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ANCR-NUREG-1308
DATE PUBLISHED — JUNE 1976

IDAHO NATIONAL ENGINEERING LABORATORY

EXPERIMENT DATA REPORT FOR SEMISCALE MOD-1
TESTS S-03-5, S-03-6, S-03-7, and S-03-8
(REFLOOD HEAT TRANSFER TESTS)

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Available from
National Technical Information Service
U. S. Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161
Price: Printed Copy \$7.75; Microfiche \$2.25

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ANCR-NUREG-1308

Distributed Under Category:
NRC-2
Water Reactor Safety Research
Systems Engineering

EXPERIMENT DATA REPORT FOR SEMISCALE MOD-1

TESTS S-03-5, S-03-6, S-03-7, and S-03-8

(Reflood Heat Transfer Tests)

By

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ABSTRACT

Recorded test data are presented for Tests S-03-5, S-03-6, S-03-7, and S-03-8 of the Semiscale Mod-1 reflood heat transfer series (Test Series 3). The tests were performed to determine the reflood heat transfer characteristics of the 5.5-ft-long Mod-1 rod bundle, to investigate the reflood behavior of the system using lower plenum injection, to determine the effects of system scale and core power profile by comparison with FLECHT-SET tests, and to investigate the effects of intact loop resistance on core reflood behavior.

The tests were conducted from initial system temperatures and pressures of 230°F and 20 psia to 300°F and 60 psia. During all four tests, reflood coolant was injected in the lower plenum from both the accumulator and LPIS systems. An electrically heated core was used in the pressure vessel to simulate the effects of a nuclear core during reflood. All four tests were conducted with a flat radial power profile. During reflood, core power was reduced from the initial level in such a manner as to simulate the surface heat flux response of nuclear fuel rods. The broken loop piping was open to the pressure suppression system (PSS). A separate steam supply system connected to the PSS system was controlled to maintain constant pressure during the tests.

The uninterpreted test data are presented for future analysis and interpretation in more than 340 graphs in engineering units. The data have been analyzed only to the extent necessary to account for known nonlinearities in transducer calibrations.

SUMMARY

Tests S-03-5, S-03-6, S-03-7, and S-03-8 were performed as part of the Semiscale Mod-1 portion of the Semiscale Program conducted by Aerojet Nuclear Company for the United States Government. These tests were part of the reflood heat transfer test series, which is the first Semiscale Mod-1 test series employing reflooding of the electrically heated core. Hardware configuration and test parameters were selected to yield a system response that simulates the response of a pressurized water reactor (PWR) to the reflood portion of a hypothesized loss-of-coolant accident (LOCA). The tests utilized a pressure vessel with internals; an intact loop with pump, and heated steam generator; a broken loop with simulated pump, simulated steam generator, and break simulator nozzles; and a pressure suppression system with header, pressure suppression tank, and heated steam supply system. The electrically heated core consisted of 40 heater rods with a 5.5-ft heated length.

The test objectives specific to Tests S-03-5 and S-03-8 were (a) to determine the basic reflood characteristics of the Mod-1 core in response to a gravity feed reflood transient with lower plenum injection and (b) to provide coupled effects reflood data for comparison with data from FLECHT-SET tests to investigate the effects of system scale and core power profile on gravity feed reflood behavior. Test objectives specific to Tests S-03-6 and S-03-7 were (a) to determine the effects of intact loop flow resistance on core reflood behavior and (b) to provide test results for final evaluation of Mod-1 analytical reflood models in advance of subsequent integral blowdown — reflood tests.

In general, the Semiscale Mod-1 system performed in an adequate manner to meet the test objectives. Specified operating conditions were met within acceptable tolerances, while data loss also was held to an acceptable level. During none of the four tests did more than 10 of the approximately 200 measurements taken fail to yield data suitable to be reported.

CONTENTS

ABSTRACT	ii
SUMMARY	iii
I. INTRODUCTION	1
II. SYSTEM, PROCEDURES, CONDITIONS, AND EVENTS FOR TESTS S-03-5, S-03-6, S-03-7, and S-03-8	2
1. SYSTEM CONFIGURATION AND TEST PROCEDURES	2
2. INITIAL TEST CONDITIONS AND SEQUENCE OF EVENTS	3
III. DATA PRESENTATION	6
IV. REFERENCE	198

FIGURES

1. Semiscale Mod-1 system and instrumentation for cold leg break configuration – isometric	7
2. Semiscale Mod-1 system and instrumentation for cold leg break configuration – schematic	8
3. Semiscale Mod-1 pressure vessel – cross section showing instrumentation	9
4. Semiscale Mod-1 pressure vessel – isometric showing instrumentation	10
5. Semiscale Mod-1 pressure vessel – penetrations and instrumentation	11
6. Semiscale Mod-1 heated core, plan view	12
7. Fluid temperature in intact loop, Spool 1 (TFU-1)	24
8. Fluid temperature in intact loop, Spool 2 (RBU-2)	24
9. Fluid temperature in intact loop, Spool 2 (TSU-2)	25
10. Fluid temperature in intact loop, Spool 6 (TSU-6)	25

11. Fluid temperature in intact loop, Spool 7, Tests S-03-5 and S-03-8 (TSU-7)	26
12. Fluid temperature in intact loop, Spool 7 Test S-03-6 (TSU-7)	26
13. Fluid temperature in intact loop, Spool 7, Test S-03-7 (TSU-7)	27
14. Fluid temperature in intact loop, Spool 8, Tests S-03-5 and S-03-8 (TFU-8)	28
15. Fluid temperature in intact loop, Spool 8, Test S-03-6 (TFU-8)	28
16. Fluid temperature in intact loop, Spool 8, Test S-03-7 (TFU-8)	29
17. Fluid temperature in intact loop, Spool 10, tests S-03-5 and S-03-8 (TFU-10)	30
18. Fluid temperature in intact loop, Spool 10, Tests S-03-6 (TFU-10)	30
19. Fluid temperature in intact loop, Spool 10, Tests S-03-7 (TFU-10)	31
20. Fluid temperature in intact loop, Spool 12 (TSU-12)	32
21. Fluid temperature in intact loop, Spool 14 (TFU-14B)	32
22. Fluid temperature in intact loop, Spool 14 (RBU-14)	33
23. Fluid temperature in broken loop, Spool 20 (TBF-20)	33
24. Fluid temperature in broken loop, Spool 23 (TFB-23)	34
25. Fluid temperature in broken loop, Spool 30 (TFB-30)	34
26. Fluid temperature in broken loop, Spool 42 (TFB-42)	35
27. Fluid temperature in downcomer annulus (TFB-ANN-35A)	35
28. Fluid temperature in downcomer annulus (TFV-ANN-35T)	36
29. Fluid temperature in upper plenum (TFV-UP+13)	36
30. Fluid temperature in lower plenum (TFV-LP-7.5)	37
31. Fluid temperature in lower plenum, Tests S-03-6 and S-03-7 (TFV-LP-14.5)	37

32.	Fluid temperature in lower plenum, Tests S-03-5 and S-03-8 (TFV-LP-27.5)	38
33.	Fluid temperature in lower plenum, Tests S-03-6 and S-03-7 (TFV-LP-27.5)	38
34.	Fluid temperature in core, Grid Spacer 5, Tests S-03-5 and S-03-8 (TFG-5CD-45)	39
35.	Fluid temperature in core, Grid Spacer 5, Tests S-03-6 and S-03-7 (TFG-5CD-45)	39
36.	Fluid temperature in core, Grid Spacer 6, Tests S-03-5 and S-03-8 (TFG-6AB-45)	40
37.	Fluid temperature in core, Grid Spacer 6, Tests S-03-6 and S-03-7 (TFG-6AB-45)	40
38.	Fluid temperature in core, Grid Spacer 6, Tests S-03-5 and S-03-8 (TFG-6CD-45)	41
39.	Fluid temperature in core, Grid Spacer 6, Tests S-03-6 and S-03-7 (TFG-6CD-45)	41
40.	Fluid temperature in core, Grid Spacer 6, Tests S-03-5 and S-03-8 (TFG-6DE-45)	42
41.	Fluid temperature in core, Grid Spacer 6, Tests S-03-6 and S-03-7 (TFG-6DE-45)	42
42.	Fluid temperature in core, Grid Spacer 6, Tests S-03-5 and S-03-8 (TFG-6DE-67)	43
43.	Fluid temperature in core, Grid Spacer 6, Tests S-03-6 and S-03-7 (TFG-6DE-67)	43
44.	Fluid temperature in core, Grid Spacer 8, Tests S-03-5 and S-03-8 (TFG-8CD-45)	44
45.	Fluid temperature in core, Grid Spacer 10, Tests S-03-5 and S-03-8 (TFG-10CD-45)	44
46.	Fluid temperature in core, Grid Spacer 10, Tests S-03-5 and S-03-8 (TFG-10CD-45)	45
47.	Fluid temperature in core, Grid Spacer 10, Tests S-03-6 and S-03-7 (TFG-10CD-45)	45

48.	Fluid temperature in core, Grid Spacer 10, Tests S-03-5 and S-03-8 (TFG-10DE-67)	46
49.	Fluid temperature in core, Grid Spacer 10, Tests S-03-6 and S-03-7 (TFG-10DE-67)	46
50.	Fluid temperature in core, Grid Spacer 10, Tests S-03-5 and S-03-8 (TFG-10EF-45)	47
51.	Fluid temperature in core, Grid Spacer 10, Tests S-03-6 and S-03-7 (TFG-10EF-45)	47
52.	Fluid temperature in core, Grid Spacer 10, Tests S-03-5 and S-03-8 (TFG-10GH-45)	48
53.	Fluid temperature in core, Grid Spacer 10, Tests S-03-6 and S-03-7 (TFG-10GH-45)	48
54.	Fluid temperature in steam generator, Tests S-03-5 and S-03-8 (TFU-SG1)	49
55.	Fluid temperature in steam generator, Tests S-03-6 and S-03-7 (TFU-SG1)	49
56.	Fluid temperature in steam generator (TFU-SG2)	50
57.	Fluid temperature in steam generator (TFU-SG3)	50
58.	Fluid temperature in steam generator (TFU-SG4)	51
59.	Fluid temperature in pressure suppression tank (TF-PSS-33)	51
60.	Fluid temperature in pressure suppression tank (TF-PSS-130)	52
61.	Material temperature in intact loop, Spool 1 (TMU-1T16)	52
62.	Material temperature in intact loop, Spool 5 (TMU-5B16)	53
63.	Material temperature in intact loop, Spool 7 (TMU-7S16)	53
64.	Material temperature in intact loop, Spool 8 (TMU-8S16)	54
65.	Material temperature in intact loop, Spool 15 (TMU-15B16)	54
66.	Material temperature in broken loop, Spool 20 (TMB-20T16)	55
67.	Material temperature in broken loop, Spool 40 (TMB-40S15)	55

68.	Material temperature in vessel filler insulator (TIV-FO-35M)	56
69.	Material temperature in core barrel (TMV-CO-35A)	56
70.	Material temperature in core barrel, Tests S-03-5 and S-03-8 (TMV-CO-115M)	57
71.	Material temperature in core barrel, Tests S-03-5 and S-03-8 (TMV-CI-70A)	57
72.	Material temperature in core barrel, Test S-03-8 (TMV-CI-95M)	58
73.	Material temperature in core housing filler (TMV-HF-115W)	58
74.	Material temperature in core housing filler (TMV-HF-127W)	59
75.	Material temperature in core housing filler (TMV=HF-138W)	59
76.	Core heater temperature, Rod D-4 (TH-D4-14)	60
77.	Core heater temperature, Rod D-4 (TH-D4-29)	60
78.	Core heater temperature, Rod D-5 (TH-D5-09)	61
79.	Core heater temperature, Rod D-5 (TH-D5-29)	61
80.	Core heater temperature, Rod D-5 (TH-D5-39)	62
81.	Core heater temperature, Rod E-4 (TH-E4-23)	62
82.	Core heater temperature, Rod E-4 (TH-E4-27)	63
83.	Core heater temperature, Rod E-5 (TH-E5-21)	63
84.	Core heater temperature, Rod E-5 (TH-E5-25)	64
85.	Core heater temperature, Rod A-4 (TH-A4-09)	64
86.	Core heater temperature, Rod A-4 (TH-A4-29)	65
87.	Core heater temperature, Rod A-5 (TH-A4-39)	65
88.	Core heater temperature, Rod A-5 (TH-A5-29)	66
89.	Core heater temperature, Rod A-5 (TH-A5-44)	66
90.	Core heater temperature, Rod B-3 (TH-B3-32)	67

91.	Core heater temperature, Rod B-5 (TH-B5-29)	67
92.	Core heater temperature, Rod B-5 (TH-B5-38)	68
93.	Core heater temperature, Rod B-6 (TH-B6-29)	68
94.	Core heater temperature, Rod C-2 (TH-C2-28)	69
95.	Core heater temperature, Rod C-2 (TH-C2-38)	69
96.	Core heater temperature, Rod C-3 (TH-C3-13)	70
97.	Core heater temperature, Rod C-3 (TH-C3-28)	70
98.	Core heater temperature, Rod C-3 (TH-C3-60)	71
99.	Core heater temperature, Rod C-4 (TH-C4-26)	71
100.	Core heater temperature, Rod C-4 (TH-C4-53)	72
101.	Core heater temperature, Rod C-5 (TH-C5-28)	72
102.	Core heater temperature, Rod C-5 (TH-C5-44)	73
103.	Core heater temperature, Rod C-6 (TH-C6-32)	73
104.	Core heater temperature, Rod C-7 (TH-C7-15)	74
105.	Core heater temperature, Rod D-1 (TH-D1-21)	74
106.	Core heater temperature, Rod D-2 (TH-D2-14)	75
107.	Core heater temperature, Rod D-2 (TH-D2-61)	75
108.	Core heater temperature, Rod D-3 (TH-D3-29)	76
109.	Core heater temperature, Rod D-3 (TH-D3-39)	76
110.	Core heater temperature, Rod D-6 (TH-D6-15)	77
111.	Core heater temperature, Rod D-6 (TH-D6-25)	77
112.	Core heater temperature, Rod D-7 (TH-D7-20)	78
113.	Core heater temperature, Rod D-8 (TH-D8-26)	78

114. Core heater temperature, Rod E-1 (TH-E1-33)	79
115. Core heater temperature, Rod E-1 (TH-E1-54)	79
116. Core heater temperature, Rod E-2 (TH-E2-21)	80
117. Core heater temperature, Rod E-2 (TH-E2-33)	80
118. Core heater temperature, Rod E-3 (TH-E3-05)	81
119. Core heater temperature, Rod E-3 (TH-E3-20)	81
120. Core heater temperature, Rod E-3 (TH-E3-24)	82
121. Core heater temperature, Rod E-6 (TH-E6-08)	82
122. Core heater temperature, Rod E-6 (TH-E6-28)	83
123. Core heater temperature, Rod E-6 (TH-E6-37)	83
124. Core heater temperature, Rod E-7 (TH-E7-13)	84
125. Core heater temperature, Rod E-7 (TH-E7-44)	84
126. Core heater temperature, Rod E-8 (TH-E8-14)	85
127. Core heater temperature, Rod E-8 (TH-E8-29)	85
128. Core heater temperature, Rod E-8 (TH-E8-45)	86
129. Core heater temperature, Rod F-2 (TH-F2-22)	86
130. Core heater temperature, Rod F-2 (TH-F2-25)	87
131. Core heater temperature, Rod F-3 (TH-F3-15)	87
132. Core heater temperature, Rod F-3 (TH-F3-22)	88
133. Core heater temperature, Rod F-4 (TH-F4-14)	88
134. Core heater temperature, Rod F-4 (TH-F4-28)	89
135. Core heater temperature, Rod F-4 (TH-F4-44)	89
136. Core heater temperature, Rod F-5 (TH-F5-20)	90

137. Core heater temperature, Rod F-5 (TH-F5-26)	90
138. Core heater temperature, Rod F-5 (TH-F5-33)	91
139. Core heater temperature, Rod F-5 (TH-F5-53)	91
140. Core heater temperature, Rod F-6 (TH-F6-08)	92
141. Core heater temperature, Rod F-6 (TH-F6-28)	92
142. Core heater temperature, Rod F-7 (TH-F7-29)	93
143. Core heater temperature, Rod F-7 (TH-F7-39)	93
144. Core heater temperature, Rod G-3 (TH-G3-13)	94
145. Core heater temperature, Rod G-3 (TH-G3-45)	94
146. Core heater temperature, Rod G-4, Tests S-03-5 and S-03-8 (TH-G4-09)	95
147. Core heater temperature, Rod G-4 (TH-G4-29)	95
148. Core heater temperature, Rod G-4 (TH-G4-33)	96
149. Core heater temperature, Rod G-4 (TH-G4-38)	96
150. Core heater temperature, Rod G-5 (TH-G5-14)	97
151. Core heater temperature, Rod G-5 (TH-G5-24)	97
152. Core heater temperature, Rod G-6 (TH-G6-33)	98
153. Core heater temperature, Rod H-5 (TH-H5-28)	98
154. Material temperature in steam generator (TMU-SG1)	99
155. Material temperature in steam generator (TMU-SG2)	99
156. Material temperature in steam generator (TMU-SG3)	100
157. Material temperature in steam generator (TMU-SG4)	100
158. Pressure in vessel, upper plenum (PV-UP+10)	101
159. Pressure in vessel, inlet annulus (PV-IANN-9)	101

160. Pressure in intact loop accumulator, Tests S-03-5 and S-03-8 (PU-ECC-ACC)	102
161. Pressure in intact loop accumulator, Tests S-03-6 and S-03-7 (PU-ECC-ACC)	102
162. Pressure in steam generator secondary side (PU-SGSD)	103
163. Pressure in pressure suppression tank (P-PSS)	103
164. Pressure in pressure suppression tank header, Tests S-03-5 and S-03-8 (P-PSS-HD)	104
165. Differential pressure in intact loop, Tests S-03-5, S-03-6, and S-03-7 (DPU-UP-1)	104
166. Differential pressure in intact loop, low range, Tests S-03-5 and S-03-8 (DPU-UP-1L)	105
167. Differential pressure in intact loop, low range, Tests S-03-6 and S-03-7 (DPU-UP-1L)	105
168. Differential pressure in intact loop (Spool 1 to Spool 3), Tests S-03-5 and S-03-8 (DPU-1-3)	106
169. Differential pressure in intact loop (Spool 1 to Spool 3), Tests S-03-6 and S-03-7 (DPU-1-3)	106
170. Differential pressure in intact loop, low range (Spool 1 to Spool 3), Tests S-03-5 and S-03-8 (DPU-1-3L)	107
171. Differential pressure in intact loop, low range (Spool 1 to Spool 3), Tests S-03-6 and S-03-7 (DPU-1-3L)	107
172. Differential pressure in intact loop (Spool 3 to Spool 7), Tests S-03-5 and S-03-8 (DPU-3-7)	108
173. Differential pressure in intact loop (Spool 3 to Spool 7), Tests S-03-6 and S-03-7 (DPU-3-7)	108
174. Differential pressure in intact loop, low range (Spool 3 to Spool 7), Tests S-03-5 and S-03-8 (DPU-3-7L)	109
175. Differential pressure in intact loop, low range (Spool 3 to Spool 7), Tests S-03-6 and S-03-7 (DPU-3-7)	109

176. Differential pressure in intact loop (Spool 3 to steam generator inlet plenum), Tests S-03-5 and S-03-8 (DPU-3-SGIP)	110
177. Differential pressure in intact loop (Spool 3 to steam generator inlet plenum), Tests S-03-6 and S-03-7 (DPU-3-SGIP)	110
178. Differential pressure in intact loop, steam generator outlet plenum to Spool 7 (DPU-SGOP-7)	111
179. Differential pressure in intact loop, Spool 7 to Spool 10 (DPU-7-10)	111
180. Differential pressure in intact loop (Spool 8, Tap C to Spool 7), Tests S-03-5 and S-03-8 (DPU-8C-7)	112
181. Differential pressure in intact loop (Spool 8, Tap C to Spool 7), Tests S-03-6 and S-03-7 (DPU-8C-7)	112
182. Differential pressure in intact loop, pump trap (Spool 8, Tap C to Tap D), Tests S-03-5 and S-03-8 (DPU-8C-8D)	113
183. Differential pressure in intact loop, pump trap (Spool 8, Tap C to Tap D), Tests S-03-6 and S-03-7 (DPU-8C-8D)	113
184. Differential pressure in intact loop, low range (Spool 12 to Spool 10), Tests S-03-5 and S-03-8 (DPU-12-10L)	114
185. Differential pressure in intact loop, low range (Spool 12 to Spool 10), Tests S-03-6 and S-03-7 (DPU-12-10L)	114
186. Differential pressure in intact loop (Spool 15 to Spool 1), Tests S-03-5 and S-03-8 (DPU-15-1)	115
187. Differential pressure in intact loop (Spool 15 to Spool 1), Tests S-03-6 and S-03-7 (DPU-15-1)	115
188. Differential pressure in intact loop, low range (Spool 15 to Spool 1), Tests S-03-5 and S-03-8 (DPU-15-1L)	116
189. Differential pressure in intact loop, low range (Spool 15 to Spool 1), Tests S-03-6 and S-03-7 (DPU-15-1L)	116
190. Differential pressure in intact loop (Spool 15 to vessel inlet annulus), Tests S-03-5 and S-03-8 (DPU-15-IANN)	117
191. Differential pressure in intact loop (Spool 15 to vessel inlet annulus), Tests S-03-6 and S-03-7 (DPU-15-IANN)	117

192. Differential pressure in intact loop, Spool 15 to atmosphere (DPU-15-ATM) . . .	118
193. Differential pressure in broken loop (Spool 21 to vessel inlet annulus), Tests S-03-5 and S-03-8 (DPB-21-IANN)	119
194. Differential pressure in broken loop (Spool 21 to vessel inlet annulus), Tests S-03-6 and S-03-7 (DPB-21-IANN)	119
195. Differential pressure in broken loop (Spool 21 to Spool 23), Tests S-03-5 and S-03-8 (DPB-21-23)	120
196. Differential pressure in broken loop (Spool 21 to Spool 23), Tests S-03-6 and S-03-7 (DPB-21-23)	120
197. Differential pressure in broken loop (Spool 23 to cold leg nozzle throat), Tests S-03-5 and S-03-8 (DPB-23-CNI)	121
198. Differential pressure in broken loop (Spool 23 to cold leg nozzle throat), Tests S-03-6 and S-03-7 (DPB-23-CNI)	121
199. Differential pressure in broken loop (cold leg nozzle throat to downstream section), Tests S-03-5 and S-03-8 (DPB-CN1-CN4)	122
200. Differential pressure in broken loop (cold leg nozzle throat to downstream section), Tests S-03-6 and S-03-7 (DPB-CN1-CN4)	122
201. Differential pressure in broken loop (upper plenum to Spool 30), Tests S-03-5 and S-03-8 (DPB-UP-30)	123
202. Differential pressure in broken loop (upper plenum to Spool 30), Tests S-03-5 and S-03-8 (DPB-UP-30)	123
203. Differential pressure in broken loop (Spool 30 to Spool 36, lower tap), Tests S-03-6 and S-03-8 (DPB-30-36L)	124
204. Differential pressure in broken loop (Spool 30 to Spool 36, lower tap), Tests S-03-6 and S-03-7 (DPB-30-36L)	124
205. Differential pressure in broken loop (Spool 30 to Spool 38), Tests S-03-5 and S-03-8 (DPB-30-38)	125
206. Differential pressure in broken loop (Spool 30 to Spool 38), Tests S-03-6 and S-03-7 (DPB-30-38)	125
207. Differential pressure in broken loop (Spool 30 to Spool 32, upper tap), Tests S-03-5 and S-03-8 (DPB-30-32U)	126

208. Differential pressure in broken loop (Spool 30 to Spool 32, upper tap), Tests S-03-6 and S-03-7 (DPB-30-32U)	126
209. Differential pressure in broken loop (Spool 32, upper tap to Spool 36 lower tap), Test S-03-8 (DPB-32U-26L)	127
210. Differential pressure in broken loop (Spool 32, upper tap to Spool 36, lower tap), Tests S-03-6 and S-03-7 (DPB-32U-36L)	127
211. Differential pressure in broken loop (Spool 38 to Spool 40), Tests S-03-5 and S-03-8 (DPB-38-40)	128
212. Differential pressure in broken loop (Spool 38 to Spool 40), Tests S-03-6 and S-03-7 (DPB-38-40)	128
213. Differential pressure in broken loop (Spool 40 to Spool 42), Tests S-03-5 and S-03-8 (DPB-40-42)	129
214. Differential pressure in broken loop (Spool 40 to Spool 42), Tests S-03-6 and S-03-7 (DPB-40-42)	129
215. Differential pressure in broken loop (Spool 42 to hot leg nozzle throat), Tests S-03-8 (DPB-42-HN1)	130
216. Differential pressure in broken loop (Spool 42 to hot leg nozzle throat), Tests S-03-6 and S-03-7 (DPB-42-HN1)	130
217. Differential pressure in vessel, tests S-03-5 and S-03-8 (DPV-UP-IANN)	131
218. Differential pressure in vessel, Tests S-03-6 and S-03-7 (DPV-UP-IANN)	131
219. Differential pressure in vessel, Tests S-03-5 and S-03-8 (DPV-9-26QQ)	132
220. Differential pressure in vessel, Tests S-03-6 and S-03-7 (DPV-9-26QQ)	132
221. Differential pressure in vessel, Tests S-03-5 and S-03-8 (DPV-9-180QQ)	133
222. Differential pressure in vessel, Tests S-03-6 and S-03-7 (DPV-9-180QQ)	133
223. Differential pressure in vessel, Tests S-03-5 and S-03-8 (DPV-26-55QM)	134
224. Differential pressure in vessel, Tests S-03-6 and S-03-7 (DPV-36-55QM)	134
225. Differential pressure in vessel, Tests S-03-5 and S-03-8 (DPV-55-110AM)	135
226. Differential pressure in vessel, Tests S-03-6 and S-03-7 (DPV-55-110AM)	135

227. Differential pressure in vessel, Tests S-03-5 and S-03-8 (DPV-110-156M)	136
228. Differential pressure in vessel, Tests S-03-6 and S-03-7 (DPV-110-156M)	136
229. Differential pressure in vessel (DPV-156-173QQ)	137
230. Differential pressure in vessel, Tests S-03-5 and S-03-8 (DPV-116-191QT)	137
231. Differential pressure in vessel, tests S-03-5 and S-03-8 (DPV-LP-UP)	138
232. Differential pressure in vessel, Tests S-03-6 and S-03-7 (DPV-LP-UP)	138
233. Differential pressure in vessel core, Tests S-03-5 and S-03-8 (DPVC-83W-UP)	139
234. Differential pressure in vessel core (DPVC-83-100WQ)	139
235. Differential pressure in vessel core (DPVC-100-117QJ)	140
236. Differential pressure in vessel core (DPVC-117-133JD)	140
237. Differential pressure in vessel core (DPVC-133-191DT)	141
238. Differential pressure in steam generator, Tests S-03-6 and S-03-7 (DPU-SG-SEC)	141
239. Volumetric flow in intact loop, Tests S-03-5 and S-03-8 (FTU-1)	142
240. Volumetric flow in intact loop, Tests S-03-6 and S-03-7 (FTU-1)	142
241. Volumetric flow in intact loop, Tests S-03-5 and S-03-8 (FTU-9)	143
242. Volumetric flow in intact loop, Test S-03-7 (FTU-9)	143
243. Volumetric flow in intact loop, Tests S-03-5 and S-03-8 (FTU-13)	144
244. Volumetric flow in intact loop, Tests S-03-6 and S-03-7 (FTU-13)	144
245. Volumetric flow in intact loop, Tests S-03-5 and S-03-8 (FTU-15)	145
246. Volumetric flow in intact loop, Tests S-03-6 and S-03-7 (FTU-15)	145
247. Volumetric flow in broken loop, Tests S-03-5 and S-03-8 (FTB-21)	146
248. Volumetric flow in broken loop, Tests S-03-6 and S-03-7 (FTB-21)	146
249. Volumetric flow in broken loop, Test S-03-5 (FTB-37)	147

250. Volumetric flow in broken loop, Tests S-03-6 and S-03-7 (FTB-37)	147
251. Volumetric flow in core inlet, Test S-03-5 (FTV-CORE-IN)	148
252. Volumetric flow in core inlet, Test S-03-6 (FTV-CORE-IN)	148
253. Volumetric flow in core inlet, Test S-03-7 (FTV-CORE-IN)	149
254. Volumetric flow in core inlet, Test S-03-8 (FTV-CORE-IN)	149
255. Volumetric flow in low pressure injection line, Tests S-03-5 and S-03-8 (FTU-LPIS)	150
256. Volumetric flow in low pressure injection line, Tests S-03-6 and S-03-7 (FTU-LPIS)	150
257. Volumetric flow in accumulator injection line, Tests S-03-5 and S-03-8 (FTU-ACC)	151
258. Volumetric flow in accumulator injection line, Tests S-03-6 and S-03-7 (FTU-ACC)	151
259. Fluid velocity in core, Test S-03-5 (FTV-40A)	152
260. Fluid velocity in core, Test S-03-6 (FTV-40A)	152
261. Fluid velocity in core, Test S-03-7 (FTV-40A)	153
262. Fluid velocity in core, Test S-03-8 (FTV-40A)	153
263. Fluid velocity in core, Test S-03-5 (FTV-40M)	154
264. Fluid velocity in core, Test S-03-6 (FTV-40M)	154
265. Fluid velocity in core, Test S-03-8 (FTV-40M)	155
266. Fluid velocity in core, Test S-03-8 (FTV-40M)	155
267. Momentum flux in intact loop (Spool 1), Test S-03-5 (FDU-1)	156
268. Momentum flux in intact loop (Spool 1), Test S-03-6 (FDU-1)	156
269. Momentum flux in intact loop (Spool 1), Test S-03-7 (FDU-1)	157
270. Momentum flux in intact loop (Spool 1), Test S-03-8 (FDU-1)	157

271. Momentum flux in core inlet, Test S-03-5 (FDV-CORE-IN)	158
272. Momentum flux in core inlet, Test S-03-6 (FDV-CORE-IN)	158
273. Momentum flux in core inlet, Test S-03-7 (FDV-CORE-IN)	159
274. Momentum flux in core inlet, Test S-03-8 (FDV-CORE-IN)	159
275. Density in intact loop, Test S-03-5 (GU-1VR)	160
276. Density in intact loop, Test S-03-6 (GU-1VR)	160
277. Density in intact loop, Test S-03-7 (GU-1VR)	161
278. Density in intact loop, Test S-03-8 (GU-1VR)	161
279. Density in intact loop, Test S-03-5 (GU-1HZ)	162
280. Density in intact loop, Test S-03-6 (GU-1HZ)	162
281. Density in intact loop, Test S-03-7 (GU-1HZ)	163
282. Density in intact loop, Test S-03-8 (GU-1HZ)	163
283. Density in intact loop, Test S-03-5 (GU-5VR)	164
284. Density in intact loop, Test S-03-6 (GU-5VR)	164
285. Density in intact loop, Test S-03-7 (GU-5VR)	165
286. Density in intact loop, Test S-03-8 (GU-5VR)	165
287. Density in intact loop, Test S-03-5 (GU-10VR)	166
288. Density in intact loop, Test S-03-6 (GU-10VR)	166
289. Density in intact loop, Test S-03-7 (GU-10VR)	167
290. Density in intact loop, Test S-03-8 (GU-10VR)	167
291. Density in intact loop, Test S-03-5 (GU-13VR)	168
292. Density in intact loop, Test S-03-6 (GU-13VR)	168
293. Density in intact loop, Test S-03-7 (GU-13VR)	169

294. Density in intact loop, Test S-03-8 (GU-13VR)	169
295. Density in intact loop, Test S-03-5 (GU-15HZ)	170
296. Density in intact loop, Test S-03-6 (GU-15HZ)	170
297. Density in intact loop, Test S-03-7 (GU-15HZ)	171
298. Density in intact loop, Test S-03-8 (GU-15HZ)	171
299. Density in intact loop, Test S-03-5 (GU-15VR)	172
300. Density in intact loop, Test S-03-6 (GU-15VR)	172
301. Density in intact loop, Test S-03-7 (GU-15VR)	173
302. Density in intact loop, Test S-03-8 (GU-15VR)	173
303. Density in broken loop, Test S-03-5 (GB-21VR)	174
304. Density in broken loop, Test S-03-6 (GB-21VR)	174
305. Density in broken loop, Test s-03-7 (GB-21VR)	175
306. Density in broken loop, Test S-03-8 (GB-21VR)	175
307. Density in broken loop, Test S-03-5 (GB-23VR)	176
308. Density in broken loop, Test S-03-6 (GB-23VR)	176
309. Density in broken loop, Test S-03-7 (GB-23VR)	177
310. Density in broken loop, Test S-03-8 (GB-23VR)	177
311. Density in broken loop, Test S-03-5 (GB-30VR)	178
312. Density in broken loop, Test S-03-6 (GB-30VR)	178
313. Density in broken loop, Test S-03-7 (GB-30VR)	179
314. Density in broken loop, Test S-03-8 (GB-30VR)	179
315. Density in broken loop, Test S-03-5 (GB-42VR)	180
316. Density in broken loop, Test S-03-6 (GB-42VR)	180

317. Density in broken loop, Test S-03-7 (GB-42VR)	181
318. Density in broken loop, Test S-03-8 (GB-42VR)	181
319. Density in vessel, Test S-03-5 (GV-150HZ)	182
320. Density in vessel, Test S-03-6 (GV-150HZ)	182
321. Density in vessel, Test S-03-7 (GV-150HZ)	183
322. Density in vessel, Test S-03-8 (GV-150HZ)	183
323. Density in vessel, Test S-03-5 (GV-161/192D)	184
324. Density in vessel, Test S-03-6 (GV-161/192D)	184
325. Density in vessel, Test S-03-7 (GV-161/192D)	185
326. Density in vessel, Test S-03-8 (GV-161/192D)	185
327. Density in vessel, Test S-03-5 (GVLP-165HZ)	186
328. Density in vessel, Test S-03-6 (GVLP-165HZ)	186
329. Density in vessel, Test S-03-7 (GVLP-165HZ)	187
330. Density in vessel, Test S-03-8 (GVLP-165HZ)	187
331. Density in vessel, Test S-03-5 (GVLP-172HZ)	188
332. Density in vessel, Test S-03-6 (GVLP-172HZ)	188
333. Density in vessel, Test S-03-7 (GVLP-172HZ)	189
334. Density in vessel, Test S-03-8 (GVLP-172HZ)	189
335. Mass flow in vessel, Test S-03-5 (FTV-CORE-IN and GV-CORE-150HZ)	190
336. Mass flow in vessel, Test S-03-6 (FTV-CORE-IN and GV-CORE-150HZ)	190
337. Mass flow in vessel, Test S-03-7 (FTV-CORE-IN and GV-CORE-150HZ)	191
338. Mass flow in vessel, Test S-03-8 (FTV-CORE-IN and GV-CORE-150HZ)	191
339. Mass flow in vessel, Test S-03-5 (FDV-CORE-IN and GV-CORE-150HZ)	192

340. Mass flow in vessel Test S-03-6 (FDV-CORE-IN and GV-CORE-150HZ)	192
341. Mass flow in vessel Test S-03-7 (FDV-CORE-IN and GV-CORE-150HZ)	193
342. Mass flow in vessel Test S-03-8 (FDV-CORE-IN and GV-CORE-150HZ)	193
343. Core heater pin total power, Test S-03-5 (PWRCOR T-1)	194
344. Core heater pin total power, Test S-03-6 (PWRCOR T-1)	194
345. Core heater pin total power, Test S-03-7 (PWRCOR T-1)	195
346. Core heater pin total power, Test S-03-8 (PWRCOR T-1)	195
347. Core heater pin total power, Tests S-03-5 and S-03-8 (PWRCOR T-2)	196
348. Core heater pin total power, tests S-03-6 and S-03-7 (PWRCOR T-2)	196
349. Core heater voltage, Tests S-03-5 and S-03-8 (VOLT-COR-T)	197
350. Core heater total current (AMPCOR-T)	197

TABLES

I. Specified Variable Test Conditions	3
II. Conditions at Reflood Initiation	4
III. Water Chemistry at Completion of Tests	5
IV. Sequence of Events During Tests	5
V. Data Presentation for Semiscale MOD-1 Test S-03-5 Through S-03-8	13

**EXPERIMENT DATA REPORT FOR SEMISCALE MOD-1
TESTS S-03-5, S-03-6, S-03-7, and S-03-8
(Reflood Heat Transfer Tests)**

I. INTRODUCTION

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

Tests S-03-5 through S-03-8 were conducted in the Semiscale Mod-1 system as part of the reflood heat transfer test series to obtain thermal hydraulic response data from a reflood transient in a simulated nuclear reactor with a heated core to provide an experimental basis for analytical model development and evaluation.

For these tests the pressure vessel was equipped with a core of 40 electric heater rods arranged to yield a flat radial power profile. Reflood coolant injection into the vessel lower plenum was initiated at an initial core power level of 105kW (97 kW for Tests S-03-6 and S-03-7) and a peak initial heater rod temperature of 1,000°F (1,300°F for Tests S-03-6 and S-03-7). During reflood, the core heater power was adjusted to simulate the response characteristics of nuclear fuel rods. The broken loop piping was open to the pressure suppression system header to allow for pressure control and system heatup using the pressure suppression system steam supply.

The purpose of this report is to present the test data in uninterpreted but readily usable form for use by the nuclear community in advance of detailed analysis and interpretation. Section II briefly describes the system configuration, procedures, initial test conditions, and events that are applicable to Tests S-03-5 through S-03-8. Section III presents the data graphs and provides comments and supporting information necessary for interpretation of the data. A description of the overall Semiscale Program and test series, a detailed description of the Semiscale Mod-1 system, and a description of the measurement and data processing techniques and uncertainties can be found in Reference 1.

II. SYSTEM, PROCEDURES, CONDITIONS, AND EVENTS FOR TESTS S-03-5, S-03-6, S-03-7, and S-03-8

The following system configuration, procedures, initial test conditions, and events are specific to Tests S-03-5 through S-03-8 as indicated.

1. SYSTEM CONFIGURATION AND TEST PROCEDURES

The Semiscale Mod-1 system used for these tests consisted of a pressure vessel with internals, including a 40-electric-heater-rod heated core set up for a flat radial power profile; an intact loop with steam generator and pump; a broken loop with simulated steam generator and simulated pump; and a pressure suppression system with header, suppression tank, and heated steam supply system. The broken loop cold leg piping was attached directly to the pressure suppression header, through restricting nozzles, but without rupture discs. The pressure suppression system was equipped with a steam supply system for system heatup and for regulating system pressure. An accumulator and low-pressure injection pump were provided to inject reflood coolant into the vessel lower plenum. The Semiscale Mod-1 system is described in more detail in Reference 1.

In preparation for each test (Tests S-03-5 through S-03-8), the steam generator feedwater tank, low pressure injection supply tank, and accumulator were filled with treated demineralized water and heated to operating temperature. Prior to warmup, system instrumentation was checked and transducer readings were initialized. Warmup to initial test conditions was accomplished by introducing saturated steam from the pressure suppression system steam supply. The condensate was drained periodically during warmup.

After the system was heated to operating temperature (306°F for Test S-03-5, 259°F for Tests S-03-6 and S-03-7, and 250°F for Test S-03-8), the steam generator secondary was heated to 500°F by circulating water from the feedwater tank. As soon as acceptable initial temperature conditions were established and the initial water level established at the core inlet, power was applied to the core. When the peak heater rod thermocouple temperature reached 1,100°F (1,300°F for Tests S-03-6 and S-03-7), reflood was initiated, and the core power control was switched to a power decay transient to simulate the thermal response of nuclear fuel rods. Tests S-03-6 and S-03-7 were performed with the American Nuclear Society (ANS) standard transient curve for decay heat, while Tests S-03-5 and S-03-8 used the ANS curve plus 20%. The tests were terminated 60 seconds after all rod thermocouples indicated quenching had occurred.

Tests S-03-6 and S-03-7 were conducted at a system pressure of 35 psia which corresponded to saturation pressure at system temperature (259°F). Tests S-03-5 and S-03-8, on the other hand were conducted at pressures of 60 psia and 20 psia, respectively, which were slightly below saturation pressures. During Tests S-03-5 and S-03-8, system warmup was accomplished using steam at 73 psia and 30 psia respectively. System pressure was lowered to the test value approximately five minutes before each test.

2. INITIAL TEST CONDITIONS AND SEQUENCE OF EVENTS

Variable test conditions specified for Tests S-03-5 through S-03-8 are given in Table I; conditions in the Semiscale Mod-1 system at initiation of reflood are given in Table II; the water chemistry from samples of injection coolant drained from the core after reflood is given in Table III; and the sequence of events relative to initiation of reflood is given in Table IV.

TABLE I
SPECIFIED VARIABLE TEST CONDITIONS

Parameter	Specified Value				Tolerance
	Test S-03-5	Test S-03-6	Test S-03-7	Test S-03-8	
System pressure (psia)	60	35	35	20	Not specified
System temperature (°F)	306	259	259	250	<u>+5</u>
Reflood coolant temperature (°F)	153	219	219	153	<u>+3</u>
Peak heater rod temperature at reflood initiation (°F)	1,100	1,300	1,300	1,100	(Maximum)
Core power (kW)	105	97	97	105	<u>+3</u>

TABLE II
CONDITIONS AT REFLOOD INITIATION

	<u>Specified</u>	<u>Measured</u>			
		<u>Test</u> <u>S-03-5</u>	<u>Test</u> <u>S-03-6</u>	<u>Test</u> <u>S-03-7</u>	<u>Test</u> <u>S-03-8</u>
System pressure (psia) (PV + 10)	[a]	60.6	35.4	36.31	19.8
Core power (kW)	[a]	109	62.5	62.5	109
Peak core temperature (°F)	[a]	1,082	1,257	1,275	1,085
PSS tank water temperature (°F) (TF-PSS-33)	[a]	Failed	261	259	227
PSS tank water level (in.)	46.5 <u>+1</u>	46	46	46	46
Steam generator feedwater	550 <u>+10</u>	>540	>540	>540	>540
Steam generator secondary liquid level (in.)	[b]	127	127	127	127
Core barrel metal temperature (°F) (TMV-CO-35A)	[a]	313	257	296	236
Intact loop hot leg metal temperature (°F) (TMU-5B16)	[a]	292	259	261	226
Intact loop cold leg metal temperature (°F) (TMU-15B16)	[a]	289	254	258	223
Broken loop hot leg metal temperature (°F) (TMB-30T16)	[a]	Failed	112	121	88
Broken loop cold leg metal temperature (°F) (TMB-20T16)	[a]	309	261	288	238
<hr/>					
[a] See Table I.					
[b] Exact level requirement was deleted.					
<hr/>					

TABLE III
WATER CHEMISTRY AT COMPLETION OF TESTS
S-03-5 THROUGH S-03-8

	Test S-03-5	Tests [b] S-03-6 and S-03-7	Test S-03-8
pH	7.05	7.25	7.7
Conductivity (μ mhos/cm)	3.6	29	48
Lithium (ppm)	2.2	1.6	2.9
Chloride (ppm)	<0.2	<0.2	<0.15
Fluoride (ppm)	<0.4 [a]	$\geq$ 0.4	<0.4
Oxygen (ppm)	107.1	143.3	110.4
Total gas (ppm)	584.6	698.9	553
Suspended solids (ppm)	0.39	2.2	<0.2

[a] Present analytical methods present accurate determination of less than 0.4 ppm.

[b] Only one water sample was taken for tests S-03-6 and S-03-7, since the tests were run consecutively.

TABLE IV
SEQUENCE OF EVENTS DURING TESTS

Event	Time Relative to Reflood Initiation			
	S-03-5	S-03-6	S-03-7	S-03-8
Initial fluid level established at level of GV-150 (8 in. below bottom of core heated length)	-10 min	-10 min	-5 min	-23 min
Core power level established	-120 sec	-120 sec	-120 sec	-60 sec
Heater rod temperature reaches 1,100°F	0	0 [a]	0 [a]	0
Initiation of reflood	0	0	0	0
Test terminated	120 sec	180 sec	180 sec	180 sec

[a] Core power trip set for 1,300°F.

III. DATA PRESENTATION

The data from Semiscale Mod-1 Tests S-03-5 through S-03-8 are presented with brief comment. Processing analysis has been performed only to the extent necessary to account for known nonlinearities in transducer calibrations and to obtain appropriate engineering units.

The performance of the system during these tests was monitored by about 200 detectors. The data obtained were recorded on both digital and analog data acquisition systems; the digital system was used to process the data presented in this report, while the analog system was used primarily to provide redundancy.

The data are presented, in most instances, in the form of composite graphs to facilitate comparison of a given variable in different tests. In cases for which composite graphs might be difficult to interpret, data for a given variable have been plotted on multiple figures. The scales selected for the graphs do not reflect the obtainable resolution of the data. Time zero on the graphs is the time of reflood initiation. (The data processing techniques are described in greater detail in Reference 1.)

Figures 1 through 6 and Table V provide supporting information for interpretation of the data graphs shown in Figures 7 through 350. Figures 1 through 6 show the relative locations of all detectors used during the Semiscale Mod-1 reflood heat transfer test series. Table V groups the measurements taken during Tests S-03-5 through S-03-8 according to measurement type; identifies the specific measurement location, and the range of the detector and actual recording range of the data acquisition system; provides brief comments regarding the data; and references the measurements and comments to the corresponding figure(s).

Figures 7 through 350 present the reflood data obtained. Data are not being presented, however, for measurements for which the detector or data acquisition system is known to have failed during a specific test. The least data are available for Test S-03-6, for which 10 measurements are not reported.

Fig. 1 Semiscale Mod-1 system and instrumentation for partial cold leg break with phase separator -- isometric.

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

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

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

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

TABLE V
DATA PRESENTATION FOR SEMISCALE MOD-1 TEST
S-03-5 THROUGH S-03-8

Measurement	Location and Comments [a]	Range [a]		Figure [a]	Measurement Comments [b]
		Detector	Data Acquisition System		
FLUID TEMPERATURE					
Chromel-Alumel thermocouples unless specified otherwise					
<u>Intact Loop</u>					
		0-2,300°F	0-1,017°F		
TFU-1	Hot leg, Spool 1, 31 in. from vessel center			7	
RBV-2	Hot leg, Spool 2, 46 in. from vessel center (platinum resistance bulb)	0-1,000°F	0-1,000°F	8	
TSU-2	Hot leg, Spool 2, 52 in. from vessel center (shielded)			9	
TSU-6	Hot leg, Spool 6, 114 in. from vessel center (shielded)			10	
TSU-7	Cold leg, Spool 7, 243 in. from vessel center (shielded)			11, 12, 13	
TFU-8	Cold leg, Spool 8, 195 in. from vessel center			14, 15, 16	
TFU-10	Cold leg, Spool 10, 144 in. from vessel center		0-591°F	17, 18, 19	
TSU-12	Cold leg, Spool 12, 80 in. from vessel center (shielded)		0-591°F	20	
TFU-14B	Cold leg, Spool 14, 39 in. from vessel center, downstream of cold leg injection port		0-591°F	21	Data not recorded for Tests S-03-5 and S-03-8.
RBV-14A	Cold leg, Spool 14, 43 in. from vessel center, downstream of cold leg injection port (platinum resistance bulb)	0-1,000°F	0-1,000°F	22	
<u>Broken Loop</u>					
		0-2,300°F	0-591°F		
TFB-20	Cold leg, Spool 20, 21 in. from vessel center			23	
TFB-23	Cold leg, Spool 23, 91 in. from vessel center, upstream of vessel-side nozzle			24	
TFB-30	Hot leg, Spool 30, 16 in. from vessel center			25	
TFB-42	Cold leg, Spool 42, 414 in. from vessel center along hot leg, upstream of pump-side nozzle			26	Thermocouple failed for Test S-03-8.
<u>Downcomer Annulus</u>					
	Centered in annulus, Type J iron-constantan thermocouples	0-1,400°F	0-803°F		
TFV-ANN-35A	35 in. below cold leg centerline, 0°			27	
TFV-ANN-35T	35 in. below cold leg centerline, 270°			28	
<u>Upper Plenum</u>					
		0-2,300°F	0-1,017°F		
TFV-UP+13	In upper plenum 13.5 in. above cold leg centerline at 180°			29	
<u>Lower Plenum</u>					
	On fluid thermocouple rack, 1 in. from vessel center, 45°	0-2,300°F	0-1,017°F		
TFV-LP-7.5	7.5 in. from bottom			30	
TFV-LP-14.5	14.5 in. from bottom			31	Thermocouple connector failed for Tests S-03-5 and S-03-8.
TRV-LP-27.5	27.5 in. from bottom			32, 33	
<u>Core Grid Spacers</u>					
	Chromel-Alumel thermocouples unless specified otherwise	0-2,300°F	0-2,382°F		
<u>Grid Spacer 5</u>					
	55 in. below cold leg centerline, 21.5 in. above top of heated length				
TFG-5CD-45	Thermocouple in space defined by columns C and D, rows 4 and 5			34, 35	
<u>Grid Spacer 6</u>					
	76 in. below cold leg centerline, 1/2 in. above top of heated length				
TFG-6AB-45	Thermocouple in space defined by columns A and B, rows 4 and 5			36, 37	
TFG-6CD-45	Thermocouple in space defined by columns C and D, rows 4 and 5			38, 39	
TFG-6DE-45 -67	Thermocouples in space defined by columns D and E, rows 4 and 5, and 6 and 7			40, 41 42, 43	

TABLE V (contd.)

Measurement	Location and Comments [a]	Detector	Range [a]	Figure [a]	Measurement Comments [b]
			Data Acquisition System		
Core Grid Spacers (contd.)					
Grid Spacer 8	109 in. below cold leg centerline at center of heated length				
TFG-8CD-45	Thermocouple in space defined by columns C and D, rows 4 and 5			44, 45	
Grid Spacer 10	143 in. below cold leg centerline at bottom of heated length				
TFG-10CD-45	Thermocouple in space defined by columns C and D, rows 4 and 5			46, 47	
TFG-10DE-67	Thermocouple in space defined by columns D and E, rows 6 and 7			48, 49	
TFG-10EF-45	Thermocouple in space defined by columns E and F, rows 4 and 5			50, 51	
TFG-10GH-45	Thermocouple in space defined by columns G and H, rows 4 and 5			52, 53	
Steam Generator		0-2,300°F	0-591°F		
TFU-SG1	Secondary side, 12 in. above bottom of tube sheet			54, 55	Noise in data for Test S-03-6 and S-03-7 may be due to poorly grounded thermocouple.
TFU-SG2	Secondary side, 24 in. above bottom of tube sheet			56	
TFU-SG3	Secondary side, 48 in. above bottom of tube sheet			57	
TFU-SG4	Secondary side, 96 in. above bottom of tube sheet			58	
Pressure Suppression System		0-2,300°F	0-591°F		
TF-PSS-33	33 in. from bottom of tank			59	
TF-PSS-130	130 in. from bottom of tank			60	
MATERIAL TEMPERATURE	Chromel-Alumel thermocouples unless specified otherwise	0-2,300°F	0-591°F		
Intact Loop					
TMU-1T16	Hot leg, Spool 1, top, 1/16 in. from pipe ID, 29 in. from vessel center			61	
TMU-5B16	Hot leg, Spool 5, bottom, 1/16 in. from pipe ID, 102 in. from vessel center			62	
TMU-7S16	Cold leg, Spool 7, side, 1/16 in. from pipe ID, 242 in. from vessel center (vertical pipe)			63	
TMU-8S16	Cold leg, Spool 8, side, in pump trap, 1/16 in. from pipe ID, 195 in. from vessel center			64	
TMU-15B16	Cold leg, Spool 15, bottom, 1/16 in. from pipe ID, 1/16 in. from vessel center			65	
Broken Loop		0-2,300°F	0-591°F		
TMB-20T16	Cold leg, Spool 20, top, 1/16 in. from pipe ID, 71 in. from vessel center			66	
TMB-30T16	Hot leg, Spool 30, top, 1/16 in. from pipe ID, 16 in. from vessel center			--	Thermocouple failed due to external junction.
TMB-40B16	Cold leg, Spool 40, discharge of simulated pump, vertical section, side, 1/16 in. from pipe ID, 368 in. from vessel center along hot leg			67	
Vessel Filler Insulator		0-1,400°F	0-803°F		
TIV-FO-35M	35 in. below cold leg centerline, 180°			68	
Core Barrel		0-1,400°F	0-803°F		
TMV-CO-35A	35 in. below cold leg centerline, 1/16 in. from core barrel OD, 0°			69	
TMV-CO-115M	115 in. below cold leg centerline, 1/16 in. from core barrel OD, 180°			70	Data not recorded for Tests S-03-6 and S-03-7.

TABLE V (contd.)

Measurement	Location and Comments [a]	Detector	Range [a]		Figure [a]	Measurement Comments [b]
				Data Acquisition System		
<u>Core Barrel (contd.)</u>						
TMV-CI-70A	70 in. below cold leg centerline, 1/16 in. from core barrel ID, 0°				71	Data not recorded for Tests S-03-6 and S-03-7.
TMV-CI-95M	95 in. below cold leg centerline, 1/16 in. from core barrel ID, 180°				72	Thermocouple failed for S-03-5, S-03-6 and S-03-7, due to external junction.
<u>Core Housing Filler</u>		0-2,300°F	0-591°F			
TMV-HF-115W	On core housing filler, 115 in. below cold leg centerline, 0.20 in. from outer surface, 315°				73	
TMV-HF-127W	On core housing filler, 127 in. below cold leg centerline, 0.20 in. from outer surface, 315°				74	
TMV-HF-138W	On core housing filler, 138 in. below cold leg centerline, 0.20 in. from outer surface, 315°				75	
CORE HEATER CLADDING TEMPERATURES						
<u>High Power Heaters</u>		0-2,300°F	0-2,382°F			
TH-D4-14	Heater at column D row 4. Thermocouples 14 in. (270°) and 29 in. (315°) above bottom of core				76	
-29					77	
TH-D5-09	Heater at column D row 5. Thermocouples 9 in. (45°), 29 in. (225°) and 39 in. (135°) above bottom of core				78	
-29					79	
-39					80	
TH-E4-23	Heater at column E row 4. Thermocouples 23 in. (90°) and 27 in. (0°) above bottom of core				81	
-27					82	
TH-E5-21	Heater at column E row 5. Thermocouples 21 in. (180°) and 25 in. (90°) above bottom of core				83	
-25					84	
<u>Low Power Heaters</u>		0-2,300°F	0-2,382°F			
TH-A4-09	Heater at column A row 4. Thermocouples 9 in. (105°), 29 in. (240°) and 39 in. (300°) above bottom of core				85	
-29					86	
-39					87	
TH-A5-29	Heater at column A row 5. Thermocouples 29 in. (180°) and 44 in. (255°) above bottom of core				88	
-44					89	
TH-B3-32	Heater at column B row 3. Thermocouples 32 in. (135°) and 52 in. (195°) above bottom of core				90	
-52					--	Thermocouple failed.
TH-B5-29	Heater at column B row 5. Thermocouples 29 in. (150°) and 38 in. (240°) above bottom of core				91	
-38					92	
TH-B6-29	Heater at column B row 6. Thermocouple 29 in. (45°) above bottom of core				93	
TH-C2-28	Heater at column C row 2. Thermocouples 28 in. (135°) and 38 in. (225°) above bottom of core				94	
-38					95	
TH-C3-13	Heater at column C row 3. Thermocouples 13 in. (285°), 28 in. (0°) and 60 in. (150°) above bottom of core				96	
-28					97	
-60					98	
TH-C4-26	Heater at column C row 4. Thermocouples 26 in. (75°) and 53 in. (300°) above bottom of core				99	
-53					100	
TH-C5-28	Heater at column C row 5. Thermocouples 28 in. (315°) and 44 in. (45°) above bottom of core				101	
-44					102	
TH-C6-32	Heater at column C row 6. Thermocouple 32 in. (225°) above bottom of core				103	
TH-C7-15	Heater at column C row 7. Thermocouple 15 in. (255°) above bottom of core				104	
TH-D1-21	Heater at column D row 1. Thermocouple 21 in. (330°) above bottom of core				105	
TH-D2-14	Heater at column D row 2. Thermocouples 14 in. (0°) and 61 in. (270°) above bottom of core				106	
-61					107	

TABLE V (contd.)

Measurement	Location and Comments [a]	Detector	Range [a]	Figure [a]	Measurement Comments [b]
			Data Acquisition System		
Low Power Heaters (contd.)					
TH-D3-29	Heater at column D row 3. Thermocouples 29 in. (150°) and 39 in. (225°) above bottom of core			108	Response is typical of thermocouples at a higher elevation; however, axial location has been verified in a cold reflux test.
-39				109	
TH-D6-15	Heater at column D row 6. Thermocouples 15 in. (90°) and 25 in. (255°) above bottom of core			110	
-25				111	
TH-D7-20	Heater at column D row 7. Thermocouple 20 in (60°) above bottom of core			112	
TH-D8-26	Heater at column D row 8. Thermocouple 26 in. (180°) above bottom of core			113	
TH-E1-33	Heater at column E row 1. Thermocouples 33 in. (60°) and 54 in. (0°) above bottom of core			114	
-54				115	
TH-E2-21	Heater at column E row 2. Thermocouples 21 in. (210°) and 33 in. (315°) above bottom of core			116	
-33				117	
TH-E3-05	Heater at column E row 3. Thermocouples 5 in. (15°), 20 in. (165°) and 24 in. (15°) above bottom of core			118	
-20				119	
-24				120	
TH-E6-08	Heater at column E row 6. Thermocouples 8 in. (150°), 28 in. (285°), and 37 in. (330°) above bottom of core			121	
-28				122	
-37				123	
TH-E7-13	Heater at column E row 6. Thermocouples 13 in. (45°) and 44 in. (195°) above bottom of core			124	
-44				125	
TH-E8-14	Heater at column E row 8. Thermocouples 14 in. (150°), 29 in. (225°) and 45 in. (300°) above bottom of core			126	
-29				127	
-45				128	
TH-F2-22	Heater at column F row 2. Thermocouples 22 in. (105°) and 25 in. (0°) above bottom of core			129	
-25				130	
TH-F3-15	Heater at column F row 3. Thermocouples 15 in. (240°) and 22 in. (105°) above bottom of core			131	
-22				132	
TH-F4-14	Heater at column F row 4. Thermocouples 14 in. (90°), 20 in. (165°), and 44 in. (210°) above bottom of core			133	
-20				134	
-44				135	
TH-F5-20	Heater at column F row 5. Thermocouples 20 in. (255°), 26 in. (165°), 33 in. (315°) and 53 in. (30°) above bottom of core			136	
-26				137	
-33				138	
-53				139	
TH-F6-08	Heater at column F row 6. Thermocouples 8 in. (60°) and 28 in. (135°) above bottom of core			140	
-28				141	
TH-F7-29	Heater at column F row 7. Thermocouples 29 in. (150°) and 39 in. (210°) above bottom of core			142	
39				143	
TH-G3-13	Heater at column G row 3. Thermocouples 13 in. (150°) and 45 in. (270°) above bottom of core			144	
-45				145	
TH-G4-09	Heater at column G row 4. Thermocouples 9 in. (130°), 29 in. (300°), 33 in. (225°) and 38 in. (30°) above bottom of core			146	TH-G4-09 failed for Tests 3-03-6 and 3-03-7.
-29				147	
-33				148	
-38				149	
TH-G5-14	Heater at column G row 5. Thermocouples 14 in. (45°) and 24 in. (330°) above bottom of core			150	
-24				151	
TH-G6-33	Heater at column G row 6. Thermocouple 33 in. (135°) above bottom of core			152	Thermocouple opened momentarily at quench; transients attenuated at 1240°F.
TH-H5-28	Heater at column H row 5. Thermocouple 28 in. (150°) above bottom of core			153	

TABLE V (contd.)

Measurement	Location and Comments [a]	Range [a]		Figure [a]	Measurement Comments [b]
		Detector	Data Acquisition System		
<u>Steam Generator</u>					
TMU-SG1	On steam generator tubes, 12 in. above bottom of tube sheet, on OD of tube	0-2,300°F	0-591°F	154	
TMU-SG2	On steam generator tubes, 24 in. above bottom of tube sheet, on OD of tube			155	
TMU-SG3	On steam generator tubes, 48 in. above bottom of tube sheet, on OD of tube			156	
TMU-SG4	On steam generator tubes, 96 in. above bottom of tube sheet, on OD of tube			157	
<u>PRESSURE</u>					
<u>Vessel</u>					
PV-UP+10	In upper plenum, 10 in. above cold leg centerline, mounted on standoff, 30°	0-250 psi	0-330.7 psia	158	
PV-IANN-9	In vessel inlet annulus, 9 in. below cold leg centerline, mounted on standoff, 225°	0-250 psi	0-345.5 psia	159	Source of signal noise for Tests S-03-6 and S-03-7 has not been identified.
<u>ECC System</u>					
PU-ECC-ACC	In intact loop accumulator	0-750 psi	0-720 psia	160, 161	
<u>Steam Generator</u>					
PU-SGSD	Secondary side, steam dome	0-3,000 psi	0-1,521 psia	162	
<u>Pressure Suppression System</u>					
P-PSS	Suppression tank top	0-750 psi	0-321 psia	163	
P-PSS-HD	In suppression tank header	0-200 psi	0-380 psia	164	Data not recorded for Test S-03-6 and S-03-7.
<u>DIFFERENTIAL PRESSURE</u>					
	Elevation difference between transducer taps is zero unless otherwise specified				Differential pressure data may contain zero shifts; use for transient response only.
<u>Intact Loop</u>					
DPU-UP-1	Upper plenum, 10.5 in. above cold leg centerline at 30° to intact loop hot leg Spool 1, 31 in. from vessel center. Upper plenum tap is ~2 in. above Spool 1 tap	±50 in. water	±2.5 psid	165	Data not recorded for Test S-03-8.
DPU-UP-1L	Upper plenum, 10.5 in. above cold leg centerline at 30° to intact loop hot leg Spool 1, 31 in. from vessel center. Upper plenum tap is ~2 in. above Spool 1 tap (low range)	±20 in. water	±1.0 psid	166, 167	
DPU-1-3	Hot leg, Spool 1, 31 in. from vessel center to hot leg, Spool 3, 62 in. from vessel center	±50 in. water	±2.5 psid	168, 169	
DPU-1-3L	Hot leg, Spool 1, 31 in. from vessel center to hot leg, Spool 3, 62 in. from vessel center (low range)	±20 in. water	±1.0 psid	170, 171	
DPU-3-7	Across steam generator, hot leg, Spool 3, 62 in. from vessel center to cold leg Spool 7, 231 in. from vessel center. Spool 3 tap approximately 18 in. above Spool 7 tap	±500 in. water	±25 psid	172, 173	
DPU-3-7L	Across steam generator, hot leg, Spool 3, 62 in. from vessel center to cold leg Spool 7, 231 in. from vessel center. Spool 3 tap approximately 18 in. above Spool 7 tap (low range)	±50 in. water	±2.5 psid	174, 175	
DPU-3-SGIP	Across inlet orifice of steam generator; hot leg, Spool 3, 62 in. from vessel center to steam generator inlet plenum, 145 in. from vessel center. Spool 3 tap is 16 in. below SGIP tap	±50 in. water	±2.5 psid	176, 177	
DPU-SGIP-SG1	Steam generator inlet plenum, 145 in. from vessel center to 12.25 in. above bottom of tube sheet. SG1 tap is 24 in. above SGIP tap	±300 in. water	±15 psid	--	Measurement failed due to drainage of senselines.

TABLE V (contd.)

Intact Loop (contd.)

DPU-SG1-SG2	Across primary side tubes, 12 to 24 in. above bottom of tube sheet. SG1 tap is 12 in. below SG2 tap	±20 in. water	±1.0 psid	--	Measurement failed due to drainage of sense lines.
DPU-SG2-SG3	Across primary side tubes, 24 to 48 in. above bottom of tube sheet. SG2 tap is 24 in. below SG3 tap	±50 in. water	±2.5 psid	--	Measurement failed due to drainage of sense lines.
DPU-SG3-SG4	Across primary side tubes, 48 to 96 in. above bottom of tube sheet. SG3 tap is 48 in. below SG4	±50 in. water	±2.5 psid	--	Measurement failed due to drainage of sense lines.
DPU-SGOP-7	From steam generator outlet plenum, 269 in. from vessel center along cold leg to cold leg Spool 7, 231 in. from vessel center, including orifice. Spool 7 tap is 35 in. below SGOP tap	±500 in. water	±25 psid	178	
DPU-7-10	Steam generator outlet to pump inlet, cold leg Spool 7, 231 in. from vessel center to cold leg Spool 10, 141 in. from vessel center	±20 in. water	±1.0 psid	179	
DPU-8C-7	From pump inlet, cold leg Spool 8, tap 8C, 197 in. from vessel center to steam generator outlet, cold leg Spool 7, 231 in. from vessel center. Tap 8C is 32 in. below Spool 7 tap	±100 in. water	±5.0 psid	180, 181	Questionable data; polarity may be reversed.
DPU-8C-8D	In pump inlet, cold leg Spool 8, tap 8C, 197 in. from vessel center to tap 8D, 184 in. from vessel center. Tap 8C is 10 in. below tap 8D	±20 in. water	±1.0 psid	182, 183	
DPU-12-10L	Pump outlet to pump inlet, cold leg Spool 12, 75 in. from vessel center to cold leg Spool 10, 141 in. from vessel center. Spool 10 tap is 10 in. below Spool 12 tap (low range)	±100 in. water	±5.0 psid	184, 185	
DPU-15-1	Cold leg to hot leg, cold leg Spool 15, 16 in. from vessel center to hot leg Spool 1, 31 in. from vessel center. Spool 15 tap is 8.5 in. below Spool 1 tap	±500 in. water	±25 psid	186, 187	
DPU-15-1L	Cold leg to hot leg, cold leg Spool 15, 16 in. from vessel center to hot leg Spool 1, 31 in. from vessel center. Spool 15 tap is 8.5 in. below Spool 1 tap (low range)	±100 in. water	±5.0 psid	188, 189	
DPU-15-IANN	Cold leg Spool 15, 16 in. from vessel center to inlet annulus 9 in. below cold leg centerline at 225°. Spool 15 tap is 9 in. above inlet annulus tap	±100 in. water	±5.0 psid	190, 191	
DPU-15-ATM	Cold leg Spool 15, 16 in. from vessel center to atmosphere	±100 psi	±100 psid	192	
<u>Broken Loop</u>					
DPB-21-IANN	Cold leg Spool 21, 49 in. from vessel center to vessel inlet annulus, 9 in. below cold leg centerline at 225°. Inlet annulus tap 9 in. below Spool 21 tap	±100 in. water	±5.0 psid	193, 194	
DPB-21-23	Cold leg Spool 21, 49 in. from vessel center to cold leg Spool 23, 92 in. from vessel center	±20 in. water	±1.0 psid	195, 196	
DPB-23-CNI	Cold leg Spool 23, 92 in. from vessel center to vessel-side nozzle throat, 96 in. from vessel center	±100 in. water	±5.0 psid	197, 198	Data acquisition system saturated at 5.0 psid for tests S-03-6 and S-03-7.
DPB-CN1-CN4	Vessel-side nozzle, nozzle throat, 96 in. from vessel center to nozzle divergent section, 101 in. from vessel center	±300 in. water	±15. psid	199, 200	
DPA-UP-30	Vessel upper plenum 10.5 in. above cold leg centerline at 30° to hot leg Spool 30, 18 in. from vessel center. Upper plenum tap is 2 in. above Spool 30 tap	±50 in. water	±2.5 psid	201, 202	
DPB-30-36L	Across entire simulated steam generator assembly, hot leg Spool 30, 18 in. from vessel center to cold leg Spool 36 lower tap, 242 in. from vessel center. Spool 30 tap is 19 in. below Spool 36 lower tap	±500 psi	±500 psid	203, 204	Note large zero shift on data for Tests S-03-6 and S-03-7.
DPB-30-38	Across entire simulated steam generator assembly and instrument spool downstream of simulated steam generator, hot leg Spool 30, 18 in. from vessel center to cold leg Spool 38, 305 in. from vessel center along hot leg. Spool 30 is 40 in. above Spool 38	±500 in. water	±25. psid	205, 206	Note large zero shift in data for Tests S-03-6 and S-03-7.

TABLE V (contd.)

Measurement	Location and Comments [a]	Range [a]		Figure [a]	Measurement Comments [b]
		Detector	Data Acquisition System		
<u>Broken Loop (contd.)</u>					
DPB-30-32U	Hot leg Spool 30, 18 in. from vessel center to Spool 32 upper tap, 73 in. from vessel center. Spool 30 tap is 30 in. below Spool 32 upper tap	±50 in. water	±2.5 psid	207, 208	
DPB-32U-36L	Across simulated steam generator orifice assembly, hot leg Spool 32 upper tap, 73 in. from vessel center to Spool 36 lower tap, 242 in. from vessel center. Spool 32 upper tap is 16 in. above Spool 36 lower tap	±300 in. water	±15. psid	209, 210	Note large zero shift in data for Tests S-03-6 and S-03-7.
DPB-38-40	Across simulated pump, cold leg Spool 38, 305 in. from vessel center along hot leg to cold leg Spool 40, 365 in. from vessel center along hot leg	±500 psi	±500 psid	211, 212	
DPB-40-42	Across elbow leading to spool upstream of pump-side nozzle, cold leg Spool 40, 365 in. from vessel center along hot leg to Spool 42, 415 in. from vessel center along hot leg. Spool 40 tap is 40 in. below Spool 42 tap	±50 in. water	±2.5 psid	213, 214	Questionable data.
DPB-42-HN1	Spool 42 upstream of pump-side nozzle, 415 in. from vessel center along hot leg to nozzle throat, 419 in. from vessel center along hot leg	±50 in. water	±2.5 psid	215, 216	
<u>Vessel</u>					
DPV-UP-1ANN	Upper plenum, 10.5 in. above cold leg centerline at 30° to inlet annulus 9 in. below cold leg centerline at 225°. Elevation difference between taps is 19 in.	±300 in. water	±15. psid	217, 218	
DPV-9-26QQ	Inlet annulus, 9 in. below cold leg centerline at 225° to downcomer gap 26 in. below cold leg centerline at 225°. Elevation difference between taps is 17 in.	±20 in. water	±1.0 psid	219, 220	
DPV-9-180QQ	Inlet annulus, 9 in. below cold leg centerline at 225° to lower plenum, 180 in. below cold leg centerline at 225°. Elevation difference between taps is 171 in.	±500 in. water	±25. psid	221, 222	
DPV-26-55QM	Across part of downcomer, 26 in. (225°) to 55 in. (180°) below centerline of cold leg. Elevation difference between taps is 29 in.	±50 in. water	±2.5 psid	223, 224	
DPV-55-110AM	Across part of downcomer, 55 in. (0°) to 110 in. (180°) below cold leg centerline. Elevation difference between taps is 55 in.	±50 in. water	±5.0 psid (overranged to 100 in. water)	225, 226	
DPV-110-156MQ	Across part of downcomer, 110 in. (180°) to 156 in. (225°) below cold leg centerline. Elevation difference between taps is 46 in.	±100 in. water	±5.0 psid	227, 228	
DPV-156-173QQ	Across downcomer exit, 7 in. above exit to 10 in. below exit, taps at 156 in. (225°) and 173 in. (225°) below cold leg centerline. Elevation difference between taps is 17 in.	±20 in. water	±1.0 psid	229	
DPV-166-191QT	Across lower plenum, 166 in. (225°) to 191 in. (270°) below cold leg centerline. Elevation difference between taps is 25 in.	±50 in. water	±2.5 psid	230	Date not recorded for Tests S-03-6 and S-03-7.
DPV-LP-UP	Lower plenum, 180 in. below cold leg centerline at 225° to upper plenum 10.5 in. above cold leg centerline at 30°. Elevation difference between taps is 191 in.	±300 in. water	±15. psid	231, 232	
DPV-LP-UPL	Lower plenum, 180 in. below cold leg centerline at 225° to upper plenum 10.5 in. above cold leg centerline at 30°. Elevation difference between taps is 191 in. (low range)	±50 in. water	±2.5 psid	--	Transducer failed.
DPV-UP-1	Upper plenum, 10.5 in. above cold leg centerline at 30° to intact loop hot leg Spool 1, 31 in. from vessel center. Upper plenum tap is 2 in. above Spool 1 tap	±50 in. water	±2.5 psid	165	Data not recorded for Test S-03-8.
DPV-UP-1L	Upper plenum, 10.5 in. above cold leg centerline at 30° to intact loop hot leg Spool 1, 31 in. from vessel center. Upper plenum tap is 3 in. above Spool 1 tap (low range)	±20 in. water	±1.0 psid	166, 167	

TABLE V (contd.)

		Range [a]			
Measurement	Location and Comments [a]	Detector	Data Acquisition System	Figure [a]	Measurement Comments [b]
Vessel (contd.)					
DPU-15-IANN	Cold leg Spool 15, 16 in. from vessel center to inlet annulus 9 in. below cold leg centerline at 225°. Spool 15 tap is 9 in. above inlet annulus tap	±100 in. water	±5.0 psid	190, 191	
DPB-21-IANN	Cold leg Spool 21, 49 in. from vessel center to vessel inlet annulus, 9 in. below cold leg centerline at 225°. Inlet annulus tap is 9 in. below Spool 21 tap	±100 in. water	±5.0 psid	193, 194	
DPVC-83W-UP	Upper segment of active core region 89 in. below cold leg centerline (315°) to upper plenum core tube 10.5 in. above cold leg centerline (30°). Elevation difference between taps is 100 in.	±100 in. water	±5.0 psid	233	Data acquisition system remained saturated at 5.0 psid throughout Tests S-03-6 and S-03-7; data not reported.
DPVC-83-100WQ	In active core region, upper segment, 89 in. below cold leg centerline (315°) to 106 in. below cold leg centerline (225°). Elevation difference between taps is 17 in.	±50 in. water	±2.5 psid	234	
DPVC-100-117QJ	Across center segment of active core region 106 in. below cold leg centerline (225°) to 122 in. below cold leg centerline (135°). Elevation difference between taps is 16 in.	±100 in. water	±5.0 psid	235	
DPVC-117-133JD	In active core region, lower segment, 122 in. below cold leg centerline (135°) to 140 in. below cold leg centerline (45°). Elevation difference between taps is 18 in.	±100 in. water	±5.0 psid	236	
DPVC-133-191DT	Lower segment of active core region 140 in. below cold leg centerline (45°) to 191 in. below cold leg centerline (270°). Elevation difference between taps is 51 in.	±100 in. water	±5.0 psid	237	
Steam Generator					
DPU-SG1-SG2	Across primary side tubes, 12 to 24 in. above bottom of tube sheet. SG1 tap is 12 in. below SG2 tap	±20 in. water	±1.0 psid	--	Measurement failed due to drainage of the sense lines.
DPU-SG2-SG3	Across primary side tubes, 24 to 48 in. above bottom of tube sheet. SG2 tap is 24 in. below SG3 tap	±50 in. water	±2.5 psid	--	
DPU-SG3-SG4	Across primary side tubes, 48 to 96 in. above bottom of tube sheet. SG3 tap is 48 in. below SG4 tap	±50 in. water	±2.5 psid	--	
DPU-SGWP-7	Outlet plenum to inlet loop hot leg Spool 7, including orifice. SGOP tap is 7 in. above Spool 7 tap	±500 in. water	±75 psid	178	
DPU-SG-SEC	Secondary side, differential pressure taps at 45 and 126 in. above bottom of tube sheet. Elevation difference between taps is 81 in.	±100 in. water	±5.0 psid	238	Data not recorded for Tests S-03-5 and S-03-8.
VOLUMETRIC FLOW RATE					
Intact Loop					
FTU-1	Hot leg, Spool 1, 18 in. from vessel center	±20-±400 gpm	±1800 gpm	239, 240	Measurement is unidirectional for Test S-03-8.
FTU-9	Cold leg, Spool 9, 154 in. from vessel center	±80-±800 gpm	±1800 gpm	241, 242	Turbine failed for Test S-03-6.
FTU-13	Cold leg, Spool 13, 64 in. from vessel center	±20-±800 gpm	±1800 gpm	243, 244	
FTU-15	Cold leg, Spool 15, 29 in. from vessel center	±20-±800 gpm	±1800 gpm	245, 246	
Broken Loop					
All measurements bidirectional, Schedule 160 pipe					
FTB-21	Cold leg, Spool 21, 58 in. from vessel center, 3-in. pipe	±20-±400 gpm	±1800 gpm	247, 243	
FTB-30	Hot leg, Spool 30, 25 in. from vessel center, 3-in. pipe	±20-±400 gpm	±800 gpm	--	Failed due to improper detector range.
FTB-37	Cold leg, Spool 37, 290 in. from vessel center along hot leg, 2-in. pipe	±3.0-±60	±800 gpm	249, 250	Data not recorded for Test S-03-8.

TABLE V (contd.)

Measurement	Location and Comments [a]	Range [a]		Figure [a]	Measurement Comments [b]
		Detector	Data Acquisition System		
<u>Core</u>					
FTV-CORE-IN	Entrance to core, ~158 in. below cold leg centerline	± 2.5 - ± 50 gpm	± 150 gpm	251, 252 253, 254	
<u>ECC System</u>					
FTU-LPIS	In line leading from LPIS for intact loop, 1/2-in. line	± 0.5 - ± 7.5 gpm	± 5.0 gpm	255, 256	
FTU-ACC	In line immediately after intact loop accumulator, 1-in. line	± 5.0 - ± 60 gpm	± 35 gpm	257, 258	
FLUID VELOCITY	Turbine flowmeter, bidirectional				
<u>Downcomer Gap</u>					
FTV-40A	40 in. below cold leg centerline, 0°	± 2.5 - ± 50 ft/sec	± 50 ft/sec	259, 260, 261, 262	
FTV-40M	40 in. below cold leg centerline, 180°	± 2.5 - ± 50 ft/sec	± 50 ft/sec	263, 264, 265, 266	
MOMENTUM FLUX	Range of drag disc is bidirectional. Computer conversion of voltage output to momentum flux is unidirectional and therefore shows magnitude only				
<u>Intact Loop</u>					
FDU-1	Hot leg, Spool 1, 29 in. from vessel center, target size 1.0 in.	± 0 -2,000 ² lbm/ft-sec ²	± 0 -4,100 ² lbm/ft-sec ²	267, 268, 269, 270	
<u>Vessel</u>					
FDV-CORE-IN	In core flow mixer box, 150 in. below cold leg centerline, target size	± 0 - $\pm 2,000$ ² lbm/ft-sec ²	± 0 - $\pm 1,500$ ² lbm/ft-sec ²	271, 272, 273, 274	
<u>DENSITY</u>					
<u>Intact Loop</u>					
GU-1VR	Hot leg, Spool 1, 24 in. from vessel center, vertical	0.1-100 ³ lbm/ft ³	0-100 ³ lbm/ft ³	275, 276, 277, 278	
GU-1HZ	Hot leg, Spool 1, 26 in. from vessel center, horizontal			279, 280, 281, 282	
GU-5VR	Hot leg, Spool 5, 96 in. from vessel center, vertical			283, 284, 285, 286	
GU-10VR	Cold leg, Spool 10, 141 in. from vessel center, vertical			287, 288, 289, 290	
GU-13VR	Cold leg, Spool 13, 59 in. from vessel center, vertical			291, 292, 293, 294	
GU-15HZ	Cold leg, Spool 15, 20 in. from vessel center, horizontal			295, 296, 297, 298	
GU-15VR	Cold leg, Spool 15, 23 in. from vessel center, vertical			299, 300, 301, 302	
<u>Broken Loop</u>					
GB-21VR	Cold leg, Spool 21, 49 in. from vessel center, vertical			303, 304, 305, 306	
GB-23VR	Cold leg, Spool 23, 92 in. from vessel center, vertical			307, 308, 309, 310	
GB-30VR	Hot leg, Spool 30, 18 in. from vessel center, vertical			311, 312, 313, 314	
GB-42VR	Cold leg, Spool 42, 415 in. from vessel center along hot leg, vertical			315, 316, 317, 318	
<u>Vessel</u>					
GV-150HZ	Core flow mixer box, 152 in. below cold leg centerline, horizontal, 0-180°	0.1-100 ³ lbm/ft ³	0-100 ³ lbm/ft ³	319, 320, 321, 322	
GV-161/192D	Lower plenum 161 in. below cold leg centerline (270°) to 192 in. below cold leg centerline (90°), 21 in. vertical 32.2 in. diagonal			323, 324, 325, 326	
GVLP-165HZ	Upper part of lower plenum, 165 in. below cold leg centerline, 1.724 in. below downcomer exit, horizontal, 0-180°			327, 328, 329, 330	
GVLP-172HZ	Lower plenum, 172 in. below cold leg centerline, 8.729 in. below downcomer exit, horizontal, 90-270°			331, 332, 333, 334	

TABLE V (contd.)

		Range [a]			
Measurement	Location and Comments [a]	Detector	Data Acquisition System	Figure [a]	Measurement Comments [a]
MASS FLOW RATE	Mass flow rate obtained by combining density (gamma attenuation technique) with volumetric flow rate (turbine flowmeter) or momentum flux (drag-disc)	Range for mass flow is determined from range of individual detectors used in calculation.			
<u>Vessel</u>					
FTV-COR-IN	Entrance to core			335, 336,	
GV-COR-150HZ				337, 338	
FDV-COR-IN	Entrance to core			339, 340,	
GV-COR-150HZ				341, 342	
<u>CORE CHARACTERISTICS</u>					
PWRCOR T-1	Core power		1,600 kW	343, 344,	
				345, 346	
PWRCOR T-2	Core power		1,500 kW	347, 348	
VOLTCOR-T	Core volts		200 Volts	349	
AMPCOR-T	Core amps		10,000 Ampe	350	
[a]	Statements at the beginning of a measurement category regarding the location and comments, range, and figure apply to all subsequent measurements within the category unless otherwise specified.				
[b]	Detectors which were subjected to overrange conditions during portions of the test were capable of withstanding these conditions without change in operating or measuring characteristics when the physical conditions were again within the detector range.				

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Fig. 7 Fluid temperature in intact loop, Spool 1 (TFU-1).

Fig. 8 Fluid temperature in intact loop, Spool 2 (RBU-2).

Fig. 9 Fluid temperature in intact loop, Spool 2 (TSU-2).

Fig. 10 Fluid temperature in intact loop, Spool 6 (TSU-6).

Fig. 11 Fluid temperature in intact loop, Spool 7, Tests S-03-5 and S-03-8 (TSU-7).

Fig. 12 Fluid temperature in intact loop, Spool 7, Test S-03-6 (TSU-7).

Fig. 13 Fluid temperature in intact loop, Spool 7, Test S-03-7 (TSU-7).

Fig. 14 Fluid temperature in intact loop, Spool 8, Tests S-03-5 and S-03-8 (TFU-8).

Fig. 15 Fluid temperature in intact loop, Spool 8, Test S-03-6 (TFU-8).

Fig. 16 Fluid temperature in intact loop, Spool 8, Test S-03-7 (TFU-8).

Fig. 17 Fluid temperature in intact loop, Spool 10, Tests S-03-5 and S-03-8 (TFU-10).

Fig. 18 Fluid temperature in intact loop, Spool 10, Tests S-03-6 (TFU-10).

Fig. 19 Fluid temperature in intact loop, Spool 10, Tests S-03-7 (TFU-10).

Fig. 20 Fluid temperature in intact loop, Spool 12 (TSU-12).

Fig. 21 Fluid temperature in intact loop, Spool 14 (TFU-14B).

Fig. 22 Fluid temperature in intact loop, Spool 14 (RBU-14).

Fig. 23 Fluid temperature in broken loop, Spool 20 (TFB-20).

Fig. 24 Fluid temperature in broken loop, Spool 23 (TFB-23).

Fig. 25 Fluid temperature in broken loop, Spool 30 (TFB-30).

Fig. 26 Fluid temperature in broken loop, Spool 42 (TFB-42).

Fig. 27 Fluid temperature in downcomer annulus (TFV-ANN-35A).

Fig. 28 Fluid temperature in downcomer annulus (TFV-ANN-35T).

Fig. 29 Fluid temperature in upper plenum (TFV-UP+13).

Fig. 30 Fluid temperature in lower plenum (TFV-LP-7.5).

Fig. 31 Fluid temperature in lower plenum, Tests S-03-6 and S-03-7 (TFV-LP-14.5).

Fig. 32 Fluid temperature in lower plenum, Tests S-03-5 and S-03-8 (TFV-LP-27.5).

Fig. 33 Fluid temperature in lower plenum, Tests S-03-6 and S-03-7 (TFV-LP-27.5).

Fig. 34 Fluid temperature in core, Grid Spacer 5, Tests S-03-5 and S-03-8 (TFG-5CD-45).

Fig. 35 Fluid temperature in core, Grid Spacer 5, Tests S-03-6 and S-03-7 (TFG-5CD-45).

Fig. 36 Fluid temperature in core, Grid Spacer 6, Tests S-03-5 and S-03-8 (TFG-6AB-45).

Fig. 37 Fluid temperature in core, Grid Spacer 6, Tests S-03-6 and S-03-7 (TFG-6AB-45).

Fig. 38 Fluid temperature in core, Grid Spacer 6, Tests S-03-5 and S-03-8 (TFG-6CD-45).

Fig. 39 Fluid temperature in core, Grid Spacer 6, Tests S-03-6 and S-03-7 (TFG-6CD-45).

Fig. 40 Fluid temperature in core, Grid Spacer 6, Tests S-03-5 and S-03-8 (TFG-6DE-45).

Fig. 41 Fluid temperature in core, Grid Spacer 6, Tests S-03-6 and S-03-7 (TFG-6DE-45).

Fig. 42 Fluid temperature in core, Grid Spacer 6, Tests S-03-5 and S-03-8 (TFG-6DE-67).

Fig. 43 Fluid temperature in core, Grid Spacer 6, Tests S-03-6 and S-03-7 (TFG-6DE-67).

Fig. 44 Fluid temperature in core, Grid Spacer 8, Tests S-03-5 and S-03-8 (TFG-8CD-45).

Fig. 45 Fluid temperature in core, Grid Spacer 8, Tests S-03-6 and S-03-7 (TFG-8CD-45).

Fig. 46 Fluid temperature in core, Grid Spacer 10, Tests S-03-5 and S-03-8 (TFG-10CD-45).

Fig. 47 Fluid temperature in core, Grid Spacer 10, Tests S-03-6 and S-03-7 (TFG-10CD-45).

Fig. 48 Fluid temperature in core, Grid Spacer 10, Tests S-03-5 and S-03-8 (TFG-10DE-67).

Fig. 49 Fluid temperature in core, Grid Spacer 10, Test S-03-6 and S-03-7 (TFG-10DE-67).

Fig. 50 Fluid temperature in core, Grid Spacer 10, Tests S-03-5 and S-03-8 (TFG-10EF-45).

Fig. 51 Fluid temperature in core, Grid Spacer 10, Tests S-03-6 and S-03-7 (TFG-10EF-45).

Fig. 52 Fluid temperature in core, Grid Spacer 10, Tests S-03-5 and S-03-8 (TFG-10GH-45).

Fig. 53 Fluid temperature in core, Grid Spacer 10, Tests S-03-6 and S-03-7 (TFG-10GH-45).

Fig. 54 Fluid temperature in steam generator, Tests S-03-5 and S-03-8 (TFU-SG1).

Fig. 55 Fluid temperature in steam generator, Tests S-03-6 and S-03-7 (TFU-SG1).

Fig. 56 Fluid temperature in steam generator (TFU-SG2).

Fig. 57 Fluid temperature in steam generator (TFU-SG3).

Fig. 58 Fluid temperature in steam generator (TFU-SG4).

Fig. 59 Fluid temperature in pressure suppression tank (TF-PSS-33).

Fig. 60 Fluid temperature in pressure suppression tank (TF-PSS-130).

Fig. 61 Material temperature in intact loop, Spool 1 (TMU-1T16).

Fig. 62 Material temperature in intact loop, Spool 5 (TMU-5B16).

Fig. 63 Material temperature in intact loop, Spool 7 (TMU-7S16).

Fig. 64 Material temperature in intact loop, Spool 8 (TMU-8S16).

Fig. 65 Material temperature in intact loop, Spool 15 (TMU-15B16).

Fig. 66. Material temperature in broken loop, Spool 20 (TMB-20T16).

Fig. 67 Material temperature in broken loop, Spool 40 (TMB-40S16).

Fig. 68 Material temperature in vessel filler insulator (TIV-F0-35M).

Fig. 69 Material temperature in core barrel (TMV-CO-35A).

Fig. 70 Material temperature in core barrel, Tests S-03-5 and S-03-8 (TMV-CO-115M).

Fig. 71 Material temperature in core barrel, Tests S-03-5 and S-03-8 (TMV-CI-70A).

Fig. 72 Material temperature in core barrel, Test S-03-8 (TMV-CI-95M).

Fig. 73 Material temperature in core housing filler (TMV-HF-115W).

Fig. 74 Material temperature in core housing filler (TMV-HF-127W).

Fig. 75 Material temperature in core housing filler (TMV-HF-138W).

Fig. 76 Core heater temperature, Rod D-4 (TH-D4-14).

Fig. 77 Core heater temperature, Rod D-4 (TH-D4-29).

Fig. 78 Core heater temperature, Rod D-5 (TH-D5-09).

Fig. 79 Core heater temperature, Rod D-5 (TH-D5-29).

Fig. 80. Core heater temperature, Rod D-5 (TH-D5-39).

Fig. 81. Core heater temperature, Rod E-4 (TH-E4-23).

Fig. 82. Core heater temperature, Rod E-4 (TH-E4-27).

Fig. 83 Core heater temperature, Rod E-5 (TH-E5-21).

Fig. 84. Core heater temperature, Rod E-5 (TH-E5-25).

Fig. 85. Core heater temperature, Rod A-4 (TH-A4-09).

Fig. 86 Core heater temperature, Rod A-4 (TH-A4-29).

Fig. 87 Core heater temperature, Rod A-4 (TH-A4-39).

Fig. 88 Core heater temperature, Rod A-5 (TH-A5-29).

Fig. 89 Core heater temperature, Rod A-5 (TH-A5-44).

Fig. 90 Core heater temperature, Rod B-3 (TH-B3-32).

Fig. 91 Core heater temperature, Rod B-5 (TH-B5-29).

Fig. 92. Core heater temperature, Rod B-5 (TH-B5-38).

Fig. 93 Core heater temperature, Rod B-6 (TH-B6-29).

Fig. 94, Core heater temperature, Rod C-2 (TH-C2-28).

Fig. 95, Core heater temperature, Rod C-2 (TH-C2-38).

Fig. 96 Core heater temperature, Rod C-3 (TH-C3-13).

Fig. 97 Core heater temperature, Rod C-3 (TH-C3-28).

Fig. 98 Core heater temperature, Rod C-3 (TH-C3-60).

Fig. 99 Core heater temperature, Rod C-4 (TH-C4-26).

Fig. 100 Core heater temperature, Rod C-4 (TH-C4-53).

Fig. 101 Core heater temperature, Rod C-5 (TH-C5-28).

Fig. 102. Core heater temperature, Rod C-5 (TH-C5-44).

Fig. 103. Core heater temperature, Rod C-6 (TH-C6-32).

Fig. 104 Core heater temperature, Rod C-7 (TH-C7-15).

Fig. 105 Core heater temperature, Rod D-1 (TH-D1-21).

Fig. 106 Core heater temperature, Rod D-2 (TH-D2-14).

Fig. 107 Core heater temperature, Rod D-2 (TH-D2-61).

Fig. 108 Core heater temperature, Rod D-3 (TH-D3-29).

Fig. 109 Core heater temperature, Rod D-3 (TH-D3-39).

Fig. 110 Core heater temperature, Rod D-6 (TH-D6-15).

Fig. 111 Core heater temperature, Rod D-6 (TH-D6-25).

Fig. 112 Core heater temperature, Rod D-7 (TH-D7-20).

Fig. 113 Core heater temperature, Rod D-8 (TH-D8-26).

Fig. 114 Core heater temperature, Rod E-1 (TH-E1-33).

Fig. 115 Core heater temperature, Rod E-1 (TH-E1-54).

Fig. 116 Core heater temperature, Rod E-2 (TH-E2-21).

Fig. 117 Core heater temperature, Rod E-2 (TH-E2-33).

Fig. 118 Core heater temperature, Rod E-3 (TH-E3-05).

Fig. 119 Core heater temperature, Rod E-3 (TH-E3-20).

Fig. 120 Core heater temperature, Rod E-3 (TH-E3-24).

Fig. 121 Core heater temperature, Rod E-6 (TH-E6-08).

Fig. 122 Core heater temperature, Rod E-6 (TH-E6-28).

Fig. 123 Core heater temperature, Rod E-6 (TH-E6-37).

Fig. 124 Core heater temperature, Rod E-7 (TH-E7-13).

Fig. 125 Core heater temperature, Rod E-7 (TH-E7-44).

Fig. 126 Core heater temperature, Rod E-8 (TH-E8-14).

Fig. 127 Core heater temperature, Rod E-8 (TH-E8-29).

Fig. 128 Core heater temperature, Rod E-8 (TH-E8-45).

Fig. 129 Core heater temperature, Rod F-2 (TH-F2-22).

Fig. 130 Core heater temperature, Rod F-2 (TH-F2-25).

Fig. 131 Core heater temperature, Rod F-3 (TH-F3-15).

Fig. 132 Core heater temperature, Rod F-3 (TH-F3-22).

Fig. 133 Core heater temperature, Rod F-4 (TH-F4-14).

Fig. 134 Core heater temperature, Rod F-4 (TH-F4-28).

Fig. 135 Core heater temperature, Rod F-4 (TH-F4-44).

Fig. 136 Core heater temperature, Rod F-5 (TH-F5-20).

Fig. 137 Core heater temperature, Rod F-5 (TH-F5-26).

Fig. 138 Core heater temperature, Rod F-5 (TH-F5-33).

Fig. 139 Core heater temperature, Rod F-5 (TH-F5-53).

Fig. 140 Core heater temperature, Rod F-6 (TH-F6-08).

Fig. 141 Core heater temperature, Rod F-6 (TH-F6-28).

Fig. 142 Core heater temperature, Rod F-7 (TH-F7-29).

Fig. 143 Core heater temperature, Rod F-7 (TH-F7-39).

Fig. 144 Core heater temperature, Rod G-3 (TH-G3-13).

Fig. 145 Core heater temperature, Rod G-3 (TH-G3-45).

Fig. 146 Core heater temperature, Rod G-4, Tests S-03-5 and S-03-8 (TH-G4-09).

Fig. 147 Core heater temperature, Rod G-4 (TH-G4-29).

Fig. 148 Core heater temperature, Rod G-4 (TH-G4-33).

Fig. 149 Core heater temperature, Rod G-4 (TH-G4-38).

Fig. 150 Core heater temperature, Rod G-5 (TH-G5-14).

Fig. 151 Core heater temperature, Rod G-5 (TH-G5-24).

Fig. 152 Core heater temperature, Rod G-6 (TH-G6-33).

Fig. 153 Core heater temperature, Rod H-5 (TH-H5-28).

Fig. 154 Material temperature in steam generator (TMU-SG1).

Fig. 155 Material temperature in steam generator (TMU-SG2).

Fig. 156 Material temperature in steam generator (TMU-SG3).

Fig. 157 Material temperature in steam generator (TMU-SG4).

Fig. 158 Pressure in vessel, upper plenum (PV-UP+10).

Fig. 159 Pressure in vessel, inlet annulus (PV-IANN-9).

Fig. 160 Pressure in intact loop accumulator, Tests S-03-5 and S-03-8 (PU-ECC-ACC).

Fig. 161 Pressure in intact loop accumulator, Tests S-03-6 and S-03-7 (PU-ECC-ACC).

Fig. 162 Pressure in steam generator secondary side (PU-SGSD).

Fig. 163 Pressure in pressure suppression tank (P-PSS).

Fig. 164 Pressure in pressure suppression tank header, Tests S-03-5 and S-03-8 (P-PSS-HD).

Fig. 165 Differential pressure in intact loop, Tests S-03-5, S-03-6, and S-03-7 (DPU-UP-1).

Fig. 166 Differential pressure in intact loop, low range, Tests S-03-5 and S-03-8 (DPU-UP-1L).

Fig. 167 Differential pressure in intact loop, low range, Tests S-03-6 and S-03-7 (DPU-UP-1L).

Fig. 168 Differential pressure in intact loop (Spool 1 to Spool 3), Tests S-03-5 and S-03-8 (DPU-1-3).

Fig. 169 Differential pressure in intact loop (Spool 1 to Spool 3), Tests S-03-6 and S-03-7 (DPU-1-3).

Fig. 170 Differential pressure in intact loop, low range (Spool 1 to Spool 3), Tests S-03-5 and S-03-8 (DPU-1-3L).

Fig. 171 Differential pressure in intact loop, low range (Spool 1 to Spool 3), Tests S-03-6 and S-03-7 (DPU-1-3L).

Fig. 172 Differential pressure in intact loop (Spool 3 to Spool 7), Tests S-03-5 and S-03-8 (DPU-3-7).

Fig. 173 Differential pressure in intact loop (Spool 3 to Spool 7), Tests S-03-6 and S-03-7 (DPU-3-7).

Fig. 174 Differential pressure in intact loop, low range (Spool 3 to Spool 7), Tests S-03-5 and S-03-8 (DPU-3-7L).

Fig. 175 Differential pressure in intact loop, low range (Spool 3 to Spool 7), Tests S-03-6 and S-03-7 (DPU-3-7L).

Fig. 176 Differential pressure in intact loop (Spool 3 to steam generator inlet plenum), Tests S-03-5 and S-03-8 (DPU-3-SGIP).

Fig. 177 Differential pressure in intact loop (Spool 3 to steam generator inlet plenum), Tests S-03-6 and S-03-7 (DPU-3-SGIP).

Fig. 178 Differential pressure in intact loop, steam generator outlet plenum to Spool 7 (DPU-SGOP-7).

Fig. 179 Differential pressure in intact loop, Spool 7 to Spool 10 (DPU-7-10).

Fig. 180 Differential pressure in intact loop (Spool 8, Tap C to Spool 7), Tests S-03-5 and S-03-8 (DPU-8C-7).

Fig. 181 Differential pressure in intact loop (Spool 8, Tap C to Spool 7), Tests S-03-6 and S-03-7 (DPU-8C-7).

Fig. 182 Differential pressure in intact loop, pump trap (Spool 8, Tap C to Tap D), Tests S-03-5 and S-03-8 (DPU-8C-8D).

Fig. 183 Differential pressure in intact loop, pump trap (Spool 8, Tap C to Tap D), Tests S-03-6 and S-03-7 (DPU-8C-8D).

Fig. 184 Differential pressure in intact loop, low range (Spool 12 to Spool 10), Tests S-03-5 and S-03-8 (DPU-12-10L).

Fig. 185 Differential pressure in intact loop, low range (Spool 12 to Spool 10), Tests S-03-6 and S-03-7 (DPU-12-10L).

Fig. 186 Differential pressure in intact loop (Spool 15 to Spool 1), Tests S-03-5 and S-03-8 (DPU-15-1).

Fig. 187 Differential pressure in intact loop (Spool 15 to Spool 1), Tests S-03-6 and S-03-7 (DPU-15-1).

Fig. 188 Differential pressure in intact loop, low range (Spool 15 to Spool 1), Tests S-03-5 and S-03-8 (DPU-15-1L).

Fig. 189 Differential pressure in intact loop, low range (Spool 15 to Spool 1), Tests S-03-6 and S-03-7 (DPU-15-1L).

Fig. 190 Differential pressure in intact loop (Spool 15 to vessel inlet annulus), Tests S-03-5 and S-03-8 (DPU-15-IANN).

Fig. 191 Differential pressure in intact loop (Spool 15 to vessel inlet annulus), Tests S-03-6 and S-03-7 (DPU-15-IANN).

Fig. 192 Differential pressure in intact loop, Spool 15 to atmosphere (DPU-15-ATM).

Fig. 193 Differential pressure in broken loop (Spool 21 to vessel inlet annulus), Tests S-03-5 and S-03-8 (DPB-21-IANN).

Fig. 194 Differential pressure in broken loop (Spool 21 to vessel inlet annulus), Tests S-03-6 and S-03-7 (DPB-21-IANN).

Fig. 195 Differential pressure in broken loop (Spool 21 to Spool 23), Tests S-03-5 and S-03-8 (DPB-21-23).

Fig. 196 Differential pressure in broken loop (Spool 21 to Spool 23), Tests S-03-6 and S-03-7 (DPB-21-23).

Fig. 197 Differential pressure in broken loop (Spool 23 to cold leg nozzle throat), Tests S-03-5 and S-03-8 (DPB-23-CNI).

Fig. 198 Differential pressure in broken loop (Spool 23 to cold leg nozzle throat), Tests S-03-6 and S-03-7 (DPB-23-CNI).

Fig. 199 Differential pressure in broken loop (cold leg nozzle throat to downstream section), Tests S-03-5 and S-03-8 (DPB-CN1-CN4).

Fig. 200 Differential pressure in broken loop (cold leg nozzle throat to downstream section), Tests S-03-6 and S-03-7 (DPB-CN1-CN4).

Fig. 201 Differential pressure in broken loop (upper plenum to Spool 30), Tests S-03-5 and S-03-8 (DPB-UP-30).

Fig. 202 Differential pressure in broken loop (upper plenum to Spool 30), Tests S-03-6 and S-03-7 (DPB-UP-30).

Fig. 203 Differential pressure in broken loop (Spool 30 to Spool 36, lower tap), Tests S-03-6 and S-03-8 (DPB-30-36L).

Fig. 204 Differential pressure in broken loop (Spool 30 to Spool 36, lower tap), Tests S-03-6 and S-03-7 (DPB-30-36L).

Fig. 205 Differential pressure in broken loop (Spool 30 to Spool 38), Tests S-03-5 and S-03-8 (DPB-30-38).

Fig. 206 Differential pressure in broken loop (Spool 30 to Spool 38), Tests S-03-6 and S-03-7 (DPB-30-38).

Fig. 207 Differential pressure in broken loop (Spool 30 to Spool 32, upper tap), Tests S-03-5 and S-03-8 (DPB-30-32U).

Fig. 208 Differential pressure in broken loop (Spool 30 to Spool 32, upper tap), Tests S-03-6 and S-03-7 (DPB-30-32U).

Fig. 209 Differential pressure in broken loop (Spool 32, upper tap to Spool 36, lower tap), Tests S-03-8 (DPB-32U-36L).

Fig. 210 Differential pressure in broken loop (Spool 32, upper tap to Spool 36, lower tap), Tests S-03-6 and S-03-7 (DPB-32U-36L).

Fig. 211 Differential pressure in broken loop (Spool 38 to Spool 40), Tests S-03-5 and S-03-8 (DPB-38-40).

Fig. 212 Differential pressure in broken loop (Spool 38 to Spool 40), Tests S-03-6 and S-03-7 (DPB-38-40).

Fig. 213 Differential pressure in broken loop (Spool 40 to Spool 42), Tests S-03-5 and S-03-8 (DPB-40-42).

Fig. 214 Differential pressure in broken loop (Spool 40 to Spool 42), Tests S-03-6 and S-03-7 (DPB-40-42).

Fig. 215 Differential pressure in broken loop (Spool 42 to hot leg nozzle throat), Tests S-03-8 (DPB-42-HN1).

Fig. 216 Differential pressure in broken loop (Spool 42 to hot leg nozzle throat), Tests S-03-6 and S-03-7 (DPB-42-HN1).

Fig. 217 Differential pressure in vessel, Tests S-03-5 and S-03-8 (DPV-UP-IANN).

Fig. 218 Differential pressure in vessel, Tests S-03-6 and S-03-7 (DPV-UP-IANN).

Fig. 219 Differential pressure in vessel, Tests S-03-5 and S-03-8 (DPV-9-26QQ).

Fig. 220 Differential pressure in vessel, Tests S-03-6 and S-03-7 (DPV-9-26QQ).

Fig. 221 Differential pressure in vessel, Tests S-03-5 and S-03-8 (DPV-9-180QQ).

Fig. 222 Differential pressure in vessel, Tests S-03-6 and S-03-7 (DPV-9-180QQ).

Fig. 223 Differential pressure in vessel, Tests S-03-5 and S-03-8 (DPV-26-55QM).

Fig. 224 Differential pressure in vessel, Tests S-03-6 and S-03-7 (DPV-26-55QM).

Fig. 225 Differential pressure in vessel, Tests S-03-5 and S-03-8 (DPV-55-110AM).

Fig. 226 Differential pressure in vessel, Tests S-03-6 and S-03-7 (DPV-55-110AM).

Fig. 227 Differential pressure in vessel, Tests S-03-5 and S-03-8 (DPV-110-156MQ).

Fig. 228 Differential pressure in vessel, Tests S-03-6 and S-03-7 (DPV-110-156MQ).

Fig. 229 Differential pressure in vessel (DPV-156-173QQ).

Fig. 230 Differential pressure in vessel, Tests S-03-5 and S-03-8 (DPV-166-191QT).

Fig. 231 Differential pressure in vessel, Tests S-03-5 and S-03-8 (DPV-LP-UP).

Fig. 232 Differential pressure in vessel, Tests S-03-6 and S-03-7 (DPV-LP-UP).

Fig. 233 Differential pressure in vessel core, Tests S-03-5 and S-03-8 (DPVC-83W-UP).

Fig. 234 Differential pressure in vessel core (DPVC-83-100WQ).

Fig. 235 Differential pressure in vessel core (DPVC-100-117QJ).

Fig. 236 Differential pressure in vessel core (DPVC-117-133JD).

Fig. 237 Differential pressure in vessel core (DPVC-133-191DT).

Fig. 238 Differential pressure in steam generator, Tests S-03-6 and S-03-7 (DPU-SG-SEC).

Fig. 239 Volumetric flow in intact loop, Tests S-03-5 and S-03-8 (FTU-1).

Fig. 240 Volumetric flow in intact loop, Tests S-03-6 and S-03-7 (FTU-1).

Fig. 241 Volumetric flow in intact loop, Tests S-03-5 and S-03-8 (FTU-9).

Fig. 242 Volumetric flow in intact loop, Test S-03-7 (FTU-9).

Fig. 243 Volumetric flow in intact loop, Tests S-03-5 and S-03-8 (FTU-13).

Fig. 244 Volumetric flow in intact loop, Tests S-03-6 and S-03-7 (FTU-13).

Fig. 245 Volumetric flow in intact loop, Tests S-03-5 and S-03-8 (FTU-15).

Fig. 246 Volumetric flow in intact loop, Tests S-03-6 and S-03-7 (FTU-15).

Fig. 247 Volumetric flow in broken loop, Tests S-03-5 and S-03-8 (FTB-21).

Fig. 248 Volumetric flow in broken loop, Tests S-03-6 and S-03-7 (FTB-21).

Fig. 249 Volumetric flow in broken loop, Test S-03-5 (FTB-37).

Fig. 250 Volumetric flow in broken loop, Tests S-03-6 and S-03-7 (FTB-37).

Fig. 251 Volumetric flow in core inlet, Test S-03-5 (FTV-CORE-IN).

Fig. 252 Volumetric flow in core inlet, Test S-03-6 (FTV-CORE-IN).

Fig. 253 Volumetric flow in core inlet, Test S-03-7 (FTV-CORE-IN).

Fig. 254 Volumetric flow in core inlet, Test S-03-8 (FTV-CORE-IN).

Fig. 255 Volumetric flow in low pressure injection line, Tests S-03-5 and S-03-8 (FTU-LPIS).

Fig. 256 Volumetric flow in low pressure injection line, Tests S-03-6 and S-03-7 (FTU-LPIS).

Fig. 257 Volumetric flow in accumulator injection line, Tests S-03-5 and S-03-8 (FTU-ACC).

Fig. 258 Volumetric flow in accumulator injection line, Tests S-03-6 and S-03-7 (FTU-ACC).

Fig. 259 Fluid velocity in core, Test S-03-5 (FTV-40A).

Fig. 260 Fluid velocity in core, Test S-03-6 (FTV-40A).

Fig. 261 Fluid velocity in core, Test S-03-7 (FTV-40A).

Fig. 262 Fluid velocity in core, Test S-03-8 (FTV-40A).

Fig. 263 Fluid velocity in core, Test S-03-5 (FTV-40M).

Fig. 264 Fluid velocity in core, Test S-03-6 (FTV-40M).

Fig. 265 Fluid velocity in core, Test S-03-7 (FTV-40M).

Fig. 266 Fluid velocity in core, Test S-03-8 (FTV-40M).

Fig. 267 Momentum flux in intact loop (Spool 1), Test S-03-5 (FDU-1).

Fig. 268 Momentum flux in intact loop (Spool 1), Test S-03-6 (FDU-1).

Fig. 269 Momentum flux in intact loop (Spool 1), Test S-03-7 (FDU-1).

Fig. 270 Momentum flux in intact loop (Spool 1), Test S-03-8 (FDU-1).

Fig. 271 Momentum flux in core inlet, Test S-03-5 (FDV-CORE-IN).

Fig. 272 Momentum flux in core inlet, Test S-03-6 (FDV-CORE-IN).

Fig. 273 Momentum flux in core inlet, Test S-03-7 (FDV-CORE-IN).

Fig. 274 Momentum flux in core inlet, Test S-03-8 (FDV-CORE-IN).

Fig. 275 Density in intact loop, Test S-03-5 (GU-1VR).

Fig. 276 Density in intact loop, Test S-03-6 (GU-1VR).

Fig. 277 Density in intact loop, Test S-03-7 (GU-1VR).

Fig. 278 Density in intact loop, Test S-03-8 (GU-1VR).

Fig. 279 Density in intact loop, Test S-03-5 (GU-1HZ).

Fig. 280 Density in intact loop, Test S-03-6 (GU-1HZ).

Fig. 281 Density in intact loop, Test S-03-7 (GU-1HZ).

Fig. 282 Density in intact loop, Test S-03-8 (GU-1HZ).

Fig. 283 Density in intact loop, Test S-03-5 (GU-5VR).

Fig. 284 Density in intact loop, Test S-03-6 (GU-5VR).

3

Fig. 285 Density in intact loop, Test S-03-7 (GU-5VR).

Fig. 286 Density in intact loop, Test S-03-8 (GU-5VR).

Fig. 287 Density in intact loop, Test S-03-5 (GU-10VR).

Fig. 288 Density in intact loop, Test S-03-6 (GU-10VR).

Fig. 289 Density in intact loop, Test S-03-7 (GU-10VR).

Fig. 290 Density in intact loop, Test S-03-8 (GU-10VR).

Fig. 291 Density in intact loop, Test S-03-5 (GU-13VR).

Fig. 292 Density in intact loop, Test S-03-6 (GU-13VR).

Fig. 293 Density in intact loop, Test S-03-7 (GU-13VR).

Fig. 294 Density in intact loop, Test S-03-8 (GU-13VR).

Fig. 295 Density in intact loop, Test S-03-5 (GU-15HZ).

Fig. 296 Density in intact loop, Test S-03-6 (GU-15HZ).

Fig. 297 Density in intact loop, Test S-03-7 (GU-15HZ).

Fig. 298 Density in intact loop, Test S-03-8 (GU-15HZ).

Fig. 299 Density in intact loop, Test S-03-5 (GU-15VR).

Fig. 300 Density in intact loop, Test S-03-6 (GU-15VR).

Fig. 301 Density in intact loop, Test S-03-7 (GU-15VR).

Fig. 302 Density in intact loop, Test S-03-8 (GU-15VR).

Fig. 303 Density in broken loop, Test S-03-5 (GB-21VR).

Fig. 304 Density in broken loop, Test S-03-6 (GB-21VR).

Fig. 305 Density in broken loop, Test S-03-7 (GB-21VR).

Fig. 306 Density in broken loop, Test S-03-8 (GB-21VR).

Fig. 307 Density in broken loop, Test S-03-5 (GB-23VR).

Fig. 308 Density in broken loop, Test S-03-6 (GB-23VR).

Fig. 309 Density in broken loop, Test S-03-7 (GB-23VR).

Fig. 310 Density in broken loop, Test S-03-8 (GB-23VR).

Fig. 311 Density in broken loop, Test S-03-5 (GB-30VR).

Fig. 312 Density in broken loop, Test S-03-6 (GB-30VR).

Fig. 313 Density in broken loop, Test S-03-7 (GB-30VR).

Fig. 314 Density in broken loop, Test S-03-8 (GB-30VR).

Fig. 315 Density in broken loop, Test S-03-5 (GB-42VR).

Fig. 316 Density in broken loop, Test S-03-6 (GB-42VR).

Fig. 317 Density in broken loop, Test S-03-7 (GB-42VR).

Fig. 318 Density in broken loop, Test S-03-8 (GB-42VR).

Fig. 319 Density in vessel, Test S-03-5 (GV-150HZ).

Fig. 320 Density in vessel, Test S-03-6 (GV-150HZ).

Fig. 321 Density in vessel, Test S-03-7 (GV-150HZ).

Fig. 322 Density in vessel, Test S-0308 (GV-150HZ).

Fig. 323 Density in vessel, Test S-03-5 (GV-161/192D).

Fig. 324 Density in vessel, Test S-03-6 (GV-161/192D).

Fig. 325 Density in vessel, Test S-03-7 (GV-161/192D).

Fig. 326 Density in vessel, Test S-03-8 (GV-161/192D).

Fig. 327 Density in vessel, Test S-03-5 (GVLP-165HZ).

Fig. 328 Density in vessel, Test S-03-6 (GVLP-165HZ).

Fig. 329 Density in vessel, Test S-03-7 (GVLP-165HZ).

Fig. 330 Density in vessel, Test S-03-8 (GVLP-165HZ).

Fig. 331 Density in vessel, Test S-03-5 (GVLP-172HZ).

Fig. 332 Density in vessel, Test S-03-6 (GVLP-172HZ).

Fig. 333 Density in vessel, Test S-03-7 (GVLP-172HZ).

Fig. 334 Density in vessel, Test S-03-8 (GVLP-172HZ).

Fig. 335 Mass flow in vessel, Test S-03-5 (FTV-CORE-IN and GV-CORE-150HZ).

Fig. 336 Mass flow in vessel, Test S-03-6 (FTV-CORE-IN and GV-CORE-150HZ).

Fig. 337 Mass flow in vessel, Test S-03-7 (FTV-CORE-IN and GV-CORE-150HZ).

Fig. 338 Mass flow in vessel, Test S-03-8 (FTV-CORE-IN and GV-CORE-150HZ).

Fig. 339 Mass flow in vessel, Test S-03-5 (FDV-CORE-IN and GV-CORE-150HZ).

Fig. 340 Mass flow in vessel Test S-03-6 (FDV-CORE-IN and GV-CORE-150HZ).

Fig. 341 Mass flow in vessel Test S-03-7 (FDV-CORE-IN and GV-CORE-150HZ).

Fig. 342 Mass flow in vessel Test S-03-8 (FDV-CORE-IN and GV-CORE-150HZ).

Fig. 343 Core heater pin total power, Test S-03-5 (PWRCOR T-1).

Fig. 344 Core heater pin total power, Test S-03-6 (PWRCOR T-1).

Fig. 345 Core heater pin total power, Test S-03-7 (PWRCOR T-1).

Fig. 346 Core heater pin total power, Test S-03-8 (PWRCOR T-1).

Fig. 347 Core heater pin total power, Tests S-03-5 and S-03-8 (PWRCOR T-2).

Fig. 348 Core heater pin total power, Tests S-03-6 and S-03-7 (PWRCOR T-2).

Fig. 349 Core heater voltage, Tests S-03-5 and S-03-8 (VOLTCOR-T).

Fig. 350 Core heater total current (AMPCOR-T).

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Report No.
Volume, Part, Revision
Distribution Category No.

ANCR-NUREG-1308
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