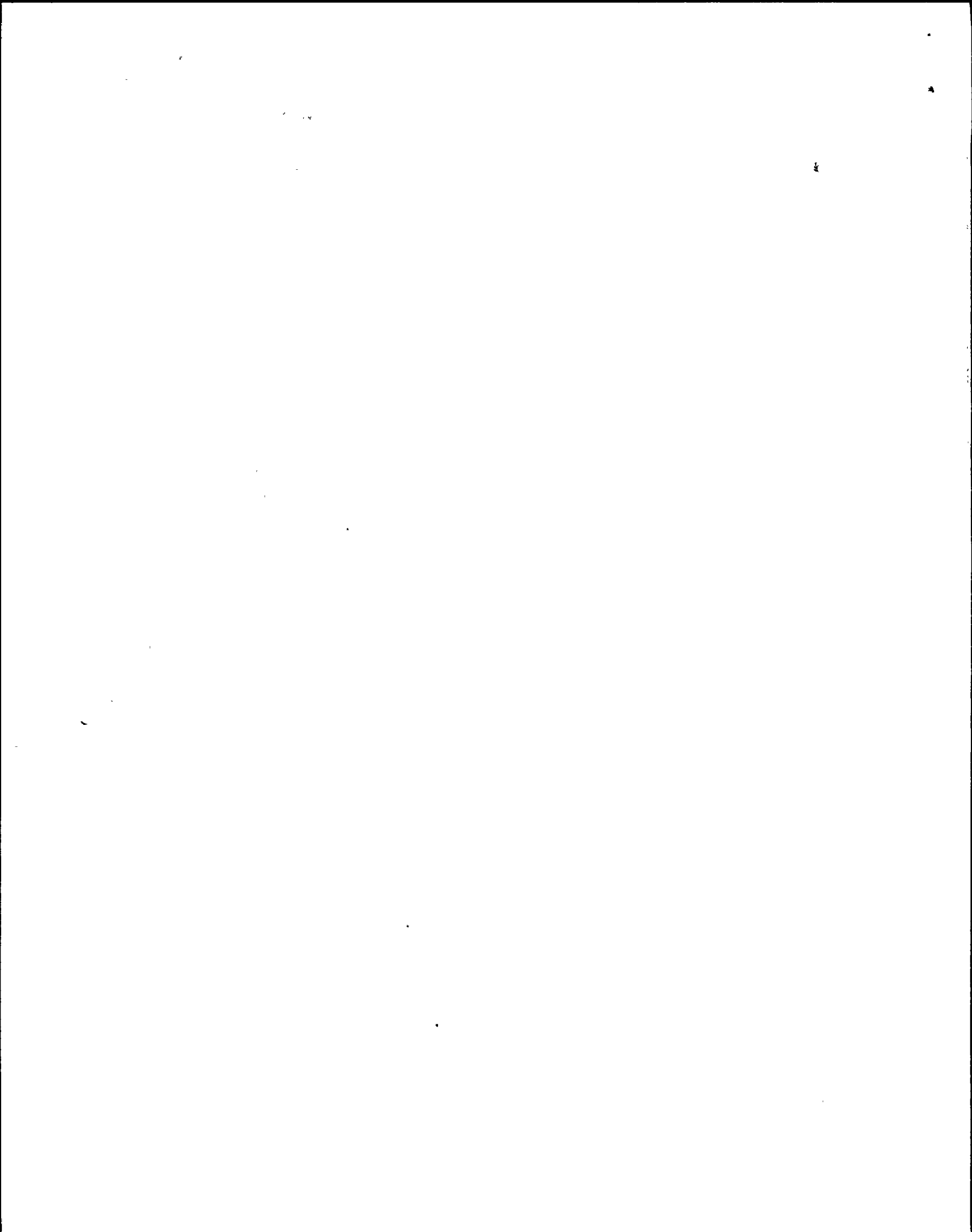


ATTACHMENT 3
NON-NUCLEAR HEATUP

NINE MILE POINT UNIT 2
HEATUP CORE NOT CRITICAL

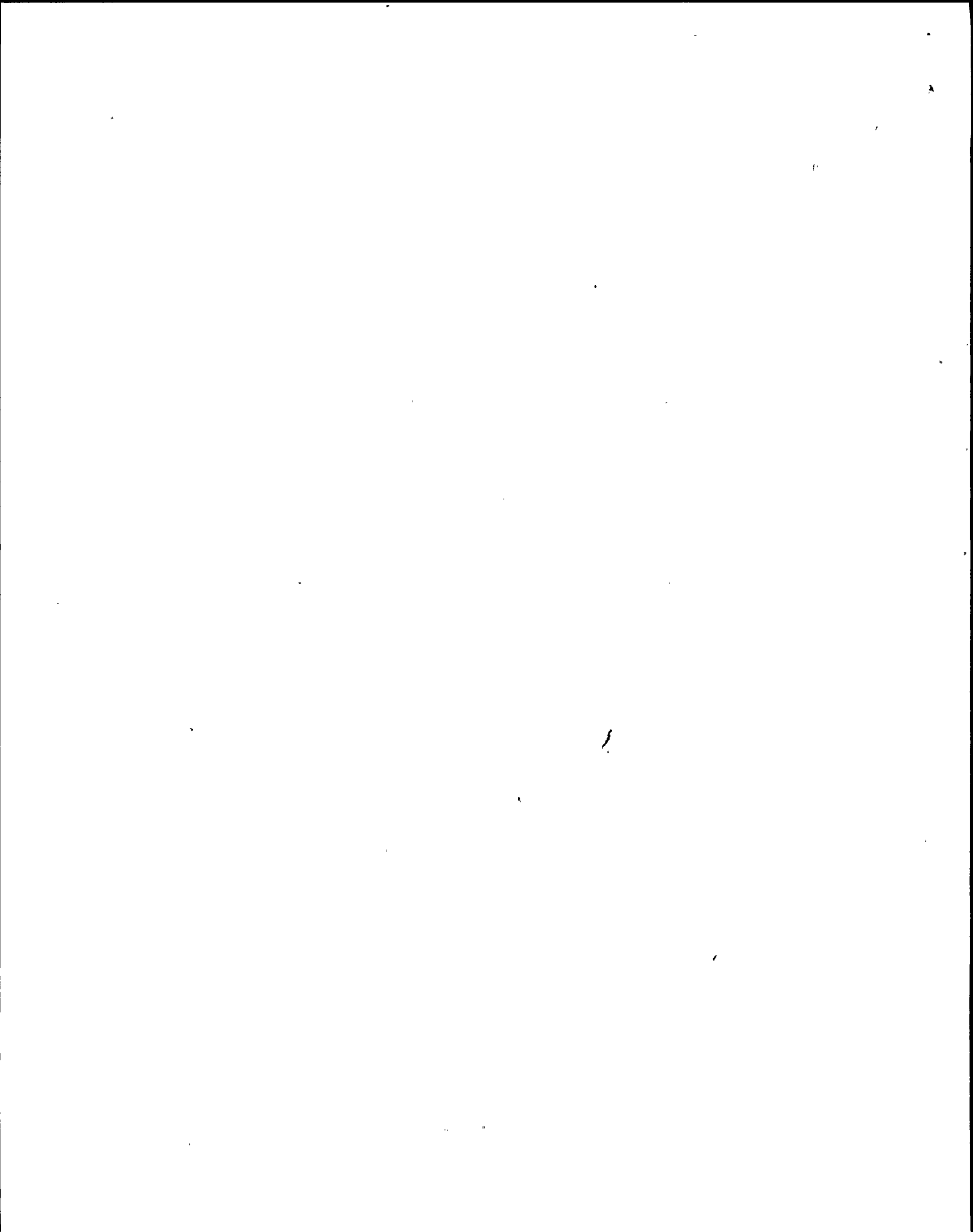


MINIMUM BELTLINE DOWNCOMER WATER TEMPERATURE FOR PRESSURIZATION DURING HEATUP AND LOW-POWER PHYSICS TESTS (REACTOR NOT CRITICAL) (HEATING RATE ≤ 100 F/HR) FOR UP TO 12.8 EFFECTIVE FULL POWER YEARS OF OPERATION



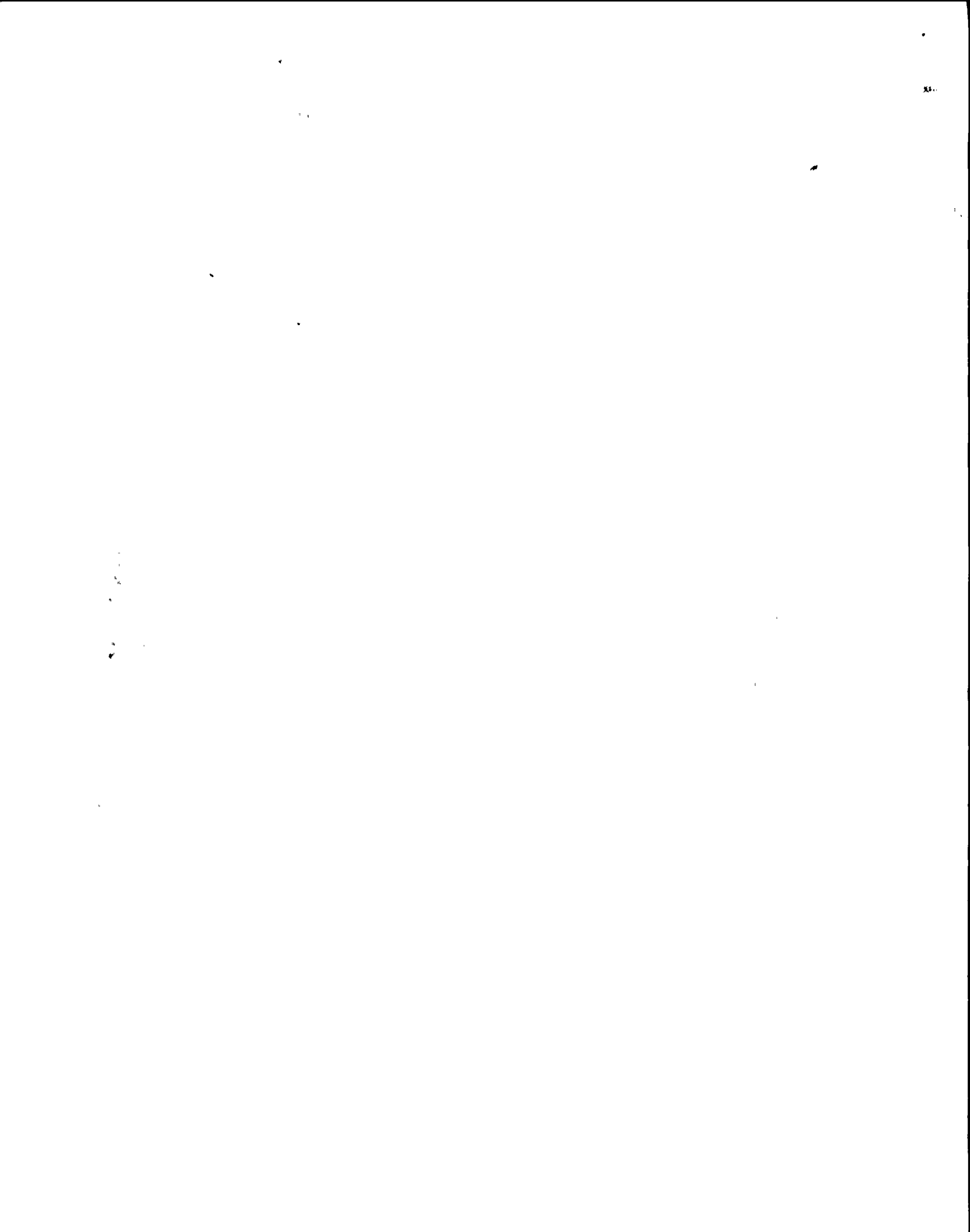
ATTACHMENT 3A
NON-CRITICAL HEATUP TABLE

Coolant Temperature (F)	Steam Dome Pressure (psig)	Coolant Temperature (F)	Steam Dome Pressure (psig)	Coolant Temperature (F)	Steam Dome Pressure (psig)
70	0	114	312	162	541
70	312	115	312	163	547
71	312	116	312	164	552
72	312	117	312	165	558
73	312	118	312	166	563
74	312	119	312	167	569
75	312	120	312	168	574
76	312	121	312	169	580
77	312	122	312	170	585
78	312	123	312	171	592
79	312	124	312	172	598
80	312	125	312	173	604
81	312	126	312	174	611
82	312	127	312	175	617
83	312	128	312	176	624
84	312	129	312	177	630
85	312	130	417	178	636
86	312	131	420	179	643
87	312	132	423	180	649
88	312	133	426	181	657
89	312	134	429	182	664
90	312	135	432	183	672
91	312	136	435	184	679
92	312	137	438	185	687
93	312	138	441	186	694
94	312	139	444	187	701
95	312	140	447	188	709
96	312	141	451	189	716
97	312	142	454	190	724
98	312	143	458	191	733
99	312	144	462	192	741
100	312	145	466	193	750
101	312	146	470	194	759
102	312	147	473	195	767
103	312	148	477	196	776
104	312	149	481	197	784
105	312	150	485	198	793
106	312	151	489	199	802
107	312	152	494	200	810
108	312	153	498	201	821
109	312	154	503	202	831
110	312	155	508	203	841
111	312	156	512	204	851
112	312	157	517	205	861
113	312	158	521	206	871
		159	526	207	881
		160	531	208	891
		161	536	209	901



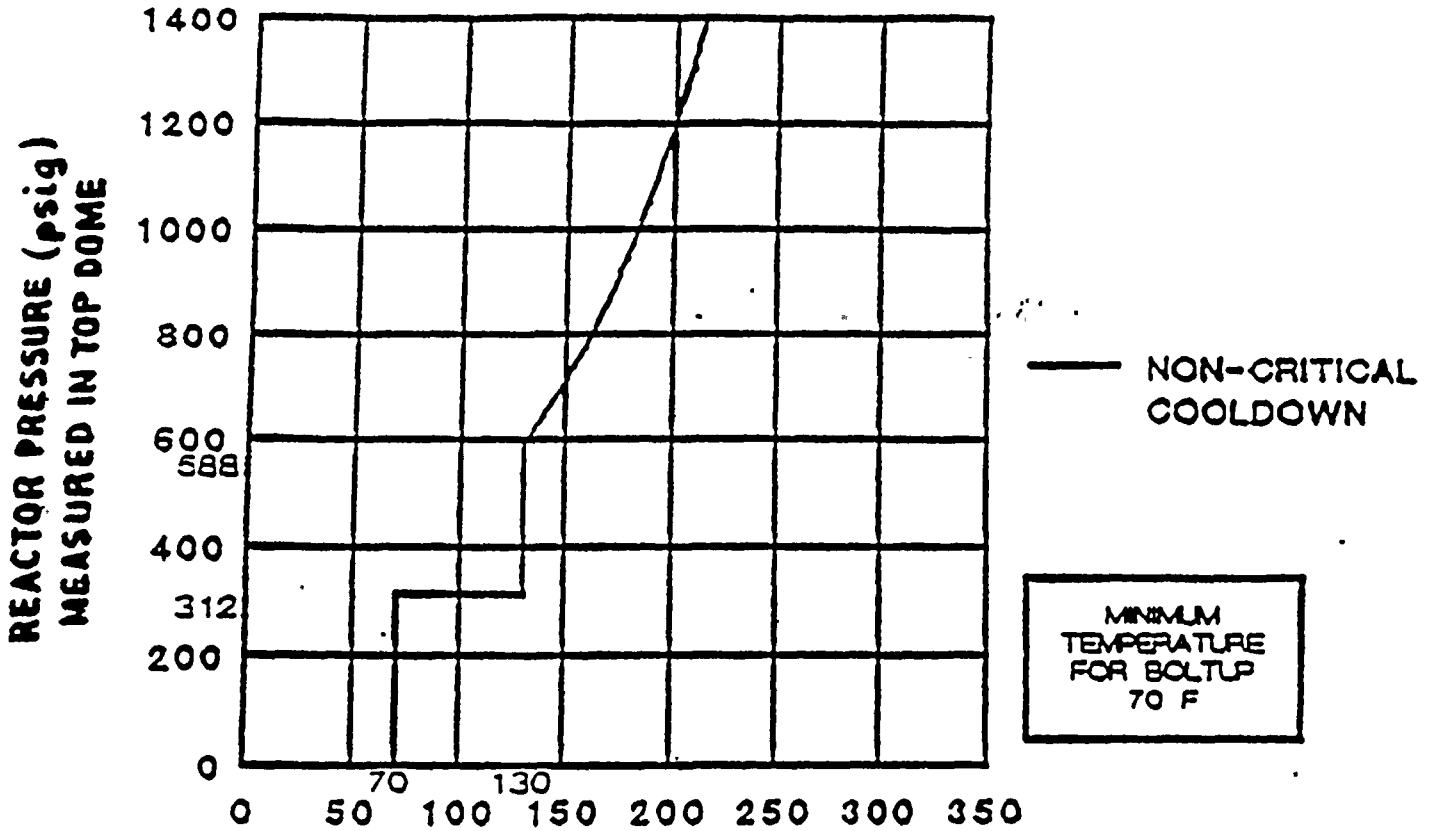
ATTACHMENT 3A (Cont)

<u>Coolant Temperature (F)</u>	<u>Steam Dome Pressure (psig)</u>
210	911
211	922
212	934
213	946
214	957
215	969
216	980
217	992
218	1004
219	1015
220	1027
221	1040
222	1054
223	1067
224	1080
225	1094
226	1107
227	1120
228	1134
229	1147
230	1161
231	1176
232	1191
233	1207
234	1222
235	1237
236	1253
237	1268
238	1284
239	1299
240	1314
241	1332
242	1349
243	1367
244	1385
245	1402
246	1420
247	1437
248	1455
249	1473
250	1490
251	1510
252	1530
253	1550
254	1570
255	1590
256	1610
257	1630



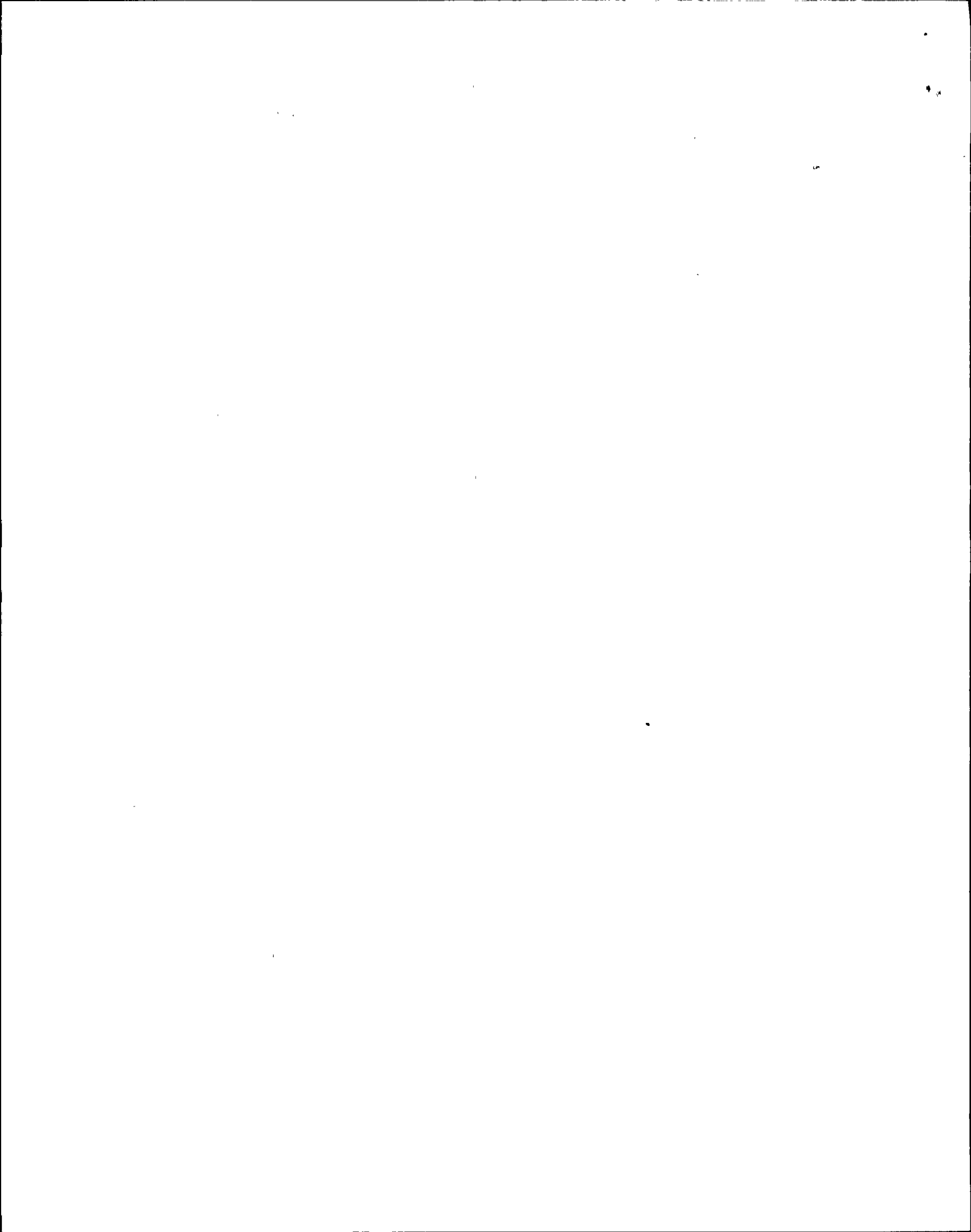
NINE MILE POINT UNIT 2

COOLDOWN CORE NOT CRITICAL



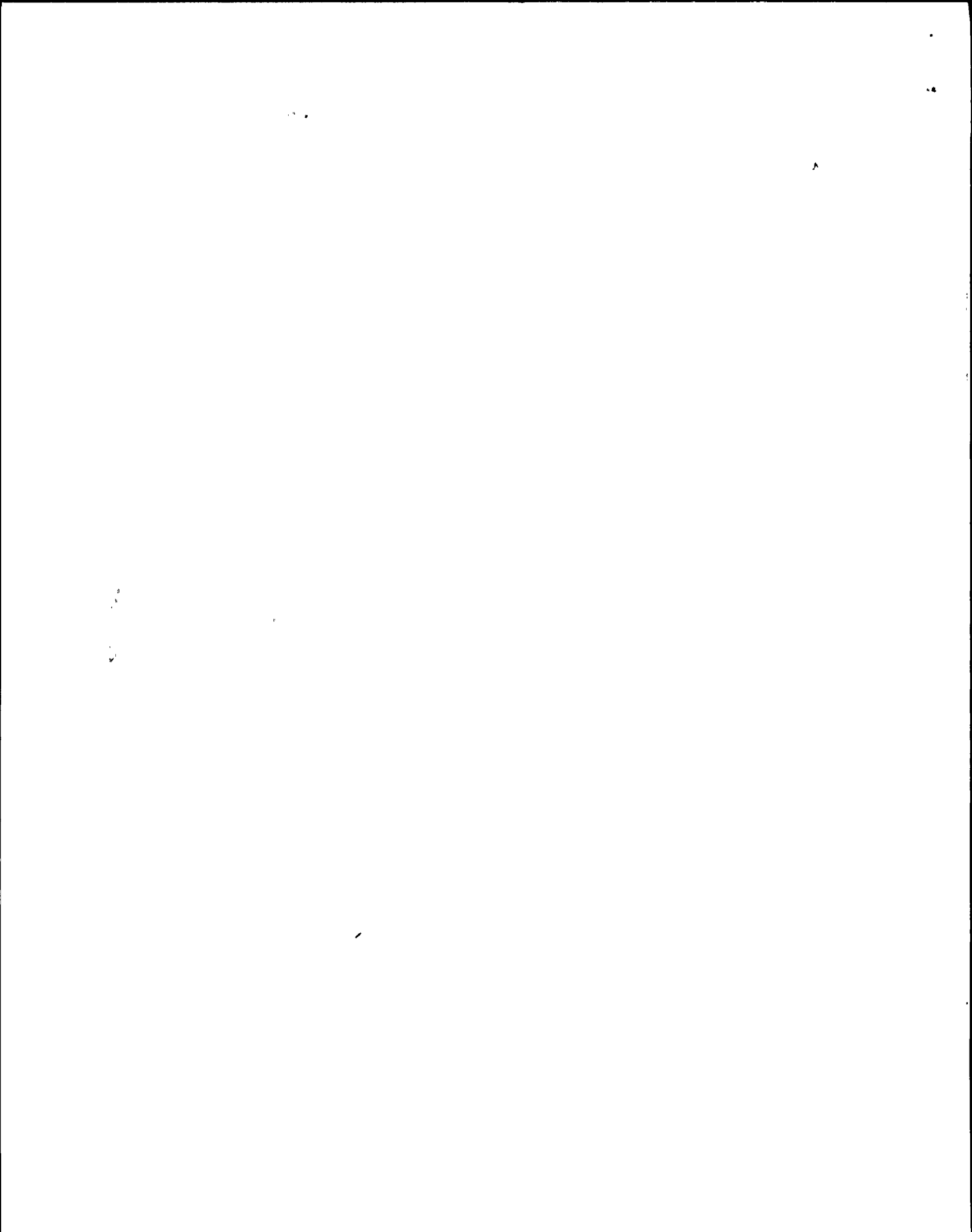
DOWNCOMER WATER TEMPERATURE(F)

MINIMUM BELTLINE DOWNCOMER WATER TEMPERATURE FOR PRESSURIZATION DURING COOLDOWN AND LOW-POWER PHYSICS TESTS (REACTOR NOT CRITICAL) (COOLING RATE ≤ 100 F/HR) FOR UP TO 12.8 EFFECTIVE FULL POWER YEARS OF OPERATION



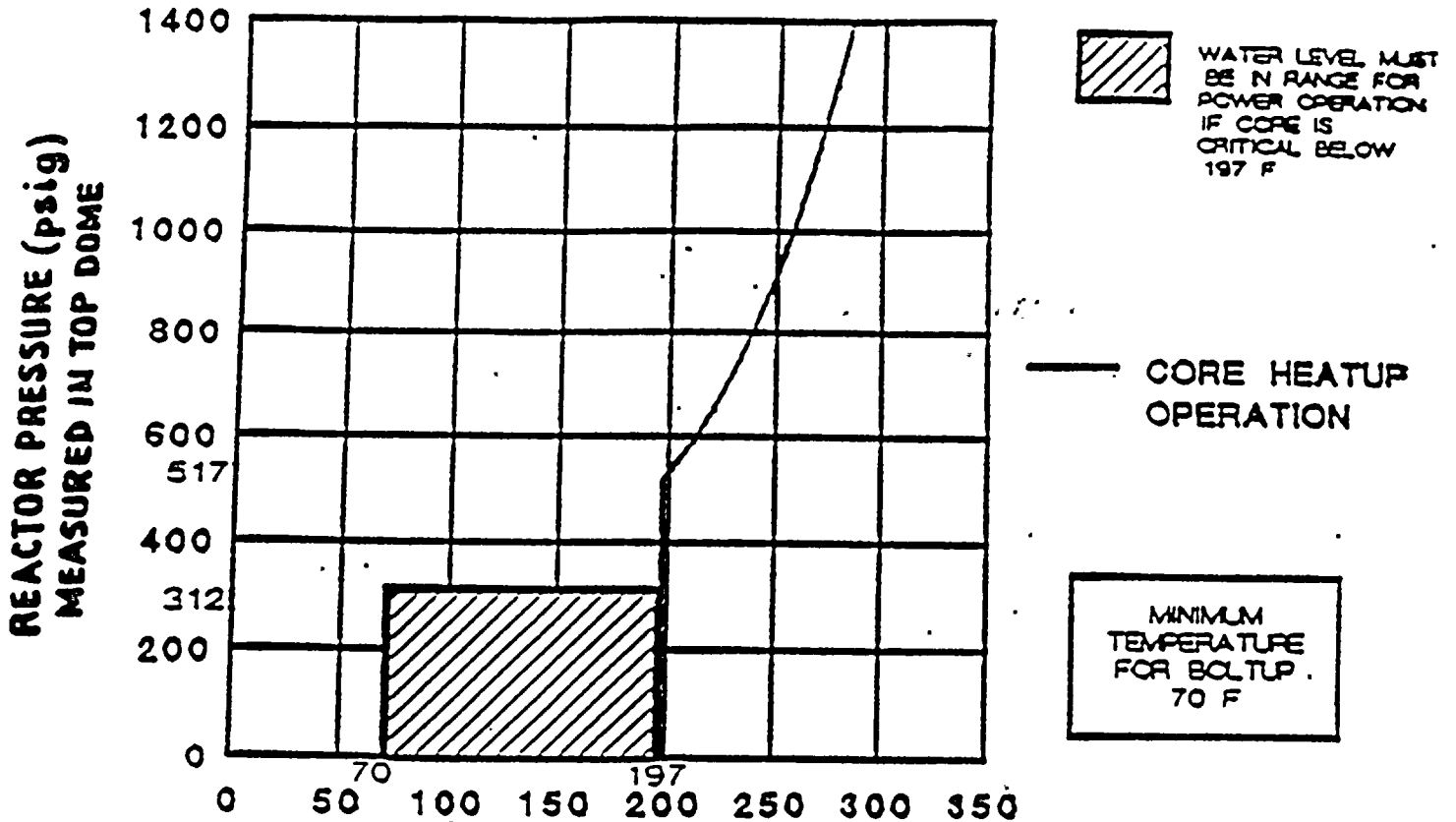
ATTACHMENT 4A
NON-CRITICAL COOLDOWN TABLE

Coolant Temperature (F)	Steam Dome Pressure (psig)	Coolant Temperature (F)	Steam Dome Pressure (psig)	Coolant Temperature (F)	Steam Dome Pressure (psig)
70	0	114	312	162	798
70	312	115	312	163	806
71	312	116	312	164	814
72	312	117	312	165	822
73	312	118	312	166	831
74	312	119	312	167	839
75	312	120	312	168	847
76	312	121	312	169	855
77	312	122	312	170	863
78	312	123	312	171	873
79	312	124	312	172	882
80	312	125	312	173	892
81	312	126	312	174	901
82	312	127	312	175	911
83	312	128	312	176	920
84	312	129	312	177	930
85	312	130	588	178	939
86	312	131	594	179	949
87	312	132	600	180	958
88	312	133	607	181	969
89	312	134	613	182	980
90	312	135	619	183	991
91	312	136	625	184	1002
92	312	137	631	185	1013
93	312	138	636	186	1023
94	312	139	642	187	1034
95	312	140	648	188	1045
96	312	141	654	189	1056
97	312	142	660	190	1067
98	312	143	667	191	1079
99	312	144	673	192	1092
100	312	145	679	193	1104
101	312	146	685	194	1117
102	312	147	691	195	1129
103	312	148	698	196	1142
104	312	149	704	197	1154
105	312	150	710	198	1167
106	312	151	717	199	1179
107	312	152	724	200	1192
108	312	153	731	201	1206
109	312	154	738	202	1221
110	312	155	746	203	1235
111	312	156	753	204	1249
112	312	157	760	205	1264
113	312	158	767	206	1278
		159	774	207	1292
		160	781	208	1307
		161	790	209	1321



ATTACHMENT 5
CORE CRITICAL CURVE - HEATUP

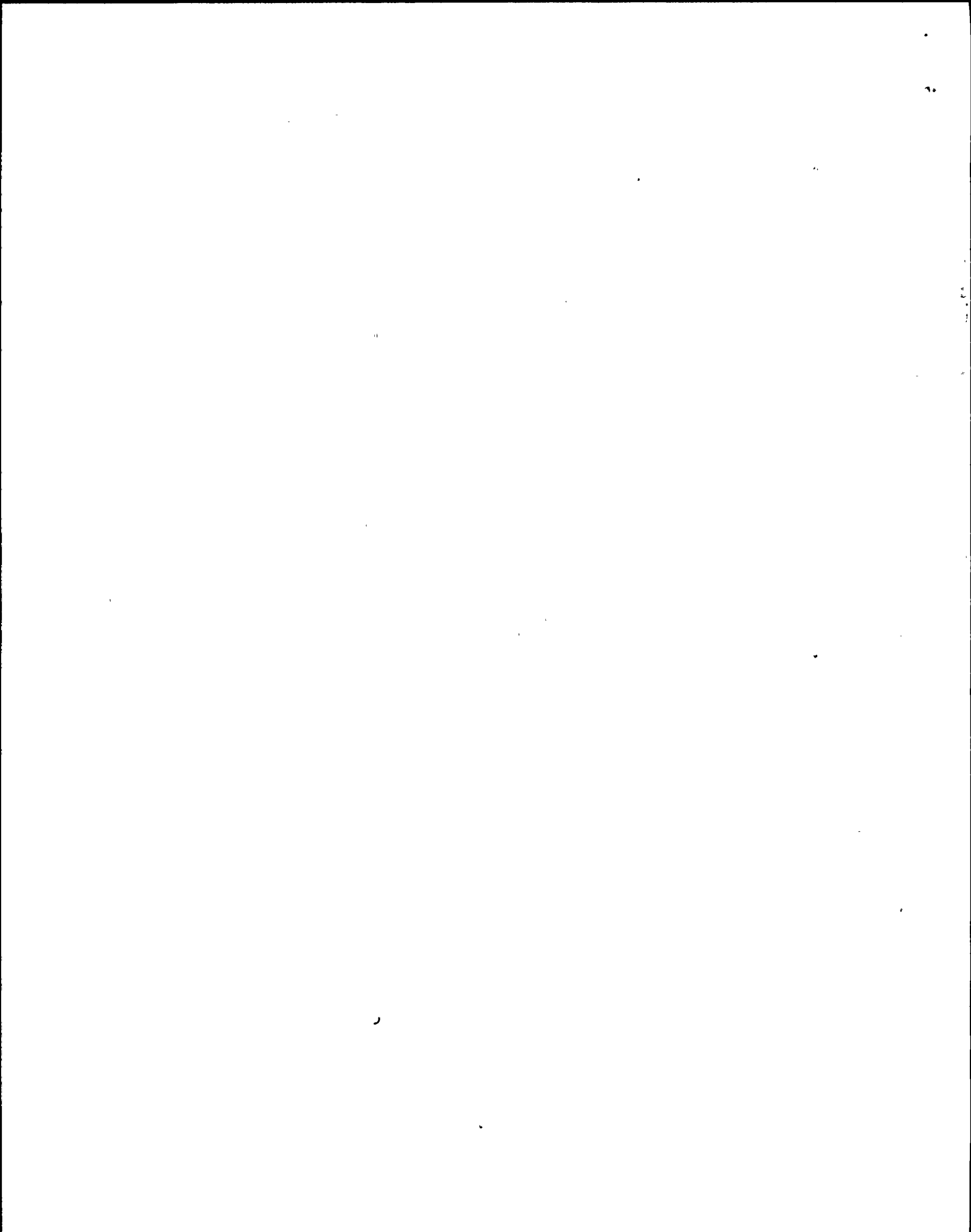
NINE MILE POINT UNIT 2
CORE OPERATION (HEATUP)



DOWNCOMER WATER TEMPERATURE(F)

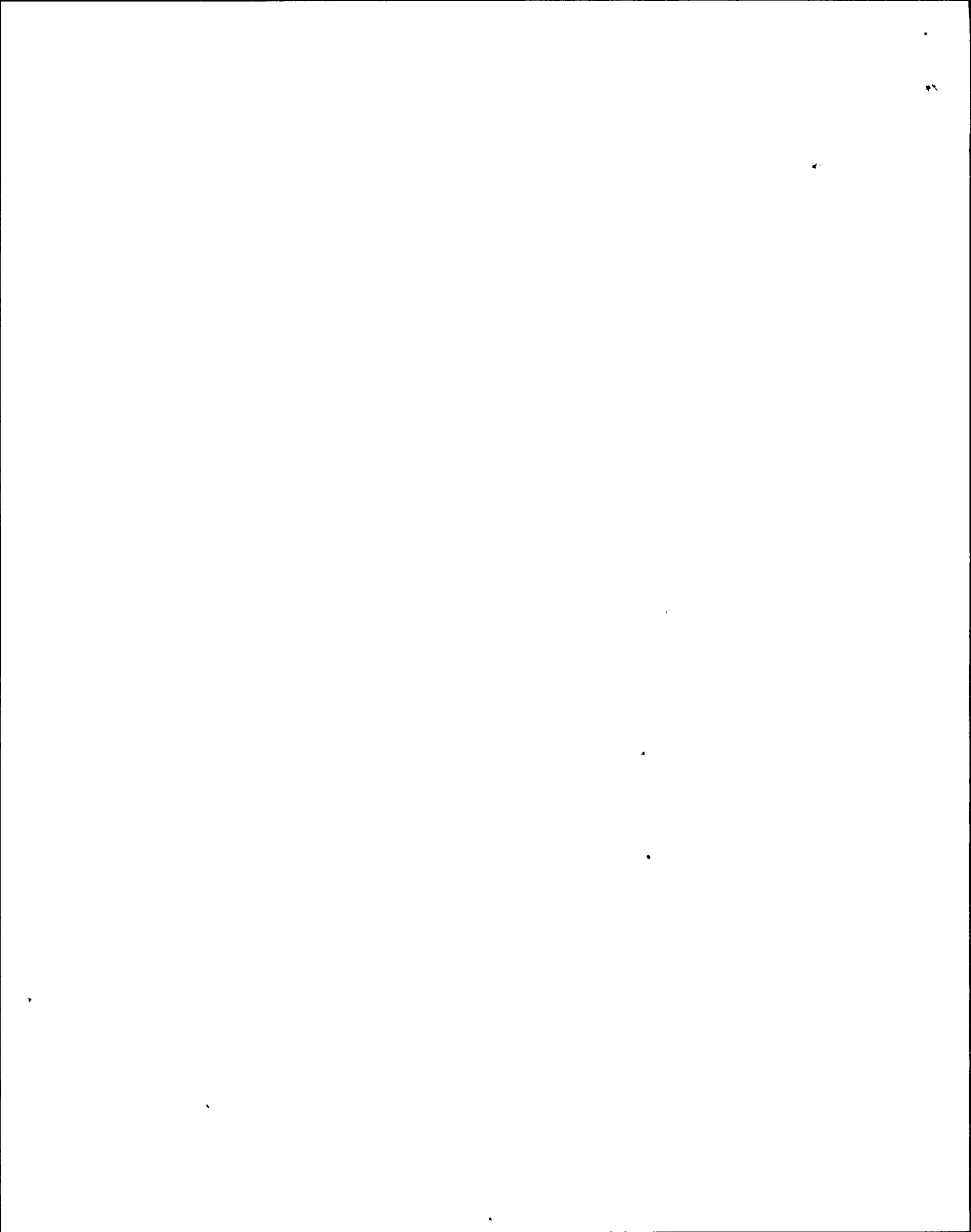
MINIMUM BELTLINE DOWNCOMER WATER TEMPERATURE FOR PRESSURIZATION DURING CORE OPERATION (CORE CRITICAL) (HEATUP AT A HEATING RATE ≤ 100 F/HR) FOR UP TO 12.8 EFFECTIVE FULL POWER YEARS OF OPERATION

NOTE: This attachment shall be used for monitoring heatup associated with Rx Startup (i.e., Rx critical or non-critical). This graph is allowed for non-critical operations because it is more conservative than the graph on Attachment 3 Non-Nuclear Heatup.



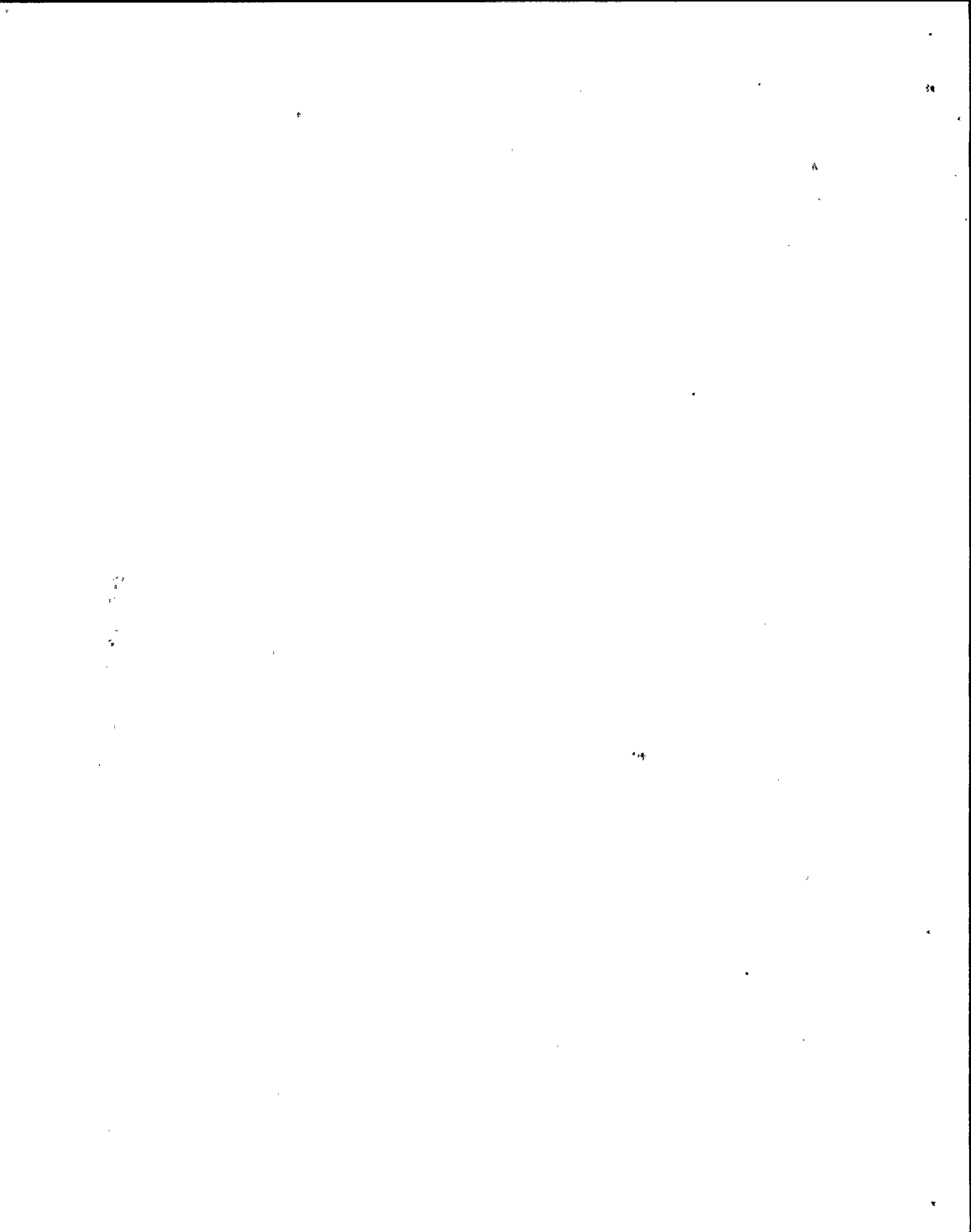
ATTACHMENT 5A
CRITICAL HEATUP TABLE

<u>Coolant Temperature (F)</u>	<u>Steam Dome Pressure (psig)</u>	<u>Coolant Temperature (F)</u>	<u>Steam Dome Pressure (psig)</u>	<u>Coolant Temperature (F)</u>	<u>Steam Dome Pressure (psig)</u>
70	0	114	312	162	312
70	312	115	312	163	312
71	312	116	312	164	312
72	312	117	312	165	312
73	312	118	312	166	312
74	312	119	312	167	312
75	312	120	312	168	312
76	312	121	312	169	312
77	312	122	312	170	312
78	312	123	312	171	312
79	312	124	312	172	312
80	312	125	312	173	312
81	312	126	312	174	312
82	312	127	312	175	312
83	312	128	312	176	312
84	312	129	312	177	312
85	312	130	312	178	312
86	312	131	312	179	312
87	312	132	312	180	312
88	312	133	312	181	312
89	312	134	312	182	312
90	312	135	312	183	312
91	312	136	312	184	312
92	312	137	312	185	312
93	312	138	312	186	312
94	312	139	312	187	312
95	312	140	312	188	312
96	312	141	312	189	312
97	312	142	312	190	312
98	312	143	312	191	312
99	312	144	312	192	312
100	312	145	312	193	312
101	312	146	312	194	312
102	312	147	312	195	312
103	312	148	312	196	312
104	312	149	312	197	517
105	312	150	312	198	521
106	312	151	312	199	526
107	312	152	312	200	531
108	312	153	312	201	536
109	312	154	312	202	541
110	312	155	312	203	547
111	312	156	312	204	552
112	312	157	312	205	558
113	312	158	312	206	563
		159	312	207	569
		160	312	208	574
		161	312	209	580



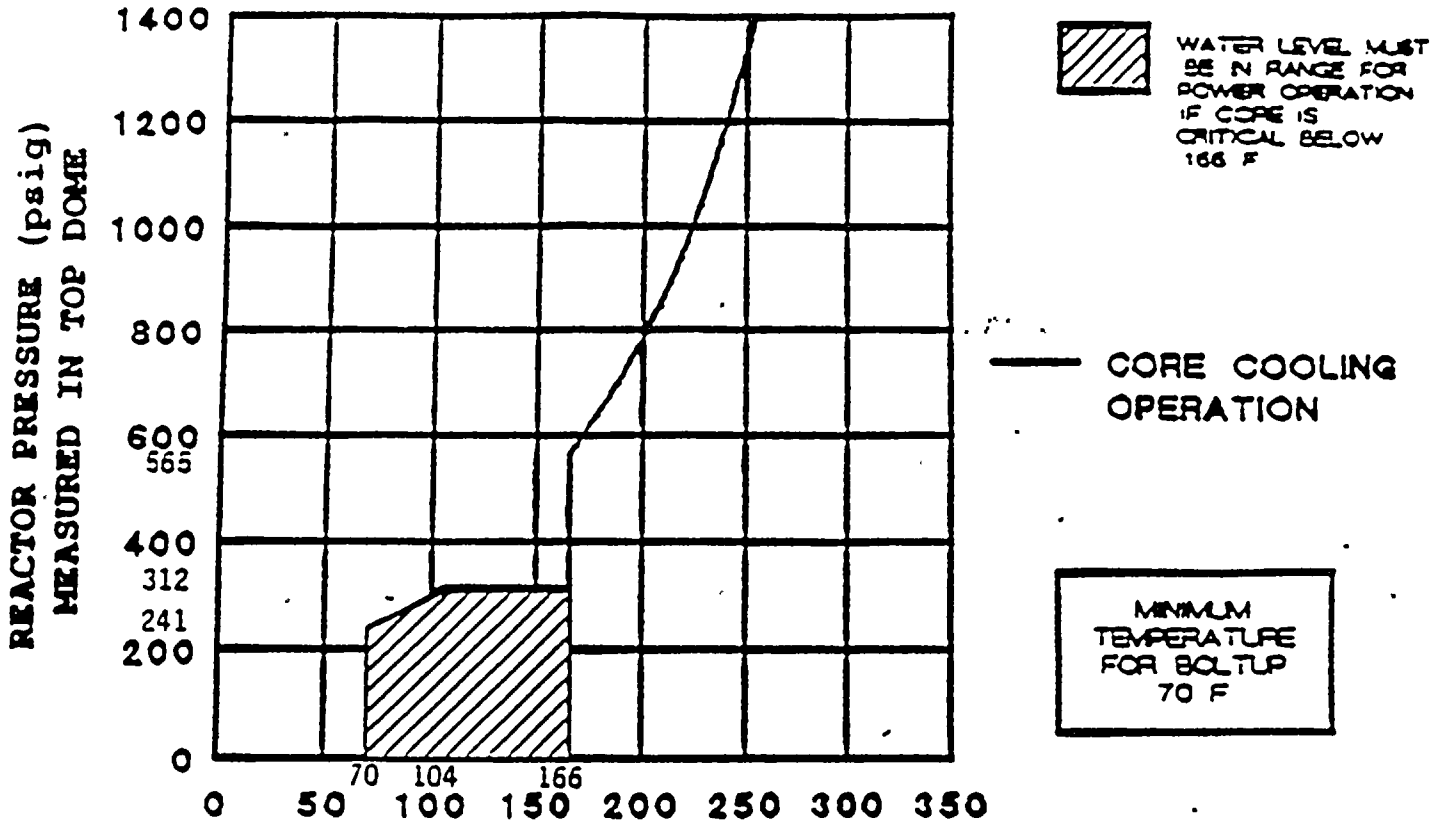
ATTACHMENT 5A (Cont)

<u>Coolant Temperature (F)</u>	<u>Steam Dome Pressure (psig)</u>	<u>Coolant Temperature (F)</u>	<u>Steam Dome Pressure (psig)</u>
210	585	258	1004
211	592	259	1015
212	598	260	1027
213	604	261	1040
214	611	262	1054
215	617	263	1067
216	624	264	1080
217	630	265	1094
218	636	266	1107
219	643	267	1120
220	649	268	1134
221	657	269	1147
222	664	270	1161
223	672	271	1176
224	679	272	1191
225	687	273	1207
226	694	274	1222
227	701	275	1237
228	709	276	1253
229	716	277	1268
230	724	278	1284
231	733	279	1299
232	741	280	1314
233	750	281	1332
234	759	282	1349
235	767	283	1367
236	776	284	1385
237	784	285	1402
238	793	286	1420
239	802	287	1437
240	810	288	1455
241	821	289	1473
242	831	290	1490
243	841	291	1510
244	851	292	1530
245	861	293	1550
246	871	294	1570
247	881	295	1590
248	891	296	1610
249	901	297	1630
250	911	298	1650
251	922	299	1671
252	934	300	1691
253	946	301	1713
254	957	302	1736
255	969	303	1759
256	980	304	1782
257	992	305	1804



ATTACHMENT 6
CORE CRITICAL CURVE - COOLDOWN

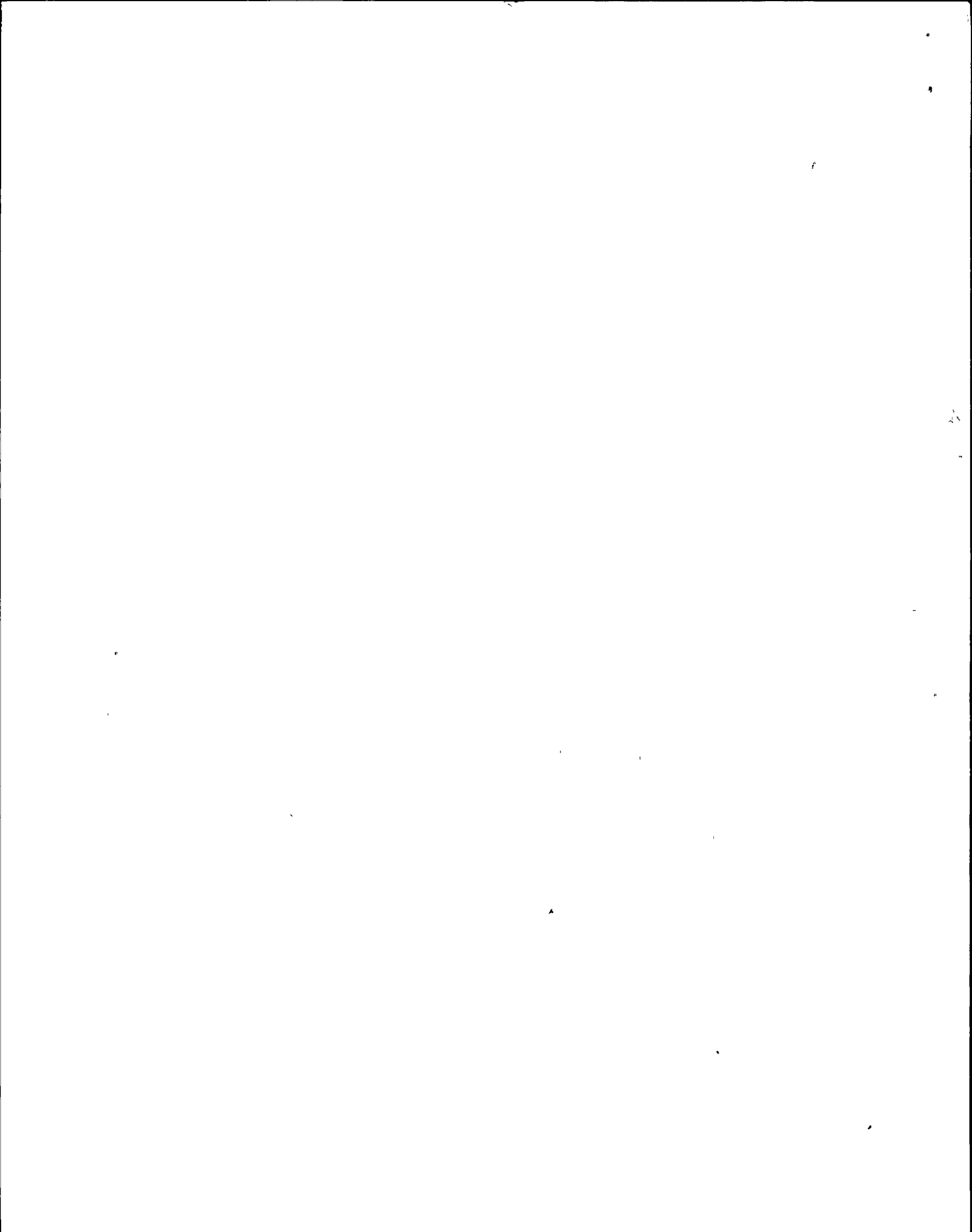
NINE MILE POINT UNIT 2
CORE OPERATION (COOLDOWN)



DOWNCOMER WATER TEMPERATURE(F)

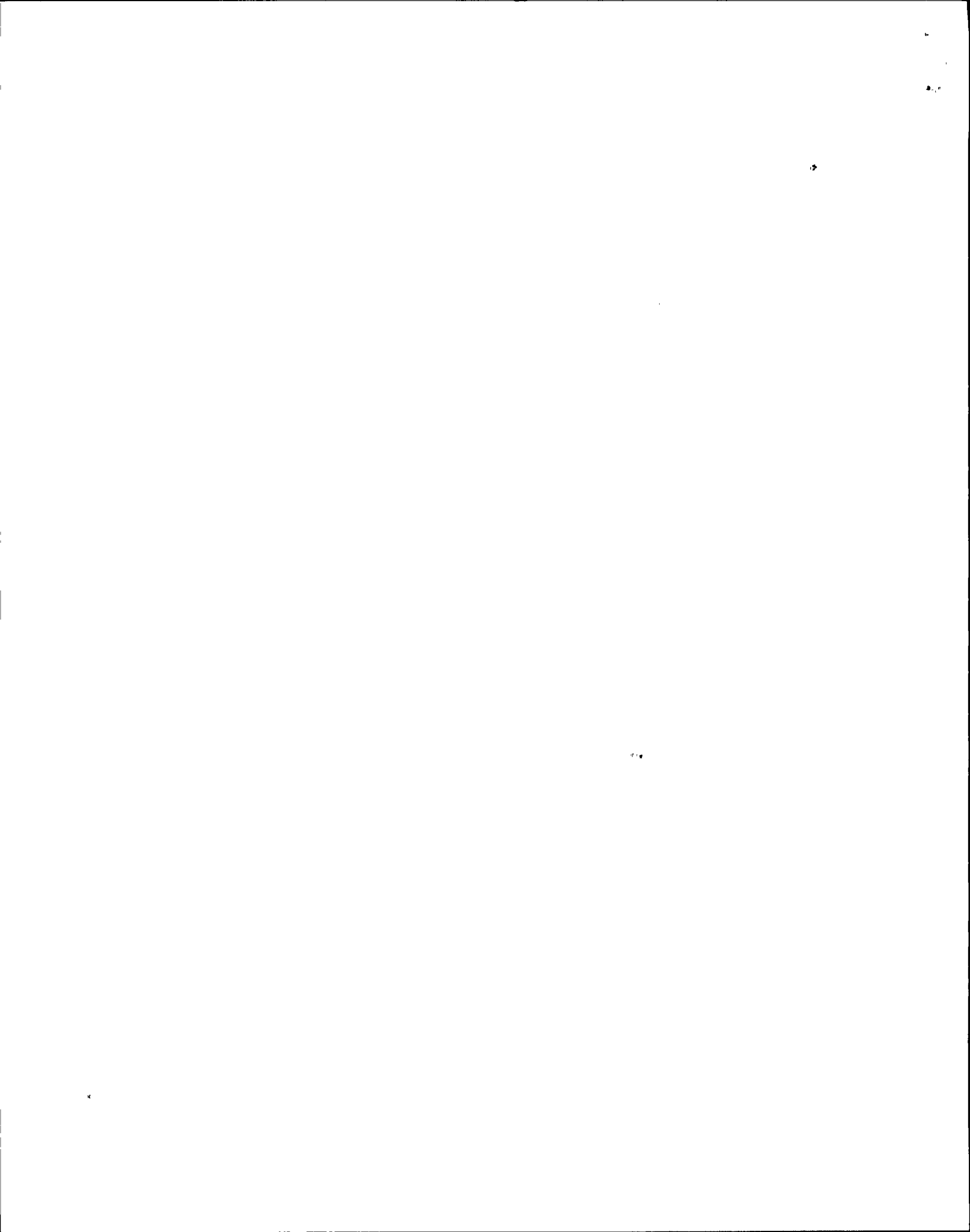
MINIMUM BELTLINE DOWNCOMER WATER TEMPERATURE FOR PRESSURIZATION DURING CORE OPERATION (CORE CRITICAL) (COOLDOWN AT A COOLING RATE ≤ 100 F/HR) FOR UP TO 12.8 EFFECTIVE FULL POWER YEARS OF OPERATION

NOTE: This attachment shall be used for monitoring Rx cooldown while the Rx is critical or non-critical. This graph is allowed for non-critical operations because it is more conservative than the graph on Attachment 4 (cooldown with Rx not critical).



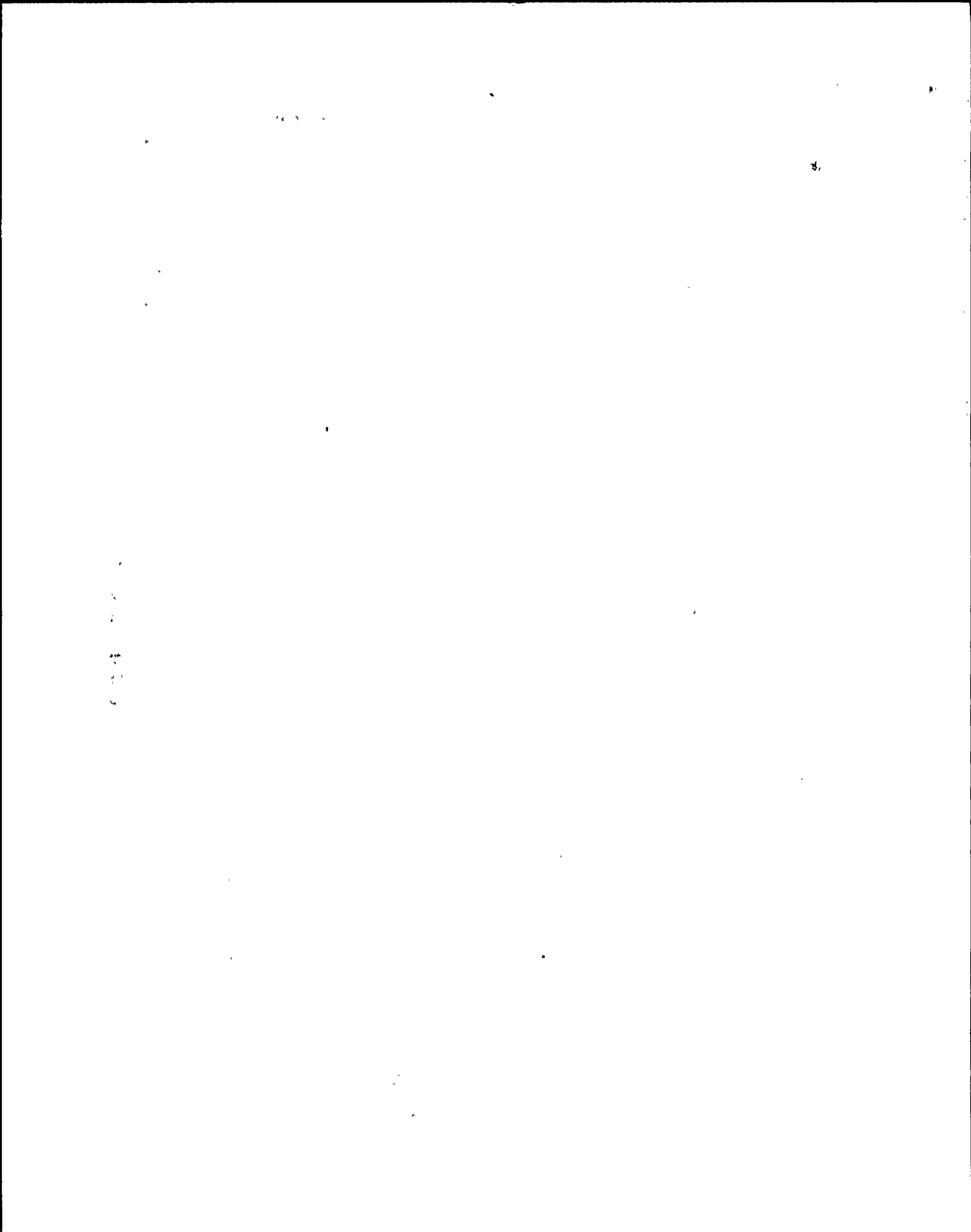
ATTACHMENT 6A
CRITICAL COOLDOWN TABLE

Coolant Temperature (F)	Steam Dome Pressure (psig)	Coolant Temperature (F)	Steam Dome Pressure (psig)	Coolant Temperature (F)	Steam Dome Pressure (psig)
70	0	114	312	162	312
70	241	115	312	163	312
71	243	116	312	164	312
72	245	117	312	165	312
73	246	118	312	166	565
74	248	119	312	167	571
75	250	120	312	168	576
76	251	121	312	169	582
77	253	122	312	170	588
78	255	123	312	171	594
79	256	124	312	172	600
80	258	125	312	173	607
81	260	126	312	174	613
82	262	127	312	175	619
83	264	128	312	176	625
84	266	129	312	177	631
85	268	130	312	178	636
86	270	131	312	179	642
87	272	132	312	180	648
88	274	133	312	181	654
89	275	134	312	182	660
90	277	135	312	183	667
91	280	136	312	184	673
92	282	137	312	185	679
93	284	138	312	186	685
94	286	139	312	187	691
95	289	140	312	188	698
96	291	141	312	189	704
97	293	142	312	190	710
98	295	143	312	191	717
99	298	144	312	192	724
100	300	145	312	193	731
101	302	146	312	194	738
102	305	147	312	195	746
103	307	148	312	196	753
104	310	149	312	197	760
105	312	150	312	198	767
106	312	151	312	199	774
107	312	152	312	200	781
108	312	153	312	201	790
109	312	154	312	202	798
110	312	155	312	203	806
111	312	156	312	204	814
112	312	157	312	205	822
113	312	158	312	206	831
		159	312	207	839
		160	312	208	847
		161	312	209	855



ATTACHMENT 6A (Cont)

<u>Coolant Temperature (F)</u>	<u>Steam Dome Pressure (psig)</u>
210	863
211	873
212	882
213	892
214	901
215	911
216	920
217	930
218	939
219	949
220	958
221	969
222	980
223	991
224	1002
225	1013
226	1023
227	1034
228	1045
229	1056
230	1067
231	1079
232	1092
233	1104
234	1117
235	1129
236	1142
237	1154
238	1167
239	1179
240	1192
241	1206
242	1221
243	1235
244	1249
245	1264
246	1278
247	1292
248	1307
249	1321
250	1335
251	1352
252	1368
253	1384
254	1401
255	1417
256	1433
257	1450



ATTACHMENT 7
HEATUP/COOLDOWN DATA SHEET

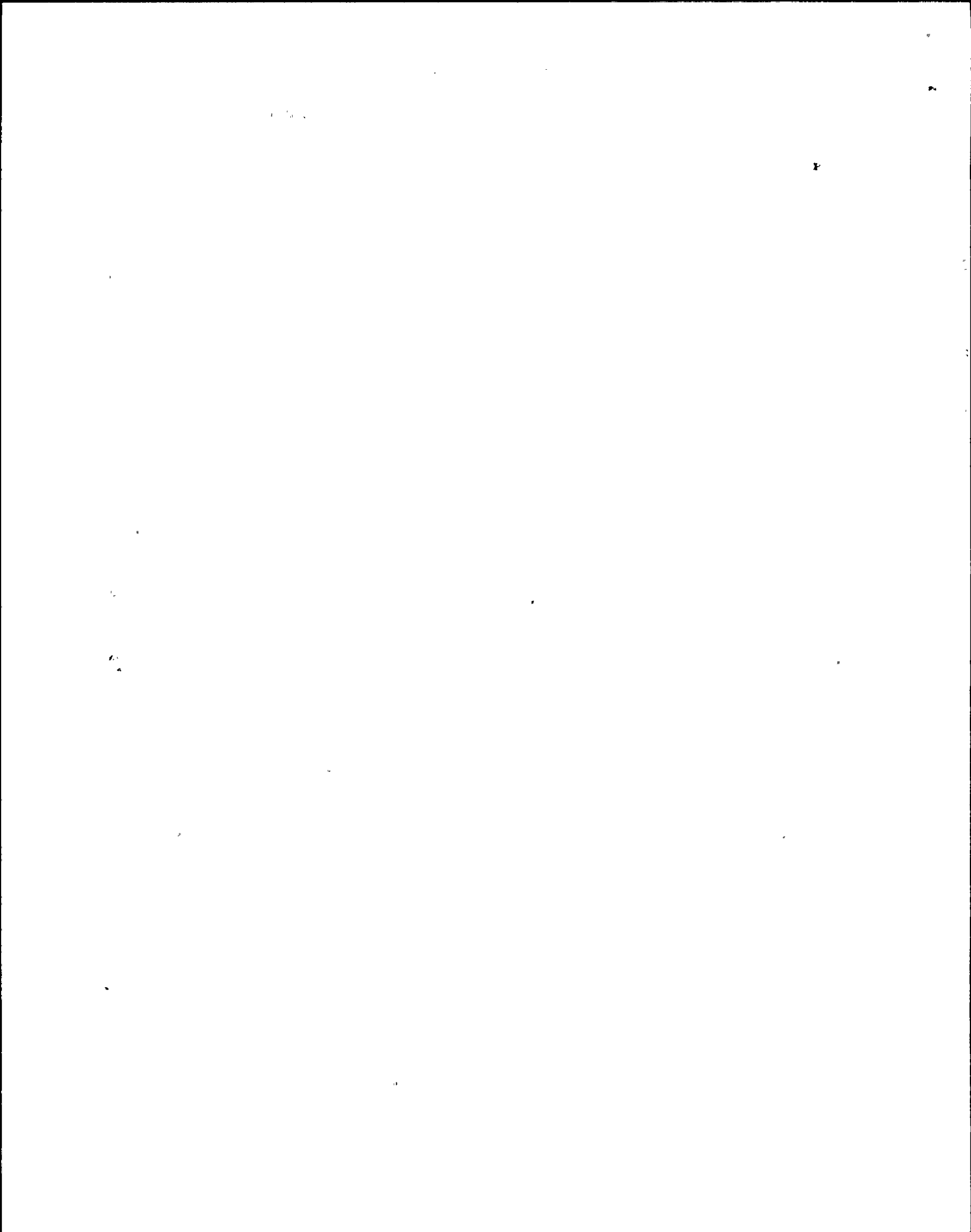
Section Performed (circle one) 8.1 8.2 8.3 8.4

- Date 8/13/19 Page 1 of 1

117
8/13/19
2

Time	Interval (frac of an hr)	RPV Press	Press Instr Used	*Reactor Coolant Temperature				H/U or C/D Rate	H/U - C/D rate & Press/Temp Acceptable per Step 8.1.4, 8.2.4, 8.3.4 or 8.4.4		Initial	Date	
				Sat Temp (Att 8)	Recirc Loop Temp	RHR Loop Temp			SAT	UNSAT			
					Loop A	Loop B	Loop A	Loop B					
0800		415	FWS PA101	467	465	463			0/C/D	✓		Res	8/13
0810		417	FWS PA101	460	463				13/C/D	✓		Res	8/13
0820		412	FWS PA101	462	460				14/C/D	✓		Res	8/13
0830		414	FWS PA101	460	455				30/C/D	✓		Res	8/13
0840		435	FWS PA101	456	453				12/C/D	✓		Res	8/13
0850		421	FWS PA101	453	450				18/C/D	✓		Res	8/13
0900		408	FWS PA101	450	448				13/C/D	✓		Res	8/13
0910		388	FWS PA101	446	442				36/C/D	✓		Res	8/13
0920		360	FWS PA101	438	435				42/C/D	✓		Res	8/13
0930		343	FWS PA101	432	430				30/C/D	✓		Res	8/13
0940		319	FWS PA101	428	425				39/C/D	✓		Res	8/13
0950		277	FWS PA101	421	418				42/C/D	✓		Res	8/13
1000		276	FWS PA101	414	411				41/C/D	✓		Res	8/13
1010		258	FWS PA101	408	406				30/C/D	✓		Res	8/13
1020		241	FWS PA101	403	400				34/C/D	✓		Res	8/13
1030		223	FWS PA101	396	393				42/C/D	✓		Res	8/13

*Temperature corresponding to Downcomer temperature in accordance with Step 4.6.



ATTACHMENT 7
HEATUP/COOLDOWN DATA SHEET

Section Performed (circle one)

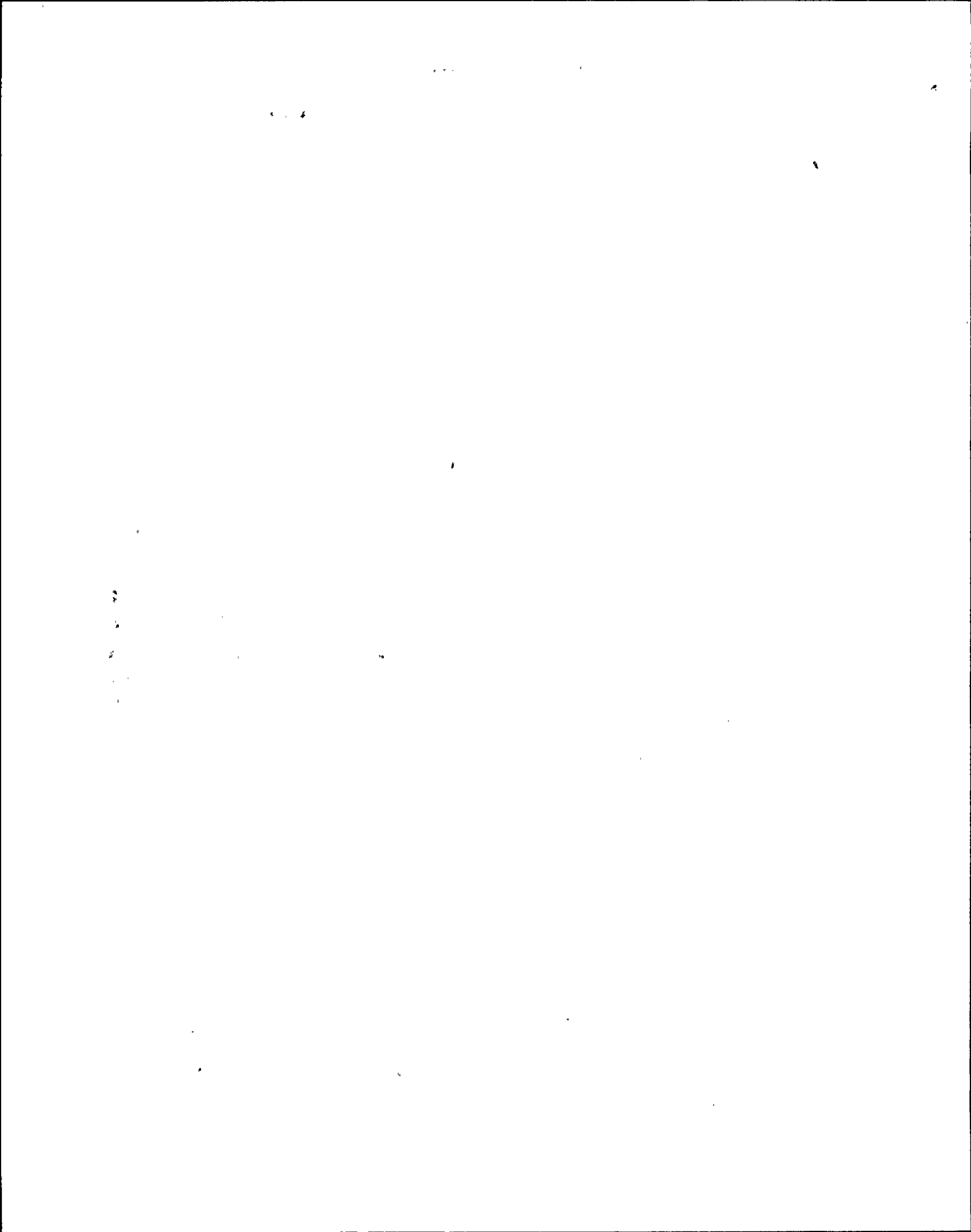
8.1 8.2 8.3 8.4

Date 8/13/61

Page 1 of 1

Time	Interval (frac of an hr)	RPV Press	Press Instr Used	*Reactor Coolant Temperature				H/U or C/D Rate	H/U - C/D rate & Press/Temp Acceptable per Step 8.1.4, 8.2.4, 8.3.4 or 8.4.4		Initial	Date	
				Sat Temp (Att '8)	Recirc Loop Temp		RHR Loop Temp		SAT	UNSAT			
					Loop A	Loop B	Loop A						Loop B
1040		201	FWS7A01	388	385			28/C/D	✓		R07	8/13	
1050		187	FWS7A01	383	380			30/C/D	✓		R07	8/13	
1100		175	FWS7A01	378	374			30/C/D	✓		R07	8/13	
1110		167	FWS7A01	374	370			28/C/D	✓		R07	8/13	
1120		162	FWS7A01	371	368			13/C/D	✓		R07	8/13	
1130		156	FWS7A01	368	364			27/C/D	✓		R07	8/13	
1140		151	FWS7A01	367	363			6/C/D	✓		R07	8/13	
1150		147	FWS7A01	365	360			18/C/D	✓		R07	8/13	
1200		138	FWS7A01	360	356			29/C/D	✓		R07	8/13	
1210		127	FWS7A01	354	351			30/C/D	✓		R07	8/13	
1220		121	FWS7A01	351	348			10/C/D	✓		R07	8/13	
1230		116	FWS7A01	348	345			15/C/D	✓		R07	8/13	
1240		111	FWS7A01	345	342			15/C/D	✓		R07	8/13	
1250		109	FWS7A01	344	340			12/C/D	✓		R07	8/13	
1300		110	FWS7A01	344	341			6/H/U	✓		R07	8/13	
1310		107	FWS7A01	343	339			12/C/D	✓		R07	8/13	

*Temperature corresponding to Downcomer temperature in accordance with Step 4.6.



ATTACHMENT 7
HEATUP/COOLDOWN DATA SHEET

Section Performed (circle one)

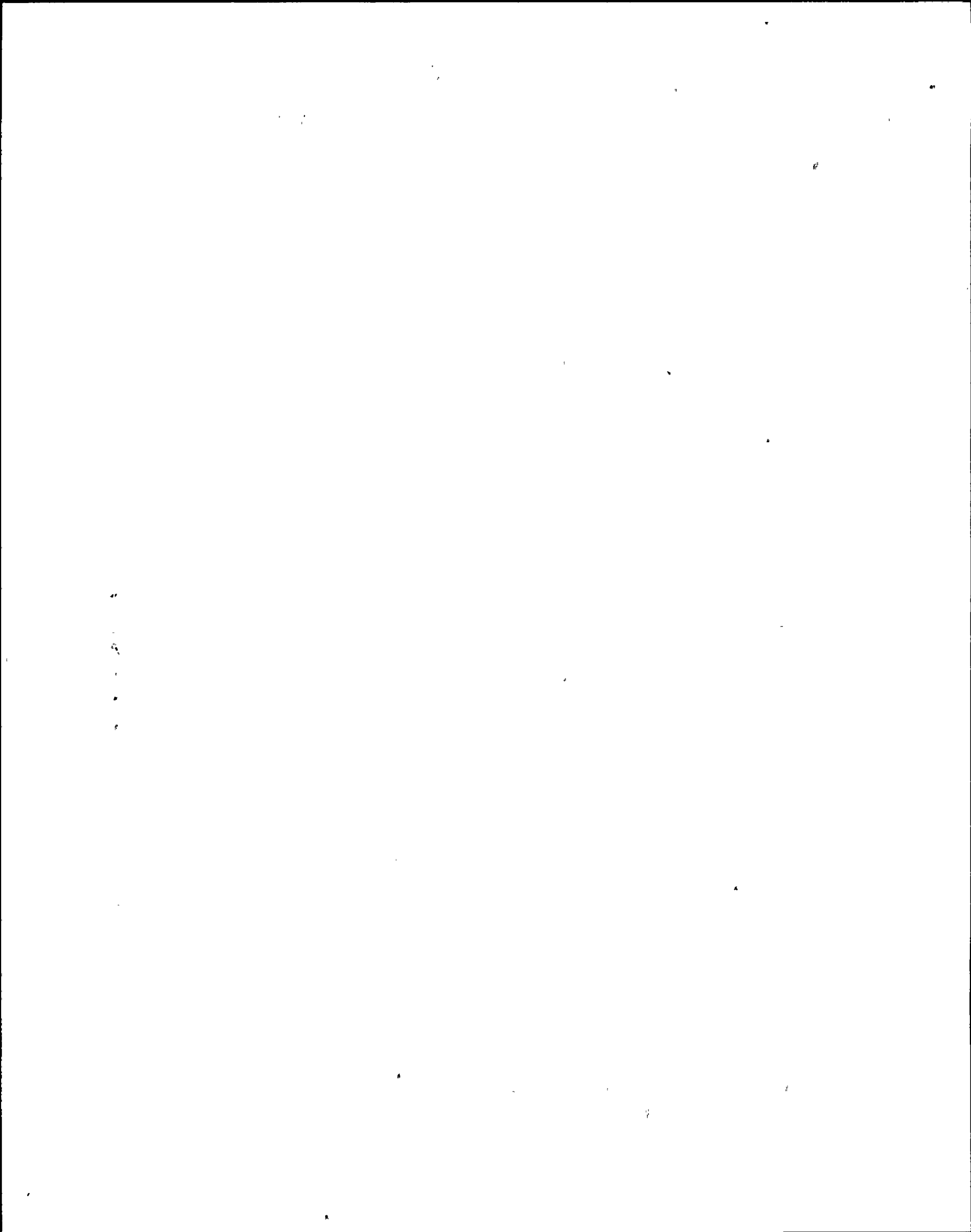
8.1 8.2 8.3 8.4

Date 8/13/13

Page 1 of 1

Time	Interval (frac of an hr)	RPV Press	Press Instr Used	*Reactor Coolant Temperature				H/U or C/D Rate	H/U - C/D rate & Press/Temp Acceptable per Step 8.1.4, 8.2.4, 8.3.4 or 8.4.4		Initial	Date	
				Sat Temp (Att 8)	Recirc Loop Temp Loop A	Recirc Loop Temp Loop B	RHR Loop Temp Loop A		RHR Loop Temp Loop B	SAT			UNSAT
1320		108	Fast Press	343	339				9/10	✓		Red	8/13
1330		112	Fast Press	345	343				9/10	✓		Red	8/13
1340		113	Fast Press	346	343				9/10	✓		Red	8/13
1350		114	Fast Press	347	343				9/10	✓		Red	8/13
1400		115	Fast Press	346	343				9/10	✓		Red	8/13
1410		110	Fast Press	344	341				12/10	✓		Red	8/13
1420		108	Fast Press	343	339				12/10	✓		Red	8/13
1430		106	Fast Press	341	338				9/10	✓		Red	8/13
1440		104	Fast Press	340	337				9/10	✓		Red	8/13
1450		104	Fast Press	340	336				9/10	✓		Red	8/13
1500	1/2	106	Fast Press	341	335				9/10	✓		Red	8/13
1510	1/2	110	Fast Press	344	336				9/10	✓		Red	8/13
1520		84	Fast Press	328	336				19/10	✓	FAURE	Red	8/13
1530		75	Fast Press	320	328				9/10	✓		Red	8/13
1545		65	Fast Press	312	322				9/10	✓		Red	8/13
1530		58	Fast Press	295	316				27/10	✓	X LORE	Red	8/13

*Temperature corresponding to Downcomer temperature in accordance with Step 4.6.



ATTACHMENT 7
HEATUP/COOLDOWN DATA SHEET

Section Performed (circle one)

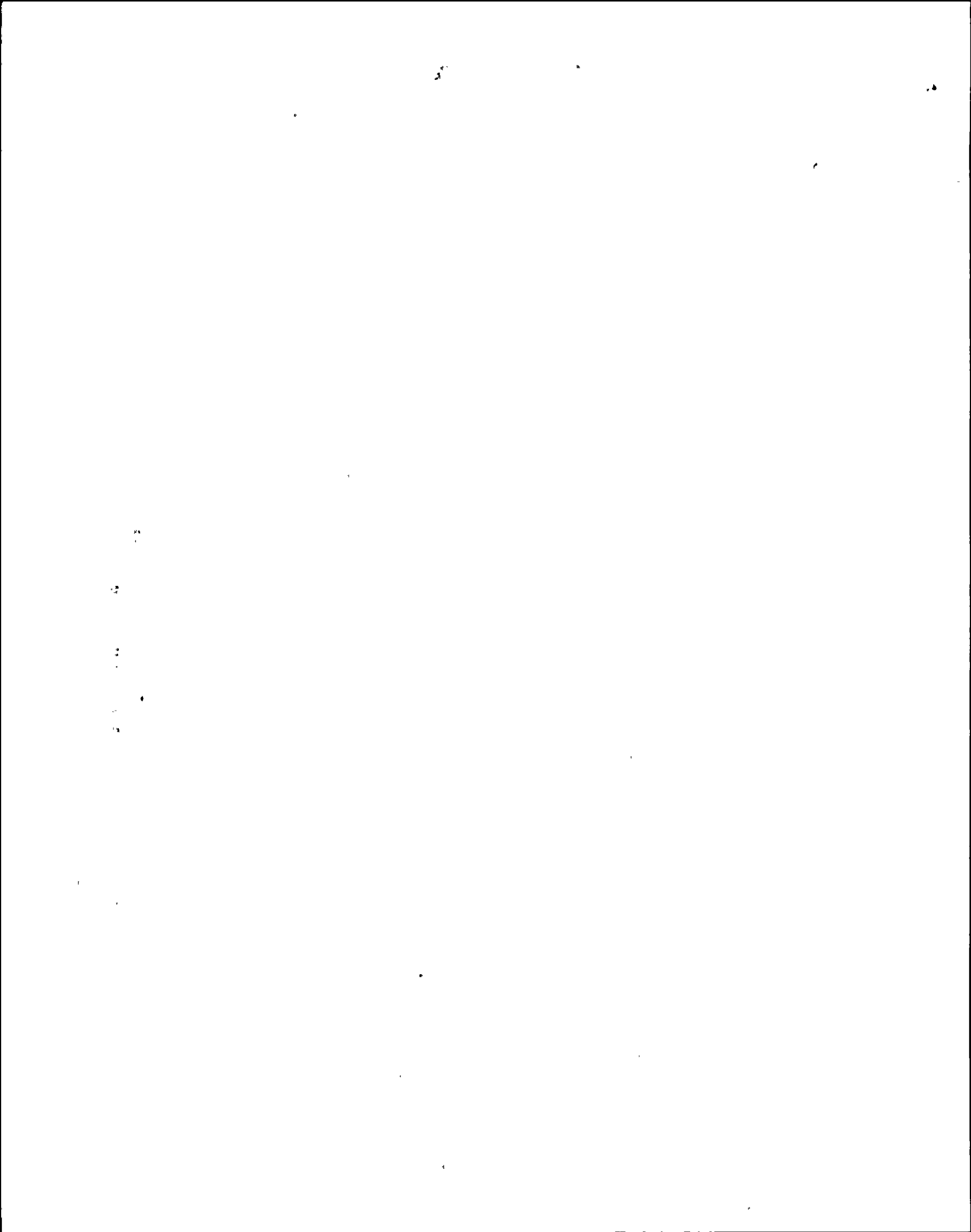
8.1 8.2 8.3 8.4

Date 5/13

Page 1 of 1

Time	Interval (frac of an hr)	RPV Press	Press Instr Used	*Reactor Coolant Temperature				H/U or C/D Rate	H/U - C/D rate & Press/Temp Acceptable per Step 8.1.4, 8.2.4, 8.3.4 or 8.4.4		Initial	Date	
				Sat Temp (Att 8)	Recirc Loop Temp Loop A	Loop B	RHR Loop Temp Loop A		Loop B	SAT			UNSAT
1535		40	FWSP101	287	260				44/C/D	✓		200	8/13
1540		38	FWSP101	285	265				27/C/D	✓		200	8/13
1545		38	FWSP101	285	265				0/C/D	✓		200	8/13
1550		37	FWSP101	284	263				24/C/D	✓		200	8/13
1555		36	FWSP101	282	261				27/C/D	✓		200	8/13
1600		35	FWSP101	281	259				21/C/D	✓		200	8/13
1605		34	FWSP101	279	258				12/C/D	✓		200	8/13
1610		34	FWSP101	279	258				0/C/D	✓		200	8/13
1615		34	FWSP101	279	257				12/C/D	✓		200	8/13
1620		34	FWSP101	278	257				6/C/D	✓		200	8/13
1625		32	FWSP101	277	255				27/C/D	✓		200	8/13
1630		31	FWSP101	276	254				12/C/D	✓		200	8/13
1635		31	FWSP101	276	254				6/C/D	✓		200	8/13
1640		30	FWSP101	274	252				27/C/D	✓		200	8/13
1645		29	FWSP101	273	251				12/C/D	✓		200	8/13
1650		28	FWSP101	271	250				12/C/D	✓		200	8/13

*Temperature corresponding to Downcomer temperature in accordance with Step 4.6.



ATTACHMENT 7
HEATUP/COOLDOWN DATA SHEET

Section Performed (circle one)

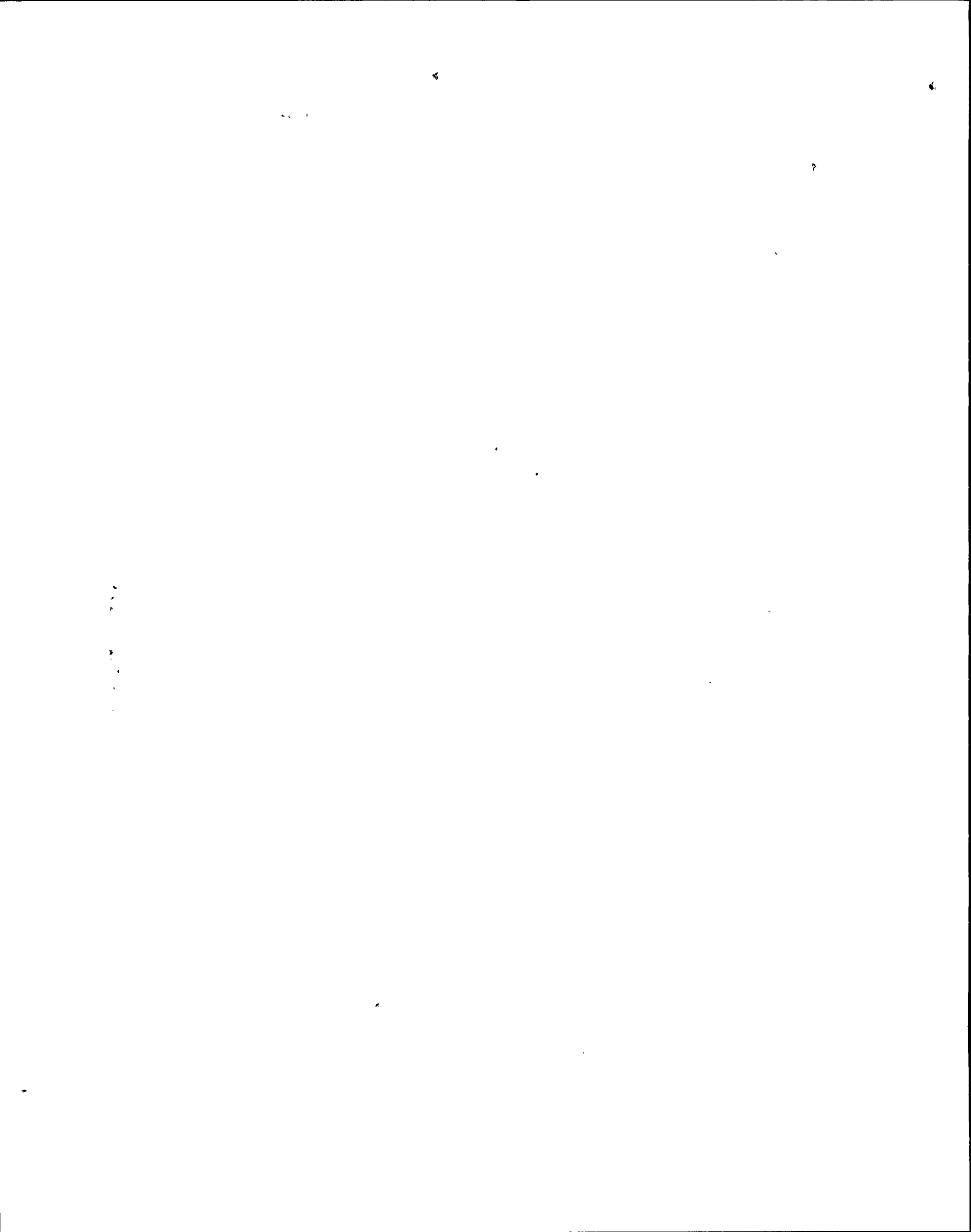
8.1 8.2 8.3 8.4

Date 8/13/91 Page 1 of 1

Time	Interval (frac of an hr)	RPV Press	Press Instr Used	*Reactor Coolant Temperature					H/U or C/D Rate	H/U - C/D rate & Press/Temp Acceptable per Step 8.1.4, 8.2.4, 8.3.4 or 8.4.4		Initial	Date
				Sat Temp (Att 8)	Recirc Loop Temp		RHR Loop Temp			SAT	UNSAT		
					Loop A	Loop B	Loop A	Loop B					
1700	1/4	24	FWS/PA101	265	244				27%CD	✓		Recd	8/13
1715	1/4	20	FWS/PA101	259	235				34%CD	✓		Recd	8/13
1730	1/4	16	FWS/PA101	251	223				48%CD	✓		Recd	8/13
1745	1/4	12	FWS/PA101	244	216				28%CD	✓		Recd	8/13
1800	1/4	10	FWS/PA101	240	212				14%CD	✓		Recd	8/13
1815	1/4	8	FWS/PA101	235	209				19%CD	✓		Recd	8/13
1830	1/4	6.75	FWS/PA101	231	202				28%ACD	✓		Recd	8/13/91
1845	1/4	5.62	FWS/PA101	228	199				12%ACD	✓		Recd	8/13/91
1900	1/4	4.12	FWS/PA101	225	194				20%ACD	✓		Recd	8/13/91
1915	1/4	3.00	FWS/PA101	222	189				20%ACD	✓		Recd	8/13/91
1930	1/4	2.62	FWS/PA101	219	192				12%ACD	✓		Recd	8/13/91
1945	1/4	3.00	FWS/PA101	222	184				32%ACD	✓		Recd	8/13/91
2000	1/4	3.37	FWS/PA101	222	179				20%ACD	✓		Recd	8/13/91
2015	1/4	3.75	FWS/PA101	224	172				28%ACD	✓		Recd	8/13/91
2030	1/4	3.75	FWS/PA101	224	166				24%ACD	✓		Recd	8/13/91
* 2100	1/2	3.75	FWS/PA101	224	157			18°	25%ACD	✓		Recd	8/13/91

*Temperature corresponding to Downcomer temperature in accordance with Step 4.6.

** WENT FROM EVERY 15 minutes to every 30 minutes for readings per SSS. *8/13/91*



ATTACHMENT 7
HEATUP/COOLDOWN DATA SHEET

Section Performed (circle one)

8.1 8.2 8.3 8.4

Date 8/3/91 Page 1 of 1

Time	Interval (frac of an hr)	RPV Press	Press Instr Used	*Reactor Coolant Temperature				H/U or C/D Rate*	H/U - C/D rate & Press/Temp Acceptable per Step 8.1.4, 8.2.4, 8.3.4 or 8.4.4		Initial	Date	
				Sat Temp (Att 8)	Recirc Loop Temp		RHR Loop Temp		SAT	UNSAT			
					Loop A	Loop B	Loop A	Loop B					
2130	1/2	3.75	FWS PA101	224	152				20%/HR CD	✓		MB	8/13/91
2200	1/2	3.75	FWS PA101	224	146				20%/HR CD	✓		MB	8/13/91
2230	1/2	3.75	FWS PA101	224	141				20%/HR CD	✓		MB	8/13/91
2300	1/2	3.75	FWS PA101	224	137				8%/HR CD	✓		MB	8/13/91
2330	1/2	3.75	FWS PA101	224	136				2%/HR CD	✓		MB	8/13/91
0000	1/2	3.75	FWS PA101	224	135				3%/HR CD	✓		MB	8/14/91
0030	1/2	3.75	FWS PA101	224	134				6%/HR CD	✓		MB	8/14/91
0100	1/2	3.75	FWS PA101	224	132				4%/HR CD	✓		MB	8/14/91
0130	1/2	3.75	FWS PA101	224	132				0	✓		ED	8-14-91
0200	1/2	4.12	FWS PA101	225	132				0	✓		ED	8-14-91
0230	1/2	3.75	FWS PA101	224	129				6%/HR CD	✓		MB	8-14-91
0300	1/2	3.75	FWS PA101	224	128				7%/HR CD	✓		MB	8-14-91
0330	1/2	3.75	FWS PA101	224	127				7%/HR CD	✓		MB	8-14-91
0400	1/2	3.75	FWS PA101	224	125				4%/HR CD	✓		MB	8-14-91
0430	1/2	3.75	FWS PA101	224	125				0%/HR CD	✓		MB	8-14-91
0500	1/2	3.75	FWS PA101	224	125				0%/HR CD	✓		MB	8-14-91

*Temperature corresponding to Downcomer temperature in accordance with Step 4.6.

ATTACHMENT 7
HEATUP/COOLDOWN DATA SHEET

Section Performed (circle one)

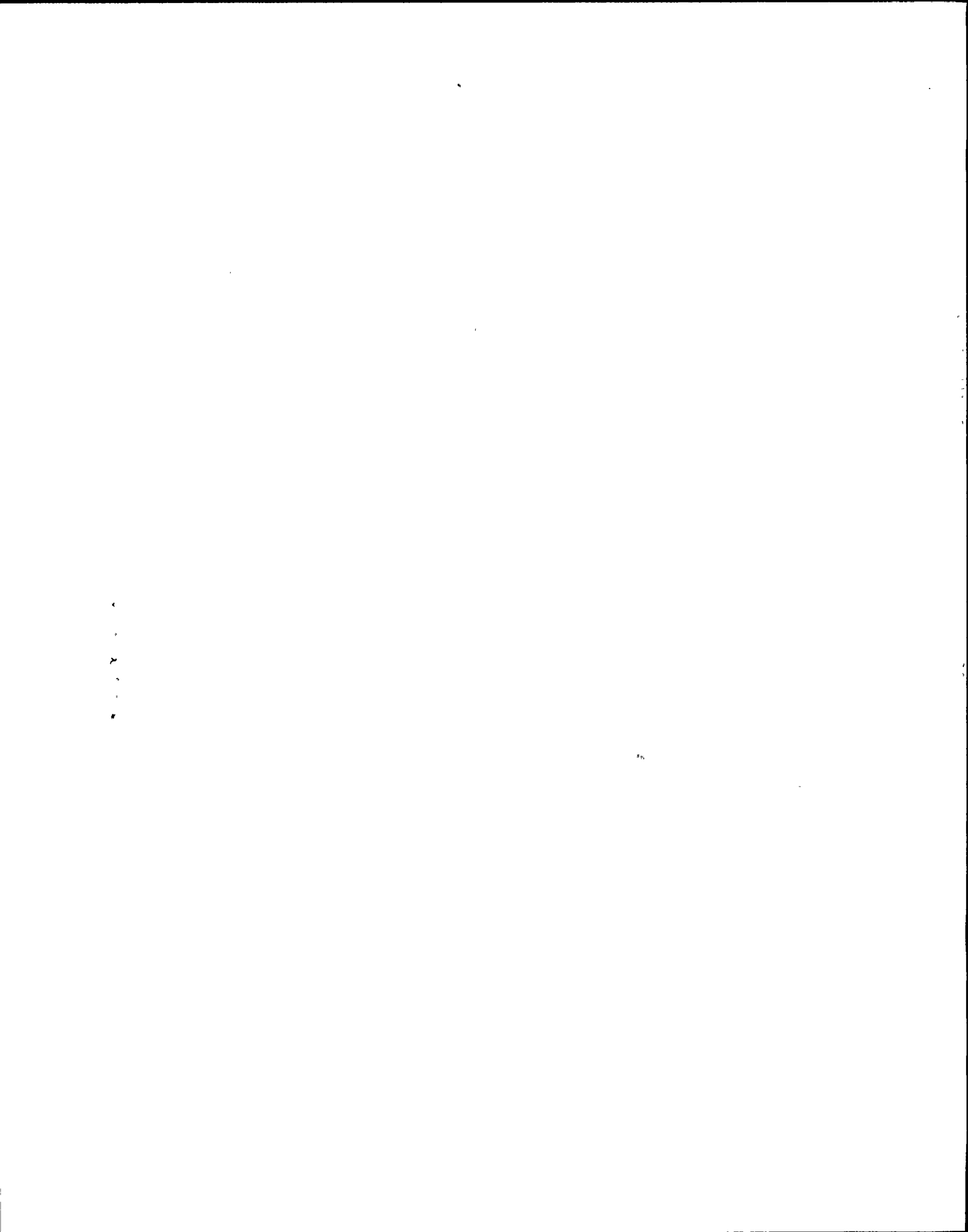
8.1 8.2 8.3 8.4

Date 8/14/91

Page 1 of 1

Time	Interval (frac of an hr)	RPV Press	Press Instr Used	*Reactor Coolant Temperature					H/U or C/D Rate	H/U - C/D rate & Press/Temp Acceptable per Step 8.1.4, 8.2.4, 8.3.4 or 8.4.4		Initial	Date
				Sat Temp (Att 8)	Recirc Loop Temp		RHR Loop Temp			SAT	UNSAT		
					Loop A	Loop B	Loop A	Loop B					
0530	1/2	3.15	FUSP101	224	127				27/60	✓		DC/H	8-14-91
0600	1/2	3.15	FUSP101	224	122				49/60	✓		DC/H	8-14-91
0630	0.5	3.75	FUSP101	N/A	121				25/60	✓		1/2	8/14/91
0700	0.5	3.75	FUSP101	N/A	120				25/60	✓		DC	8/14/91
0730	0.5	3.75	FUSP101	N/A	120				25/60	✓		DC	8/14/91
0800	0.5	3.75	FUSP101	N/A	117				25/60	✓		DC	8/14/91
0830	0.5	3.75	FUSP101	N/A	119				25/60	✓		DC	8/14/91
0900	0.5	3.15	FUSP101	N/A	120				25/60	✓		DC	8/14/91

*Temperature corresponding to Downcomer temperature in accordance with Step 4.6.



ATTACHMENT 8
SATURATED STEAM TABLES

PRESS PSIA	TEMP °F	PRESS PSIA	TEMP °F	PRESS PSIA	TEMP °F
14.7	212	84	315	154	361
16.0	216	86	317	156	362
18.0	222	88	319	158	363
20.0	228	90	320	160	364
22	233	92	322	162	365
24	238	94	323	164	366
26	242	96	325	166	367
28	246	98	326	168	367
30	250	100	328	170	368
32	254	102	329	172	369
34	258	104	331	174	370
36	261	106	332	176	371
38	264	108	333	178	372
40	267	110	335	180	373
42	270	112	336	182	374
44	273	114	337	184	375
46	276	116	339	186	376
48	278	118	340	188	377
50	281	120	341	190	378
52	284	122	343	192	378
54	286	124	344	194	379
56	288	126	345	196	380
58	291	128	346	198	381
60	293	130	347	200	382
62	295	132	349	205	384
64	297	134	350	210	386
66	299	136	351	215	388
68	301	138	352	220	390
70	303	140	353	225	392
72	305	142	354	230	394
74	307	144	355	235	396
76	309	146	356	240	397
78	310	148	357	245	399
80	312	150	358	250	401
82	314	152	359	255	403

...

...

ATTACHMENT 8 (Cont)

PRESS PSIA	TEMP °F	PRESS PSIA	TEMP °F	PRESS PSIA	TEMP °F
260	404	520	471	870	528
265	406	530	473	880	529
270	408	540	475	890	531
275	409	550	477	900	532
280	411	560	479	910	533
285	413	570	481	920	535
290	414	580	483	930	536
295	416	590	484	940	537
300	417	600	486	950	538
305	419	610	488	960	540
310	420	620	490	970	541
315	422	630	491	980	542
320	423	640	493	990	543
325	425	650	495	1000	545
330	426	660	497	1010	546
335	428	670	498	1020	547
340	429	680	500	1030	548
345	430	690	501	1040	549
350	432	700	503	1050	551
360	434	710	505	1060	552
370	437	720	506	1070	553
380	440	730	508	1080	554
390	442	740	509	1090	555
400	445	750	511	1100	556
410	447	760	512	1110	557
420	449	770	514	1120	559
430	452	780	515	1130	560
440	454	790	517	1140	561
450	456	800	518	1150	562
460	459	810	520	1160	563
470	461	820	521	1170	564
480	463	830	522	1180	565
490	465	840	524	1190	566
500	467	850	525	1200	567
510	469	860	527		

