

## APPENDIX T

### CODE-DATA COMPARISON FOR CCTF RUN 54 WITH NEWRFD = 1

This appendix presents the calculation results for the reflood option newrfd=1. The set of plots presented is the same as presented in the main body of the report for the reflood option newrfd=3. The TRAC-PF1/MOD2 developmental assessment calculations used the TRAC grid-spacer model. We have run CCTF Run 54 calculations both with and without the grid-spacer model. We have determined that the grid-spacer model should not be used because it results in excessive and nonphysical heat-transfer processes in the upper portions of the core. Therefore, the base-case assessment results for CCTF Run 54 do not use the TRAC grid-spacer model (see Sec. 5.3-10 for details). For reference purposes, the figure numbers for the two reflood options are listed below.

newrfd=1	newrfd=3	newrfd=1	newrfd=3
T-1	5.3-13	T-17	5.3-29
T-2	5.3-14	T-18	5.3-30
T-3	5.3-15	T-19	5.3-31
T-4	5.3-16	T-20	5.3-32
T-5	5.3-17	T-21	5.3-33
T-6	5.3-18	T-22	5.3-34
T-7	5.3-19	T-23	5.3-35
T-8	5.3-20	T-24	5.3-36
T-9	5.3-21	T-25	5.3-37
T-10	5.3-22	T-26	5.3-38
T-11	5.3-23	T-27	5.3-39
T-12	5.3-24	T-28	5.3-40
T-13	5.3-25	T-29	5.3-41
T-14	5.3-26	T-30	5.3-42
T-15	5.3-27	T-31	5.3-43
T-16	5.3-28	T-32	5.3-44

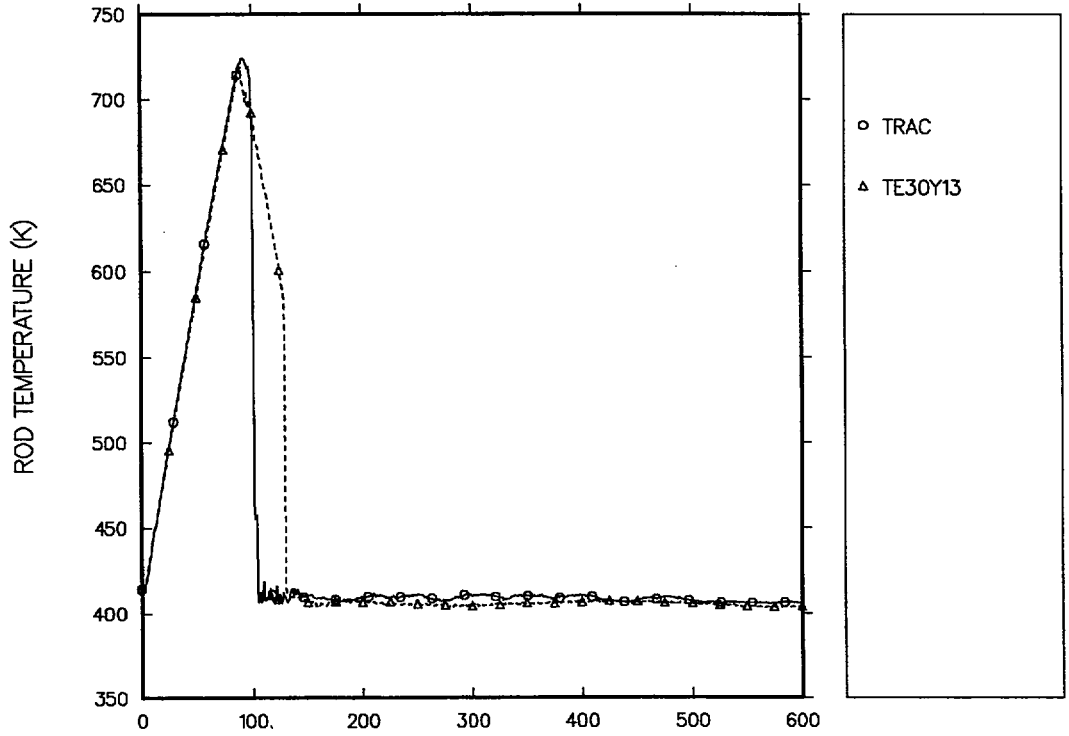


Fig. T-1. Calculated and measured cladding temperatures for the hot rod at the 2.480-m elevation.

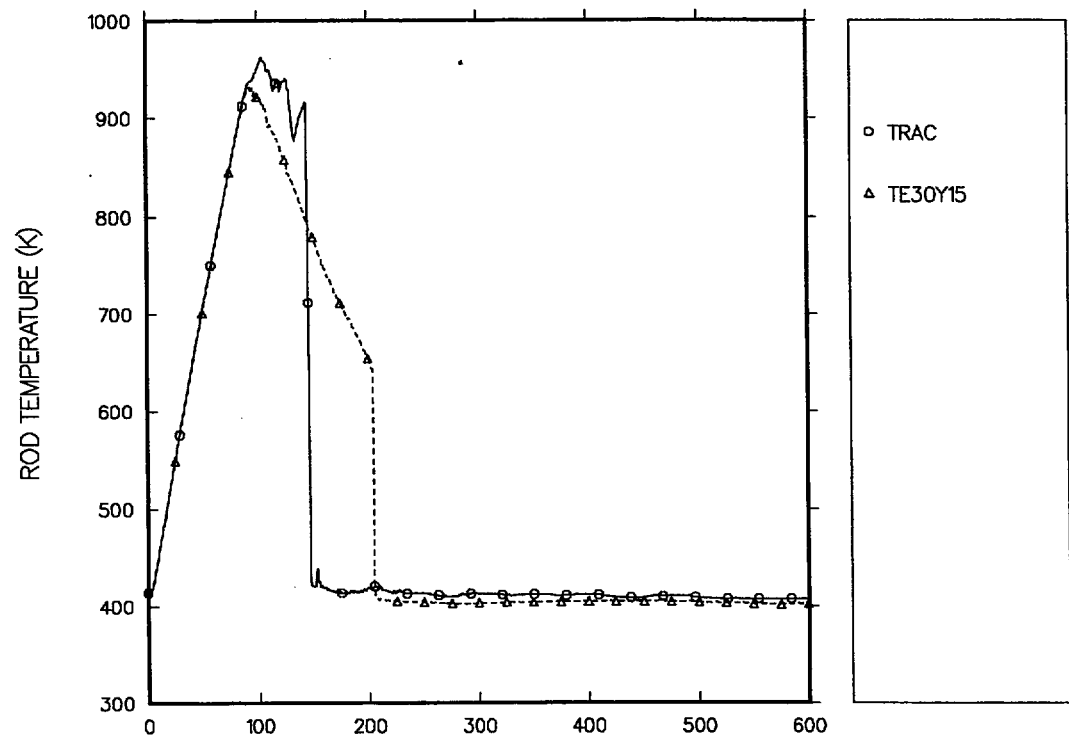


Fig. T-2. Calculated and measured cladding temperatures for the hot rod at the 3.115-m elevation.

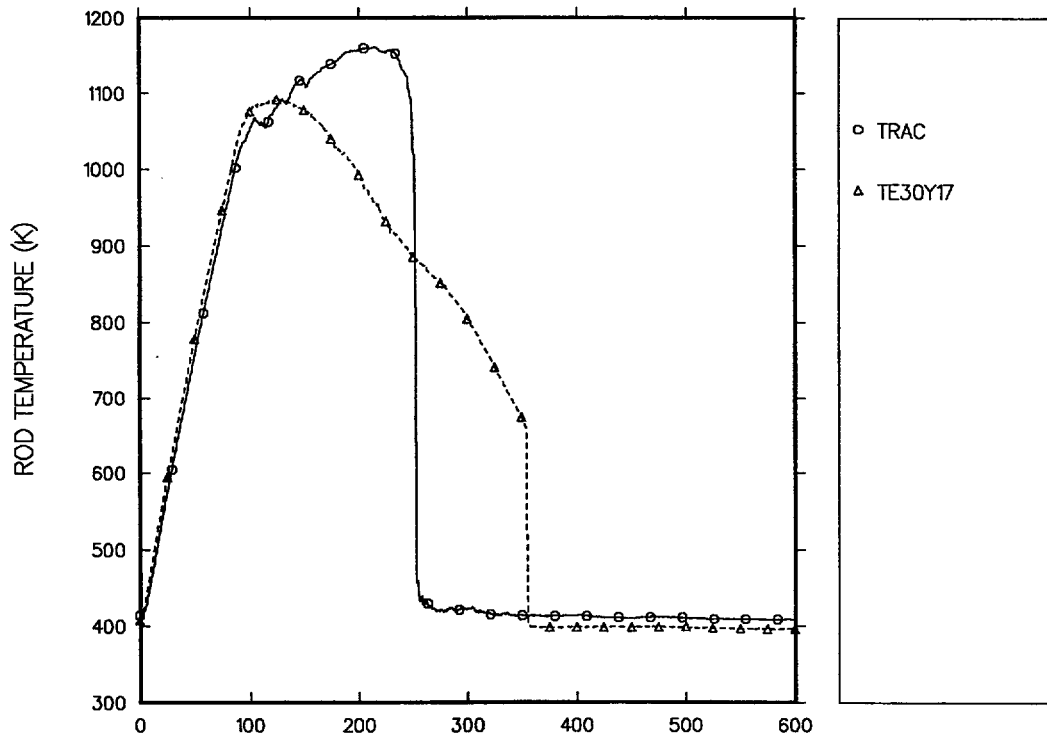


Fig. T-3. Calculated and measured cladding temperatures for the hot rod at the 3.930-m (core midplane) elevation.

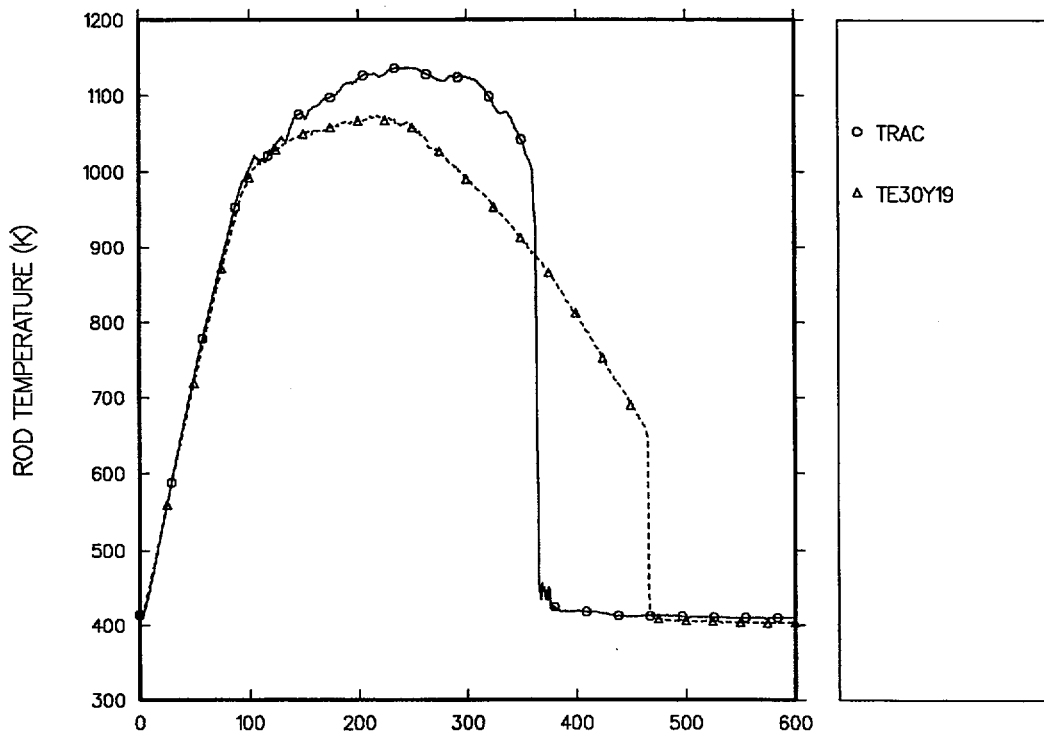


Fig. T-4. Cladding temperatures for the hot rod at the 4.540-m elevation.

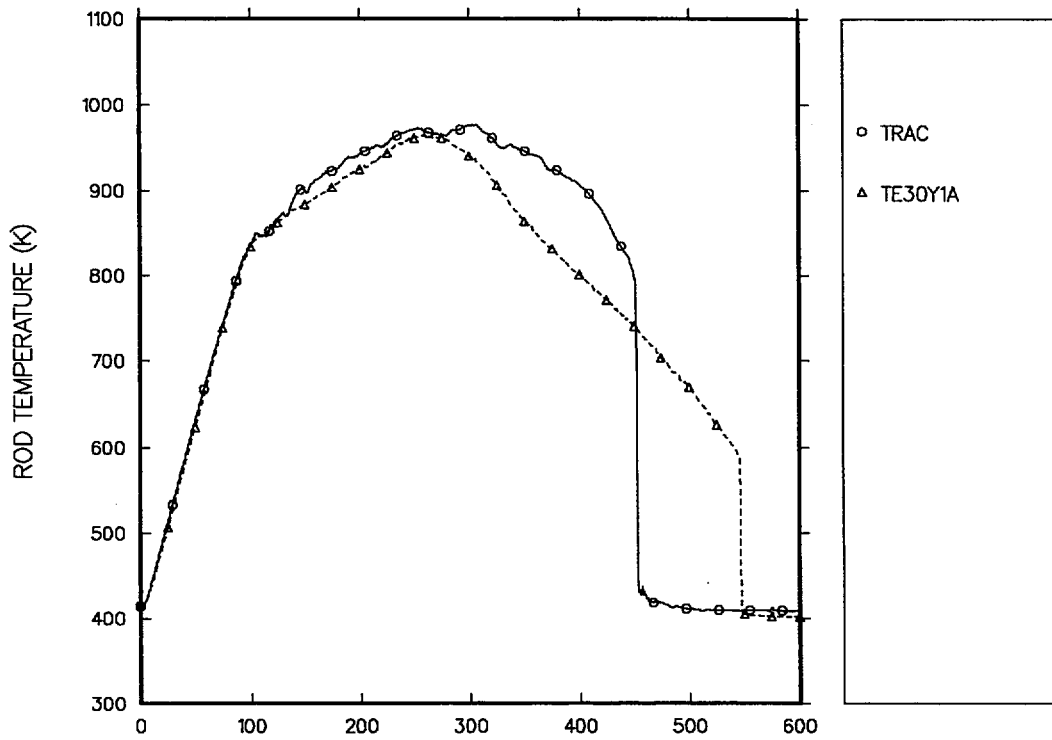


Fig. T-5. Cladding temperatures for the hot rod at the 5.150-m elevation.

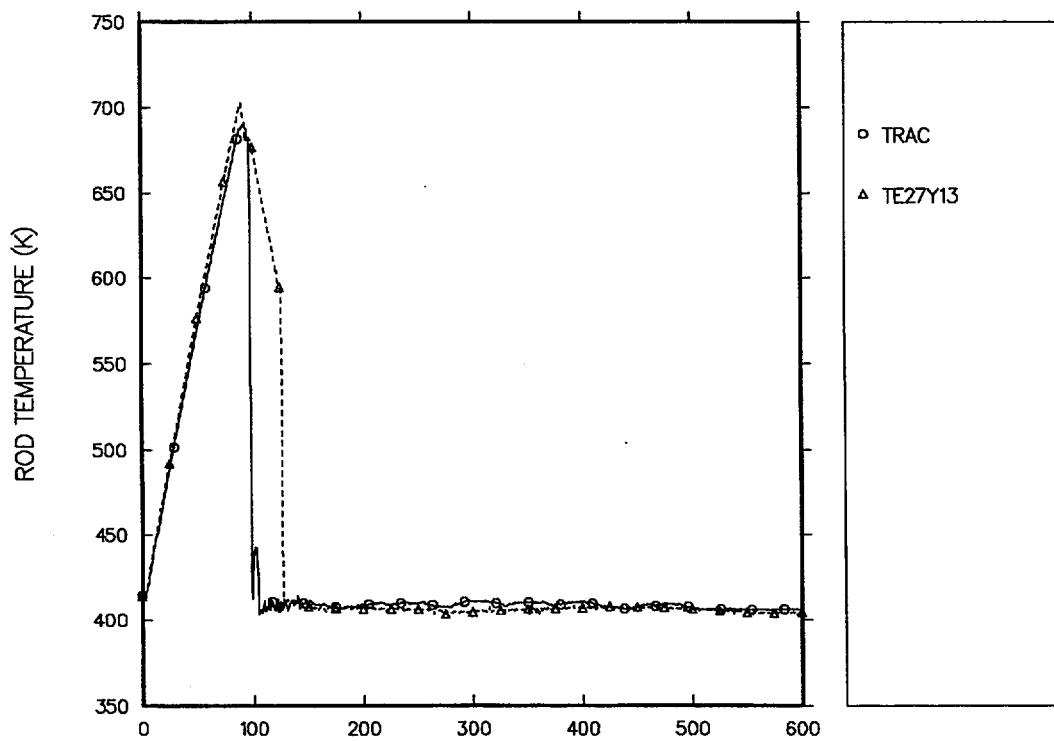


Fig. T-6. Cladding temperatures for the intermediate-powered rod at the 2.480-m elevation.

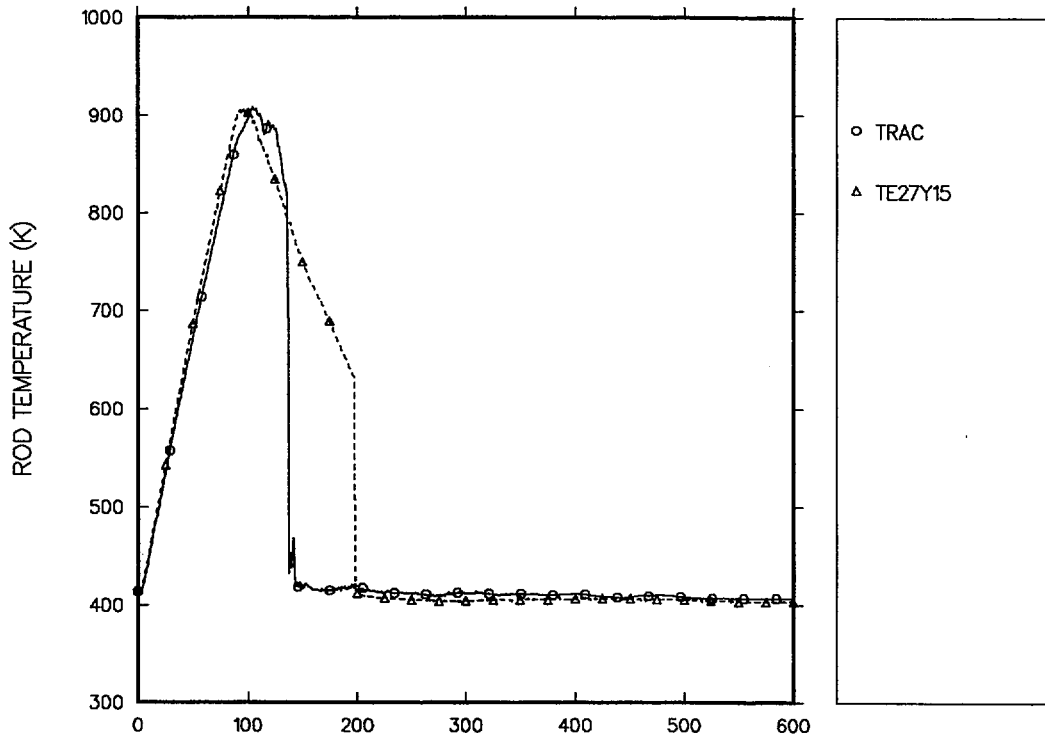


Fig. T-7. Cladding temperatures for the intermediate-powered rod at the 3.115-m elevation.

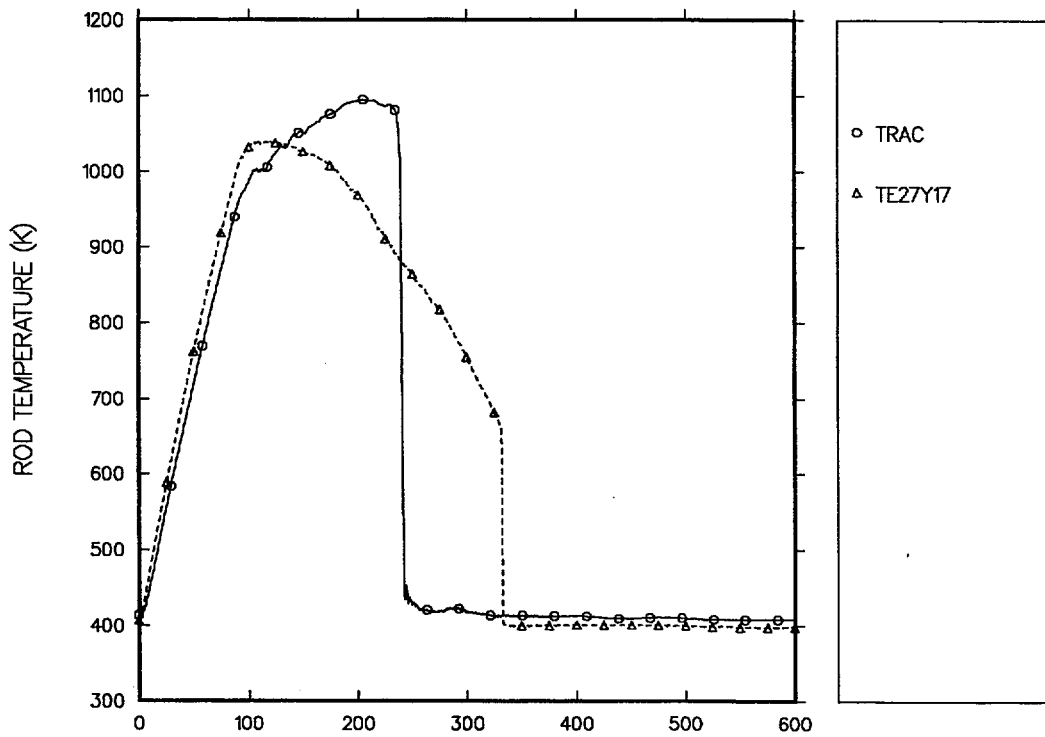


Fig. T-8. Cladding temperatures for the intermediate-powered rod at the core midplane.

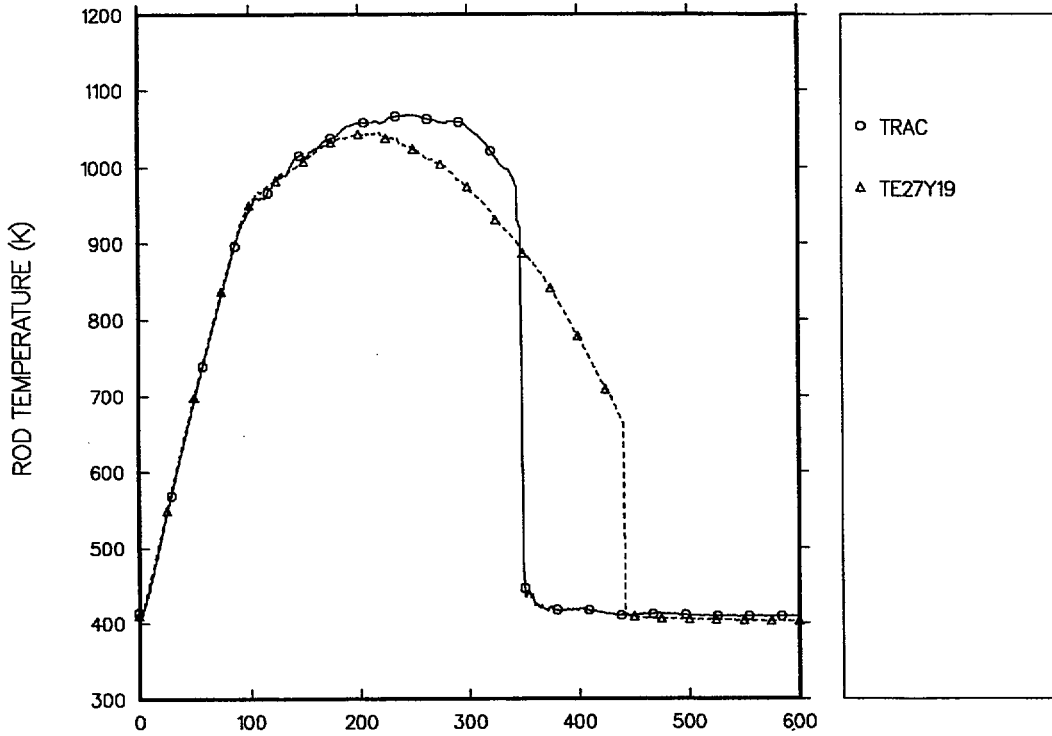


Fig. T-9. Comparison of calculated and measured cladding temperatures for the intermediate-powered rod at the 4.540-m elevation.

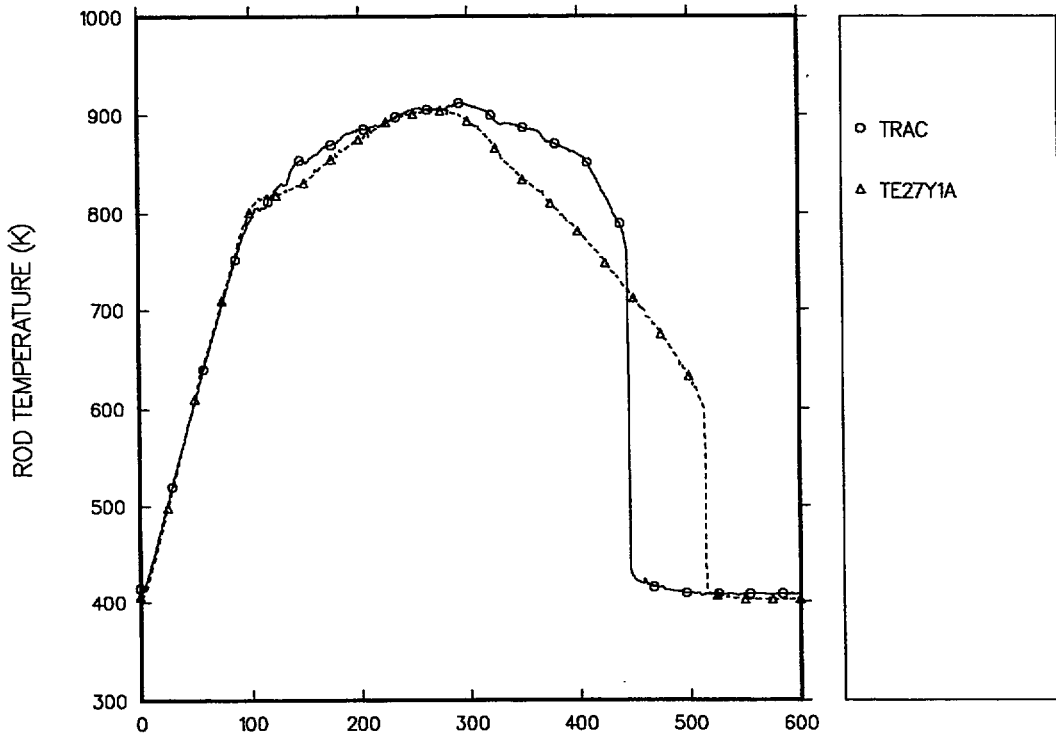


Fig. T-10. Comparison of calculated and measured cladding temperatures for the intermediate-powered rod at the 5.150-m elevation.

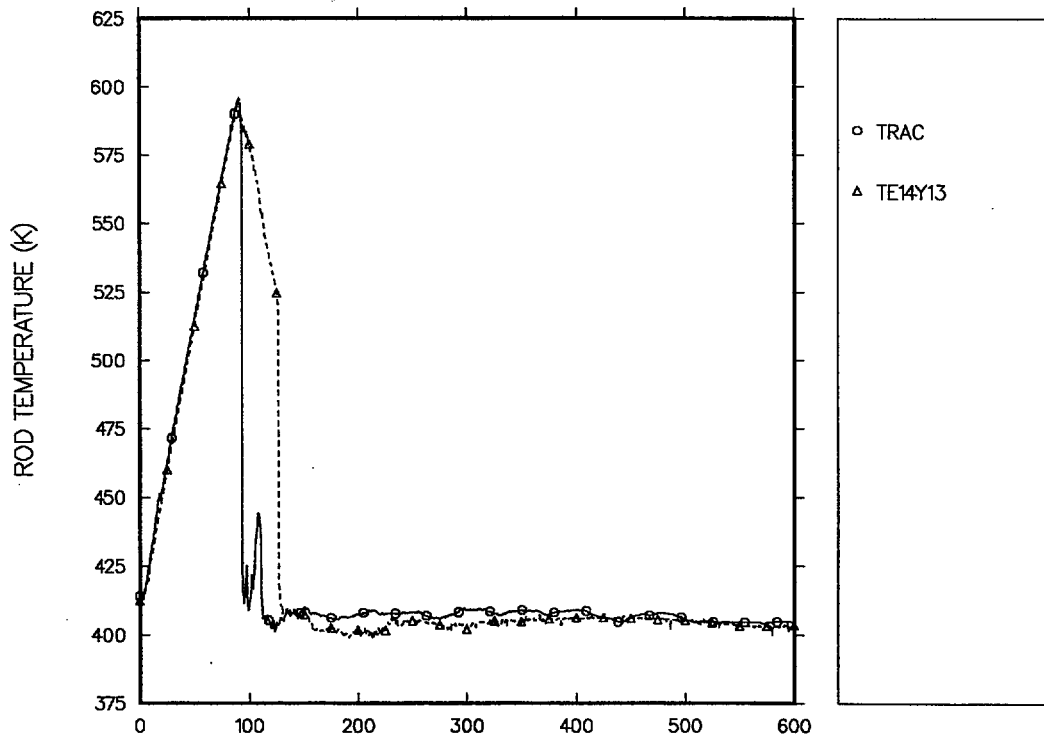


Fig. T-11. Cladding temperatures for the low-powered rod at the 2.480-m elevation.

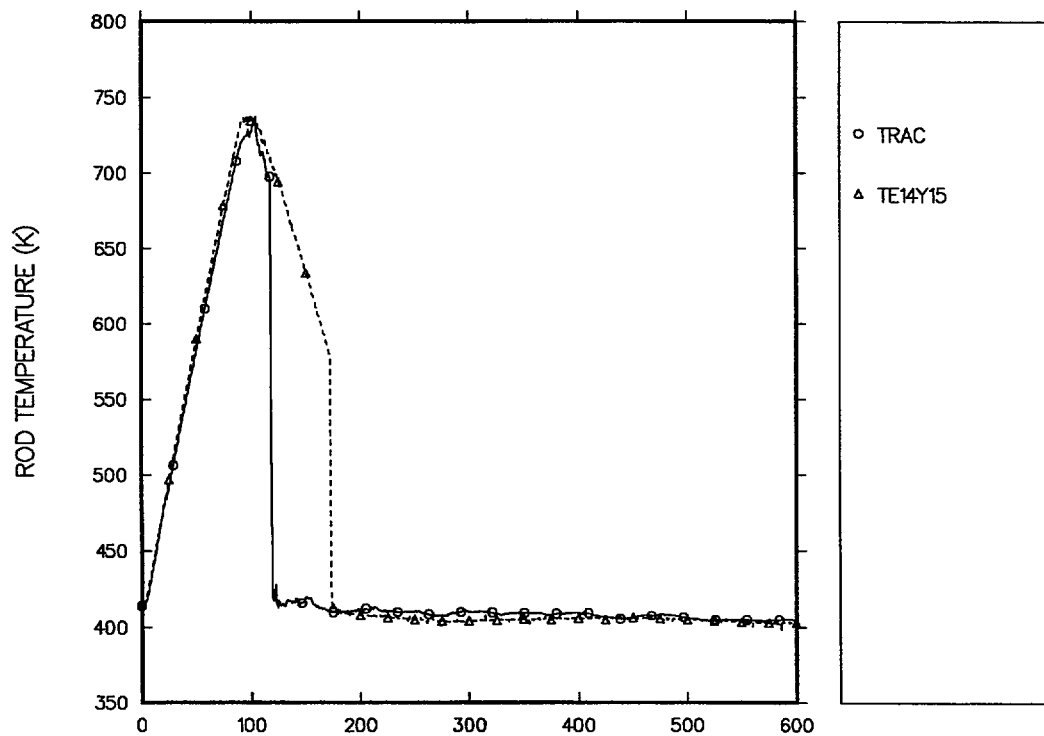


Fig. T-12. Cladding temperatures for the low-powered rod at the 3.115-m elevation.

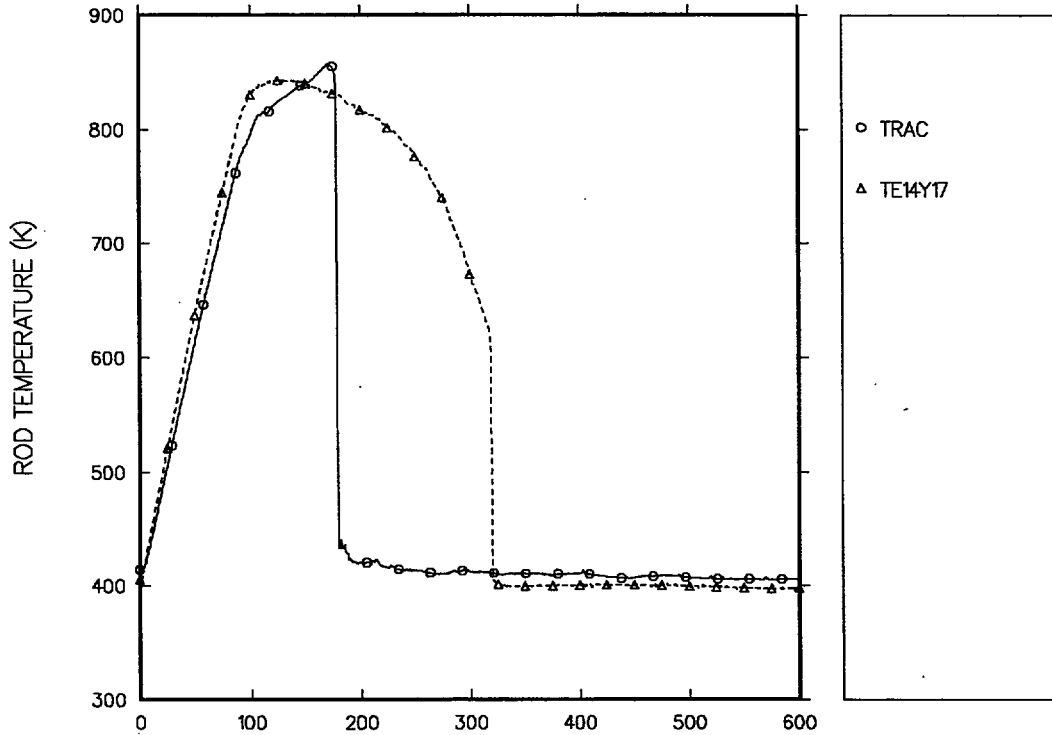


Fig. T-13. Cladding temperatures for the low-powered rod at the core midplane.

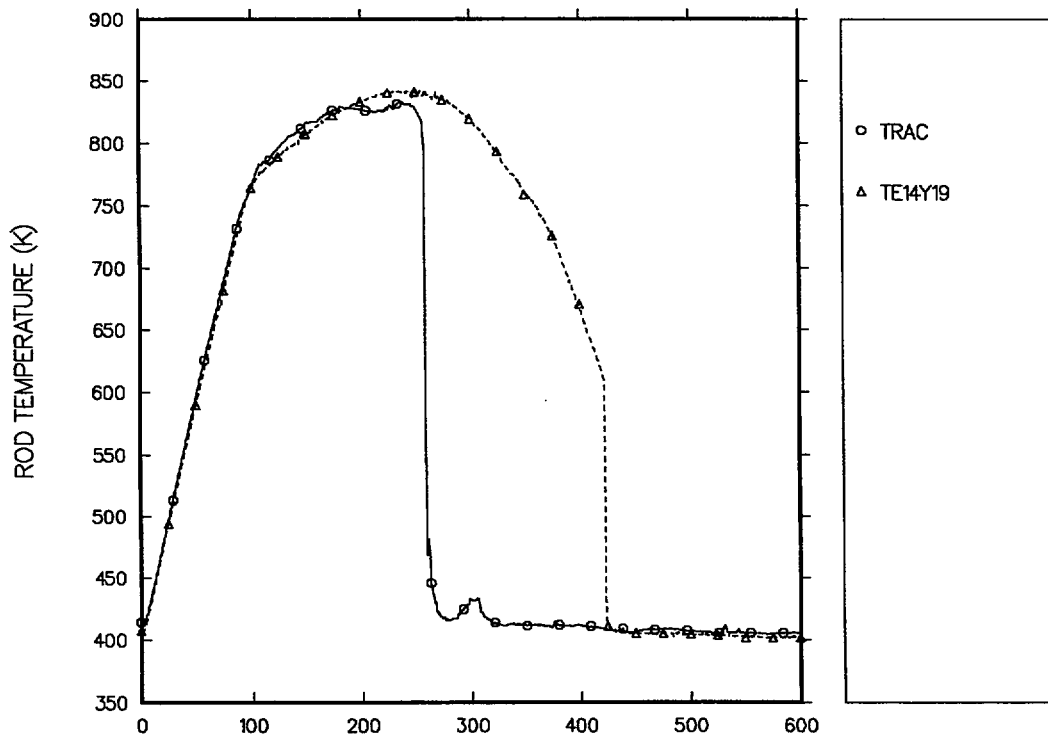


Fig. T-14. Cladding temperatures for the low-powered rod at the 4.540-m elevation.



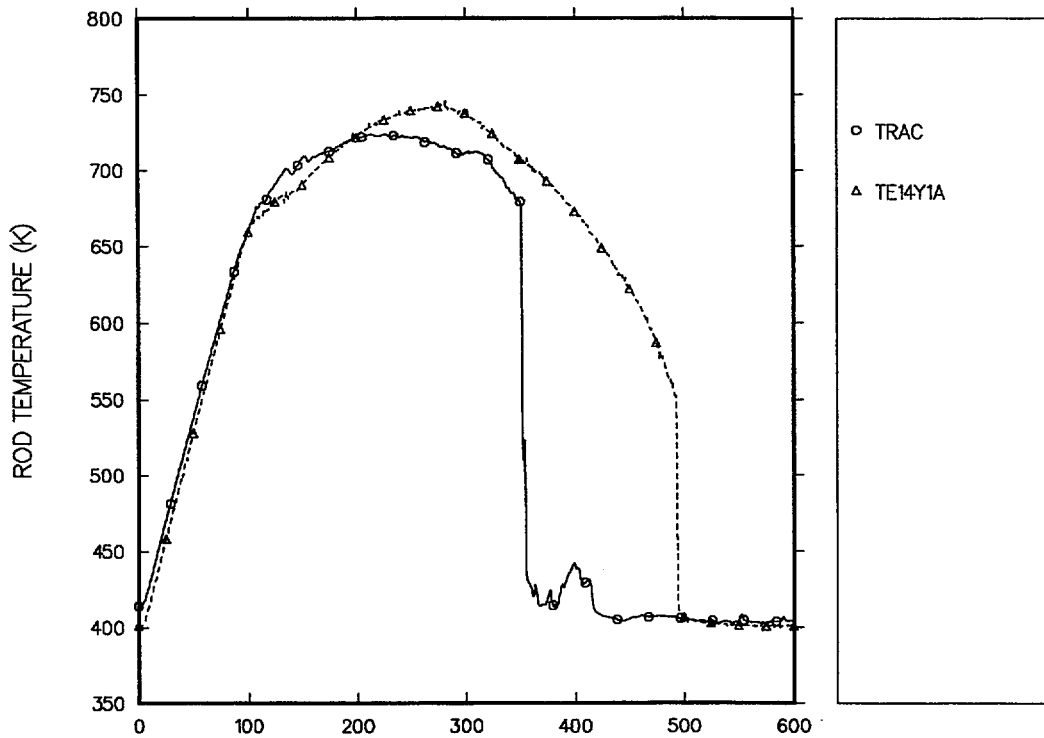


Fig. T-15. Comparison of calculated and measured cladding temperatures for the low-powered rod at the 5.150-m elevation.

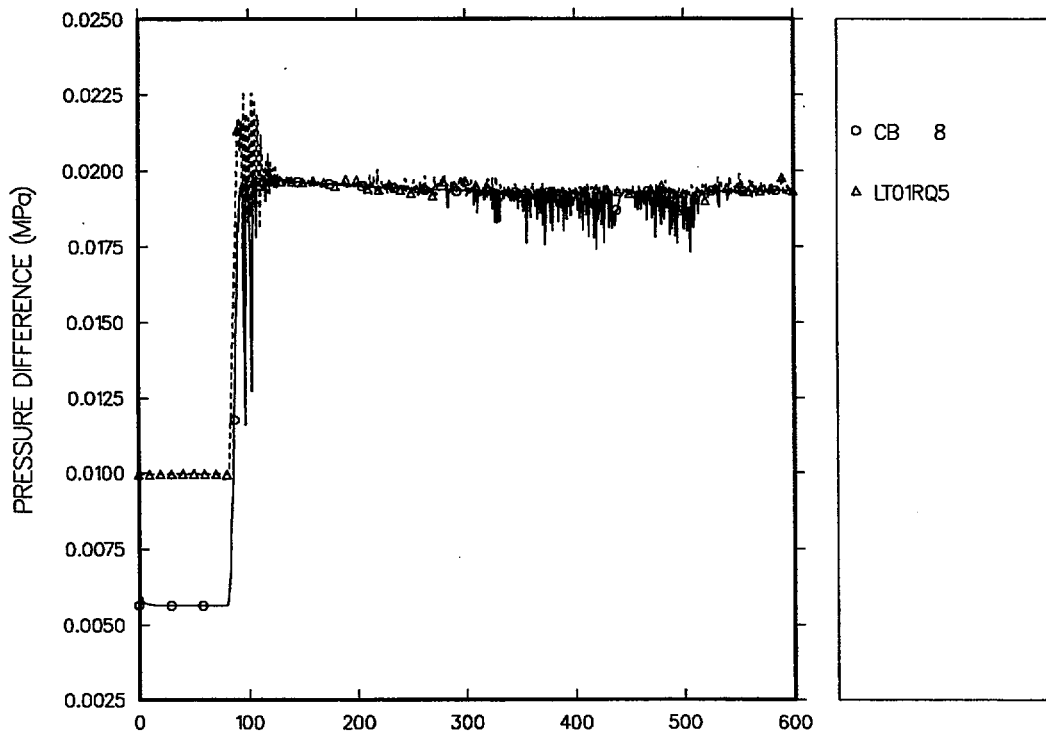


Fig. T-16. Calculated and measured pressure vessel differential pressure: lower plenum.

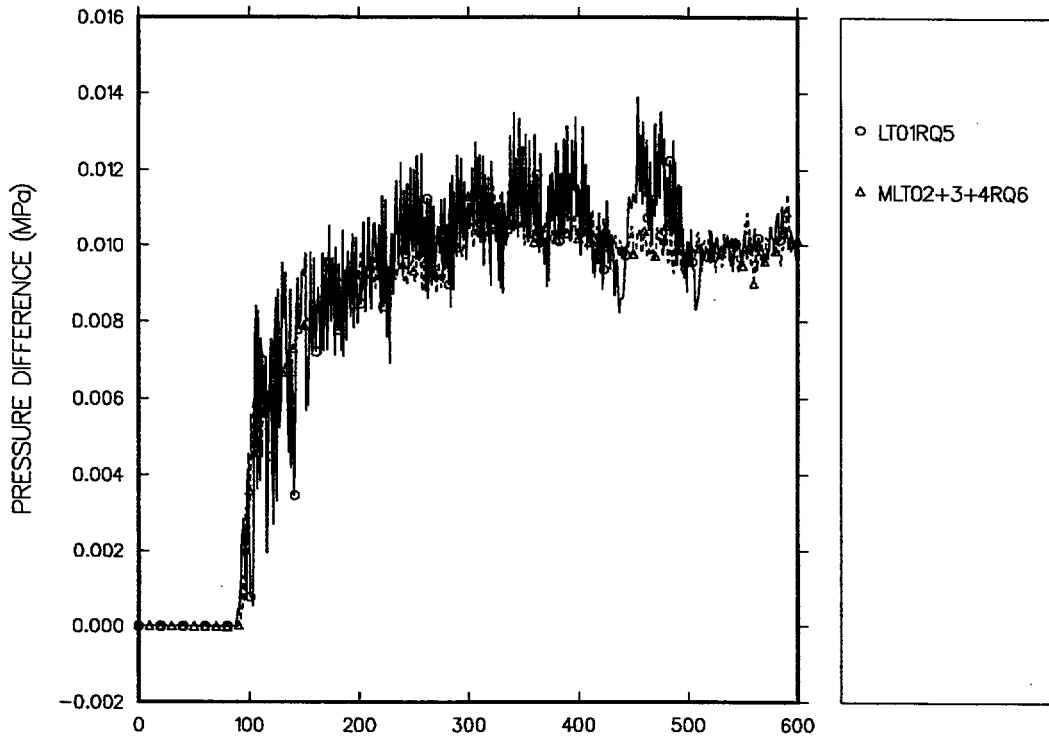


Fig. T-17. Calculated and measured pressure vessel differential pressure: lower half of the core.

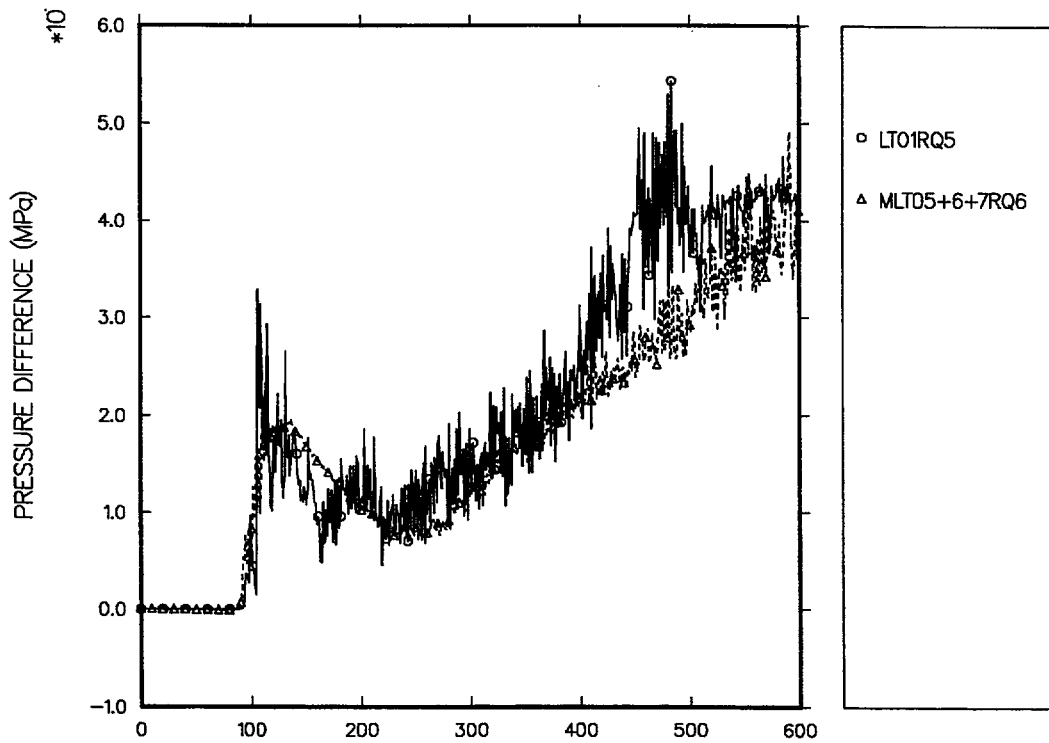


Fig. T-18. Calculated and measured pressure vessel differential pressure: upper half of the core.

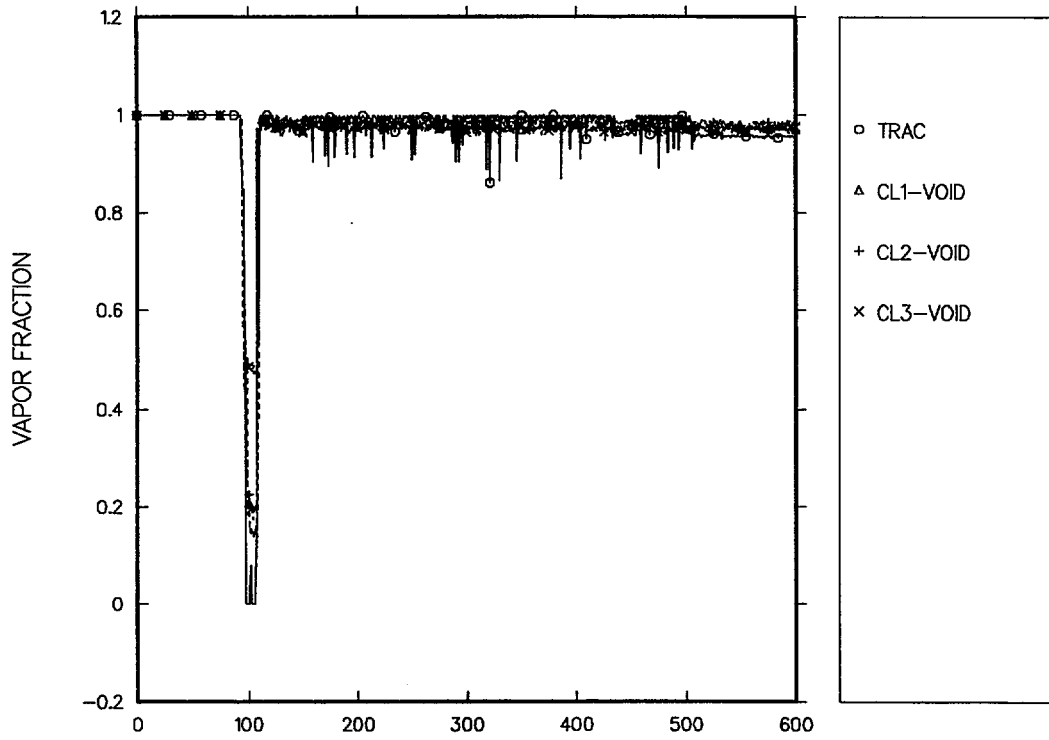


Fig. T-19. Calculated and measured cold-leg, spool-piece void fraction.

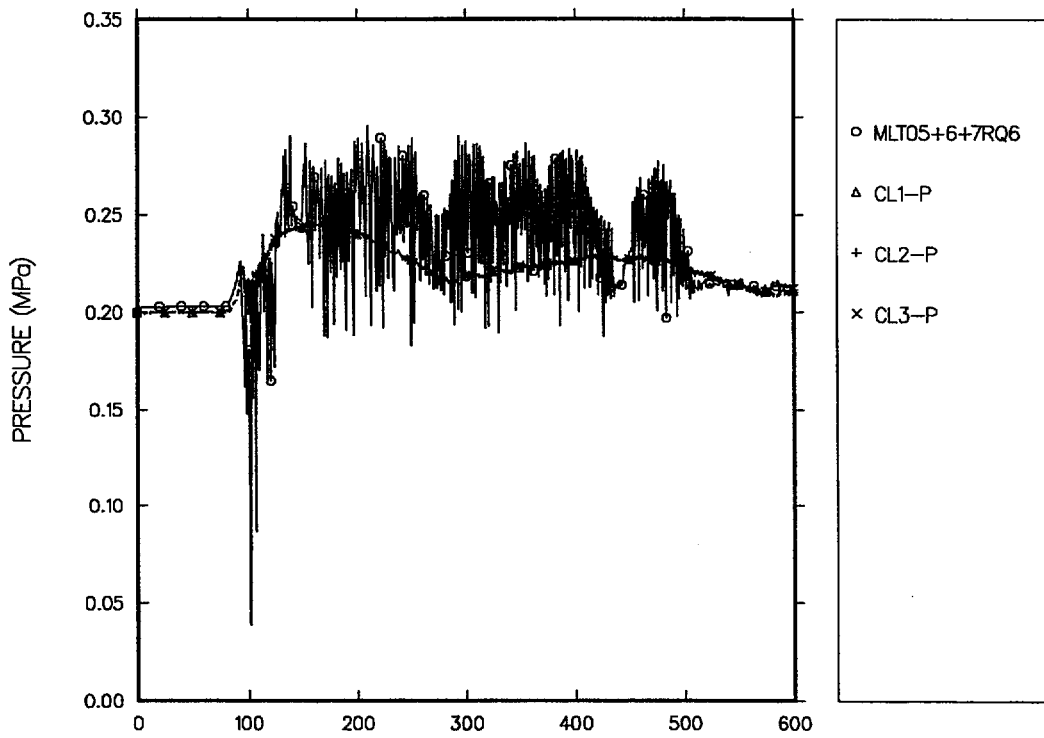


Fig. T-20. Calculated and measured cold-leg, spool-piece pressure.

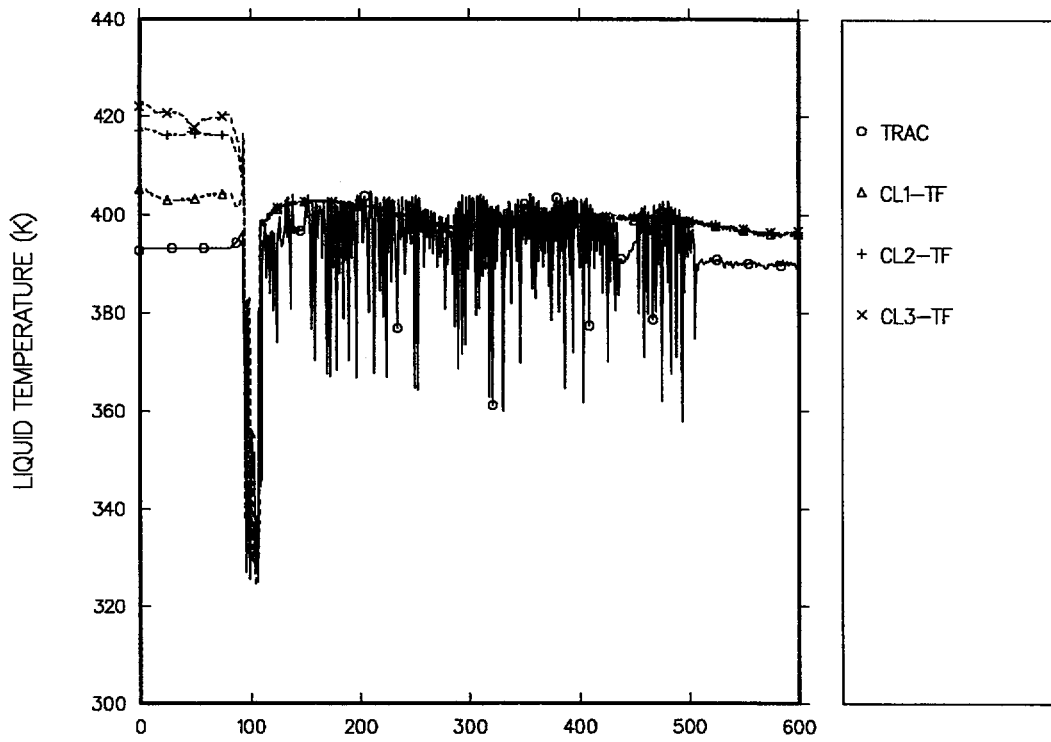


Fig. T-21. Calculated and measured cold-leg, spool-piece fluid temperature.

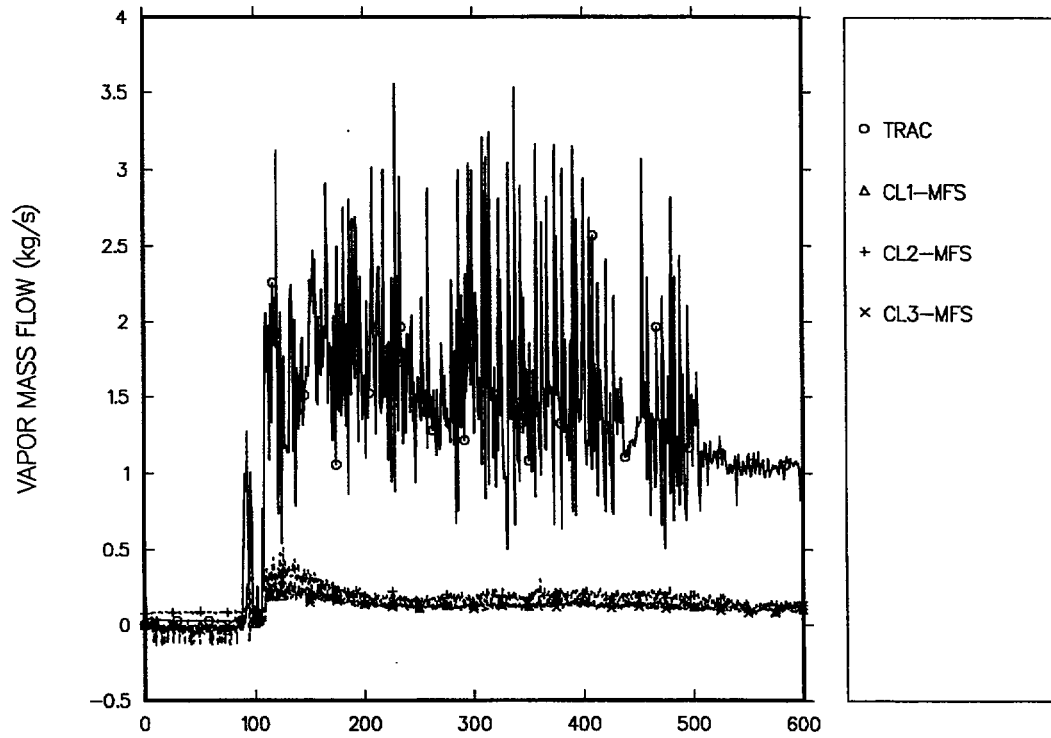


Fig. T-22. Calculated and measured cold-leg, spool-piece, steam mass flow rate.

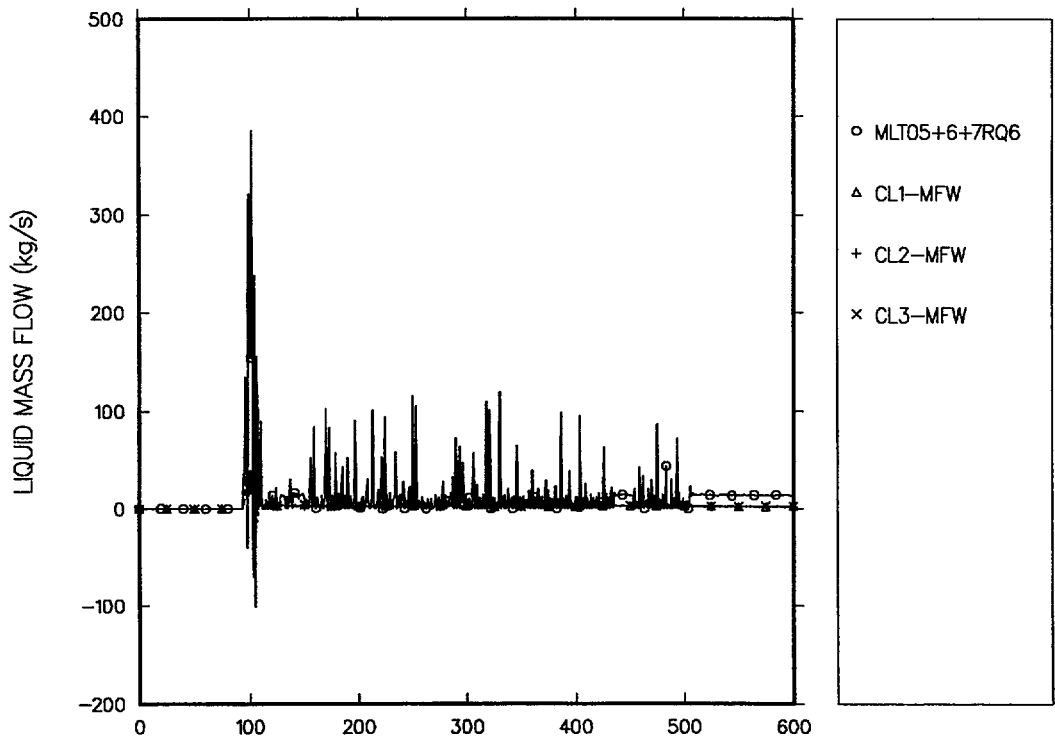


Fig. T-23. Calculated and measured cold-leg, spool-piece, liquid mass flow rate.

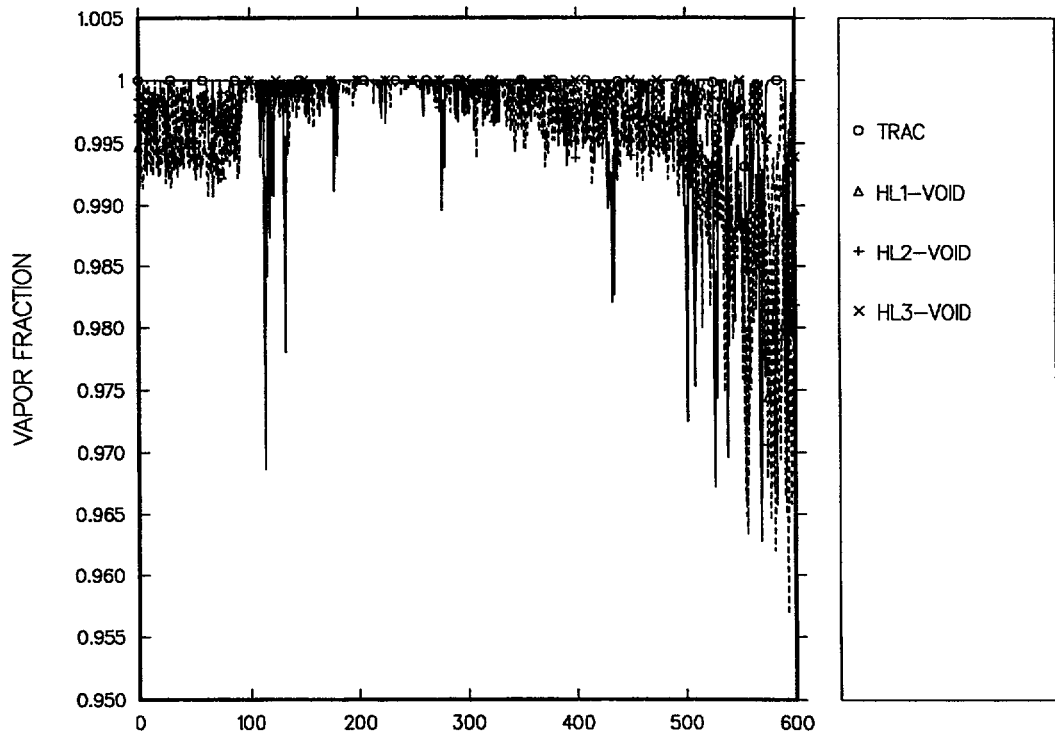


Fig. T-24. Calculated and measured hot-leg, spool-piece void fraction.

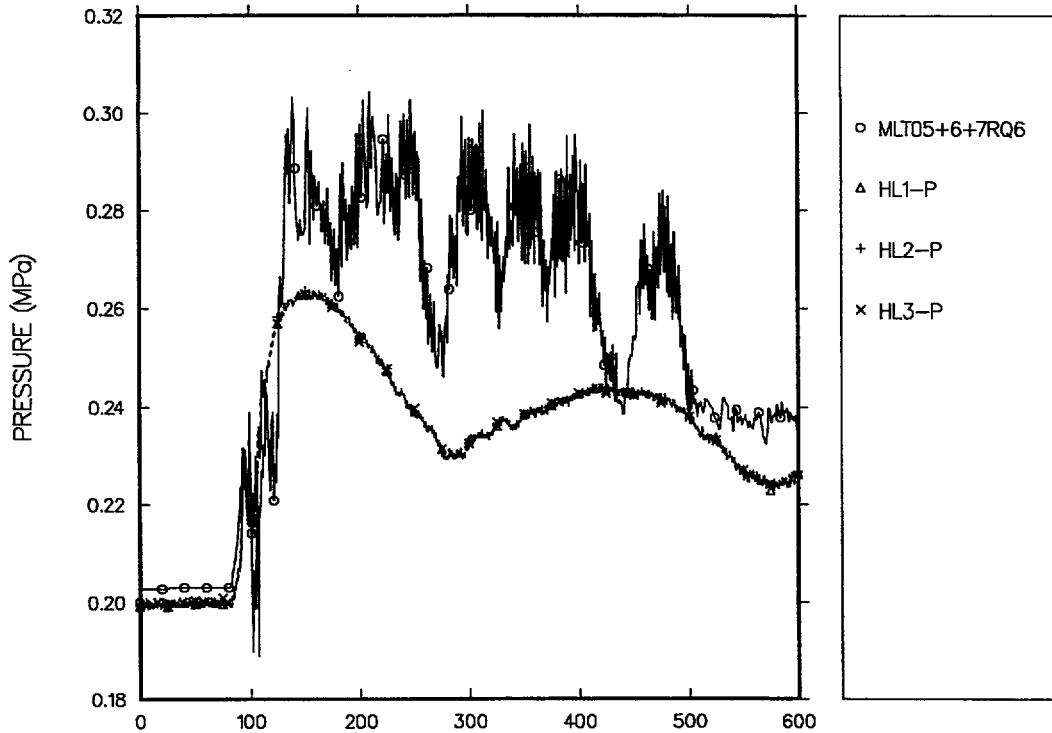


Fig. T-25. Calculated and measured hot-leg, spool-piece pressure.

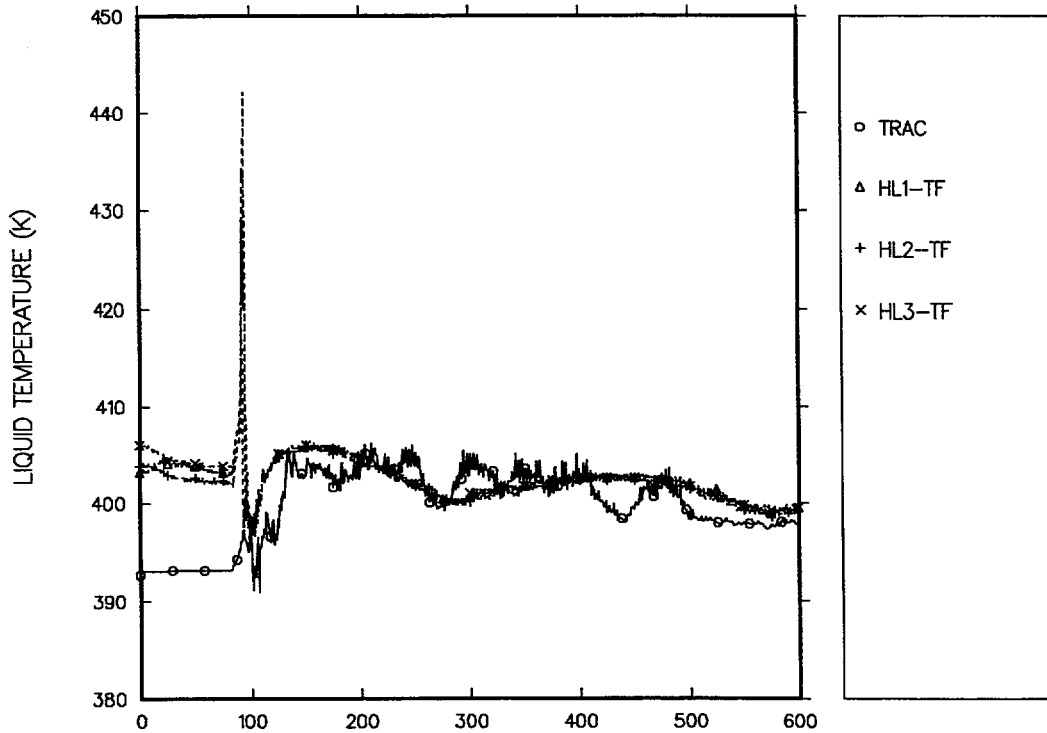


Fig. T-26. Calculated and measured hot-leg, spool-piece fluid temperature.

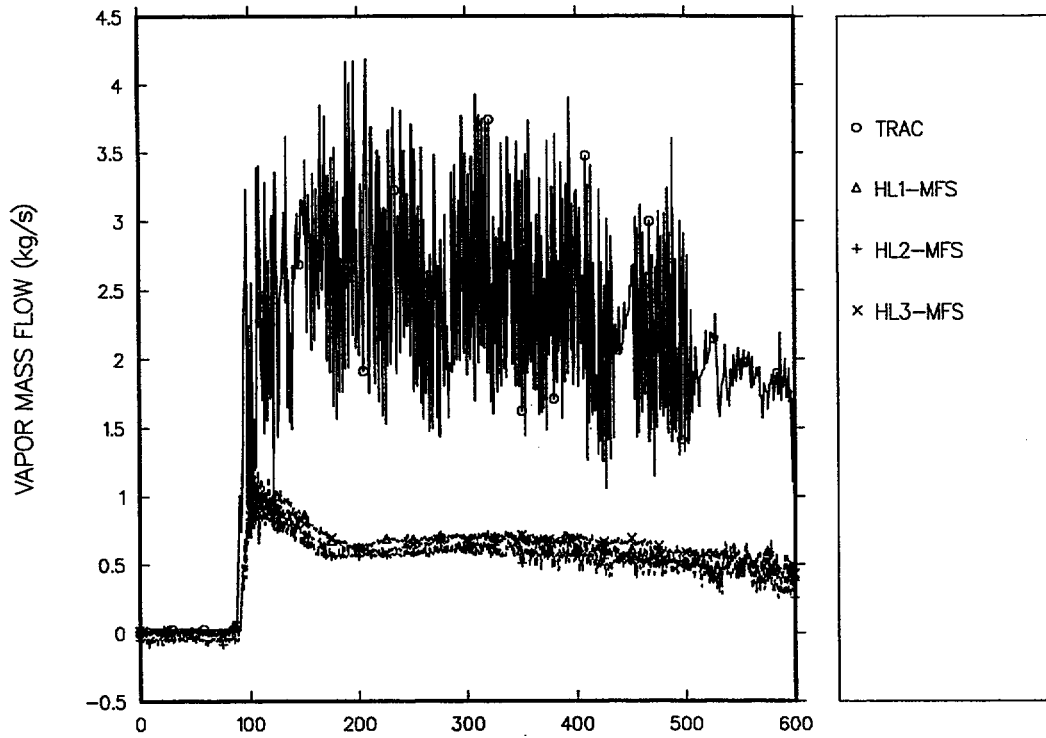


Fig. T-27. Calculated and measured hot-leg, spool-piece, steam mass flow rate.

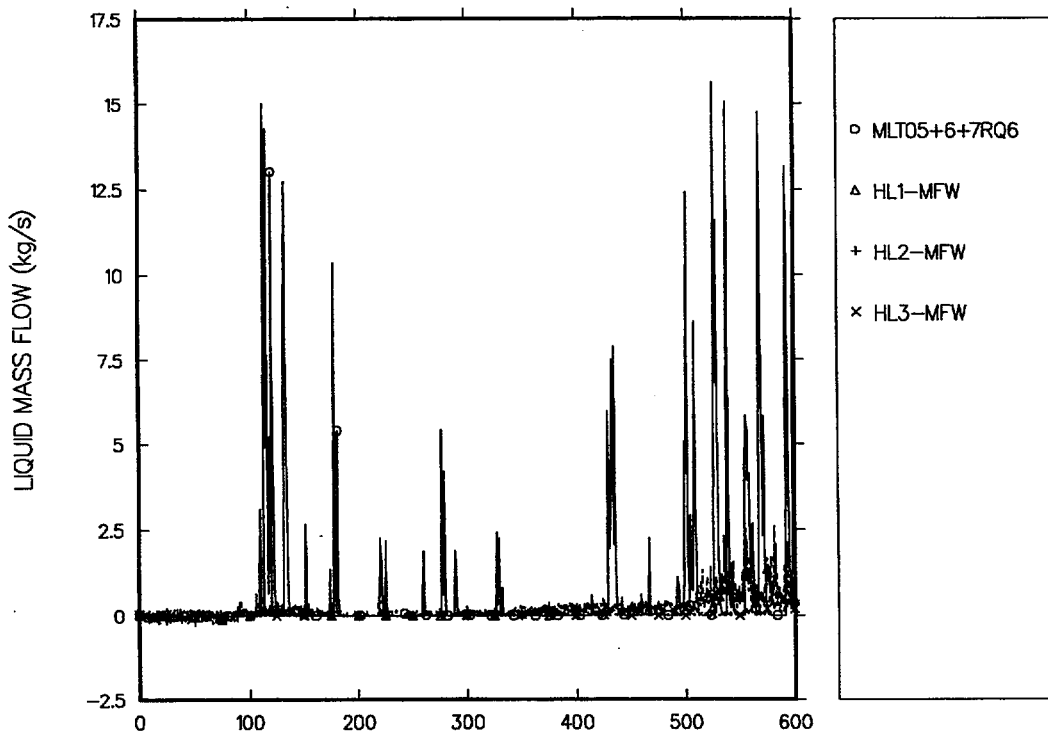


Fig. T-28. Calculated and measured hot-leg, spool-piece, steam mass flow rate.

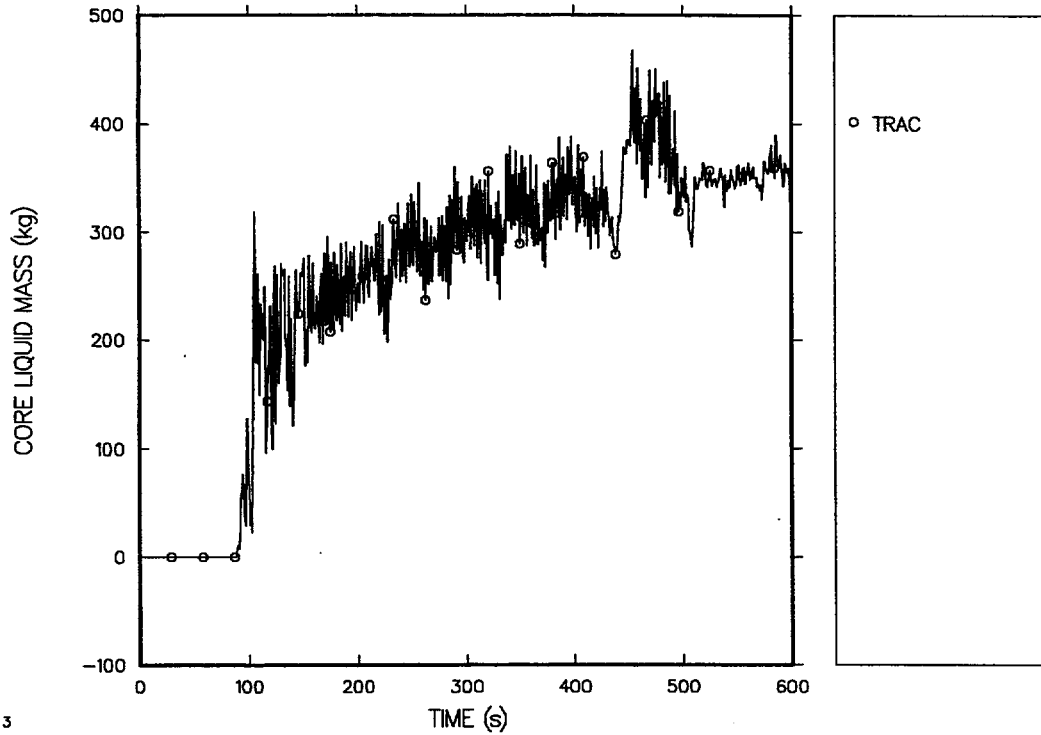


Fig. T-29. Calculated core liquid mass.

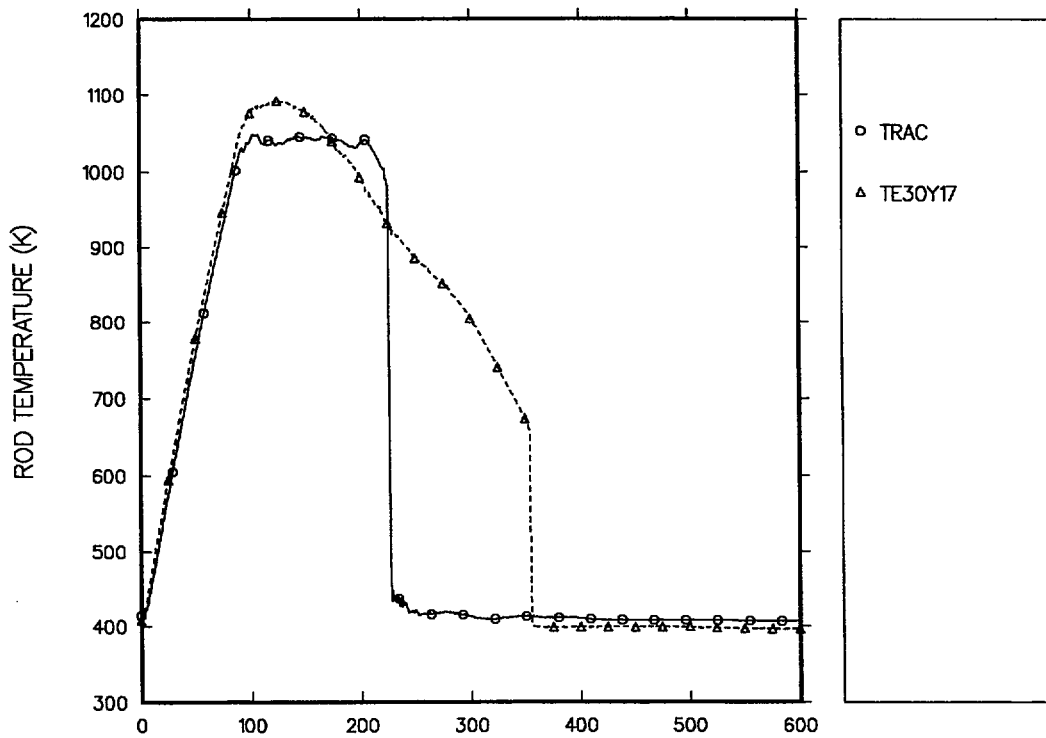


Fig. T-30. Calculated and measured cladding temperatures for the hot rod at the 3.930-m (core midplane) elevation (with grid-spacer model).



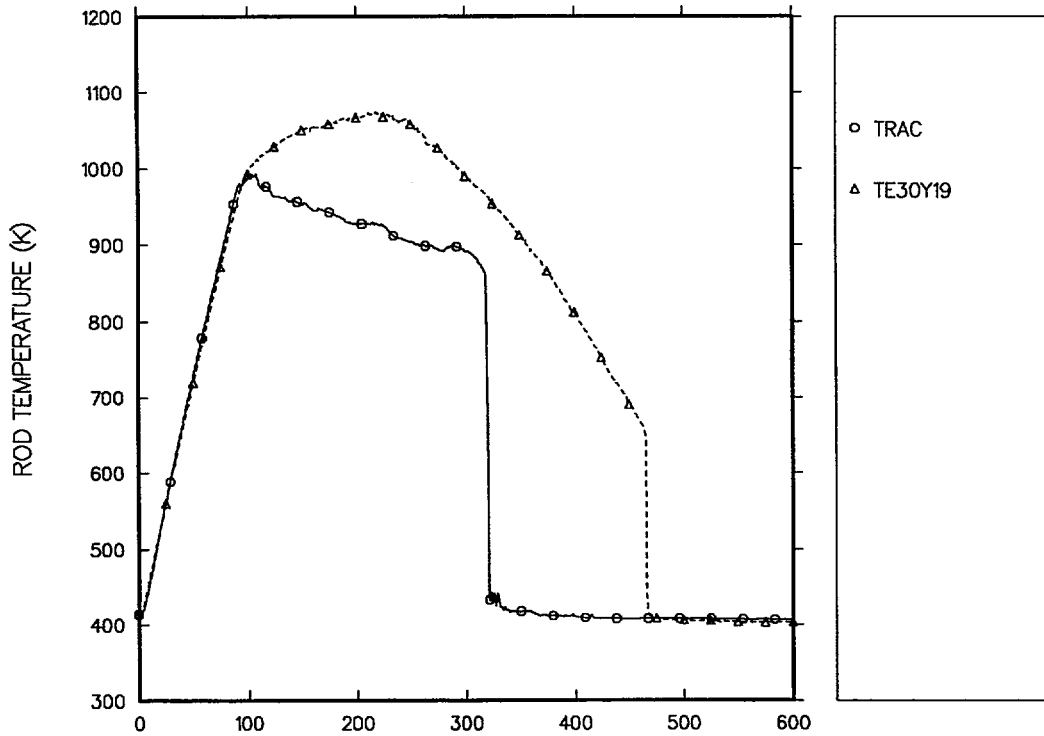


Fig. T-31. Cladding temperatures for the hot rod at the 4.540-m elevation (with grid-spacer model).

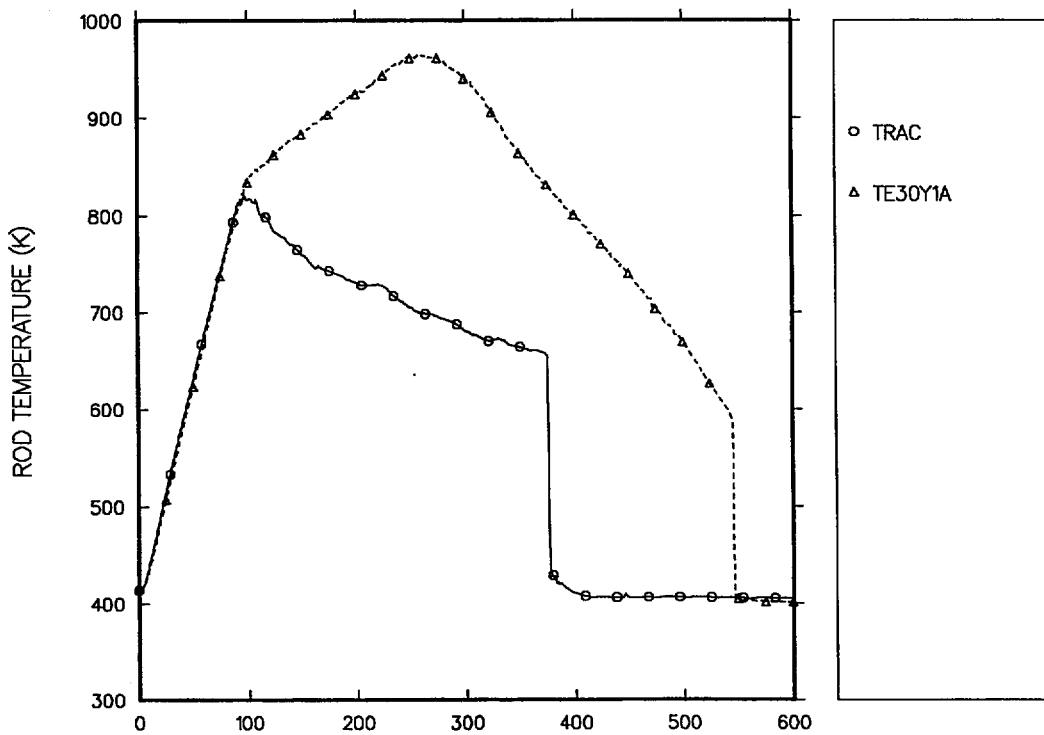


Fig. T-32. Cladding temperatures for the hot rod at the 5.150-m elevation (with grid-spacer model).

# APPENDIX U

## SCTF RUN 719 INPUT LISTING

```

1 free format
2 *
3 *****
4 * main data *
5 *****
6 *      numtcr      ieos      inopt      nmat
7      33           0         1         4
8 --- SCTF run 719 trac-pf1/mod2 deck---
9 Updated 10/20/00 by J. F. Lime for the following corrections
10 (1) The 17-step axial power shape was modeled
11 (2) Counter-current flow limitation modeling was reinstated.
12 It had been modeled in the MOD1 input but was taken out when
13 converted to MOD2 because early versions of MOD2 did not
14 model CCFI in the vessel component.
15 (3) The liquid additive loss coefficient in the vessel was corrected
16 to match the vapor additive loss coefficient.
17 Adapted from
18 sctf/run703/harmony/august 18,1987/pf1mod1(14.2)/posttest analysis
19 12/4/81 - new vessel, vessel s/w sep., revised system
20 rechecked hl valve, p vs t break, real rod ics
21 redone u.p. heat slab areas and masses, pfi conversion
22 3/12/82 - revision to correct some areas and hds; remove
23 gap from rod model; test facility power decay curve;
24 revised baffle representation.
25 5/15/82 - revision to correct flow area in cl ecc;remove
26 blockage plate from bottom of downcomer; add in extra
27 volume from vent line discovered on april 1982 trip
28 to facility.
29 9/16/82 - revision to shut off choking model in pfi code;
30 revise baffle to model flow restrictions as added
31 friction (k=2) rather than reduced flow areas.
32 12/6/86 - revision by Joel Gilbert to convert model from Core-II
33 to core-III. Audit notebook developed for conversion.
34 component 3 nodding reduced by Brent Boyack.
35 8/18/87 - Modified by Steve Harmony to reflect JAERI numbering
36 convention for upper plenum injection lines 1-4
37 9/17/87 - Modified by Steve Harmony with minor corrections
38 suggested by F. Araya of JAERI.
39 2/18/88 - Converted to TRAC-PF1/MOD2 input deck for Run 719
40 by C. P. Booker.*
41 *
42 *****
43 * namelist data *
44 *****
45 *
46 &inopts
47 iadded=10, icflow=2, imfr=3, nlt=18, nhtstr=47, newrfd=3,
48 nrslv=1, iblaus=1,
49 &end
50 *
51 *      dstep      timet
52      -1          0.0000e+00
53 *      stdyst      transi      ncomp      njun      ipak
54      0           1           79         41         1
55 *      epso      epss
56      1.0000e-04  1.0000e-04
57 *      oitmax      sitmax      isolut      ncontr      nccfl
58      15          20         0         0         1
59 *      ntsv      ntcb      ntcf      ntrp      ntcp
60      2           0         0         2         1
61 *
62 *****
63 * component-number data *
64 *****
65 * iorder array *
66 1s * VESSEL - pressure vessel comp. 12X15 2d slab.
67 2s * PIPE - hot leg.
68 3s * VALVE - broken cold leg (separator side).
69 4s * VALVE - broken cold leg (pressure vessel side).
70 6s * VESSEL - steam-water separator component.
71 8s * TEE - cl ecc, intact cold leg, pump simulator component.
72 12s * FILL - cold leg ecc fill component.
73 13s * BREAK - separator-side cold leg break CT2.
74 14s * BREAK - pv-side cold leg break CT1.
75 20s * PIPE - support column bundle 1.
76 22s * PIPE - support column bundle 6.
77 24s * PIPE - support column bundle 7.
78 26s * PIPE - support column bundle 3.
79 28s * PIPE - support column bundle 5.
80 30s * PIPE - pipe for lower plenum fill.
81 31s * FILL - lower plenum ecc fill component.
82 50s * TEE - injection piping at pressure vessel side.
83 51s * FILL - ucsp injection line 4 (bundles 1 & 2).
84 52s * TEE - injection piping at pressure vessel side (inj. 3).
85 53s * FILL - ucsp injection line 3 (bundles 3 & 4).

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86 54s * TEE - injection piping at pressure vessel side (inj. 2).
87 55s * FILL - ucsj injection line 2 (bundles 5 & 6).
88 56s * TEE - injection piping at pressure vessel side (inj. 1).
89 57s * FILL - ucsj injection line 1 (bundles 7 & 8).
90 101s * PIPE - injection pipe for ecc4 thru upper plenum.
91 103s * PIPE - injection pipe for ecc3 thru upper plenum.
92 105s * PIPE - injection pipe for ecc2 thru upper plenum.
93 107s * PIPE - injection pipe for ecc1 thru upper plenum.
94 111s * PIPE - injection pipe for ecc1 thru upper plenum.
95 113s * FILL - ecc3 thru upper plenum (bundles 3 & 4).
96 115s * FILL - ecc2 thru upper plenum (bundles 5 & 6).
97 117s * FILL - ecc1 thru upper plenum (bundles 7 & 8).
98 908s * SLAB - for S/W Sep. Level 1, cells 1 & 2.
99 907s * SLAB - for S/W Sep. Level 2, cells 1 & 2.
100 906s * SLAB - for S/W Sep. Level 3, cell 1.
101 909s * SLAB - for S/W Sep. Level 3, cell 2.
102 905s * SLAB - for S/W Sep. Level 4, cells 1 & 2.
103 991s * ROD - rods in pressure vessel.
104 989 s * slab level 1, cells 1-11
105 985 s * slab level 1, cell 12
106 984 s * slab level 2, cell 1
107 983 s * slab level 2, cells 2-8
108 982 s * slab level 2, cells 9-12
109 978 s * slab level 3, cells 1-8
110 977 s * slab level 3, cells 9-10
111 975 s * slab level 3, cell 11
112 974 s * slab level 3, cell 12
113 973 s * slab level 4-9, cells 1-8
114 972 s * slab level 4, cells 9-10
115 970 s * slab level 4, cell 11
116 969 s * slab level 4, cell 12
117 967 s * slab levels 5-8, cells 9-10
118 965 s * slab levels 5-8, cell 11
119 964 s * slab levels 5-8, cell 12
120 947 s * slab level 9, cells 9-10
121 945 s * slab level 9, cell 11
122 944 s * slab level 9, cell 12
123 943 s * slab level 10, cells 1 and 3
124 942 s * slab level 10, cell 2
125 941 s * slab level 10, cells 4, 5, and 8
126 940 s * slab level 10, cell 6
127 939 s * slab level 10, cell 7
128 938 s * slab level 10, cell 9
129 937 s * slab level 10, cell 10
130 936 s * slab level 11, cells 1 and 6
131 935 s * slab level 11, cells 2 and 4
132 934 s * slab level 11, cells 3 and 5
133 933 s * slab level 11, cell 7
134 910 s * slab level 11, cell 8
135 932 s * slab level 11, cell 9 and 10
136 930 s * slab level 12, cells 1-8
137 929 s * slab level 12, cells 9 and 10
138 927 s * slab level 12, cells 11 and 12
139 926 s * slab level 13, cells 1-8
140 925 s * slab level 13, cells 9-12
141 922 s * slab level 14, cells 1,3,5-7
142 921 s * slab level 14, cells 2,4,8
143 920 s * slab level 14, cells 9-12
144 917 e * slab level 15, cells 1-12
145 *
146 *****
147 * ccfl input parameters *
148 *****
149 *
150 * ccfl is bankoff correlation for upper tie plate
151 *
152 * cbeta * -1.00 e
153 * ccflm * 0.0 e
154 * ccflc * 0.0 e
155 * nholes tp gamma diah ctrans
156 137 0.02 0.37 0.012 0.0 *upper tie plate
157 *
158 *****
159 * material-properties data *
160 *****
161 *
162 * matb *
163 55s * nichrome
164 58s * aluminum oxide
165 59s * magnesium oxide
166 60e * inconel 600
167 * ptbln * r02 7 6 5e
168 *
169 * prpth(1,i) prpth(2,i) prpth(3,i) prpth(4,i) prpth(5,i)
170 * --T-- --rho-- --cpw-- --cw-- --emis--
171 * (k) (kg/m3) (j/kg/k) (w/m/k)
172 * Material no. 55 --- Nichrome
173 3.0000e+02 8.3500e+03 4.4487e+02 1.2337e+01 1.0000e+00
174 5.0000e+02 8.3500e+03 4.9042e+02 1.5834e+01 1.0000e+00
175 7.0000e+02 8.3500e+03 5.3948e+02 1.9331e+01 1.0000e+00
176 9.0000e+02 8.3500e+03 5.8987e+02 2.2828e+01 1.0000e+00
177 1.1000e+03 8.3500e+03 6.3939e+02 2.6324e+01 1.0000e+00

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178 1.3000e+03 8.3500e+03 6.8588e+02 2.9821e+01 1.0000e+00e
179 1.5000e+03 8.3500e+03 7.8189e+02 3.3318e+01 1.0000e+00e
180 * Material no. 58 --- Aluminum Oxide
181 3.0000e+02 3.8000e+03 8.4970e+02 3.5870e+01 1.0000e+00
182 5.0000e+02 3.8000e+03 9.6550e+02 2.0173e+01 1.0000e+00
183 7.0000e+02 3.8000e+03 1.0813e+03 1.2529e+01 1.0000e+00
184 9.0000e+02 3.8000e+03 1.1971e+03 8.9514e+00 1.0000e+00
185 1.1000e+03 3.8000e+03 1.3129e+03 7.1615e+00 1.0000e+00
186 1.3000e+03 3.8000e+03 1.4287e+03 6.1228e+00 1.0000e+00e
187 1.5000e+03 3.8000e+03 1.5445e+03 5.0841e+00 1.0000e+00e
188 * Material no. 59 --- Magnesium Oxide
189 3.0000e+02 2.6500e+03 9.9800e+02 1.6300e+00 1.0000e+00
190 6.0000e+02 2.6500e+03 1.0920e+03 1.4200e+00 1.0000e+00
191 9.0000e+02 2.6500e+03 1.1850e+03 1.2100e+00 1.0000e+00
192 1.2000e+03 2.6500e+03 1.2350e+03 1.0000e+00 1.0000e+00
193 1.3000e+03 2.6500e+03 1.2790e+03 9.3000e-01 1.0000e+00e
194 1.5000e+03 2.6500e+03 1.3670e+03 7.9000e-01 1.0000e+00e
195 * Material no. 60 --- Inconel 600
196 3.0000e+02 8.4103e+03 4.4029e+02 1.4340e+01 8.4000e-01
197 6.0000e+02 8.2925e+03 5.0636e+02 1.9331e+01 8.4000e-01
198 9.0000e+02 8.1747e+03 5.7242e+02 2.4322e+01 8.4000e-01
199 1.2000e+03 8.0569e+03 6.3839e+02 2.9314e+01 8.4000e-01e
200 1.5000e+03 7.9391e+03 7.0436e+02 3.4306e+01 8.4000e-01e
201 *
202 *****
203 * control-parameter data *
204 *****
205 *
206 * signal variables
207 * idsv isvn ilcn icn1 icn2
208 * time * 101 0 0 0 0
209 * Tfuel * 102 25 991 1004 8009
210 *
211 * trips
212 * ntse ntct ntsf ntdp ntsd
213 * 0 0 0 0 0
214 *
215 * trip to start-up fine mesh.
216 * idtp isrt iset itst idsg
217 * 1001 2 0 1 101
218 * setp(1) setp(2)
219 * 1.0000e-02 1.1000e-02
220 * dtsp(1) dtsp(2)
221 * 0.0000e+00 0.0000e+00
222 * ifsp(1) ifsp(2)
223 * 0 0
224 *
225 * trip to initiate reflood calculation.
226 * idtp isrt iset itst idsg
227 * 1002 2 0 1 101
228 * setp(1) setp(2)
229 * 1.0000e-02 0.011
230 * dtsp(1) dtsp(2)
231 * 0.0000e+00 0.0000e+00
232 * ifsp(1) ifsp(2)
233 * 0 0
234 *
235 *****
236 * component data *
237 *****
238 *****
239 * Cold Leg Fill (zero for run 719)
240 *****
241 * type num id ctitle
242 fill 12 12 $12$ cold leg ecc
243 * junl ifty ioff
244 * 9 1 1
245 * twtold rfmv concin felv
246 * 0.0000e+00 1.0000e+30 0.0000e+00 0.0000e+00
247 * dxin volin alpin vlin tlin
248 * 3.3100e-01 1.7000e-02 0.0000e+00 0.0000e+00 3.9300e+02
249 * pin pain flowin vvin tvin
250 * 2.0180e+05 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
251 *****
252 * Lower Plenum Ecc Fill
253 *****
254 * type num id ctitle
255 fill 31 31 $31$ lower plenum ecc
256 * junl ifty ioff
257 * 31 6 0
258 * iftr ifsv nftb nfsv nfrf
259 * 0 101 27 0 0
260 * twtold rfmv concin felv
261 * 0.0000e+00 1.0000e+05 0.0000e+00 0.0000e+00
262 * dxin volin alpin vlin tlin
263 * 5.0000e-01 8.0500e-03 0.0000e+00 0.0000e+00 3.9080e+02
264 * pin pain flowin vvin tvin
265 * 2.0180e+05 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
266 * Scale factor: VMSCl=1/area = 1/0.0161
267 * vmsc1 vvscl
268 * 6.2112e+01 6.2112e+01
269 * t1scl tvscl pscl pascl conscl

```

```

270      1.0000e+00  1.0000e+00  1.0000e+00  1.0000e+00  0.0000e+00
271 * input value is volumetric flow rate, q.
272 * tag ft01as
273 * vmtb * r02 0.0000e+00  1.1400e+02  0.0000e+00  1.1500e+02  2.8210e-02
274 * vmtb * 1.1600e+02  4.6220e-02  1.1700e+02  3.9780e-02  1.1800e+02
275 * vmtb * 3.8080e-02  1.2000e+02  3.9490e-02  1.2400e+02  3.7960e-02
276 * vmtb * 1.2600e+02  3.8190e-02  1.2800e+02  3.6000e-02  1.2900e+02
277 * vmtb * 3.6400e-02  1.3000e+02  3.4650e-02  1.3100e+02  3.5220e-02
278 * vmtb * 1.3300e+02  3.0790e-02  1.4400e+02  1.4110e-02  1.4700e+02
279 * vmtb * 1.1990e-02  1.5100e+02  1.2580e-02  1.7200e+02  1.0000e-02
280 * vmtb * 2.2300e+02  4.4860e-03  2.5100e+02  4.1740e-03  3.4500e+02
281 * vmtb * 4.2000e-03  3.8000e+02  4.3000e-03  4.3500e+02  4.2000e-03
282 * vmtb * 5.3000e+02  4.3900e-03  5.6000e+02  4.2500e-03  6.0000e+02
283 * vmtb * 4.3000e-03  1.0000e+03  4.3000e-03e  0.0000e+00  0.0000e+00
284 * vvtb * r02 0.0000e+00  1.1400e+02  0.0000e+00  1.1500e+02  0.0000e+00
285 * vvtb * 1.1600e+02  0.0000e+00  1.1700e+02  0.0000e+00  1.1800e+02
286 * vvtb * 0.0000e+00  1.2000e+02  0.0000e+00  1.2400e+02  0.0000e+00
287 * vvtb * 1.2600e+02  0.0000e+00  1.2800e+02  0.0000e+00  1.2900e+02
288 * vvtb * 0.0000e+00  1.3000e+02  0.0000e+00  1.3100e+02  0.0000e+00
289 * vvtb * 1.3300e+02  0.0000e+00  1.4400e+02  0.0000e+00  1.4700e+02
290 * vvtb * 0.0000e+00  1.5100e+02  0.0000e+00  1.7200e+02  0.0000e+00
291 * vvtb * 2.2300e+02  0.0000e+00  2.5100e+02  0.0000e+00  3.4500e+02
292 * vvtb * 0.0000e+00  3.8000e+02  0.0000e+00  4.3500e+02  0.0000e+00
293 * vvtb * 5.3000e+02  0.0000e+00  5.6000e+02  0.0000e+00  6.0000e+02
294 * vvtb * 0.0000e+00  1.0000e+03  0.0000e+00e  0.0000e+00  0.0000e+00
295 * tag te06aws
296 * tltb * 0.0000e+00  3.9080e+02  1.1400e+02  3.8990e+02  1.1500e+02
297 * tltb * 3.8810e+02  1.1600e+02  3.0770e+02  1.1700e+02  3.0080e+02
298 * tltb * 1.1800e+02  2.9500e+02  1.2000e+02  3.1200e+02  1.2400e+02
299 * tltb * 3.4830e+02  1.2600e+02  3.5190e+02  1.2800e+02  3.5730e+02
300 * tltb * 1.2900e+02  3.5970e+02  1.3000e+02  3.6160e+02  1.3100e+02
301 * tltb * 3.6350e+02  1.3300e+02  3.6620e+02  1.4400e+02  3.7280e+02
302 * tltb * 1.4700e+02  3.7340e+02  1.5100e+02  3.7400e+02  1.7200e+02
303 * tltb * 3.7380e+02  2.2300e+02  3.6080e+02  2.5100e+02  3.5580e+02
304 * tltb * 3.4500e+02  3.7240e+02  3.8000e+02  3.7630e+02  4.3500e+02
305 * tltb * 3.7950e+02  5.3000e+02  3.8120e+02  5.6000e+02  3.8010e+02
306 * tltb * 6.0000e+02  3.8040e+02  1.0000e+03  3.8040e+02e
307 * Set vapor temp. to saturation
308 * tvtb * 0.0000e+00  3.9366e+02  1.1400e+02  3.9400e+02  1.1500e+02
309 * tvtb * 3.9366e+02  1.1600e+02  3.9400e+02  1.1700e+02  3.9366e+02
310 * tvtb * 1.1800e+02  3.9400e+02  1.2000e+02  3.9366e+02  1.2400e+02
311 * tvtb * 3.9400e+02  1.2600e+02  3.9366e+02  1.2800e+02  3.9400e+02
312 * tvtb * 1.2900e+02  3.9366e+02  1.3000e+02  3.9400e+02  1.3100e+02
313 * tvtb * 3.9366e+02  1.3300e+02  3.9400e+02  1.4400e+02  3.9366e+02
314 * tvtb * 1.4700e+02  3.9400e+02  1.5100e+02  3.9366e+02  1.7200e+02
315 * tvtb * 3.9400e+02  2.2300e+02  3.9366e+02  2.5100e+02  3.9400e+02
316 * tvtb * 3.4500e+02  3.9366e+02  3.8000e+02  3.9400e+02  4.3500e+02
317 * tvtb * 3.9366e+02  5.3000e+02  3.9400e+02  5.6000e+02  3.9366e+02
318 * tvtb * 6.0000e+02  3.9400e+02  1.0000e+03  3.9366e+02e
319 * alptb * r02 0.0000e+00  1.1400e+02  0.0000e+00  1.1500e+02  0.0000e+00
320 * alptb * 1.1600e+02  0.0000e+00  1.1700e+02  0.0000e+00  1.1800e+02
321 * alptb * 0.0000e+00  1.2000e+02  0.0000e+00  1.2400e+02  0.0000e+00
322 * alptb * 1.2600e+02  0.0000e+00  1.2800e+02  0.0000e+00  1.2900e+02
323 * alptb * 0.0000e+00  1.3000e+02  0.0000e+00  1.3100e+02  0.0000e+00
324 * alptb * 1.3300e+02  0.0000e+00  1.4400e+02  0.0000e+00  1.4700e+02
325 * alptb * 0.0000e+00  1.5100e+02  0.0000e+00  1.7200e+02  0.0000e+00
326 * alptb * 2.2300e+02  0.0000e+00  2.5100e+02  0.0000e+00  3.4500e+02
327 * alptb * 0.0000e+00  3.8000e+02  0.0000e+00  4.3500e+02  0.0000e+00
328 * alptb * 5.3000e+02  0.0000e+00  5.6000e+02  0.0000e+00  6.0000e+02
329 * alptb * 0.0000e+00  1.0000e+03  0.0000e+00e
330 * ptb * 0.0000e+00  2.0180e+05  1.1400e+02  2.0180e+05  1.1500e+02
331 * ptb * 2.0180e+05  1.1600e+02  2.0180e+05  1.1700e+02  2.0180e+05
332 * ptb * 1.1800e+02  2.0180e+05  1.2000e+02  2.0180e+05  1.2400e+02
333 * ptb * 2.0180e+05  1.2600e+02  2.0180e+05  1.2800e+02  2.0180e+05
334 * ptb * 1.2900e+02  2.0180e+05  1.3000e+02  2.0180e+05  1.3100e+02
335 * ptb * 2.0180e+05  1.3300e+02  2.0180e+05  1.4400e+02  2.0180e+05
336 * ptb * 1.4700e+02  2.0180e+05  1.5100e+02  2.0180e+05  1.7200e+02
337 * ptb * 2.0180e+05  2.2300e+02  2.0180e+05  2.5100e+02  2.0180e+05
338 * ptb * 3.4500e+02  2.0180e+05  3.8000e+02  2.0180e+05  4.3500e+02
339 * ptb * 2.0180e+05  5.3000e+02  2.0180e+05  5.6000e+02  2.0180e+05
340 * ptb * 6.0000e+02  2.0180e+05  1.0000e+03  2.0180e+05e
341 * patb * r02 0.0000e+00  1.1400e+02  0.0000e+00  1.1500e+02  0.0000e+00
342 * patb * 1.1600e+02  0.0000e+00  1.1700e+02  0.0000e+00  1.1800e+02
343 * patb * 0.0000e+00  1.2000e+02  0.0000e+00  1.2400e+02  0.0000e+00
344 * patb * 1.2600e+02  0.0000e+00  1.2800e+02  0.0000e+00  1.2900e+02
345 * patb * 0.0000e+00  1.3000e+02  0.0000e+00  1.3100e+02  0.0000e+00
346 * patb * 1.3300e+02  0.0000e+00  1.4400e+02  0.0000e+00  1.4700e+02
347 * patb * 0.0000e+00  1.5100e+02  0.0000e+00  1.7200e+02  0.0000e+00
348 * patb * 2.2300e+02  0.0000e+00  2.5100e+02  0.0000e+00  3.4500e+02
349 * patb * 0.0000e+00  3.8000e+02  0.0000e+00  4.3500e+02  0.0000e+00
350 * patb * 5.3000e+02  0.0000e+00  5.6000e+02  0.0000e+00  6.0000e+02
351 * patb * 0.0000e+00  1.0000e+03  0.0000e+00e
352 *****
353 * Pipe for Lower Plenum Fill comp. 31
354 *****
355 *
356 pipe      type      30      num      id      ctitle
357 *         ncells    nodes    jun1     jun2     epsw
358 *         1         0         30      31      1.0000e-05
359 *         ichf     iconc     iacc     ipow
360 *         1         0         0         0
361 *         radin    th        hout1    houtv    tout1

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```

362      7.1600e-02  1.1000e-02  0.0000e+00  0.0000e+00  0.0000e+00
363 *      toutv
364      0.0000e+00
365 *
366 * dx      *      5.0000e-01e
367 * vol    *      8.0500e-03e
368 * fa     * f      1.6100e-02e
369 * fric   * f      0.0000e+00e
370 * grav   * f      0.0000e+00e
371 * hd     * f      1.4320e-01e
372 * icflg  * f      0e
373 * nff    * -1     1e
374 * lccfl  *      f 0 e
375 * alp    *      0.0000e+00e
376 * vl     * f      0.0000e+00e
377 * vv     * f      0.0000e+00e
378 * tl     *      3.9100e+02e
379 * tv     *      3.9300e+02e
380 * p      *      2.0180e+05e
381 * pa     *      0.0000e+00e
382 *****
383 * UCSP injection line 4 (bundles 1 & 2) (zero for run 719)
384 *****
385 *      type      num      id      ctitle
386 fill      51      51 $51$ ucsp inj (1 and 2)
387 *      junl      ifty      ioff
388      51      6      0
389 *      iftr      ifsv      nftb      nfsv      nfrf
390      0      101      2      0      0
391 *      twtold    rfmX      concin      felv
392      0.0000e+00  1.0000e+05  0.0000e+00  0.0000e+00
393 *      dxin      volin      alpin      vlin      tlin
394      3.9600e-01  1.9400e-03  0.0000e+00  0.0000e+00  3.9300e+02
395 *      pin      pain      flowin      vvin      tvin
396      2.0180e+05  0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
397 * No UCSP injection into bundles 1 and 2 for Run 719
398 * Scale factor: VMSCl=1/area
399 *      vmscl      vvscl
400      0.0000e+00  0.0000e+00
401 *      tmscl      tvscl      pscl      pascl      conscl
402      1.0000e+00  1.0000e+00  1.0000e+00  1.0000e+00  0.0000e+00
403 * input value is volumetric flow rate, q.
404 * tag ft05us
405 * vmtb *      0.0000e+00  0.0000e+00  1.0000e+03  0.0000e+00e
406 * vvtb *      0.0000e+00  0.0000e+00  1.0000e+03  0.0000e+00e
407 * tag te05uws
408 * tltb *      0.0000e+00  3.8700e+02  1.0000e+03  3.8700e+02e
409 * tvtb *      0.0000e+00  3.8700e+02  1.0000e+03  3.8700e+02e
410 * alptb *      0.0000e+00  0.0000e+00  1.0000e+03  0.0000e+00e
411 * ptb *      0.0000e+00  6.0000e+05  1.0000e+03  6.0000e+05e
412 * patb *      0.0000e+00  0.0000e+00  1.0000e+03  0.0000e+00e
413 *****
414 * UCSP injection line 3 (bundles 3 & 4) (zero for run 719)
415 *****
416 *      type      num      id      ctitle
417 fill      53      53 $53$ ucsp inj (3 and 4)
418 *      junl      ifty      ioff
419      53      6      0
420 *      iftr      ifsv      nftb      nfsv      nfrf
421      0      101      2      0      0
422 *      twtold    rfmX      concin      felv
423      0.0000e+00  1.0000e+05  0.0000e+00  0.0000e+00
424 *      dxin      volin      alpin      vlin      tlin
425      3.9600e-01  1.9400e-03  0.0000e+00  0.0000e+00  3.9300e+02
426 *      pin      pain      flowin      vvin      tvin
427      2.0180e+05  0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
428 * No UCSP injection into bundles 3 and 4 for Run 719
429 * Scale factor: VMSCl=1/area
430 *      vmscl      vvscl
431      0.0000e+00  0.0000e+00
432 *      tmscl      tvscl      pscl      pascl      conscl
433      1.0000e+00  1.0000e+00  1.0000e+00  1.0000e+00  0.0000e+00
434 * input value is volumetric flow rate, q.
435 * tag ft04us
436 * vmtb *      0.0000e+00  0.0000e+00  1.0000e+03  0.0000e+00e
437 * vvtb *      0.0000e+00  0.0000e+00  1.0000e+03  0.0000e+00e
438 * tag te04uws
439 * tltb *      0.0000e+00  3.8700e+02  1.0000e+03  3.8700e+02e
440 * tvtb *      0.0000e+00  3.8700e+02  1.0000e+03  3.8700e+02e
441 * alptb *      0.0000e+00  0.0000e+00  1.0000e+03  0.0000e+00e
442 * ptb *      0.0000e+00  6.0000e+05  1.0000e+03  6.0000e+05e
443 * patb *      0.0000e+00  0.0000e+00  1.0000e+03  0.0000e+00e
444 *****
445 * UCSP injection line 2 (bundles 5 & 6) (zero for run 719)
446 *****
447 *      type      num      id      ctitle
448 fill      55      55 $55$ ucsp inj (5 and 6)
449 *      junl      ifty      ioff
450      55      6      0
451 *      iftr      ifsv      nftb      nfsv      nfrf
452      0      101      2      0      0
453 *      twtold    rfmX      concin      felv

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454      0.0000e+00      1.0000e+05      0.0000e+00      0.0000e+00
455 *      dxin      volin      alpin      vlin      tlin
456      3.9600e-01      1.9400e-03      0.0000e+00      0.0000e+00      3.9300e+02
457 *      pin      pain      flowin      vvin      tvin
458      2.0180e+05      0.0000e+00      0.0000e+00      0.0000e+00      0.0000e+00
459 * No UCSF injection into bundles 5 and 6 for Run 719
460 * Scale factor: VMSCl=1/area
461 *      vmsc1      vvscl
462      0.0000e+00      0.0000e+00
463 *      t1scl      tvscl      pscl      pascl      conscl
464      1.0000e+00      1.0000e+00      1.0000e+00      1.0000e+00      0.0000e+00
465 * input value is volumetric flow rate, q.
466 * tag ft03us
467 * vmtb *      0.0000e+00      0.0000e+00      1.0000e+03      0.0000e+00e
468 * vvtb *      0.0000e+00      0.0000e+00      1.0000e+03      0.0000e+00e
469 * tag te03uws
470 * tltb *      0.0000e+00      3.8700e+02      1.0000e+03      3.8700e+02e
471 * tvtb *      0.0000e+00      3.8700e+02      1.0000e+03      3.8700e+02e
472 * alptb *      0.0000e+00      0.0000e+00      1.0000e+03      0.0000e+00e
473 * ptb *      0.0000e+00      6.0000e+05      1.0000e+03      6.0000e+05e
474 * patb *      0.0000e+00      0.0000e+00      1.0000e+03      0.0000e+00e
475 *****
476 * UCSF injection line 1 (bundles 7 & 8) (zero for run 719)
477 *****
478 *      type      num      id      ctitle
479 fill      57      57 $57$ ucsp inj (7 and 8)
480 *      juni      ifty      ioff
481      57      6      0
482 *      iftr      ifsv      nftb      nfsv      nfrf
483      0      101      2      0      0
484 *      twtold      rfmX      concin      felv
485      0.0000e+00      1.0000e+05      0.0000e+00      0.0000e+00
486 *      dxin      volin      alpin      vlin      tlin
487      3.9600e-01      1.9400e-03      0.0000e+00      0.0000e+00      3.8240e+02
488 *      pin      pain      flowin      vvin      tvin
489      2.0180e+05      0.0000e+00      0.0000e+00      0.0000e+00      0.0000e+00
490 * No UCSF injection into bundles 7 and 8 for Run 719
491 * Scale factor: VMSCl=1/area
492 *      vmsc1      vvscl
493      0.0000e+00      0.0000e+00
494 *      t1scl      tvscl      pscl      pascl      conscl
495      1.0000e+00      1.0000e+00      1.0000e+00      1.0000e+00      0.0000e+00
496 * input value is volumetric flow rate, q.
497 * tag ft02us
498 * vmtb *      0.0000e+00      0.0000e+00      1.0000e+03      0.0000e+00e
499 * vvtb *      0.0000e+00      0.0000e+00      1.0000e+03      0.0000e+00e
500 * tag te02uws
501 * tltb *      0.0000e+00      3.8700e+02      1.0000e+03      3.8700e+02e
502 * tvtb *      0.0000e+00      3.8700e+02      1.0000e+03      3.8700e+02e
503 * alptb *      0.0000e+00      0.0000e+00      1.0000e+03      0.0000e+00e
504 * ptb *      0.0000e+00      6.0000e+05      1.0000e+03      6.0000e+05e
505 * patb *      0.0000e+00      0.0000e+00      1.0000e+03      0.0000e+00e
506 *****
507 * Injection piping at pressure vessel side (inj. 4)
508 *****
509 *      type      num      id      ctitle
510 tee      50      50 $50$ inj 4 to vessel piping - 3/20/
511 *      jcell      nodes      ichf      cost      epsw
512      2      0      1      0.      1.0000e-05
513 *      iconc1      ncell1      jun1      jun2      ipow1
514      0      3      41      42      0
515 *      radin1      th1      hout11      houtv1      tout11
516      4.0000e-02      5.0000e-03      0.0000e+00      0.0000e+00      0.0000e+00
517 *      toutv1
518      0.0000e+00
519 *      iconc2      ncell2      jun3      ipow2
520      0      1      51      0
521 *      radin2      th2      hout12      houtv2      tout12
522      4.0000e-02      5.0000e-03      0.0000e+00      0.0000e+00      0.0000e+00
523 *      toutv2
524      0.0000e+00
525 *
526 * dx *      1.3850e+00      2.3000e-01      1.3850e+00e
527 * vol *      6.9610e-03      1.1560e-03      6.9610e-03e
528 * fa * f      5.0266e-03e
529 * fric *      4.9500e-02r02      6.0000e-01      4.9500e-02e
530 * grav * f      0.0000e+00e
531 * hd * f      8.0000e-02e
532 * icflg * f      0e
533 * nff *      -1r02      1      -1e
534 * lccfl *      f 0 e
535 * alp * f      1.0000e+00e
536 * vl * f      0.0000e+00e
537 * vv * f      0.0000e+00e
538 * tl * f      3.9300e+02e
539 * tv * f      3.9300e+02e
540 * p * f      2.0180e+05e
541 * pa * f      0.0000e+00e
542 *
543 * dx *      1.4850e+00e
544 * vol *      7.4640e-03e
545 * fa * f      5.0270e-03e

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546 * fric * 6.7500e-02 3.6400e-02e
547 * grav * f 0.0000e+00e
548 * hd * f 8.0000e-02e
549 * icflg * f 0e
550 * nff * f 1e
551 * lccfl * f 0 e
552 * alp * f 1.0000e+00e
553 * vl * f 0.0000e+00e
554 * vv * f 0.0000e+00e
555 * tl * 3.9300e+02e
556 * tv * 3.9300e+02e
557 * p * 2.0180e+05e
558 * pa * 0.0000e+00e
559 *****
560 * Injection piping at pressure vessel side (inj. 3)
561 *****
562 * type num id ctitle
563 tee 52 52 $52$ inj 3 to vessel piping - 3/20/
564 * jcell nodes ichf cost epsw
565 * 2 0 1 0. 1.0000e-05
566 * iconcl ncell1 jun1 jun2 ipow1
567 * 0 3 43 44 0
568 * radin1 th1 hout11 houtv1 tout11
569 * 4.0000e-02 5.0000e-03 0.0000e+00 0.0000e+00 0.0000e+00
570 * toutv1
571 * 0.0000e+00
572 * iconc2 ncell2 jun3 ipow2
573 * 0 1 53 0
574 * radin2 th2 hout12 houtv2 tout12
575 * 4.0000e-02 5.0000e-03 0.0000e+00 0.0000e+00 0.0000e+00
576 * toutv2
577 * 0.0000e+00
578 *
579 * dx * 1.3850e+00 2.3000e-01 1.3850e+00e
580 * vol * 6.9610e-03 1.1560e-03 6.9610e-03e
581 * fa * f 5.0266e-03e
582 * fric * 4.9500e-02r02 6.0000e-01 4.9500e-02e
583 * grav * f 0.0000e+00e
584 * hd * f 8.0000e-02e
585 * icflg * f 0e
586 * nff * f -1r02 1 -1e
587 * lccfl * f 0 e
588 * alp * f 1.0000e+00e
589 * vl * f 0.0000e+00e
590 * vv * f 0.0000e+00e
591 * tl * f 3.9300e+02e
592 * tv * f 3.9300e+02e
593 * p * f 2.0180e+05e
594 * pa * f 0.0000e+00e
595 *
596 * dx * 1.4850e+00e
597 * vol * 7.4640e-03e
598 * fa * f 5.0270e-03e
599 * fric * 6.7500e-02 3.6400e-02e
600 * grav * f 0.0000e+00e
601 * hd * f 8.0000e-02e
602 * icflg * f 0e
603 * nff * f 1e
604 * lccfl * f 0 e
605 * alp * f 1.0000e+00e
606 * vl * f 0.0000e+00e
607 * vv * f 0.0000e+00e
608 * tl * 3.9300e+02e
609 * tv * 3.9300e+02e
610 * p * 2.0180e+05e
611 * pa * 0.0000e+00e
612 *****
613 * Injection piping at pressure vessel side (inj. 2)
614 *****
615 * type num id ctitle
616 tee 54 54 $54$ inj 2 to vessel piping - 3/20/
617 * jcell nodes ichf cost epsw
618 * 2 0 1 0. 1.0000e-05
619 * iconcl ncell1 jun1 jun2 ipow1
620 * 0 3 45 46 0
621 * radin1 th1 hout11 houtv1 tout11
622 * 4.0000e-02 5.0000e-03 0.0000e+00 0.0000e+00 0.0000e+00
623 * toutv1
624 * 0.0000e+00
625 * iconc2 ncell2 jun3 ipow2
626 * 0 1 55 0
627 * radin2 th2 hout12 houtv2 tout12
628 * 4.0000e-02 5.0000e-03 0.0000e+00 0.0000e+00 0.0000e+00
629 * toutv2
630 * 0.0000e+00
631 *
632 * dx * 1.3850e+00 2.3000e-01 1.3850e+00e
633 * vol * 6.9610e-03 1.1560e-03 6.9610e-03e
634 * fa * f 5.0266e-03e
635 * fric * 4.9500e-02r02 6.0000e-01 4.9500e-02e
636 * grav * f 0.0000e+00e
637 * hd * f 8.0000e-02e

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638 * icflg * f 0e
639 * nff * -1r02 1 -1e
640 * lccfl * f 0 e
641 * alp * f 1.0000e+00e
642 * vl * f 0.0000e+00e
643 * vv * f 0.0000e+00e
644 * tl * f 3.9300e+02e
645 * tv * f 3.9300e+02e
646 * p * f 2.0180e+05e
647 * pa * f 0.0000e+00e
648 *
649 * dx * 1.4850e+00e
650 * vol * 7.4640e-03e
651 * fa * f 5.0270e-03e
652 * fric * 6.7500e-02 3.6400e-02e
653 * grav * f 0.0000e+00e
654 * hd * f 8.0000e-02e
655 * icflg * f 0e
656 * nff * f 1e
657 * lccfl * f 0 e
658 * alp * 1.0000e+00e
659 * vl * f 0.0000e+00e
660 * vv * f 0.0000e+00e
661 * tl * 3.9300e+02e
662 * tv * 3.9300e+02e
663 * p * 2.0180e+05e
664 * pa * 0.0000e+00e
665 *
666 * Injection piping at pressure vessel side (inj. 1)
667 *
668 * type num id ctitle
669 tee 56 56 $$$ inj 1 to vessel piping - 3/20/
670 * jcell nodes ichf cost epsw
671 * 2 0 1 0. 1.0000e-05
672 * iconc1 ncell1 jun1 jun2 ipow1
673 * 0 3 47 48 0
674 * radin1 th1 hout11 houtv1 tout11
675 * 4.0000e-02 5.0000e-03 0.0000e+00 0.0000e+00 0.0000e+00
676 * toutv1
677 * 0.0000e+00
678 * iconc2 ncell2 jun3 ipow2
679 * 0 1 57 0
680 * radin2 th2 hout12 houtv2 tout12
681 * 4.0000e-02 5.0000e-03 0.0000e+00 0.0000e+00 0.0000e+00
682 * toutv2
683 * 0.0000e+00
684 *
685 * dx * 1.3850e+00 2.3000e-01 1.3850e+00e
686 * vol * 6.9610e-03 1.1560e-03 6.9610e-03e
687 * fa * f 5.0266e-03e
688 * fric * 4.9500e-02r02 6.0000e-01 4.9500e-02e
689 * grav * f 0.0000e+00e
690 * hd * f 8.0000e-02e
691 * icflg * f 0e
692 * nff * -1r02 1 -1e
693 * lccfl * f 0 e
694 * alp * f 1.0000e+00e
695 * vl * f 0.0000e+00e
696 * vv * f 0.0000e+00e
697 * tl * f 3.9300e+02e
698 * tv * f 3.9300e+02e
699 * p * f 2.0180e+05e
700 * pa * f 0.0000e+00e
701 *
702 * dx * 1.4850e+00e
703 * vol * 7.4640e-03e
704 * fa * f 5.0270e-03e
705 * fric * 6.7500e-02 3.6400e-02e
706 * grav * f 0.0000e+00e
707 * hd * f 8.0000e-02e
708 * icflg * f 0e
709 * nff * f 1e
710 * lccfl * f 0 e
711 * alp * 1.0000e+00e
712 * vl * f 0.0000e+00e
713 * vv * f 0.0000e+00e
714 * tl * 3.9300e+02e
715 * tv * 3.9300e+02e
716 * p * 2.0180e+05e
717 * pa * 0.0000e+00e
718 *
719 * ecc4 thru upper plenum (bundles 1 & 2) (zero for run 719)
720 *
721 * type num id ctitle
722 fill 111 111 $$$ ecc4 through upper plenum
723 * jun1 ifty ioff
724 * 111 6 1
725 * iftr ifsv nftb nfsv nfrf
726 * 0 101 2 0 0
727 * twtold rfmv concin felv
728 * 0.0000e+00 1.0000e+30 0.0000e+00 0.0000e+00
729 * dxin volin alpin vlin tlin

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730      8.7400e-01  1.7000e-03  0.0000e+00  0.0000e+00  3.1200e+02
731 *      pin      pain      flowin      vvin      tvin
732      2.0180e+05  0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
733 * No ECC injection into bundles 1 and 2 for Run 719
734 * Scale factor: VMSCL=1/area
735 *      vmscl      vvscl
736      0.0000e+00  0.0000e+00
737 *      tlscl      tvscl      pscl      pascl      conscl
738      1.0000e+00  1.0000e+00  1.0000e+00  1.0000e+00  0.0000e+00
739 * input value is volumetric flow rate, q.
740 * tag ft06us
741 * vmtb *      0.0000e+00  0.0000e+00  1.0000e+03  0.0000e+00e
742 * vvtb *      0.0000e+00  0.0000e+00  1.0000e+03  0.0000e+00e
743 * tag te06uws
744 * tltb *      0.0000e+00  3.8700e+02  1.0000e+03  3.8700e+02e
745 * tvtb *      0.0000e+00  3.8700e+02  1.0000e+03  3.8700e+02e
746 * alptb *     0.0000e+00  0.0000e+00  1.0000e+03  0.0000e+00e
747 * ptb *      0.0000e+00  6.0000e+05  1.0000e+03  6.0000e+05e
748 * patb *     0.0000e+00  0.0000e+00  1.0000e+03  0.0000e+00e
749 *****
750 * Injection pipe for ecc4 thru upper plenum
751 *****
752 *      type      num      id      ctitle
753 pipe      101      $101$ ecc4 inj pipe, upper plenum
754 *      ncells      nodes      jun1      jun2      epsw
755      2      0      111      101      1.0000e-05
756 *      ichf      iconc      iacc      ipow
757      1      0      0      0
758 *      radin      th      houtl      houtv      toutl
759      2.5250e-02  5.0000e-03  0.0000e+00  0.0000e+00  0.0000e+00
760 *      toutv
761      0.0000e+00
762 *
763 * dx *      8.7400e-01  1.5000e-01e
764 * vol *      1.7000e-03  3.0000e-04e
765 * fa * f      2.0000e-03e
766 * fric * f    1.0000e-02e
767 * grav * f    -1.0000e+00e
768 * hd * r02   5.0500e-02  9.1500e-04e
769 * icflg * f   0e
770 * nff * r02  1 -1e
771 * lccfl * f  0 e
772 * alp * f    1.0000e+00e
773 * vl * f    0.0000e+00e
774 * vv * f    0.0000e+00e
775 * tl * f    3.9300e+02e
776 * tv * f    3.9300e+02e
777 * p * f     2.0180e+05e
778 * pa * f    0.0000e+00e
779 *****
780 * ecc3 thru upper plenum (bundles 3 & 4)
781 *****
782 *      type      num      id      ctitle
783 fill      113      $113$ ecc3 through upper plenum
784 *      jun1      ifty      ioft
785      113      6      1
786 *      iftr      ifsv      nftb      nfsv      nfrf
787      0      101      2      0      0
788 *      twtold      rfmX      concin      felv
789      0.0000e+00  1.0000e+30  0.0000e+00  0.0000e+00
790 *      dbxin      volin      alpin      vlin      tlin
791      8.7400e-01  1.7000e-03  0.0000e+00  0.0000e+00  3.1200e+02
792 *      pin      pain      flowin      vvin      tvin
793      2.0180e+05  0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
794 * No ECC injection into bundles 3 and 4 for Run 719
795 * Scale factor: VMSCL=1/area
796 *      vmscl      vvscl
797      0.0000e+00  0.0000e+00
798 *      tlscl      tvscl      pscl      pascl      conscl
799      1.0000e+00  1.0000e+00  1.0000e+00  1.0000e+00  0.0000e+00
800 * input value is volumetric flow rate, q.
801 * tag ft07us
802 * vmtb *      0.0000e+00  0.0000e+00  1.0000e+03  0.0000e+00e
803 * vvtb *      0.0000e+00  0.0000e+00  1.0000e+03  0.0000e+00e
804 * tag te07uws
805 * tltb *      0.0000e+00  3.8700e+02  1.0000e+03  3.8700e+02e
806 * tvtb *      0.0000e+00  3.8700e+02  1.0000e+03  3.8700e+02e
807 * alptb *     0.0000e+00  0.0000e+00  1.0000e+03  0.0000e+00e
808 * ptb *      0.0000e+00  6.0000e+05  1.0000e+03  6.0000e+05e
809 * patb *     0.0000e+00  0.0000e+00  1.0000e+03  0.0000e+00e
810 *****
811 * Injection pipe for ecc3 thru upper plenum
812 *****
813 *      type      num      id      ctitle
814 pipe      103      $103$ ecc3 inj pipe, upper plenum
815 *      ncells      nodes      jun1      jun2      epsw
816      2      0      113      103      1.0000e-05
817 *      ichf      iconc      iacc      ipow
818      1      0      0      0
819 *      radin      th      houtl      houtv      toutl
820      2.5250e-02  5.0000e-03  0.0000e+00  0.0000e+00  0.0000e+00
821 *      toutv

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822      0.0000e+00
823 *
824 * dx      *      8.7400e-01    1.5000e-01e
825 * vol    *      1.7000e-03    3.0000e-04e
826 * fa     * f      2.0000e-03e
827 * fric   * f      1.0000e-02e
828 * grav   * f     -1.0000e+00e
829 * hd     * r02  5.0500e-02    9.1500e-04e
830 * icflg  * f      0e
831 * nff    * r02  1      -1e
832 * lccfl  *      f 0 e
833 * alp    * f      1.0000e+00e
834 * vl     * f      0.0000e+00e
835 * vv     * f      0.0000e+00e
836 * tl     * f      3.9300e+02e
837 * tv     * f      3.9300e+02e
838 * p      * f      2.0180e+05e
839 * pa     * f      0.0000e+00e
840 *****
841 * ecc2 thru upper plenum (bundles 5 & 6) (zero for run 719)
842 *****
843 *      type      num      id      ctitle
844 fill      115      115 $115$ ecc2 through upper plenum
845 *      jun1      ifty      ioff
846 *      115      6      1
847 *      iftr      ifsv      nftb      nfsv      nfrf
848 *      0      101      2      0      0
849 *      twtold    rfmX      concin      felv
850 *      0.0000e+00  1.0000e+30  0.0000e+00  0.0000e+00
851 *      dxin      volin      alpin      vlin      tlin
852 *      8.7400e-01  1.7000e-03  0.0000e+00  0.0000e+00  3.1200e+02
853 *      pin      pain      flowin     vvin      tvin
854 *      2.0180e+05  0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
855 * No ECC injection into bundles 5 and 6 for Run 719
856 * Scale factor: VMSCl=1/area
857 *      vmScl     vvscl
858 *      0.0000e+00  0.0000e+00
859 *      tIscl     tvscl      pscl      pascl      conscl
860 *      1.0000e+00  1.0000e+00  1.0000e+00  1.0000e+00  0.0000e+00
861 * input value is volumetric flow rate, q.
862 * tag ft08us
863 * vmtb * 0.0000e+00 0.0000e+00 1.0000e+03 0.0000e+00e
864 * vvtb * 0.0000e+00 0.0000e+00 1.0000e+03 0.0000e+00e
865 * tag te08uws
866 * tlTb * 0.0000e+00 3.8700e+02 1.0000e+03 3.8700e+02e
867 * tvTb * 0.0000e+00 3.8700e+02 1.0000e+03 3.8700e+02e
868 * alptb * 0.0000e+00 0.0000e+00 1.0000e+03 0.0000e+00e
869 * ptb * 0.0000e+00 6.0000e+05 1.0000e+03 6.0000e+05e
870 * patb * 0.0000e+00 0.0000e+00 1.0000e+03 0.0000e+00e
871 *****
872 * Injection pipe for ecc2 thru upper plenum
873 *****
874 *      type      num      id      ctitle
875 pipe      105      105 $105$ ecc2 inj pipe, upper plenum
876 *      ncells    nodes      jun1      jun2      epsw
877 *      2      0      115      105      1.0000e-05
878 *      ichf      iconc      iacc      ipow
879 *      1      0      0      0
880 *      radin     th      houtl     houtv     toutl
881 *      2.5250e-02  5.0000e-03  0.0000e+00  0.0000e+00  0.0000e+00
882 *      toutv
883 *      0.0000e+00
884 *
885 * dx      *      8.7400e-01    1.5000e-01e
886 * vol    *      1.7000e-03    3.0000e-04e
887 * fa     * f      2.0000e-03e
888 * fric   * f      1.0000e-02e
889 * grav   * f     -1.0000e+00e
890 * hd     * r02  5.0500e-02    9.1500e-04e
891 * icflg  * f      0e
892 * nff    * r02  1      -1e
893 * lccfl  *      f 0 e
894 * alp    * f      1.0000e+00e
895 * vl     * f      0.0000e+00e
896 * vv     * f      0.0000e+00e
897 * tl     * f      3.9300e+02e
898 * tv     * f      3.9300e+02e
899 * p      * f      2.0180e+05e
900 * pa     * f      0.0000e+00e
901 *****
902 * ecc1 thru upper plenum (bundles 7 & 8) (zero for run 719)
903 *****
904 *      type      num      id      ctitle
905 fill      117      117 $117$ ecc1 through upper plenum
906 *      jun1      ifty      ioff
907 *      117      6      1
908 *      iftr      ifsv      nftb      nfsv      nfrf
909 *      0      101      2      0      0
910 *      twtold    rfmX      concin      felv
911 *      0.0000e+00  1.0000e+30  0.0000e+00  0.0000e+00
912 *      dxin      volin      alpin      vlin      tlin
913 *      8.7400e-01  1.7000e-03  0.0000e+00  0.0000e+00  3.1200e+02

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914 *      pin      pain      flowin      vvin      tvin
915 *      2.0180e+05  0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
916 * No ECC injection into bundles 7 and 8 for Run 719
917 * Scale factor: VMSCL=1/area
918 *      vmscl      vvscl
919 *      0.0000e+00  0.0000e+00
920 *      t1scl      tvscl      pscl      pascl      conscl
921 *      1.0000e+00  1.0000e+00  1.0000e+00  1.0000e+00  0.0000e+00
922 * input value is volumetric flow rate, q.
923 * tag ft09us
924 * vmtb *      0.0000e+00  0.0000e+00  1.0000e+03  0.0000e+00e
925 * vvtb *      0.0000e+00  0.0000e+00  1.0000e+03  0.0000e+00e
926 * tag te09uws
927 * tltb *      0.0000e+00  3.8700e+02  1.0000e+03  3.8700e+02e
928 * tvtb *      0.0000e+00  3.8700e+02  1.0000e+03  3.8700e+02e
929 * alptb *      0.0000e+00  0.0000e+00  1.0000e+03  0.0000e+00e
930 * ptb *      0.0000e+00  6.0000e+05  1.0000e+03  6.0000e+05e
931 * patb *      0.0000e+00  0.0000e+00  1.0000e+03  0.0000e+00e
932 *****
933 * Injection pipe for eccl thru upper plenum
934 *****
935 *      type      num      id      ctitle
936 pipe 107 107 $107$ eccl inj pipe, upper plenum
937 *      ncells      nodes      jun1      jun2      epsw
938 *      2      0      117      107      1.0000e-05
939 *      ichf      iconc      iacc      ipow
940 *      1      0      0      0
941 *      radin      th      houtl      houtv      toutl
942 *      2.5250e-02  5.0000e-03  0.0000e+00  0.0000e+00  0.0000e+00
943 *      toutv
944 *      0.0000e+00
945 *
946 * dx *      8.7400e-01  1.5000e-01e
947 * vol *      1.7000e-03  3.0000e-04e
948 * fa * f 2.0000e-03e
949 * fric * f 1.0000e-02e
950 * grav * f -1.0000e+00e
951 * hd * r02 5.0500e-02 9.1500e-04e
952 * icflg * f 0e
953 * nff * r02 1 -1e
954 * lccfl * f 0 e
955 * alp * f 1.0000e+00e
956 * vl * f 0.0000e+00e
957 * vv * f 0.0000e+00e
958 * tl * f 3.9300e+02e
959 * tv * f 3.9300e+02e
960 * p * f 2.0180e+05e
961 * pa * f 0.0000e+00e
962 *****
963 * separator-side cold leg break -- CT2
964 *****
965 *      type      num      id      ctitle
966 break 13 13 $13$ cold leg break, s/w sep side
967 *      jun1      ibty      isat      ioff
968 *      2      1      3      0
969 *      ibtr      ibsv      nbtb      nbsv      nbrf
970 *      0      101      30      0      0
971 *      dxin      volin      alpin      tin      pin
972 *      8.5000e-01  5.9300e-02  1.0000e+00  3.9300e+02  2.0180e+05
973 *      pain      concin      rhmx      poff      belv
974 *      0.0000e+00  0.0000e+00  1.0000e+05  0.0000e+00  0.0000e+00
975 *      pscl      t1scl      tvscl      pascl      conscl
976 *      1.0000e+00  1.0000e+00  1.0000e+00  1.0000e+00  1.0000e+00
977 * ptb *      0.0000e+00  2.0180e+05  2.4000e+01  2.0310e+05  3.7000e+01
978 * ptb *      2.0310e+05  4.4000e+01  2.0340e+05  9.9000e+01  2.0340e+05
979 * ptb *      1.0400e+02  2.0370e+05  1.1700e+02  2.0370e+05  1.2100e+02
980 * ptb *      2.0400e+05  1.2900e+02  2.1890e+05  1.4000e+02  2.2560e+05
981 * ptb *      1.4500e+02  2.2700e+05  1.4700e+02  2.2700e+05  1.5800e+02
982 * ptb *      2.2240e+05  1.7900e+02  2.0980e+05  1.9000e+02  2.0480e+05
983 * ptb *      2.1500e+02  1.9690e+05  2.2500e+02  1.9510e+05  2.3800e+02
984 * ptb *      1.9390e+05  2.5500e+02  1.9390e+05  3.0500e+02  1.9600e+05
985 * ptb *      3.1500e+02  1.9600e+05  3.1900e+02  1.9630e+05  4.0700e+02
986 * ptb *      1.9630e+05  4.1000e+02  1.9600e+05  4.5600e+02  1.9600e+05
987 * ptb *      4.6000e+02  1.9630e+05  4.9900e+02  1.9630e+05  5.6200e+02
988 * ptb *      1.9420e+05  5.9700e+02  1.9510e+05  1.0000e+03  1.9510e+05
989 e
990 *****
991 * pv-side cold leg break -- CT1
992 *****
993 *      type      num      id      ctitle
994 break 14 14 $14$ cold leg break, pv side
995 *      jun1      ibty      isat      ioff
996 *      4      1      3      0
997 *      ibtr      ibsv      nbtb      nbsv      nbrf
998 *      0      101      27      0      0
999 *      dxin      volin      alpin      tin      pin
1000 *      11.700e+00  81.600e+00  1.0000e+00  3.9300e+02  2.0180e+05
1001 *      pain      concin      rhmx      poff      belv
1002 *      0.0000e+00  0.0000e+00  1.0000e+05  0.0000e+00  0.0000e+00
1003 *      pscl      t1scl      tvscl      pascl      conscl
1004 *      1.0000e+00  1.0000e+00  1.0000e+00  1.0000e+00  1.0000e+00
1005 * ptb *      0.0000e+00  2.0180e+05  1.1000e+01  2.0280e+05  3.0000e+01

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1006 * ptb * 2.0340e+05 3.2000e+01 2.0350e+05 3.3000e+01 2.0370e+05
1007 * ptb * 5.5000e+01 2.0400e+05 1.1400e+02 2.0400e+05 1.2100e+02
1008 * ptb * 2.0470e+05 1.3000e+02 2.2060e+05 1.3700e+02 2.2560e+05
1009 * ptb * 1.4400e+02 2.2900e+05 1.4800e+02 2.2950e+05 1.5700e+02
1010 * ptb * 2.2590e+05 1.8900e+02 2.1000e+05 2.0300e+02 2.0500e+05
1011 * ptb * 2.2300e+02 2.0000e+05 2.4100e+02 1.9780e+05 2.6300e+02
1012 * ptb * 1.9780e+05 3.0300e+02 1.9970e+05 3.1900e+02 2.0000e+05
1013 * ptb * 3.5100e+02 2.0000e+05 4.3300e+02 1.9880e+05 4.9800e+02
1014 * ptb * 1.9880e+05 5.5200e+02 1.9570e+05 5.8300e+02 1.9570e+05
1015 * ptb * 6.0000e+02 1.9630e+05 1.0000e+03 1.9630e+05e
1016 *****
1017 * broken cold leg (pv side) to CT1
1018 *****
1019 * type num id ctitle
1020 valve 4 4 $$$ bcl(pv side) to ct1 - 7/7/81
1021 * ncells nodes jun1 jun2 epsw
1022 * 6 1 3 4 1.0000e-05
1023 * ichf iconc ivty ivps nvtb2
1024 * 1 0 0 4 0
1025 * ivtr ivsv nvtbl nvsv nvrfr
1026 * 0 0 0 0 0
1027 * iqp3tr iqp3sv nqp3tb nqp3sv nqp3rf
1028 * 0 0 0 0 0
1029 * ivtrov ivtyov
1030 * 0 0
1031 * rvmx rvov fminov fmaxov
1032 * 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
1033 * radin th houtl houtv toutl
1034 * 7.7500e-02 7.1000e-03 0.0000e+00 0.0000e+00 2.9000e+02
1035 * toutv avlve hvlve favlve xpos
1036 * 2.9000e+02 1.7910e-02 1.5100e-01 1.0000e+00 1.0000e+00
1037 * qp3in qp3off rqp3mx qp3scl
1038 * 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
1039 *
1040 * dx * 7.2200e-01 4.4800e-01 2.6100e+00 6.6000e-01 3.2200e+00
1041 * dx * 1.1700e+01e 1.1700e+01e
1042 * vol * 1.3300e-02 8.0200e-03 4.6740e-02 4.6030e-02 2.2458e-01
1043 * vol * 8.1603e-01e
1044 * fa * r02 1.8400e-02r02 1.7910e-02r03 6.9750e-02e
1045 * fric * r 2 0.0097 r 2 0.06123 0.0393 r 2 0.1e
1046 * grav * r04 0.0000e+00 -8.2990e-01 -2.1580e-01 0.0000e+00e
1047 * hd * r02 1.1600e-01r02 1.5100e-01r03 2.9800e-01e
1048 * icflg * r03 0 2r03 0e
1049 * nff * -1r03 1 -1 1 -1
1050 * nff * e
1051 * lccfl * f 0 e
1052 * alp * f 1.0000e+00e
1053 * vl * f 0.0000e+00e
1054 * vv * f 0.0000e+00e
1055 * tl * f 3.9300e+02e
1056 * tv * f 3.9300e+02e
1057 * p * f 2.0180e+05e
1058 * pa * f 0.0000e+00e
1059 * qppp * f 0.0000e+00e
1060 * matid * 6e
1061 * tw * f 3.9300e+02e
1062 *****
1063 * broken cold leg (separator side) to CT2
1064 *****
1065 * type num id ctitle
1066 valve 3 3 $$$ bcl(sep side) to ct2 - 7/20/81
1067 * ncells nodes jun1 jun2 epsw
1068 * 8 1 1 2 1.0000e-05
1069 * ichf iconc ivty ivps nvtb2
1070 * 1 0 0 4 0
1071 * ivtr ivsv nvtbl nvsv nvrfr
1072 * 0 0 0 0 0
1073 * iqp3tr iqp3sv nqp3tb nqp3sv nqp3rf
1074 * 0 0 0 0 0
1075 * ivtrov ivtyov
1076 * 0 0
1077 * rvmx rvov fminov fmaxov
1078 * 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
1079 * radin th houtl houtv toutl
1080 * 7.5500e-02 7.1000e-03 0.0000e+00 0.0000e+00 2.9000e+02
1081 * toutv avlve hvlve favlve xpos
1082 * 2.9000e+02 1.7910e-02 1.5100e-01 1.0000e+00 1.0000e+00
1083 * qp3in qp3off rqp3mx qp3scl
1084 * 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
1085 *
1086 * dx * 7.7500e-01r02 1.2610e+00 1.6210e+00 1.1500e+00 3.2200e+00
1087 * dx * 4.6000e+00 8.5000e-01e
1088 * vol * 1.3880e-02r02 2.2580e-02 2.9030e-02 8.0210e-02 2.2460e-01
1089 * vol * 3.2085e-01 5.9290e-02e
1090 * fa * r03 1.7910e-02 5.9000e-03 1.7910e-02r04 6.9750e-02e
1091 * fric * f 0.0000e+00e
1092 * grav * r05 0.0000e+00 -7.5973e-01 -3.9898e-01r02 0.0000e+00e
1093 * hd * r03 1.5100e-01 8.6400e-02 1.5100e-01r04 2.9800e-01e
1094 * icflg * r03 0 2r05 0e
1095 * nff * -1r02 1r03 -1r02 1 -1
1096 * nff * e
1097 * lccfl * f 0 e

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1098 * alp * f 1.0000e+00e
1099 * vl * f 0.0000e+00e
1100 * vv * f 0.0000e+00e
1101 * tl * f 3.9300e+02e
1102 * tv * f 3.9300e+02e
1103 * p * f 2.0180e+05e
1104 * pa * f 0.0000e+00e
1105 * qppp * f 0.0000e+00e
1106 * matid * 6e
1107 * tw * f 3.9300e+02e
1108 *****
1109 * hot leg component
1110 *****
1111 * type num id ctitle
1112 pipe 2 2 $2$ hot leg - 7/7/81
1113 * ncells nodes jun1 jun2 epsw
1114 4 1 12 5 1.0000e-05
1115 * ichf iconc iacc ipow
1116 1 0 0 0
1117 * iq3tr iq3sv nqp3tb nqp3sv nqp3rf
1118 0 0 0 0 0
1119 * radin th hout1 houtv tout1
1120 1.6220e-01 1.0300e-02 0.0000e+00 0.0000e+00 0.0000e+00
1121 * toutv
1122 0.0000e+00
1123 * qp3in qp3off rqp3mx qp3scl
1124 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
1125 *
1126 * dx * 5.5050e-01 1.5240e+00 7.6000e-01 1.4450e+00e
1127 * vol * 4.5700e-02 1.2650e-01 6.3100e-02 1.1990e-01e
1128 * fa * f 8.3000e-02e
1129 * fric * f 0.0000e+00e
1130 * grav * r03 0.0000e+00 4.2120e-01 6.2880e-01e
1131 * hd * f 2.0670e-01e
1132 * icflg * f 0e
1133 * nff * -1r03 1 -1e
1134 * lccfl * f 0 e
1135 * alp * f 1.0000e+00e
1136 * vl * f 0.0000e+00e
1137 * vv * f 0.0000e+00e
1138 * tl * f 3.9300e+02e
1139 * tv * f 3.9300e+02e
1140 * p * f 2.0180e+05e
1141 * pa * f 0.0000e+00e
1142 * qppp * f 0.0000e+00e
1143 * matid * 6e
1144 * tw * f 3.9300e+02e
1145 *****
1146 * Support Column bundle 3
1147 *****
1148 * type num id ctitle
1149 pipe 26 26 $26$ support column
1150 * ncells nodes jun1 jun2 epsw
1151 4 1 26 27 1.0000e-05
1152 * ichf iconc iacc ipow
1153 1 0 0 0
1154 * iq3tr iq3sv nqp3tb nqp3sv nqp3rf
1155 0 0 0 0 0
1156 * radin th hout1 houtv tout1
1157 8.8400e-02 1.2000e-02 0.0000e+00 0.0000e+00 0.0000e+00
1158 * toutv
1159 0.0000e+00
1160 * qp3in qp3off rqp3mx qp3scl
1161 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
1162 *
1163 * dx * 3.3900e-01 4.8500e-01 7.3700e-01 4.3700e-01e
1164 * vol * 1.4560e-02 1.9900e-02 1.8100e-02 1.0700e-02e
1165 * fa * 1.4500e-02r03 2.4600e-02 7.5000e-03e *rfat*
1166 * fric * 2.7190e-02 0.0000e+00 1.7570e-01 1.8290e-01 7.5800e-02
1167 e
1168 * grav * f 1.0000e+00e
1169 * hd * 2.5400e-01r03 3.0000e-02 6.9000e-02e
1170 * icflg * f 0e
1171 * nff * -1r03 1 -1e
1172 * lccfl * f 0 e
1173 * alp * f 1.0000e+00e
1174 * vl * f 0.0000e+00e
1175 * vv * f 0.0000e+00e
1176 * tl * f 3.9300e+02e
1177 * tv * f 3.9300e+02e
1178 * p * f 2.0180e+05e
1179 * pa * f 0.0000e+00e
1180 * qppp * f 0.0000e+00e
1181 * matid * 6e
1182 * tw * f 3.9300e+02e
1183 *****
1184 * Support Column bundle 5
1185 *****
1186 * type num id ctitle
1187 pipe 28 28 $28$ support column
1188 * ncells nodes jun1 jun2 epsw
1189 4 1 28 29 1.0000e-05

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1190 *      ichf      iconc      iacc      ipow
1191      1          0          0          0
1192 *      iqp3tr    iqp3sv      nqp3tb    nqp3sv      nqp3rf
1193      0          0          0          0          0
1194 *      radin      th          houtl      houtv      toutl
1195      8.8400e-02  1.2000e-02  0.0000e+00  0.0000e+00  0.0000e+00
1196 *      toutv
1197      0.0000e+00
1198 *      qp3in      qp3off      rqp3mx      qp3scl
1199      0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
1200 *
1201 * dx *      3.3900e-01  4.8500e-01  7.3700e-01  4.3700e-01e
1202 * vol *     1.4560e-02  1.9900e-02  1.8100e-02  1.0700e-02e
1203 * fa *     1.4500e-02r03  2.4600e-02  7.5000e-03e  *rfat*
1204 * fric *    2.7190e-02  0.0000e+00  1.7570e-01  1.8290e-01  7.5800e-02
1205 e
1206 * grav * f 1.0000e+00e
1207 * hd *     2.5400e-01r03  3.0000e-02  6.9000e-02e
1208 * icflg * f 0e
1209 * nff *     -1r03          1          -1e
1210 * lccfl *   f 0 e
1211 * alp * f 1.0000e+00e
1212 * vl * f 0.0000e+00e
1213 * vv * f 0.0000e+00e
1214 * tl * f 3.9300e+02e
1215 * tv * f 3.9300e+02e
1216 * p * f 2.0180e+05e
1217 * pa * f 0.0000e+00e
1218 * qppp * f 0.0000e+00e
1219 * matid * 6e
1220 * tw * f 3.9300e+02e
1221 *****
1222 * Support Column bundle 1
1223 *****
1224 *      type      num      id      ctitle
1225 pipe      20      20 $20$ support column
1226 *      ncells      nodes      jun1      jun2      epsw
1227      3          1          20          21      1.0000e-05
1228 *      ichf      iconc      iacc      ipow
1229      1          0          0          0
1230 *      iqp3tr    iqp3sv      nqp3tb    nqp3sv      nqp3rf
1231      0          0          0          0          0
1232 *      radin      th          houtl      houtv      toutl
1233      8.8400e-02  1.2000e-02  0.0000e+00  0.0000e+00  0.0000e+00
1234 *      toutv
1235      0.0000e+00
1236 *      qp3in      qp3off      rqp3mx      qp3scl
1237      0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
1238 *
1239 * dx *      4.8500e-01  7.3700e-01  4.3700e-01e
1240 * vol *     1.1910e-02  1.8090e-02  1.0730e-02e
1241 * fa *     1.4500e-02r02  2.4600e-02  7.1270e-03e
1242 * fric *    2.7000e-02  1.7570e-01  1.8290e-01  7.5800e-02e
1243 * grav * f 1.0000e+00e
1244 * hd *     3.2000e-02r02  3.0000e-02  6.9000e-02e
1245 * icflg * f 0e
1246 * nff *     -1r02          1          -1e
1247 * lccfl *   f 0 e
1248 * alp * f 1.0000e+00e
1249 * vl * f 0.0000e+00e
1250 * vv * f 0.0000e+00e
1251 * tl * f 3.9300e+02e
1252 * tv * f 3.9300e+02e
1253 * p * f 2.0180e+05e
1254 * pa * f 0.0000e+00e
1255 * qppp * f 0.0000e+00e
1256 * matid * 6e
1257 * tw * f 3.9300e+02e
1258 *****
1259 * Support Column bundle 6
1260 *****
1261 *      type      num      id      ctitle
1262 pipe      22      22 $22$ support column
1263 *      ncells      nodes      jun1      jun2      epsw
1264      3          1          22          23      1.0000e-05
1265 *      ichf      iconc      iacc      ipow
1266      1          0          0          0
1267 *      iqp3tr    iqp3sv      nqp3tb    nqp3sv      nqp3rf
1268      0          0          0          0          0
1269 *      radin      th          houtl      houtv      toutl
1270      8.8400e-02  1.2000e-02  0.0000e+00  0.0000e+00  0.0000e+00
1271 *      toutv
1272      0.0000e+00
1273 *      qp3in      qp3off      rqp3mx      qp3scl
1274      0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
1275 *
1276 * dx *      4.8500e-01  7.3700e-01  4.3700e-01e
1277 * vol *     1.1910e-02  1.8090e-02  1.0730e-02e
1278 * fa *     1.4500e-02r02  2.4600e-02  7.4780e-03e
1279 * fric *    2.7000e-02  1.7570e-01  1.8290e-01  7.5800e-02e
1280 * grav * f 1.0000e+00e
1281 * hd *     3.2000e-02r02  3.0000e-02  6.9000e-02e

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1282 * icflg * f 0e
1283 * nff * -1r02 1 -1e
1284 * lccfl * f 0 e
1285 * alp * f 1.0000e+00e
1286 * vl * f 0.0000e+00e
1287 * vv * f 0.0000e+00e
1288 * tl * f 3.9300e+02e
1289 * tv * f 3.9300e+02e
1290 * p * f 2.0180e+05e
1291 * pa * f 0.0000e+00e
1292 * qppp * f 0.0000e+00e
1293 * matid * 6e
1294 * tw * f 3.9300e+02e
1295 *****
1296 * Support Column bundle 7
1297 *****
1298 * type num id ctitle
1299 pipe 24 24 $24$ support column
1300 * ncells nodes jun1 jun2 epsw
1301 3 1 24 25 1.0000e-05
1302 * ichf iconc iacc ipow
1303 1 0 0 0
1304 * iq3tr iq3sv nqp3tb nqp3sv nqp3rf
1305 0 0 0 0 0
1306 * radin th hout1 houtv tout1
1307 8.8400e-02 1.2000e-02 0.0000e+00 0.0000e+00 0.0000e+00
1308 * toutv
1309 0.0000e+00
1310 * qp3in qp3off rqp3mx qp3scl
1311 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
1312 *
1313 * dx * 4.8500e-01 7.3700e-01 4.3700e-01e
1314 * vol * 1.1910e-02 1.8090e-02 1.0730e-02e
1315 * fa * 1.4500e-02r02 2.4600e-02 7.4780e-03e
1316 * fric * 2.7000e-02 1.7570e-01 1.8290e-01 7.5800e-02e
1317 * grav * f 1.0000e+00e
1318 * hd * 3.2000e-02r02 3.0000e-02 6.9000e-02e
1319 * icflg * f 0e
1320 * nff * -1r02 1 -1e
1321 * lccfl * f 0 e
1322 * alp * f 1.0000e+00e
1323 * vl * f 0.0000e+00e
1324 * vv * f 0.0000e+00e
1325 * tl * f 3.9300e+02e
1326 * tv * f 3.9300e+02e
1327 * p * f 2.0180e+05e
1328 * pa * f 0.0000e+00e
1329 * qppp * f 0.0000e+00e
1330 * matid * 6e
1331 * tw * f 3.9300e+02e
1332 *****
1333 * cl ecc, intact cl, pump simulator
1334 *****
1335 * type num id ctitle
1336 tee 8 8 $8$ intact cold leg - 7/7/81
1337 * jcell nodes ichf cost epsw
1338 7 1 1 0.7071 1.0000e-05
1339 * iconc1 ncell1 jun1 jun2 ipow1
1340 0 8 7 8 0
1341 * iqptr1 iqpsv1 nqptb1 nqpsv1 nqprf1
1342 0 0 0 0 0
1343 * radin1 th1 hout11 houtv1 tout11
1344 1.4900e-01 6.9700e-02 0.0000e+00 0.0000e+00 0.0000e+00
1345 * toutv1
1346 0.0000e+00
1347 * qp1n qpoff1 rqp1mx qp1scl1
1348 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
1349 * iconc2 ncell2 jun3 ipow2
1350 0 2 9 0
1351 * iqptr2 iqpsv2 nqptb2 nqpsv2 nqprf2
1352 0 0 0 0 0
1353 * radin2 th2 hout12 houtv2 tout12
1354 4.0800e-02 5.2000e-03 0.0000e+00 0.0000e+00 0.0000e+00
1355 * toutv2
1356 0.0000e+00
1357 * qp2n qpoff2 rqp2mx qp2scl2
1358 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
1359 *
1360 * dx * 4.2420e+00 3.0999e+00 3.1405e+00 1.4095e+00 3.1405e+00
1361 * dx * 6.2650e-01 1.2530e+00 2.2035e+00e
1362 * vol * 2.9570e-01 2.1600e-01 2.1890e-01 9.8200e-02 6.7000e-01
1363 * vol * 4.3700e-02 8.7300e-02 1.5360e-01e
1364 * intact cl orifice and pump simulator orifice directly simulated.
1365 * fa * 6.9700e-02 2.5400e-02r03 6.9700e-02 2.3700e-02r03 6.9700e-02
1366 e
1367 * fric * f 0.0000e+00e
1368 * grav * r02 0.0000e+00 -5.0330e-01 -6.9020e-01 8.0900e-01 5.8400e-01
1369 * grav * 2.1280e-01r02 0.0000e+00e
1370 * intact cl orifice and pump simulator orifice directly simulated.
1371 * hd * 2.9800e-01 1.7990e-01r03 2.9800e-01 1.7370e-01r03 2.9800e-01
1372 e
1373 * icflg * f 0e

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1374 * nff * r03 -1r01 1r03 -1 1 -1
1375 * nff *
1376 * lccfl * f 0 e
1377 * alp * f 1.0000e+00e
1378 * vl * f 0.0000e+00e
1379 * vv * f 0.0000e+00e
1380 * tl * f 3.9300e+02e
1381 * tv * f 3.9300e+02e
1382 * p * f 2.0180e+05e
1383 * pa * f 0.0000e+00e
1384 * qppp * f 0.0000e+00e
1385 * matid * 6e
1386 * tw * f 3.9300e+02e
1387 *
1388 * dx * f 1.6550e+00e
1389 * vol * f 8.5000e-03e
1390 * fa * f 5.1360e-03e
1391 * fric * f 0.0000e+00e
1392 * grav * f 0.0000e+00e
1393 * hd * f 8.1500e-02e
1394 * icflg * f 0e
1395 * nff * -1 f 1e
1396 * lccfl * f 0 e
1397 * alp * f 1.0000e+00e
1398 * vl * f 0.0000e+00e
1399 * vv * f 0.0000e+00e
1400 * tl * f 3.9300e+02e
1401 * tv * f 3.9300e+02e
1402 * p * f 2.0180e+05e
1403 * pa * f 0.0000e+00e
1404 * qppp * f 0.0000e+00e
1405 * matid * 6e
1406 * tw * f 3.9300e+02e
1407 *****
1408 * Steam-water separator component
1409 *****
1410 * type num id ctitle
1411 vessel 6 6 $6$ steam-water separator - 7/7/81
1412 * nasx nrsx ntsx ncsr ivssbf
1413 4 1 2 3 0
1414 * idcu idcl idcr icru icrl
1415 0 0 0 0 0
1416 * icrr ilcsp iucsp iuhp iconc
1417 0 0 0 0 0
1418 * igeom nvent nvvtb nsgrid
1419 0 0 0 0
1420 * shelv epsw
1421 0.0000e+00 1.0000e-05
1422 * z * 9.5000e-01 3.3300e+00 5.0600e+00 5.9600e+00e
1423 * rad * 6.0000e-01e
1424 * th * 3.1416e+00 6.2832e+00e
1425 * funh * f 1.0 e
1426 * nhsca * f 0 e
1427 *
1428 * gc gytc gprc gzc
1429 * 0.0 0.0 0.0 0.0
1430 *
1431 * lisrl lisrc lisrf ljuns
1432 2 1 3 7
1433 2 2 3 1
1434 3 1 3 5
1435 * level 1
1436 * cfzl-t* f 0.0000e+00e
1437 * cfzl-z* f 0.0000e+00e
1438 * cfzl-r* f 0.0000e+00e
1439 * cfzv-t* f 0.0000e+00e
1440 * cfzv-z* f 0.0000e+00e
1441 * cfzv-r* f 0.0000e+00e
1442 * lccfl * f 0 e
1443 * vol * f 9.7367e-01e
1444 * fa-t * f 9.7367e-01e *rfat*
1445 * fa-z * f 1.0000e+00e
1446 * fa-r * f 0.0000e+00e
1447 * hd-t * f 1.1990e+00e
1448 * hd-z * f 1.1990e+00e
1449 * hd-r * f 1.1990e+00e
1450 * alpn * f 9.2460e-01e
1451 * vvn-t * f 0.0000e+00e
1452 * vvn-z * f 0.0000e+00e
1453 * vvn-r * f 0.0000e+00e
1454 * vln-t * f 0.0000e+00e
1455 * vln-z * f 0.0000e+00e
1456 * vln-r * f 0.0000e+00e
1457 * tvn * f 3.9300e+02e
1458 * tln * f 3.9100e+02e
1459 * pn * f 2.0180e+05e
1460 * pan * f 0.0000e+00e
1461 * level 2 - icl connected to cell 1, bcl connected to cell 2.
1462 * cfzl-t* f 0.0000e+00e
1463 * cfzl-z* f 0.0000e+00e
1464 * cfzl-r* f 0.0000e+00e
1465 * cfzv-t* f 0.0000e+00e

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1466 * cfzv-z* f 0.0000e+00e
1467 * cfzv-r* f 0.0000e+00e
1468 * lccfl * f 0 e
1469 * vol * f 1.0000e+00e
1470 * fa-t * f 1.0000e+00e
1471 * fa-z * f 0.0000e+00e 1.0000e+00e
1472 * fa-r * f 0.0000e+00e
1473 * hd-t * f 1.1990e+00e
1474 * hd-z * f 0.0000e+00 1.1990e+00e
1475 * hd-r * f 1.1990e+00e
1476 * alpn * f 1.0000e+00e
1477 * vvn-t * f 0.0000e+00e
1478 * vvn-z * f 0.0000e+00e
1479 * vvn-r * f 0.0000e+00e
1480 * vln-t * f 0.0000e+00e
1481 * vln-z * f 0.0000e+00e
1482 * vln-r * f 0.0000e+00e
1483 * tvn * f 3.9300e+02e
1484 * tln * f 3.9300e+02e
1485 * pn * f 2.0180e+05e
1486 * pan * f 0.0000e+00e
1487 * level 3 - cell 1 inlet pleunum -- hl connection.
1488 * cfzl-t* f 0.0000e+00e
1489 * cfzl-z* f 0.0000e+00 0.0000e+00e
1490 * cfzl-r* f 0.0000e+00e
1491 * cfzv-t* f 0.0000e+00e
1492 * cfzv-z* f 0.0000e+00e
1493 * cfzv-r* f 0.0000e+00e
1494 * lccfl * f 0 e
1495 * vol * f 1.0000e+00e
1496 * fa-t * f 0.0000e+00e
1497 * fa-z * f 3.4484e-01 1.0000e+00e
1498 * fa-r * f 0.0000e+00e
1499 * hd-t * f 1.1990e+00e
1500 * hd-z * f 1.5690e-01 9.0950e-01e
1501 * hd-r * f 1.1990e+00e
1502 * alpn * f 1.0000e+00e
1503 * vvn-t * f 0.0000e+00e
1504 * vvn-z * f 0.0000e+00e
1505 * vvn-r * f 0.0000e+00e
1506 * vln-t * f 0.0000e+00e
1507 * vln-z * f 0.0000e+00e
1508 * vln-r * f 0.0000e+00e
1509 * tvn * f 3.9300e+02e
1510 * tln * f 3.9300e+02e
1511 * pn * f 2.0180e+05e
1512 * pan * f 0.0000e+00e
1513 * level 4
1514 * cfzl-t* f 0.0000e+00e
1515 * cfzl-z* f 0.0000e+00e
1516 * cfzl-r* f 0.0000e+00e
1517 * cfzv-t* f 0.0000e+00e
1518 * cfzv-z* f 0.0000e+00e
1519 * cfzv-r* f 0.0000e+00e
1520 * lccfl * f 0 e
1521 * vol * f 9.7220e-01e
1522 * fa-t * f 9.7220e-01e *rfat*
1523 * fa-z * f 0.0000e+00e
1524 * fa-r * f 0.0000e+00e
1525 * hd-t * f 0.0000e+00e
1526 * hd-z * f 0.0000e+00e
1527 * hd-r * f 0.0000e+00e
1528 * alpn * f 1.0000e+00e
1529 * vvn-t * f 0.0000e+00e
1530 * vvn-z * f 0.0000e+00e
1531 * vvn-r * f 0.0000e+00e
1532 * vln-t * f 0.0000e+00e
1533 * vln-z * f 0.0000e+00e
1534 * vln-r * f 0.0000e+00e
1535 * tvn * f 3.9300e+02e
1536 * tln * f 3.9300e+02e
1537 * pn * f 2.0180e+05e
1538 * pan * f 0.0000e+00e
1539 *****
1540 * Pressure vessel component -- 12X15 2d slab
1541 *****
1542 * type num id ctitle
1543 vessel 1 1 $1$ 2d slab - 12x15 -10/24/86
1544 * nasx nrsx ntsx ncsr ivssbf
1545 * 15 12 1 26 0
1546 * idcu idcl idcr icru icrl
1547 * 14 1 10 9 3
1548 * icrr ilcsp iucsp iuhp iconc
1549 * 8 3 10 14 0
1550 * igeom nvent nvvtb nsgrid
1551 * 1 0 0 0 * 6 *
1552 * shelv epsw
1553 * 0.0000e+00 1.0000e-05
1554 * z * 5.0200e-01 1.4330e+00 1.7190e+00 1.9595e+00 2.6245e+00
1555 * z * 3.2895e+00 3.9545e+00 4.6195e+00 5.3320e+00 5.7480e+00
1556 * z * 6.3370e+00 6.8220e+00 7.5590e+00 7.9960e+00 8.6570e+00
1557 e

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1558 * rad * 2.3000e-01 4.6000e-01 6.9000e-01 9.2000e-01 1.1500e+00
1559 * rad * 1.3800e+00 1.6100e+00 1.8400e+00 2.0170e+00 2.3340e+00
1560 * rad * 2.6770e+00 3.0200e+00e
1561 * th * 2.3000e-01e
1562 * funh * f 0.1 e
1563 * nhsca * f 991 e
1564 *
1565 * gc gyc garc gzc
1566 * 0.0 0.0 0.0 0.0
1567 *
1568 * zsgrid 1.779 2.394 3.059 3.724 4.389s
1569 * zsgrid 5.054 e
1570 * lisrl lisrc lisrf ljuns
1571 * 13 10 3 12
1572 * 12 12 1 3
1573 * 12 11 1 8
1574 * 1 10 1 30
1575 * 11 1 1 41
1576 * 11 2 1 42
1577 * 11 3 1 43
1578 * 11 4 1 44
1579 * 11 5 1 45
1580 * 11 6 1 46
1581 * 11 7 1 47
1582 * 11 8 1 48
1583 * 14 1 2 101
1584 * 14 3 2 103
1585 * 14 5 2 105
1586 * 14 7 2 107
1587 * 11 1 2 20
1588 * 11 3 2 26
1589 * 11 5 2 28
1590 * 11 6 2 22
1591 * 11 7 2 24
1592 * 15 1 -2 21
1593 * 15 3 -2 27
1594 * 15 5 -2 29
1595 * 15 6 -2 23
1596 * 15 7 -2 25
1597 * level 1 - bottom level in lower plenum.
1598 * cfzl-t* f 0.0000e+00e
1599 * cfzl-z* f 1.0000e+00e
1600 * cfzl-r* f 1.0000e+00e
1601 * cfzv-t* f 0.0000e+00e
1602 * cfzv-z* f 1.0000e+00e
1603 * cfzv-r* f 1.0000e+00e
1604 * lccfl * f 0 e
1605 * vol * r10 1.9464e+00 1.5825e+00 8.4200e-01e
1606 * fa-t * f 0.0000e+00e
1607 * fa-z * r10 1.0000e+00r02 1.0000e+00e
1608 * fa-r * r10 1.0000e+00 1.0000e+00 0.0000e+00e
1609 * hd-t * 4.5760e-01r10 7.0400e-01 3.2000e-01e
1610 * hd-z * 4.5760e-01r10 7.0400e-01 3.2000e-01e
1611 * hd-r * 4.5760e-01r10 7.0400e-01 3.2000e-01e
1612 * alpn * f 0.0000e+00e
1613 * vvn-t * f 0.0000e+00e
1614 * vvn-z * f 0.0000e+00e
1615 * vvn-r * f 0.0000e+00e
1616 * vln-t * f 0.0000e+00e
1617 * vln-z * f 0.0000e+00e
1618 * vln-r * f 0.0000e+00e
1619 * tvn * f 3.9300e+02e
1620 * tln * f 3.9100e+02e
1621 * pn * f 2.0180e+05e
1622 * pan * f 0.0000e+00e
1623 * level 2 - second level in lower plenum.
1624 * cfzl-t* f 0.0000e+00e
1625 * cfzl-z* f 1.0000e+00e
1626 * cfzl-r* f 1.0000e+00e
1627 * cfzv-t* f 0.0000e+00e
1628 * cfzv-z* f 1.0000e+00e
1629 * cfzv-r* f 1.0000e+00e
1630 * lccfl * f 0 e
1631 * vol * r10 1.3206e+00r02 1.0870e+00e
1632 * fa-t * f 0.0000e+00e
1633 * fa-z * r08 8.5079e-01r02 0.0000e+00r02 1.0000e+00e
1634 * fa-r * r09 1.0000e+00 0.0000e+00 1.0000e+00 0.0000e+00e
1635 * hd-t * 3.1000e-01r10 4.6000e-01 3.2000e-01e
1636 * hd-z * 3.1000e-01r10 4.6000e-01 3.2000e-01e
1637 * hd-r * 3.1000e-01r10 4.6000e-01 3.2000e-01e
1638 * alpn * f 2.5510e-01e
1639 * vvn-t * f 0.0000e+00e
1640 * vvn-z * f 0.0000e+00e
1641 * vvn-r * f 0.0000e+00e
1642 * vln-t * f 0.0000e+00e
1643 * vln-z * f 0.0000e+00e
1644 * vln-r * f 0.0000e+00e
1645 * tvn * f 3.9300e+02e
1646 * tln * f 3.9100e+02e
1647 * pn * f 2.0180e+05e
1648 * pan * f 0.0000e+00e
1649 * level 3 - top level in lower plenum.

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1650 * cfzl-t* f 0.0000e+00e
1651 * cfzl-z* f 0.0100e+00e
1652 * cfzl-r* r07 1.0000e+00 1.0609e+00r04 1.0000e+00e
1653 * cfzv-t* f 0.0000e+00e
1654 * cfzv-z* f 0.0100e+00e
1655 * cfzv-r* r07 1.0000e+00 1.0609e+00r04 1.0000e+00e
1656 * lccfl * f 0 e
1657 * vol * r10 1.0757e+00r02 1.0870e+00e
1658 * fa-t * f 0.0000e+00e
1659 * fa-z * r08 5.0000e-01r04 1.0000e+00e
1660 * fa-r * r07 2.5175e-01r03 0.0000e+00 1.0000e+00 0.0000e+00e
1661 * hd-t * 1.8662e-01r07 2.7650e-01r02 4.5589e-01 4.3656e-01 3.6853e-01
1662 e
1663 * hd-z * 1.8662e-01r07 2.7650e-01r02 4.5589e-01 4.3656e-01 3.6853e-01
1664 e
1665 * hd-r * 1.8662e-01r07 2.7650e-01r02 4.5589e-01 4.3656e-01 3.6853e-01
1666 e
1667 * alpn * f 1.0000e+00e
1668 * vvn-t * f 0.0000e+00e
1669 * vvn-z * f 0.0000e+00e
1670 * vvn-r * f 0.0000e+00e
1671 * vln-t * f 0.0000e+00e
1672 * vln-z * f 0.0000e+00e
1673 * vln-r * f 0.0000e+00e
1674 * tvn * f 3.9300e+02e
1675 * tln * f 3.9300e+02e
1676 * pn * f 2.0180e+05e
1677 * pan * f 0.0000e+00e
1678 * level 4 - bottom level in core.
1679 * cfzl-t* f 0.0000e+00e
1680 * cfzl-z* 2.4106e-04r06 2.4708e-04 2.4106e-04 6.6027e-04r03 0.0000e+00
1681 e
1682 * cfzl-r* 1.6720e-01r06 1.7137e-01 1.6720e-01r04 1.0000e+00e
1683 * cfzv-t* f 0.0000e+00e
1684 * cfzv-z* 2.4106e-04r06 2.4708e-04 2.4106e-04 6.6027e-04r03 0.0000e+00
1685 e
1686 * cfzv-r* 1.6720e-01r06 1.7137e-01 1.6720e-01r04 0.0000e+00e
1687 * lccfl * f 0 e
1688 * vol * r08 8.3280e-01r02 9.1390e-01r02 1.0000e+00e
1689 * fa-t * r08 2.5175e-01r02 0.0000e+00r02 1.0000e+00e
1690 * fa-z * r08 5.4008e-01r02 0.9139 r02 1.0 e
1691 * fa-r * r07 2.5175e-01r03 0.0000e+00 1.0000e+00 0.0000e+00e
1692 * hd-t * 1.2020e-02r06 1.2320e-02 1.2020e-02r02 1.4980e-02r02 0.0039e-01
1693 e
1694 * hd-z * 1.2020e-02r06 1.2320e-02 1.2020e-02r02 1.4980e-02r02 0.0039e-01
1695 e
1696 * hd-r * 1.2020e-02r06 1.2320e-02 1.2020e-02r02 1.4980e-02r02 0.0039e-01
1697 e
1698 * alpn * f 1.0000e+00e
1699 * vvn-t * f 0.0000e+00e
1700 * vvn-z * f 0.0000e+00e
1701 * vvn-r * f 0.0000e+00e
1702 * vln-t * f 0.0000e+00e
1703 * vln-z * f 0.0000e+00e
1704 * vln-r * f 0.0000e+00e
1705 * tvn * f 3.9300e+02e
1706 * tln * f 3.9300e+02e
1707 * pn * f 2.0180e+05e
1708 * pan * f 0.0000e+00e
1709 * level 5 - second level in core.
1710 * cfzl-t* f 0.0000e+00e
1711 * cfzl-z* 1.6448e-04r06 1.6859e-04 1.6448e-04 4.5060e-04r03 0.0000e+00
1712 e
1713 * cfzl-r* 1.6720e-01r06 1.7137e-01 1.6720e-01r04 0.0000e+00e
1714 * cfzv-t* f 0.0000e+00e
1715 * cfzv-z* 1.6448e-04r06 1.6859e-04 1.6448e-04 4.5060e-04r03 0.0000e+00
1716 e
1717 * cfzv-r* 1.6720e-01r06 1.7137e-01 1.6720e-01r04 0.0000e+00e
1718 * lccfl * f 0 e
1719 * vol * r08 8.3280e-01r02 9.1390e-01r02 1.0000e+00e
1720 * fa-t * r08 2.5175e-01r02 0.0000e+00r02 1.0000e+00e
1721 * fa-z * r08 5.4008e-01r02 9.1390e-01r02 1.0000e+00e *rfat*
1722 * fa-r * r07 2.5175e-01r03 0.0000e+00 1.0000e+00 0.0000e+00e
1723 * hd-t * 1.2020e-02r06 1.2320e-02 1.2020e-02r02 1.4980e-02r02 0.0039e-01
1724 e
1725 * hd-z * 1.2020e-02r06 1.2320e-02 1.2020e-02r02 1.4980e-02r02 0.0039e-01
1726 e
1727 * hd-r * 1.2020e-02r06 1.2320e-02 1.2020e-02r02 1.4980e-02r02 0.0039e-01
1728 e
1729 * alpn * f 1.0000e+00e
1730 * vvn-t * f 0.0000e+00e
1731 * vvn-z * f 0.0000e+00e
1732 * vvn-r * f 0.0000e+00e
1733 * vln-t * f 0.0000e+00e
1734 * vln-z * f 0.0000e+00e
1735 * vln-r * f 0.0000e+00e
1736 * tvn * f 3.9300e+02e
1737 * tln * f 3.9300e+02e
1738 * pn * f 2.0180e+05e
1739 * pan * f 0.0000e+00e
1740 * level 6 - third level in core.
1741 * cfzl-t* f 0.0000e+00e

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1742 * cfzl-z*      1.6448e-04r06 1.6859e-04      1.6448e-04      4.5060e-04r03 0.0000e+00
1743 e
1744 * cfzl-r*      1.6720e-01r06 1.7137e-01      1.6720e-01r04 0.0000e+00e
1745 * cfzv-t* f    0.0000e+00e
1746 * cfzv-z*      1.6448e-04r06 1.6859e-04      1.6448e-04      4.5060e-04r03 0.0000e+00
1747 e
1748 * cfzv-r*      1.6720e-01r06 1.7137e-01      1.6720e-01r04 0.0000e+00e
1749 * lccfl *      f 0 e
1750 * vol * r08 8.3280e-01r02 9.1390e-01r02 1.0000e+00e
1751 * fa-t * r08 2.5175e-01r02 0.0000e+00r02 1.0000e+00e
1752 * fa-z * r08 5.4008e-01r02 9.1390e-01r02 1.0000e+00e *rfat*
1753 * fa-r * r07 2.5175e-01r03 0.0000e+00 1.0000e+00 0.0000e+00e
1754 * hd-t *      1.2020e-02r06 1.2320e-02      1.2020e-02r02 1.4980e-02r02 0.0039e-01
1755 e
1756 * hd-z *      1.2020e-02r06 1.2320e-02      1.2020e-02r02 1.4980e-02r02 0.0039e-01
1757 e
1758 * hd-r *      1.2020e-02r06 1.2320e-02      1.2020e-02r02 1.4980e-02r02 0.0039e-01
1759 e
1760 * alpn * f    1.0000e+00e
1761 * vvn-t * f    0.0000e+00e
1762 * vvn-z * f    0.0000e+00e
1763 * vvn-r * f    0.0000e+00e
1764 * vln-t * f    0.0000e+00e
1765 * vln-z * f    0.0000e+00e
1766 * vln-r * f    0.0000e+00e
1767 * tvn * f    3.9300e+02e
1768 * tln * f    3.9300e+02e
1769 * pn * f    2.0180e+05e
1770 * pan * f    0.0000e+00e
1771 * level 7 - fourth level in core.
1772 * cfzl-t* f    0.0000e+00e
1773 * cfzl-z*      1.6448e-04r06 1.6859e-04      1.6448e-04      4.5060e-04r03 0.0000e+00
1774 e
1775 * cfzl-r*      1.6720e-01r06 1.7137e-01      1.6720e-01r04 0.0000e+00e
1776 * cfzv-t* f    0.0000e+00e
1777 * cfzv-z*      1.6448e-04r06 1.6859e-04      1.6448e-04      4.5060e-04r03 0.0000e+00
1778 e
1779 * cfzv-r*      1.6720e-01r06 1.7137e-01      1.6720e-01r04 0.0000e+00e
1780 * lccfl *      f 0 e
1781 * vol * r08 8.3280e-01r02 9.1390e-01r02 1.0000e+00e
1782 * fa-t * r08 2.5175e-01r02 0.0000e+00r02 1.0000e+00e
1783 * fa-z * r08 5.4008e-01r02 9.1390e-01r02 1.0000e+00e *rfat*
1784 * fa-r * r07 2.5175e-01r03 0.0000e+00 1.0000e+00 0.0000e+00e
1785 * hd-t *      1.2020e-02r06 1.2320e-02      1.2020e-02r02 1.4980e-02r02 0.0039e-01
1786 e
1787 * hd-z *      1.2020e-02r06 1.2320e-02      1.2020e-02r02 1.4980e-02r02 0.0039e-01
1788 e
1789 * hd-r *      1.2020e-02r06 1.2320e-02      1.2020e-02r02 1.4980e-02r02 0.0039e-01
1790 e
1791 * alpn * f    1.0000e+00e
1792 * vvn-t * f    0.0000e+00e
1793 * vvn-z * f    0.0000e+00e
1794 * vvn-r * f    0.0000e+00e
1795 * vln-t * f    0.0000e+00e
1796 * vln-z * f    0.0000e+00e
1797 * vln-r * f    0.0000e+00e
1798 * tvn * f    3.9300e+02e
1799 * tln * f    3.9300e+02e
1800 * pn * f    2.0180e+05e
1801 * pan * f    0.0000e+00e
1802 * level 8 - fifth level in core.
1803 * cfzl-t* f    0.0000e+00e
1804 * cfzl-z*      1.5378e-04r06 1.5762e-04      1.5378e-04      4.2124e-04r03 0.0000e+00
1805 e
1806 * cfzl-r*      1.6720e-01r06 1.7137e-01      1.6720e-01r04 0.0000e+00e
1807 * cfzv-t* f    0.0000e+00e
1808 * cfzv-z*      1.5378e-04r06 1.5762e-04      1.5378e-04      4.2124e-04r03 0.0000e+00
1809 e
1810 * cfzv-r*      1.6720e-01r06 1.7137e-01      1.6720e-01r04 0.0000e+00e
1811 * lccfl *      f 0 e
1812 * vol * r08 8.3280e-01r02 9.1390e-01r02 1.0000e+00e
1813 * fa-t * r08 2.5175e-01r02 0.0000e+00r02 1.0000e+00e
1814 * fa-z * r08 5.4008e-01r02 9.1390e-01r02 1.0000e+00e *rfat*
1815 * fa-r * r07 2.5175e-01r03 0.0000e+00 1.0000e+00 0.0000e+00e
1816 * hd-t *      1.2020e-02r06 1.2320e-02      1.2020e-02r02 1.4980e-02r02 0.0039e-01
1817 e
1818 * hd-z *      1.2020e-02r06 1.2320e-02      1.2020e-02r02 1.4980e-02r02 0.0039e-01
1819 e
1820 * hd-r *      1.2020e-02r06 1.2320e-02      1.2020e-02r02 1.4980e-02r02 0.0039e-01
1821 e
1822 * alpn * f    1.0000e+00e
1823 * vvn-t * f    0.0000e+00e
1824 * vvn-z * f    0.0000e+00e
1825 * vvn-r * f    0.0000e+00e
1826 * vln-t * f    0.0000e+00e
1827 * vln-z * f    0.0000e+00e
1828 * vln-r * f    0.0000e+00e
1829 * tvn * f    3.9300e+02e
1830 * tln * f    3.9300e+02e
1831 * pn * f    2.0180e+05e
1832 * pan * f    0.0000e+00e
1833 * level 9 - top level in core (has UCSP flow restriction).

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1834 * cfzl-t* f 0.0000e+00e
1835 * cfzl-z* 2.0266e-04r06 2.0772e-04 2.0266e-04 5.5507e-04r03 0.0000e+00
1836 e
1837 * cfzl-r* 1.6720e-01r06 1.7137e-01 1.6720e-01r04 0.0000e+00e
1838 * cfzv-t* f 0.0000e+00e
1839 * cfzv-z* 2.0266e-04r06 2.0772e-04 2.0266e-04 5.5507e-04r03 0.0000e+00
1840 e
1841 * cfzv-r* 1.6720e-01r06 1.7137e-01 1.6720e-01r04 0.0000e+00e
1842 * lccfl * f 0 e
1843 * vol * r08 8.3280e-01r02 9.1390e-01r02 1.0000e+00e
1844 * fa-t * r08 2.5175e-01r02 0.0000e+00r02 1.0000e+00e
1845 * fa-z * r08 5.2195e-01r02 9.1390e-01r02 1.0000e+00e *rfat*
1846 * fa-r * r07 2.5175e-01r03 0.0000e+00 1.0000e+00 0.0000e+00e
1847 * hd-t * 1.2020e-02r06 1.2320e-02 1.2020e-02r02 1.4980e-02r02 0.0039e-01
1848 e
1849 * hd-z * 1.2020e-02r06 1.2320e-02 1.2020e-02r02 1.4980e-02r02 0.0039e-01
1850 e
1851 * hd-r * 1.2020e-02r06 1.2320e-02 1.2020e-02r02 1.4980e-02r02 0.0039e-01
1852 e
1853 * alpn * f 1.0000e+00e
1854 * vvn-t * f 0.0000e+00e
1855 * vvn-z * f 0.0000e+00e
1856 * vvn-r * f 0.0000e+00e
1857 * vln-t * f 0.0000e+00e
1858 * vln-z * f 0.0000e+00e
1859 * vln-r * f 0.0000e+00e
1860 * tvn * f 3.9300e+02e
1861 * tln * f 3.9300e+02e
1862 * pn * f 2.0180e+05e
1863 * pan * f 0.0000e+00e
1864 * level 10 - first level of upper plenum.
1865 * cfzl-t* f 0.0000e+00e
1866 * cfzl-z* r08 6.1521e-04r04 0.0000e+00e
1867 * cfzl-r* r08 5.9200e-02r04 0.0000e+00e
1868 * cfzv-t* f 0.0000e+00e
1869 * cfzv-z* r08 6.1521e-04r04 0.0000e+00e
1870 * cfzv-r* r08 5.9200e-02r04 0.0000e+00e
1871 * lccfl * r8 1 f 0 e
1872 * vol * r08 8.5430e-01r02 1.0783e+00 1.0870e+00 1.0000e+00e
1873 * fa-t * 1.4915e-01 9.9565e-01 1.4915e-01 9.9565e-01 1.4915e-01
1874 * fa-z * 1.4480e-01 5.8720e-02 9.9783e-01 0.0000e+00r03 1.0000e+00
1875 e
1876 * fa-z * r08 3.7000e-01r02 0.0000e+00r02 1.0000e+00e
1877 * fa-r * r07 1.1750e-01r03 0.0000e+00r02 1.0000e+00e
1878 * hd-t * 3.9370e-02 6.0750e-02 5.8720e-02 6.0750e-02 5.8720e-02
1879 * hd-z * 5.2870e-02 6.5100e-02r02 3.6294e-01r02 2.4408e-01e
1880 e
1881 * hd-z * r08 1.1840e-02r02 3.6294e-01r02 2.4408e-01e
1882 * hd-r * r08 1.1840e-02r02 3.6294e-01r02 2.4408e-01e
1883 * alpn * f 1.0000e+00e
1884 * vvn-t * f 0.0000e+00e
1885 * vvn-z * f 0.0000e+00e
1886 * vvn-r * f 0.0000e+00e
1887 * vln-t * f 0.0000e+00e
1888 * vln-z * f 0.0000e+00e
1889 * vln-r * f 0.0000e+00e
1890 * tvn * f 3.9300e+02e
1891 * tln * f 3.9300e+02e
1892 * pn * f 2.0180e+05e
1893 * pan * f 0.0000e+00e
1894 * level 11 - second level of upper plenum.
1895 * cfzl-t* f 0.0000e+00e
1896 * cfzl-z* 4.4386e-04 1.8400e-04 3.8870e-04 1.8400e-04 3.8870e-04
1897 * cfzl-r* 4.4386e-04 3.4976e-04 1.8400e-04r04 0.0000e+00e
1898 * cfzl-z* 2.9647e-02 4.1400e-02 3.6920e-01 4.1400e-02 6.2690e-01
1899 * cfzl-r* 2.9647e-02 8.6219e-03 4.1400e-02r02 0.0000e+00 1.7378e-01
1900 * cfzl-r* 0.0000e+00e
1901 * cfzv-t* f 0.0000e+00e
1902 * cfzv-z* 4.4386e-04 1.8400e-04 3.8870e-04 1.8400e-04 3.8870e-04
1903 * cfzv-z* 4.4386e-04 3.4976e-04 1.8400e-04r04 0.0000e+00e
1904 * cfzv-r* 2.9647e-02 4.1400e-02 3.6920e-01 4.1400e-02 6.2690e-01
1905 * cfzv-r* 2.9647e-02 8.6219e-03 4.1400e-02r02 0.0000e+00 1.7378e-01
1906 * cfzv-r* 0.0000e+00e
1907 * lccfl * f 0 e
1908 * vol * 8.9000e-01 9.8110e-01 3.9000e-01 9.8110e-01 3.9000e-01
1909 * vol * 8.8580e-01 8.0690e-01 9.8110e-01r02 1.0000e+00 1.0870e+00
1910 * vol * 1.0000e+00e
1911 * fa-t * f 0.0000e+00e
1912 * fa-z * 4.2627e-01 0.9811e+00 0.0000e+00 0.9811e+00 0.0000e+00
1913 * fa-z * r02 4.2627e-01r01 0.9811e+00r04 1.0000e+00e *rfat*
1914 * fa-r * 6.8370e-01 8.5550e-01 1.9160e-01 8.5550e-01 1.9160e-01
1915 * fa-r * 6.8370e-01 3.1520e-01 8.5550e-01r04 1.0000e+00e
1916 * hd-t * f 0.0000e+00e
1917 * hd-z * 1.0042e-01 4.6000e-01 0.0000e+00 4.6000e-01 0.0000e+00
1918 * hd-z * r02 1.0042e-01r02 4.6000e-01 2.1400e-01r02 2.4408e-01e
1919 * hd-r * 2.8022e-01 4.6000e-01 1.8201e-01 4.6000e-01 1.8201e+01
1920 * hd-r * 2.8022e-01 8.2270e-02r03 4.6000e-01r02 2.4408e-01e
1921 * alpn * f 1.0000e+00e
1922 * vvn-t * f 0.0000e+00e
1923 * vvn-z * f 0.0000e+00e
1924 * vvn-r * f 0.0000e+00e
1925 * vln-t * f 0.0000e+00e

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1926 \* vln-z \* f 0.0000e+00e  
1927 \* vln-r \* f 0.0000e+00e  
1928 \* tvn \* f 3.9300e+02e  
1929 \* tln \* f 3.9300e+02e  
1930 \* pn \* f 2.0180e+05e  
1931 \* pan \* f 0.0000e+00e  
1932 \* level 12 - third level of upper plenum.  
1933 \* cfzl-t\* f 0.0000e+00e  
1934 \* cfzl-z\* f 0.0100e+00e  
1935 \* cfzl-r\* 7.9664e-03 2.0055e-02 7.9664e-03 2.0055e-02r03 7.9664e-03  
1936 \* cfzl-r\* 2.0055e-02r02 0.0000e+00 1.7378e-01 0.0000e+00e  
1937 \* cfzv-t\* f 0.0000e+00e  
1938 \* cfzv-z\* f 0.0000e+00e  
1939 \* cfzv-r\* 7.9664e-03 2.0055e-02 7.9664e-03 2.0055e-02r03 7.9664e-03  
1940 \* cfzv-r\* 2.0055e-02r02 0.0000e+00 1.7378e-01 0.0000e+00e  
1941 \* lccfl \* f 0 e  
1942 \* vol \* 4.2616e-01 1.0000e+00 4.2616e-01 1.0000e+00r03 4.2616e-01  
1943 \* vol \* r03 1.0000e+00 1.3669e+00 1.0000e+00e  
1944 \* fa-t \* f 0.0000e+00e  
1945 \* fa-z \* 4.2629e-01 1.0000e+00 4.2629e-01 1.0000e+00r03 4.2629e-01  
1946 \* fa-z \* r03 1.0000e+00r02 2.3478e-01e  
1947 \* fa-r \* 3.9561e-01 1.0000e+00 3.9561e-01 1.0000e+00r03 3.9561e-01  
1948 \* fa-r \* r05 1.0000e+00e  
1949 \* hd-t \* f 0.0000e+00e  
1950 \* hd-z \* 1.0042e-01 4.6000e-01 1.3498e-01 4.6000e-01r03 1.3498e-01  
1951 \* hd-z \* r02 4.6000e-01 2.1400e-01r02 5.1955e-02e  
1952 \* hd-r \* 1.8322e-01 4.6124e-01 1.8322e-01 4.6124e-01r03 1.8322e-01  
1953 \* hd-r \* r03 4.6124e-01r02 2.4408e-01e  
1954 \* alpn \* f 1.0000e+00e  
1955 \* vvn-t \* f 0.0000e+00e  
1956 \* vvn-z \* f 0.0000e+00e  
1957 \* vvn-r \* f 0.0000e+00e  
1958 \* vln-t \* f 0.0000e+00e  
1959 \* vln-z \* f 0.0000e+00e  
1960 \* vln-r \* f 0.0000e+00e  
1961 \* tvn \* f 3.9300e+02e  
1962 \* tln \* f 3.9300e+02e  
1963 \* pn \* f 2.0180e+05e  
1964 \* pan \* f 0.0000e+00e  
1965 \* level 13 - fourth level of upper plenum.  
1966 \* cfzl-t\* f 0.0000e+00e  
1967 \* cfzl-z\* f 0.0100e+00e  
1968 \* cfzl-r\* 7.9138e-03 2.0001e-02 7.9138e-03 2.0001e-02r03 7.9138e-03  
1969 \* cfzl-r\* 2.0001e-02r02 0.0000e+00 3.0160e-02 0.0000e+00e  
1970 \* cfzv-t\* f 0.0000e+00e  
1971 \* cfzv-z\* f 0.0000e+00e  
1972 \* cfzv-r\* 7.9138e-03 2.0001e-02 7.9138e-03 2.0001e-02r03 7.9138e-03  
1973 \* cfzv-r\* 2.0001e-02r02 0.0000e+00 3.0160e-02 0.0000e+00e  
1974 \* lccfl \* f 0 e  
1975 \* vol \* 4.2616e-01 1.0000e+00 4.2616e-01 1.0000e+00r03 4.2616e-01  
1976 \* vol \* r03 1.0000e+00r02 1.9092e-01e  
1977 \* fa-t \* f 0.0000e+00e  
1978 \* fa-z \* 4.2629e-01 1.0000e+00 4.2629e-01 1.0000e+00r03 4.2629e-01  
1979 \* fa-z \* r03 1.0000e+00r02 2.3478e-01e  
1980 \* fa-r \* 3.9561e-01 1.0000e+00 3.9561e-01 1.0000e+00r03 3.9561e-01  
1981 \* fa-r \* r03 1.0000e+00r02 1.9092e-01e  
1982 \* hd-t \* f 0.0000e+00e  
1983 \* hd-z \* 1.0042e-01 4.6000e-01 1.3498e-01 4.6000e-01r03 1.3498e-01  
1984 \* hd-z \* r02 4.6000e-01 2.1400e-01r02 5.1955e-02e  
1985 \* hd-r \* 1.8201e-01 4.6000e-01 1.8201e-01 4.6000e-01r03 1.8201e-01  
1986 \* hd-r \* r03 4.6000e-01r02 4.2359e-02e  
1987 \* alpn \* f 1.0000e+00e  
1988 \* vvn-t \* f 0.0000e+00e  
1989 \* vvn-z \* f 0.0000e+00e  
1990 \* vvn-r \* f 0.0000e+00e  
1991 \* vln-t \* f 0.0000e+00e  
1992 \* vln-z \* f 0.0000e+00e  
1993 \* vln-r \* f 0.0000e+00e  
1994 \* tvn \* f 3.9300e+02e  
1995 \* tln \* f 3.9300e+02e  
1996 \* pn \* f 2.0180e+05e  
1997 \* pan \* f 0.0000e+00e  
1998 \* level 14 - fifth level of upper plenum.  
1999 \* cfzl-t\* f 0.0000e+00e  
2000 \* cfzl-z\* f 0.0000e+00e  
2001 \* cfzl-r\* 6.2650e-03 1.5834e-02 6.2650e-03 1.5834e-02r03 6.2650e-03  
2002 \* cfzl-r\* 1.5834e-02r04 0.0100e+00e  
2003 \* cfzv-t\* f 0.0000e+00e  
2004 \* cfzv-z\* f 0.0000e+00e  
2005 \* cfzv-r\* 6.2650e-04 1.5834e-04 6.2650e-04 1.5834e-04r03 6.2650e-03  
2006 \* cfzv-r\* 1.5834e-04r04 0.0000e+00e  
2007 \* lccfl \* f 0 e  
2008 \* vol \* 4.2616e-01 1.0000e+00 4.2616e-01 1.0000e+00r03 4.2616e-01  
2009 \* vol \* r03 1.0000e+00 1.3669e+00 1.0000e+00e  
2010 \* fa-t \* f 0.0000e+00e  
2011 \* fa-z \* f 0.0000e+00e  
2012 \* fa-r \* 3.9561e-01 1.0000e+00 3.9561e-01 1.0000e+00r03 3.9561e-01  
2013 \* fa-r \* r05 1.0000e+00e  
2014 \* hd-t \* f 0.0000e+00e  
2015 \* hd-z \* 1.0042e-01 4.6000e-01 1.3498e-01 4.6000e-01r03 1.3498e-01  
2016 \* hd-z \* r02 4.6000e-01 2.1400e-01r02 2.4408e-01e  
2017 \* hd-r \* 1.4409e-01 3.6417e-01 1.4409e-01 3.6417e-01r03 1.4409e-01

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2018 * hd-r * r03 3.6417e-01r02 2.4408e-01e
2019 * alpn * f 1.0000e+00e
2020 * vvn-t * f 0.0000e+00e
2021 * vvn-z * f 0.0000e+00e
2022 * vvn-r * f 0.0000e+00e
2023 * vln-t * f 0.0000e+00e
2024 * vln-z * f 0.0000e+00e
2025 * vln-r * f 0.0000e+00e
2026 * tvn * f 3.9300e+02e
2027 * tln * f 3.9300e+02e
2028 * pn * f 2.0180e+05e
2029 * pan * f 0.0000e+00e
2030 * level 15 - upper head.
2031 * cfzl-t* f 0.0000e+00e
2032 * cfzl-z* f 0.0000e+00e
2033 * cfzl-r* f 0.0000e+00e
2034 * cfzv-t* f 0.0000e+00e
2035 * cfzv-z* f 0.0000e+00e
2036 * cfzv-r* f 0.0000e+00e
2037 * lccfl * f 0 e
2038 * vol * f 1.8731e+00e
2039 * fa-t * f 1.0000e+00e
2040 * fa-z * f 1.0000e+00e
2041 * fa-r * f 1.0000e+00e
2042 * hd-t * r08 2.3000e-01r02 2.9970e-01r02 2.4408e-01e
2043 * hd-z * r08 2.3000e-01r02 2.9970e-01r02 2.4408e-01e
2044 * hd-r * r08 2.3000e-01r02 2.9970e-01r02 2.4408e-01e
2045 * alpn * f 1.0000e+00e
2046 * vvn-t * f 0.0000e+00e
2047 * vvn-z * f 0.0000e+00e
2048 * vvn-r * f 0.0000e+00e
2049 * vln-t * f 0.0000e+00e
2050 * vln-z * f 0.0000e+00e
2051 * vln-r * f 0.0000e+00e
2052 * tvn * f 3.9300e+02e
2053 * tln * f 3.9300e+02e
2054 * pn * f 2.0180e+05e
2055 * pan * f 0.0000e+00e
2056 *****
2057 * Rods in pressure vessel
2058 *****
2059 ***** type num id ctitle
2060 rod 991 991 $991$ fuel rod component
2061 * ncrx ncrz ittc
2062 * 8 6
2063 * nopowr nrldr modez liqlev iaxcnd
2064 * 0 0 0 1 1
2065 * idbci idbco
2066 * 0 2
2067 * nrods nodes irftr nzmax irftr2
2068 * 8 7 1001 250 1002
2069 * dtxht(1) dtxht(2) dznht hgapo, shelv
2070 * 5.0000e+00 2.0000e+01 5.0000e-03 5.0000e+04 0.0000e+00
2071 * irpwty ndgx ndhx nrts nhist
2072 * 6 0 0 10 0
2073 * irpwtr irpwsv nrpwtb nrpwsv nrpwrf
2074 * 0 101 29 0 0
2075 * izpwtr izpwsv nzpwtb nzpwsv nzpwrf
2076 * 0 101 1 0 0
2077 * nmwrx nfcil
2078 * 0 0 0
2079 * nzpwz nzpwi nfbpwt
2080 * 18 -1 0
2081 * react tneut rpwoff rrpwmx rpwscl
2082 * 0.0000e+00 0.0000e+00 0.0000e+00 1.0000e+30 1.0000e+00
2083 * rpowri zpwini zpwoff rrpwmx
2084 * 1.0000e-20 0.0000e+00 0.0000e+00 1.0000e+30
2085 * extsou pldr pdrat fucrac
2086 * 0.0000e+00 0.0000e+00 1.3360e+00 0.0000e+00
2087 * nhcoms
2088 f 1e
2089 * nhcelo
2090 -4s
2091 4s
2092 5s
2093 6s
2094 7s
2095 8s
2096 9s
2097 10e
2098 * z
2099 1.7190e+00s
2100 1.9595e+00s
2101 2.6245e+00s
2102 3.2895e+00s
2103 3.9545e+00s
2104 4.6195e+00s
2105 5.3320e+00e
2106 * grav
2107 f 1.0e
2108 * rdx * f 2.3600e+02e
2109 * radrd * 0.0000e+00 2.6000e-03 3.1000e-03 4.1500e-03 4.3500e-03

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2110 * radrd *      4.8500e-03    5.3500e-03e
2111 * matrdr *      59          55r02          59r02          60e
2112 * nfax * f      3e
2113 * rftn * f      3.9230e+02e
2114 * rftn * f      3.9230e+02e
2115 * rftn * f      3.9230e+02e
2116 * rftn * f      3.9230e+02e
2117 * rftn * f      3.9230e+02e
2118 * rftn * f      3.9230e+02e
2119 * rftn * f      3.9230e+02e
2120 * rftn * f      3.9230e+02e
2121 * rdpwr *      0.0000e+00r02 1.0000e+00r04 0.0000e+00e
2122 * cpowr *      1.3600e+00    1.2000e+00    1.1000e+00    1.0000e+00    9.1000e-01
2123 * cpowr *      8.6000e-01    8.1000e-01    7.6000e-01e
2124 * 17-step axial power profile elevations
2125 * zpwzt *      1.719  1.924  2.129  2.334  2.554 s
2126 * zpwzt *      2.774  2.994  3.214  3.434  3.664 s
2127 * zpwzt *      3.884  4.104  4.324  4.544  4.764 s
2128 * zpwzt *      4.969  5.174  5.332 e
2129 * 17-step axial power profile
2130 * first value is table independent value
2131 * zpwtb *      0.0 s
2132 * zpwtb *      0.379  0.5786  0.771  0.95  1.1 s
2133 * zpwtb *      1.229  1.321  1.3786  1.4  1.3786 s
2134 * zpwtb *      1.321  1.229  1.1  0.95  0.771 s
2135 * zpwtb *      0.5786  0.379  0.0 e
2136 * rpwtb * r02 0.0000e+00    1.0000e+00    1.1975e+06    2.0000e+00    5.1116e+06
2137 * rpwtb *      3.0000e+00    6.4028e+06    4.0000e+00    6.5519e+06    8.0000e+00
2138 * rpwtb *      7.0190e+06    1.5000e+01    7.1056e+06    1.2200e+02    7.1056e+06
2139 * rpwtb *      1.4000e+02    6.6896e+06    1.5400e+02    6.4547e+06    1.5500e+02
2140 * rpwtb *      6.4667e+06    1.5600e+02    6.4483e+06    1.7500e+02    6.1814e+06
2141 * rpwtb *      2.0000e+02    5.9493e+06    2.2600e+02    5.7462e+06    2.2800e+02
2142 * rpwtb *      5.7427e+06    2.4000e+02    5.7150e+06    2.4100e+02    5.7143e+06
2143 * rpwtb *      2.6300e+02    5.5468e+06    2.6400e+02    5.4516e+06    2.6500e+02
2144 * rpwtb *      5.5546e+06    2.6900e+02    5.4928e+06    2.7000e+02    5.4879e+06
2145 * rpwtb *      2.7500e+02    5.4488e+06    3.2500e+02    5.1336e+06    4.0000e+02
2146 * rpwtb *      4.7808e+06    5.0000e+02    4.4550e+06    6.0000e+02    4.2087e+06
2147 * rpwtb *      1.0000e+03    3.2234e+06e
2148 * fpuc2 * f      0.0000e+00e
2149 * ftd * f      9.0000e-01e
2150 * gmix * f      0.0000e+00e
2151 * gmles * f      0.0000e+00e
2152 * pgapt * f      0.0000e+00e
2153 * plvol * f      0.0000e+00e
2154 * pslen * f      0.0000e+00e
2155 * clenm * f      0.0000e+00e
2156 * burn * f      0.0000e+00e
2157 * burn * f      0.0000e+00e
2158 * burn * f      0.0000e+00e
2159 * burn * f      0.0000e+00e
2160 * burn * f      0.0000e+00e
2161 * burn * f      0.0000e+00e
2162 * burn * f      0.0000e+00e
2163 * burn * f      0.0000e+00e
2164 *
2165 *****
2166 * Slab for PV Level 1, cells 1 - 11
2167 *****
2168 *      type      num      id      ctitle
2169 slab      989      $989$ slab level 1, cells 1-11
2170 *      ncrx      ncrz
2171 *      11      1
2172 *      nopowr      nrldr      modez      liqlv      iaxcnd
2173 *      1      1      1      0      0
2174 *      idbci      idco
2175 *      0      2
2176 *      width      ipatch
2177 *      8.24003      0
2178 *      nrods      nodes      irftr      nzmax      irftr2
2179 *      11      1      0      5      0
2180 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
2181 *      3.0000e+00      1.0000e+01      0.0000e+00      0.0000e+00      0.0000e+00
2182 * nhcomo * f      1e
2183 * nhcelo *      -1      1      2e
2184 * dz * f      5.0200e-01e
2185 * grav * f      1.0000e+00e
2186 * idrod * 1      2      3      4      5s
2187 *      6      7      8 s
2188 *      9      10      11 e
2189 * rdx *      0.137075 r7 0.081469 0.062615 0.112172 0.117855 e
2190 * radrd * f      1.0500e-01e
2191 * matrdr * f      6e
2192 * nfax * f      1e
2193 * rftn * f      3.910e+02e
2194 * rftn * f      3.910e+02e
2195 * rftn * f      3.910e+02e
2196 * rftn * f      3.910e+02e
2197 * rftn * f      3.910e+02e
2198 * rftn * f      3.910e+02e
2199 * rftn * f      3.910e+02e
2200 * rftn * f      3.910e+02e
2201 * rftn * f      3.910e+02e

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2202 * rftn * f 3.910e+02e
2203 * rftn * f 3.910e+02e
2204 *
2205 *****
2206 * Slab for PV Level 1, cell 12
2207 *****
2208 * type num id ctitle
2209 slab 985 985 $985$ slab level 1, cell 12
2210 * ncrx ncrz
2211 * 1 1
2212 * nopowr nridr modez liqlev iaxcnd
2213 * 1 1 1 0 0
2214 * idbci idco
2215 * 0 2
2216 * width ipatch
2217 * 1.0313e+00 0
2218 * nrods nodes irftr nzmax irftr2
2219 * 1 1 0 5 0
2220 * dtxht(1) dtxht(2) dznht hgapo shelv
2221 * 3.0000e+00 1.0000e+01 0.0000e+00 0.0000e+00 0.0000e+00
2222 * nhcomo * f 1e
2223 * nhcelo * -1 1 2e
2224 * dz * f 5.0200e-01e
2225 * grav * f 1.0000e+00e
2226 * idrod * 12e
2227 * rdx * f 1.0000e+00e
2228 * radrd * f 1.4868e-01e
2229 * matrdr * f 6e
2230 * nfax * f 1e
2231 * rftn * f 3.910e+02e
2232 *
2233 *****
2234 * Slab for PV Level 2, cell 1
2235 *****
2236 * type num id ctitle
2237 slab 984 984 $984$ slab level 2, cell 1
2238 * ncrx ncrz
2239 * 1 1
2240 * nopowr nridr modez liqlev iaxcnd
2241 * 1 1 1 0 0
2242 * idbci idco
2243 * 0 2
2244 * width ipatch
2245 * 3.2331e+00 0
2246 * nrods nodes irftr nzmax irftr2
2247 * 1 1 0 5 0
2248 * dtxht(1) dtxht(2) dznht hgapo shelv
2249 * 3.0000e+00 1.0000e+01 0.0000e+00 0.0000e+00 5.0200e-01
2250 * nhcomo * f 1e
2251 * nhcelo * -2 2 3e
2252 * dz * f 9.3100e-01e
2253 * grav * f 1.0000e+00e
2254 * idrod * 1e
2255 * rdx * f 1.0000e+00e
2256 * radrd * f 1.0345e-02e
2257 * matrdr * f 6e
2258 * nfax * f 1e
2259 * rftn * f 3.910e+02e
2260 *
2261 * Slab for PV Level 2, cells 2 - 8
2262 *****
2263 * type num id ctitle
2264 slab 983 983 $983$ slab level 2, cells 2-8
2265 * ncrx ncrz
2266 * 7 1
2267 * nopowr nridr modez liqlev iaxcnd
2268 * 1 1 1 0 0
2269 * idbci idco
2270 * 0 2
2271 * width ipatch
2272 * 2.9001e+00 0
2273 * nrods nodes irftr nzmax irftr2
2274 * 7 1 0 5 0
2275 * dtxht(1) dtxht(2) dznht hgapo shelv
2276 * 3.0000e+00 1.0000e+01 0.0000e+00 0.0000e+00 5.0200e-01
2277 * nhcomo * f 1e
2278 * nhcelo * -2 2 3e
2279 * dz * f 9.3100e-01e
2280 * grav * f 1.0000e+00e
2281 * idrod * 2 3 4 5s
2282 * 6 7 8e
2283 * rdx * f 1.0000e+00e
2284 * radrd * f 8.3740e-03e
2285 * matrdr * f 6e
2286 * nfax * f 1e
2287 * rftn * f 3.910e+02e
2288 * rftn * f 3.910e+02e
2289 * rftn * f 3.910e+02e
2290 * rftn * f 3.910e+02e
2291 * rftn * f 3.910e+02e
2292 * rftn * f 3.910e+02e
2293 * rftn * f 3.910e+02e

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2294 *****
2295 * Slab for PV Level 2, cells 9 - 12
2296 *****
2297 *      type          num          id      ctitle
2298 slab      982          982 $982$ slab level 2, cells 9-12
2299 *      ncrx          ncrz
2300 *      4              1
2301 *      nopowr      nridr          modez          liqlev          iaxcnd
2302 *      1              1              1              0              0
2303 *      idbci          idco
2304 *      0              2
2305 *      width          ipatch
2306 *      1.19012        0
2307 *      nrods          nodes          irftr          nzmax          irftr2
2308 *      4              1              0              5              0
2309 *      dtxht(1)      dtxht(2)      dznht          hgapo          shelv
2310 *      3.0000e+00    1.0000e+01    0.0000e+00    0.0000e+00    5.0200e-01
2311 *      nhcomo * f          1e
2312 *      nhcelo *          -2              2              3e
2313 *      dz * f          9.3100e-01e
2314 *      grav * f          1.0000e+00e
2315 *      idrod *          9 10 11 12 e
2316 *      rdx * 0.14720 0.26363 0.25090 0.33827 e
2317 *      radrd * f          1.0250e-01e
2318 *      matrd * f          6e
2319 *      nfax * f          1e
2320 *      rftn * f          3.910e+02e
2321 *      rftn * f          3.910e+02e
2322 *      rftn * f          3.910e+02e
2323 *      rftn * f          3.910e+02e
2324 *
2325 *****
2326 * Slab for PV Level 3, cells 1 - 8
2327 *****
2328 *      type          num          id      ctitle
2329 slab      978          978 $978$ slab level 3, cells 1-8
2330 *      ncrx          ncrz
2331 *      8              1
2332 *      nopowr      nridr          modez          liqlev          iaxcnd
2333 *      1              1              1              0              0
2334 *      idbci          idco
2335 *      0              2
2336 *      width          ipatch
2337 *      1.0105e+01    0
2338 *      nrods          nodes          irftr          nzmax          irftr2
2339 *      8              1              0              5              0
2340 *      dtxht(1)      dtxht(2)      dznht          hgapo          shelv
2341 *      3.0000e+00    1.0000e+01    0.0000e+00    0.0000e+00    1.4330e+00
2342 *      nhcomo * f          1e
2343 *      nhcelo *          -3              3              4e
2344 *      dz * f          2.8600e-01e
2345 *      grav * f          1.0000e+00e
2346 *      idrod *          1              2              3              4s
2347 *      5              6              7              8e
2348 *      rdx * f          1.0000e+00e
2349 *      radrd * f          2.2968e-03e
2350 *      matrd * f          6e
2351 *      nfax * f          1e
2352 *      rftn * f          3.930e+02e
2353 *      rftn * f          3.930e+02e
2354 *      rftn * f          3.930e+02e
2355 *      rftn * f          3.930e+02e
2356 *      rftn * f          3.930e+02e
2357 *      rftn * f          3.930e+02e
2358 *      rftn * f          3.930e+02e
2359 *      rftn * f          3.930e+02e
2360 *****
2361 * Slab for PV Level 3, cells 9 and 10
2362 *****
2363 *      type          num          id      ctitle
2364 slab      977          977 $977$ slab level 3, cells 9-10
2365 *      ncrx          ncrz
2366 *      2              1
2367 *      nopowr      nridr          modez          liqlev          iaxcnd
2368 *      1              1              1              0              0
2369 *      idbci          idco
2370 *      0              2
2371 *      width          ipatch
2372 *      1.26832        0
2373 *      nrods          nodes          irftr          nzmax          irftr2
2374 *      2              1              0              5              0
2375 *      dtxht(1)      dtxht(2)      dznht          hgapo          shelv
2376 *      3.0000e+00    1.0000e+01    0.0000e+00    0.0000e+00    1.4330e+00
2377 *      nhcomo * f          1e
2378 *      nhcelo *          -3              3              4e
2379 *      dz * f          2.8600e-01e
2380 *      grav * f          1.0000e+00e
2381 *      idrod *          9 10 e
2382 *      rdx * 0.35830 0.64170 e
2383 *      radrd * f          7.9786e-02e
2384 *      matrd * f          6e
2385 *      nfax * f          1e

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2386 * rftn * f 3.930e+02e
2387 * rftn * f 3.930e+02e
2388 *
2389 *****
2390 * Slab for FV Level 3, cell 11
2391 *****
2392 * type num id ctitle
2393 slab 975 975 $975$ slab level 3, cell 11
2394 * ncrx ncrz
2395 * 1 1
2396 * nopowr nridr modez liqlev iaxcnd
2397 * 1 1 1 0 0
2398 * idbci idco
2399 * 0 2
2400 * width ipatch
2401 * 7.5524e-01 0
2402 * nrods nodes irftr nzmax irftr2
2403 * 1 1 0 5 0
2404 * dtxht(1) dtxht(2) dznht hgapo shelv
2405 * 3.0000e+00 1.0000e+01 0.0000e+00 0.0000e+00 1.4330e+00
2406 * nhcoco * f 1e
2407 * nhcelo * -3 3 4e
2408 * dz * f 2.8600e-01e
2409 * grav * f 1.0000e+00e
2410 * idrod * 11e
2411 * rdx * f 1.0000e+00e
2412 * radrd * f 7.1480e-02e
2413 * matrdr * f 6e
2414 * nfax * f 1e
2415 * rftn * f 3.930e+02e
2416 *
2417 *****
2418 * Slab for FV Level 3, cell 12
2419 *****
2420 * type num id ctitle
2421 slab 974 974 $974$ slab level 3, cell 12
2422 * ncrx ncrz
2423 * 1 1
2424 * nopowr nridr modez liqlev iaxcnd
2425 * 1 1 1 0 0
2426 * idbci idco
2427 * 0 2
2428 * width ipatch
2429 * 7.5524e-01 0
2430 * nrods nodes irftr nzmax irftr2
2431 * 1 1 0 5 0
2432 * dtxht(1) dtxht(2) dznht hgapo shelv
2433 * 3.0000e+00 1.0000e+01 0.0000e+00 0.0000e+00 1.4330e+00
2434 * nhcoco * f 1e
2435 * nhcelo * -3 3 4e
2436 * dz * f 2.8600e-01e
2437 * grav * f 1.0000e+00e
2438 * idrod * 12e
2439 * rdx * f 1.0000e+00e
2440 * radrd * f 1.0000e-01e
2441 * matrdr * f 6e
2442 * nfax * f 1e
2443 * rftn * f 3.930e+02e
2444 *
2445 *****
2446 * Slab for PV Levels 4 - 9, cells 1 - 8
2447 *****
2448 * type num id ctitle
2449 slab 973 973 $973$ slab level 4-9, cells 1-8
2450 * ncrx ncrz
2451 * 8 6
2452 * nopowr nridr modez liqlev iaxcnd
2453 * 1 1 1 0 0
2454 * idbci idco
2455 * 0 2
2456 * width ipatch
2457 * 8.6861e-01 0
2458 * nrods nodes irftr nzmax irftr2
2459 * 8 1 0 13 0
2460 * dtxht(1) dtxht(2) dznht hgapo shelv
2461 * 3.0000e+00 1.0000e+01 0.0000e+00 0.0000e+00 1.7190e+00
2462 * nhcoco * f 1e
2463 * nhcelo * -4 4 5 6 7 s
2464 * nhcelo * 8 9 10 e
2465 * dz * 0.2405 r4 0.6650 0.7125 e
2466 * grav * f 1.0000e+00e
2467 * idrod * 1 2 3 4s
2468 * 5 6 7 8e
2469 * rdx * f 1.0000e+00e
2470 * radrd * f 2.0500e-03e
2471 * matrdr * f 6e
2472 * nfax * f 1e
2473 * rftn * f 3.930e+02e
2474 * rftn * f 3.930e+02e
2475 * rftn * f 3.930e+02e
2476 * rftn * f 3.930e+02e
2477 * rftn * f 3.930e+02e

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2478 * rftn * f 3.930e+02e
2479 * rftn * f 3.930e+02e
2480 * rftn * f 3.930e+02e
2481 *
2482 *****
2483 * Slab for PV Level 4, cells 9 and 10
2484 *****
2485 * type num id ctitle
2486 slab 972 $972$ slab level 4, cells 9-10
2487 * ncrx ncrz
2488 * 2 1
2489 * nopowr nrldr modez liqlev iaxcnd
2490 * 1 1 1 0 0
2491 * idbci idco
2492 * 0 2
2493 * width ipatch
2494 * 1.40167 0
2495 * nrods nodes irftr nzmax irftr2
2496 * 2 1 0 5 0
2497 * dtxht(1) dtxht(2) dznht hgapo shelv
2498 * 3.0000e+00 1.0000e+01 0.0000e+00 0.0000e+00 1.7190e+00
2499 * nhcomo * f 1e
2500 * nhcelo * -4 4 5e
2501 * dz * f 2.4050e-01e
2502 * grav * f 1.0000e+00e
2503 * idrod * 9 10 e
2504 * rdx * f 1.0000e+00e
2505 * radrd * f 6.6764e-02e
2506 * matrdr * f 6e
2507 * nfax * f 1e
2508 * rftn * f 3.930e+02e
2509 * rftn * f 3.930e+02e
2510 *
2511 *****
2512 * Slab for PV Level 4, cell 11
2513 *****
2514 * type num id ctitle
2515 slab 970 $970$ slab level 4, cell 11
2516 * ncrx ncrz
2517 * 1 1
2518 * nopowr nrldr modez liqlev iaxcnd
2519 * 1 1 1 0 0
2520 * idbci idco
2521 * 0 2
2522 * width ipatch
2523 * 7.4345e-01 0
2524 * nrods nodes irftr nzmax irftr2
2525 * 1 1 0 5 0
2526 * dtxht(1) dtxht(2) dznht hgapo shelv
2527 * 3.0000e+00 1.0000e+01 0.0000e+00 0.0000e+00 1.7190e+00
2528 * nhcomo * f 1e
2529 * nhcelo * -4 4 5e
2530 * dz * f 2.4050e-01e
2531 * grav * f 1.0000e+00e
2532 * idrod * 11e
2533 * rdx * f 1.0000e+00e
2534 * radrd * f 6.8990e-02e
2535 * matrdr * f 6e
2536 * nfax * f 1e
2537 * rftn * f 3.930e+02e
2538 *****
2539 * Slab for PV Level 4, cell 12
2540 *****
2541 * type num id ctitle
2542 slab 969 $969$ slab level 4, cell 12
2543 * ncrx ncrz
2544 * 1 1
2545 * nopowr nrldr modez liqlev iaxcnd
2546 * 1 1 1 0 0
2547 * idbci idco
2548 * 0 2
2549 * width ipatch
2550 * 7.4345e-01 0
2551 * nrods nodes irftr nzmax irftr2
2552 * 1 1 0 5 0
2553 * dtxht(1) dtxht(2) dznht hgapo shelv
2554 * 3.0000e+00 1.0000e+01 0.0000e+00 0.0000e+00 1.7190e+00
2555 * nhcomo * f 1e
2556 * nhcelo * -4 4 5e
2557 * dz * f 2.4050e-01e
2558 * grav * f 1.0000e+00e
2559 * idrod * 12e
2560 * rdx * f 1.0000e+00e
2561 * radrd * f 9.6548e-02e
2562 * matrdr * f 6e
2563 * nfax * f 1e
2564 * rftn * f 3.930e+02e
2565 *
2566 *****
2567 * Slab for PV Levels 5-8, cells 9 and 10
2568 *****
2569 * type num id ctitle

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2570 slab      967      967 $967$ slab levels 5-8, cells 9-10
2571 *        ncrx      ncrz
2572 *          2          4
2573 *        nopowr      nridr      modez      liqlev      iaxcnd
2574 *          1          1          1          0          0
2575 *        idbci      idco
2576 *          0          2
2577 *        width      ipatch
2578 * 1.24692      0
2579 *        nrods      nodes      irftr      nzmax      irftr2
2580 *          2          1          0          9          0
2581 *        dtxht(1)      dtxht(2)      dznht      hgapo      shelv
2582 * 3.0000e+00      1.0000e+01      0.0000e+00      0.0000e+00      1.9595e+00
2583 * nhcomo * f      1e
2584 * nhcelo *      -5      5      6      7      8 s
2585 * nhcelo *      9 e
2586 * dz * f      6.6500e-01e
2587 * grav * f      1.0000e+00e
2588 * idrod *      9      10 e
2589 * rdx * f      1.0000e+00e
2590 * radrd * f      6.7240e-02e
2591 * matrdr * f      6e
2592 * nfax * f      1e
2593 * rftn * f      3.930e+02e
2594 * rftn * f      3.930e+02e
2595 *
2596 *****
2597 * Slab for PV Levels 5-8, cell 11
2598 *****
2599 *      type      num      id      cttitle
2600 slab      965      965 $965$ slab levels 5-8, cell 11
2601 *        ncrx      ncrz
2602 *          1          4
2603 *        nopowr      nridr      modez      liqlev      iaxcnd
2604 *          1          1          1          0          0
2605 *        idbci      idco
2606 *          0          2
2607 *        width      ipatch
2608 * 7.1015e-01      0
2609 *        nrods      nodes      irftr      nzmax      irftr2
2610 *          1          1          0          13          0
2611 *        dtxht(1)      dtxht(2)      dznht      hgapo      shelv
2612 * 3.0000e+00      1.0000e+01      0.0000e+00      0.0000e+00      1.9595e+00
2613 * nhcomo * f      1e
2614 * nhcelo *      -5      5      6      7      8 s
2615 * nhcelo *      9 e
2616 * dz * f      6.6500e-01e
2617 * grav * f      1.0000e+00e
2618 * idrod *      11e
2619 * rdx * f      1.0000e+00e
2620 * radrd * f      7.1306e-02e
2621 * matrdr * f      6e
2622 * nfax * f      1e
2623 * rftn * f      3.930e+02e
2624 *
2625 *****
2626 * Slab for PV Levels 5-8, cell 12
2627 *****
2628 *      type      num      id      cttitle
2629 slab      964      964 $964$ slab levels 5-8, cell 12
2630 *        ncrx      ncrz
2631 *          1          4
2632 *        nopowr      nridr      modez      liqlev      iaxcnd
2633 *          1          1          1          0          0
2634 *        idbci      idco
2635 *          0          2
2636 *        width      ipatch
2637 * 7.1015e-01      0
2638 *        nrods      nodes      irftr      nzmax      irftr2
2639 *          1          1          0          15          0
2640 *        dtxht(1)      dtxht(2)      dznht      hgapo      shelv
2641 * 3.0000e+00      1.0000e+01      0.0000e+00      0.0000e+00      1.9595e+00
2642 * nhcomo * f      1e
2643 * nhcelo *      -5      5      6      7      8 s
2644 * nhcelo *      9 e
2645 * dz * f      6.6500e-01e
2646 * grav * f      1.0000e+00e
2647 * idrod *      12e
2648 * rdx * f      1.0000e+00e
2649 * radrd * f      9.9760e-02e
2650 * matrdr * f      6e
2651 * nfax * f      1e
2652 * rftn * f      3.930e+02e
2653 *
2654 *****
2655 * Slab for PV Level 9, cells 9 and 10
2656 *****
2657 *      type      num      id      cttitle
2658 slab      947      947 $947$ slab level 9, cells 9-10
2659 *        ncrx      ncrz
2660 *          2          1
2661 *        nopowr      nridr      modez      liqlev      iaxcnd

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2662 *          1          1          1          0          0
2663 *      idbci          idco
2664 *          0          2
2665 *      width          ipatch
2666 *      1.45165          0
2667 *      nrods          nodes          irftr          nzmax          irftr2
2668 *          2          1          0          5          0
2669 *      dtxht(1)          dtxht(2)          dznht          hgapo          shelv
2670 *      3.0000e+00          1.0000e+01          0.0000e+00          0.0000e+00          4.6195e+00
2671 *      nhcomo * f          1e
2672 *      nhcelo *          -9          9          10e
2673 *      dz * f          7.1250e-01e
2674 *      grav * f          1.0000e+00e
2675 *      idrod *          9          10 e
2676 *      rdx *          0.35831          0.64169 e
2677 *      radrd * f          6.7970e-02e
2678 *      matrdr * f          6e
2679 *      nfax * f          1e
2680 *      rftn * f          3.930e+02e
2681 *      rftn * f          3.930e+02e
2682 *
2683 *****
2684 * Slab for PV Level 9, cell 11
2685 *****
2686 *      type          num          id          ctitle
2687 slab          945          945 $945$ slab level 9, cell 11
2688 *      ncrx          ncrz
2689 *          1          1
2690 *      nopowr          nrldr          modez          liqlev          iaxcnd
2691 *          1          1          1          0          0
2692 *      idbci          idco
2693 *          0          2
2694 *      width          ipatch
2695 *      7.5663e-01          0
2696 *      nrods          nodes          irftr          nzmax          irftr2
2697 *          1          1          0          5          0
2698 *      dtxht(1)          dtxht(2)          dznht          hgapo          shelv
2699 *      3.0000e+00          1.0000e+01          0.0000e+00          0.0000e+00          4.6195e+00
2700 *      nhcomo * f          1e
2701 *      nhcelo *          -9          9          10e
2702 *      dz * f          7.1250e-01e
2703 *      grav * f          1.0000e+00e
2704 *      idrod *          11e
2705 *      rdx * f          1.0000e+00e
2706 *      radrd * f          7.1472e-02e
2707 *      matrdr * f          6e
2708 *      nfax * f          1e
2709 *      rftn * f          3.930e+02e
2710 *
2711 *****
2712 * Slab for PV Level 9, cell 12
2713 *****
2714 *      type          num          id          ctitle
2715 slab          944          944 $944$ slab level 9, cell 12
2716 *      ncrx          ncrz
2717 *          1          1
2718 *      nopowr          nrldr          modez          liqlev          iaxcnd
2719 *          1          1          1          0          0
2720 *      idbci          idco
2721 *          0          2
2722 *      width          ipatch
2723 *      7.5663e-01          0
2724 *      nrods          nodes          irftr          nzmax          irftr2
2725 *          1          1          0          5          0
2726 *      dtxht(1)          dtxht(2)          dznht          hgapo          shelv
2727 *      3.0000e+00          1.0000e+01          0.0000e+00          0.0000e+00          4.6195e+00
2728 *      nhcomo * f          1e
2729 *      nhcelo *          -9          9          10e
2730 *      dz * f          7.1250e-01e
2731 *      grav * f          1.0000e+00e
2732 *      idrod *          12e
2733 *      rdx * f          1.0000e+00e
2734 *      radrd * f          9.9996e-02e
2735 *      matrdr * f          6e
2736 *      nfax * f          1e
2737 *      rftn * f          3.930e+02e
2738 *
2739 *****
2740 * Slab for PV Level 10, cells 1 & 3
2741 *****
2742 *      type          num          id          ctitle
2743 slab          943          943 $943$ slab level 10, cells 1 and 3
2744 *      ncrx          ncrz
2745 *          2          1
2746 *      nopowr          nrldr          modez          liqlev          iaxcnd
2747 *          1          1          1          0          0
2748 *      idbci          idco
2749 *          0          2
2750 *      width          ipatch
2751 *      7.6418e-01          0
2752 *      nrods          nodes          irftr          nzmax          irftr2
2753 *          2          1          0          5          0

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2754 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
2755 * 3.0000e+00      1.0000e+01      0.0000e+00      0.0000e+00      5.3320e+00
2756 * nhcomo * f      1e
2757 * nhcelo *      -10      10      11e
2758 * dz * f      4.1600e-01e
2759 * grav * f      1.0000e+00e
2760 * idrod *      1      3e
2761 * rdx * f      1.0000e+00e
2762 * radrd * f      1.0237e-02e
2763 * matrdr * f      6e
2764 * nfax * f      1e
2765 * rftn * f      3.930e+02e
2766 * rftn * f      3.930e+02e
2767 *
2768 *****
2769 * Slab for FV Level 10, cell 2
2770 *****
2771 *      type      num      id      ctitle
2772 slab      942      942 $942$ slab level 10, cell 2
2773 *      ncrx      ncrz
2774 *      1      1
2775 *      nopowr      nrldr      modez      liqlev      iaxcnd
2776 *      1      1      1      0      0
2777 *      idbci      idco
2778 *      0      2
2779 *      width      ipatch
2780 * 4.7813e-01      0
2781 *      nrods      nodes      irftr      nzmax      irftr2
2782 *      1      1      0      5      0
2783 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
2784 * 3.0000e+00      1.0000e+01      0.0000e+00      0.0000e+00      5.3320e+00
2785 * nhcomo * f      1e
2786 * nhcelo *      -10      10      11e
2787 * dz * f      4.1600e-01e
2788 * grav * f      1.0000e+00e
2789 * idrod *      2e
2790 * rdx * f      1.0000e+00e
2791 * radrd * f      1.4115e-02e
2792 * matrdr * f      6e
2793 * nfax * f      1e
2794 * rftn * f      3.930e+02e
2795 *
2796 *****
2797 * Slab for FV Level 10, cells 4, 5, & 8
2798 *****
2799 *      type      num      id      ctitle
2800 slab      941      941 $941$ slab level 10, cells 4, 5, and 8
2801 *      ncrx      ncrz
2802 *      3      1
2803 *      nopowr      nrldr      modez      liqlev      iaxcnd
2804 *      1      1      1      0      0
2805 *      idbci      idco
2806 *      0      2
2807 *      width      ipatch
2808 * 4.8173e-01      0
2809 *      nrods      nodes      irftr      nzmax      irftr2
2810 *      3      1      0      5      0
2811 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
2812 * 3.0000e+00      1.0000e+01      0.0000e+00      0.0000e+00      5.3320e+00
2813 * nhcomo * f      1e
2814 * nhcelo *      -10      10      11e
2815 * dz * f      4.1600e-01e
2816 * grav * f      1.0000e+00e
2817 * idrod *      4      5      8e
2818 * rdx * f      1.0000e+00e
2819 * radrd * f      1.4459e-02e
2820 * matrdr * f      6e
2821 * nfax * f      1e
2822 * rftn * f      3.930e+02e
2823 *
2824 * rftn * f      3.930e+02e
2825 * rftn * f      3.930e+02e
2826 *****
2827 * Slab for FV Level 10, cell 6
2828 *****
2829 *      type      num      id      ctitle
2830 slab      940      940 $940$ slab level 10, cell 6
2831 *      ncrx      ncrz
2832 *      1      1
2833 *      nopowr      nrldr      modez      liqlev      iaxcnd
2834 *      1      1      1      0      0
2835 *      idbci      idco
2836 *      0      2
2837 *      width      ipatch
2838 * 4.7813e-01      0
2839 *      nrods      nodes      irftr      nzmax      irftr2
2840 *      1      1      0      5      0
2841 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
2842 * 3.0000e+00      1.0000e+01      0.0000e+00      0.0000e+00      5.3320e+00
2843 * nhcomo * f      1e
2844 * nhcelo *      -10      10      11e
2845 * dz * f      4.1600e-01e

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2846 * grav * f 1.0000e+00e
2847 * idrod * f 6e
2848 * rdx * f 1.0000e+00e
2849 * radrd * f 1.4115e-02e
2850 * matrd * f 6e
2851 * nfax * f 1e
2852 * rftn * f 3.930e+02e
2853 *
2854 *****
2855 * Slab for PV Level 10, cell 7
2856 *****
2857 * type num id ctitle
2858 slab 939 939 $939$ slab level 10, cell 7
2859 * ncrx ncrz
2860 * 1 1
2861 * nopowr nridr modez liqlev iaxcmd
2862 * 1 1 1 0 0
2863 * idbci idco
2864 * 0 2
2865 * width ipatch
2866 * 6.0337e-01 0
2867 * nrods nodes irftr nzmax irftr2
2868 * 1 1 0 5 0
2869 * dtxht(1) dtxht(2) dznht hgapo shelv
2870 * 3.0000e+00 1.0000e+01 0.0000e+00 0.0000e+00 5.3320e+00
2871 * nhcomo * f 1e
2872 * nhcelo * -10 10 11e
2873 * dz * f 4.1600e-01e
2874 * grav * f 1.0000e+00e
2875 * idrod * f 7e
2876 * rdx * f 1.0000e+00e
2877 * radrd * f 1.2600e-02e
2878 * matrd * f 6e
2879 * nfax * f 1e
2880 * rftn * f 3.930e+02e
2881 *
2882 *****
2883 * Slab for PV Level 10, cell 9
2884 *****
2885 * type num id ctitle
2886 slab 938 938 $938$ slab level 10, cell 9
2887 * ncrx ncrz
2888 * 1 1
2889 * nopowr nridr modez liqlev iaxcmd
2890 * 1 1 1 0 0
2891 * idbci idco
2892 * 0 2
2893 * width ipatch
2894 * 3.2332e-01 0
2895 * nrods nodes irftr nzmax irftr2
2896 * 1 1 0 5 0
2897 * dtxht(1) dtxht(2) dznht hgapo shelv
2898 * 3.0000e+00 1.0000e+01 0.0000e+00 0.0000e+00 5.3320e+00
2899 * nhcomo * f 1e
2900 * nhcelo * -10 10 11e
2901 * dz * f 4.1600e-01e
2902 * grav * f 1.0000e+00e
2903 * idrod * f 9e
2904 * rdx * f 1.0000e+00e
2905 * radrd * f 5.9994e-03e
2906 * matrd * f 6e
2907 * nfax * f 1e
2908 * rftn * f 3.930e+02e
2909 *
2910 *****
2911 * Slab for PV Level 10, cell 10
2912 *****
2913 * type num id ctitle
2914 slab 937 937 $937$ slab level 10, cell 10
2915 * ncrx ncrz
2916 * 1 1
2917 * nopowr nridr modez liqlev iaxcmd
2918 * 1 1 1 0 0
2919 * idbci idco
2920 * 0 2
2921 * width ipatch
2922 * 6.0377e-01 0
2923 * nrods nodes irftr nzmax irftr2
2924 * 1 1 0 5 0
2925 * dtxht(1) dtxht(2) dznht hgapo shelv
2926 * 3.0000e+00 1.0000e+01 0.0000e+00 0.0000e+00 5.3320e+00
2927 * nhcomo * f 1e
2928 * nhcelo * -10 10 11e
2929 * dz * f 4.1600e-01e
2930 * grav * f 1.0000e+00e
2931 * idrod * f 10e
2932 * rdx * f 1.0000e+00e
2933 * radrd * f 5.9994e-03e
2934 * matrd * f 6e
2935 * nfax * f 1e
2936 * rftn * f 3.930e+02e
2937 *

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2938 *****
2939 * Slab for PV Level 11, cells 1 & 6
2940 *****
2941 *      type      num      id      ctitle
2942 slab      936      936 $936$ slab level 11, cells 1 and 6
2943 *      ncrx      ncrz
2944 *      2          1
2945 *      nopowr    nridr      modez      liqlev      iaxcnd
2946 *      1          1          1          0          0
2947 *      idbci      idco
2948 *      0          2
2949 *      width      ipatch
2950 *      1.7029e-01  0
2951 *      nrods      nodes      irftr      nzmax      irftr2
2952 *      2          1          0          5          0
2953 *      dtxht(1)  dtxht(2)  dznht      hgapo      shelv
2954 *      3.0000e+00  1.0000e+01  0.0000e+00  0.0000e+00  5.7480e+00
2955 *      nhcomo * f      1e
2956 *      nhcelo *      -11      11      12e
2957 *      dz * f      5.8900e-01e
2958 *      grav * f      1.0000e+00e
2959 *      idrod *      1          6e
2960 *      rdx * f      1.0000e+00e
2961 *      radrd * f      1.4300e-02e
2962 *      matrd * f      6e
2963 *      nfax * f      1e
2964 *      rftn * f      3.930e+02e
2965 *      rftn * f      3.930e+02e
2966 *
2967 *****
2968 * Slab for PV Level 11, cells 2 & 4
2969 *****
2970 *      type      num      id      ctitle
2971 slab      935      935 $935$ slab level 11, cells 2 and 4
2972 *      ncrx      ncrz
2973 *      2          1
2974 *      nopowr    nridr      modez      liqlev      iaxcnd
2975 *      1          1          1          0          0
2976 *      idbci      idco
2977 *      0          2
2978 *      width      ipatch
2979 *      3.3277e-02  0
2980 *      nrods      nodes      irftr      nzmax      irftr2
2981 *      2          1          0          5          0
2982 *      dtxht(1)  dtxht(2)  dznht      hgapo      shelv
2983 *      3.0000e+00  1.0000e+01  0.0000e+00  0.0000e+00  5.7480e+00
2984 *      nhcomo * f      1e
2985 *      nhcelo *      -11      11      12e
2986 *      dz * f      5.8900e-01e
2987 *      grav * f      1.0000e+00e
2988 *      idrod *      2          4e
2989 *      rdx * f      1.0000e+00e
2990 *      radrd * f      3.0000e-02e
2991 *      matrd * f      6e
2992 *      nfax * f      1e
2993 *      rftn * f      3.930e+02e
2994 *      rftn * f      3.930e+02e
2995 *
2996 *****
2997 * Slab for PV Level 11, cells 3, & 5
2998 *****
2999 *      type      num      id      ctitle
3000 slab      934      934 $934$ slab level 11, cells 3 and 5
3001 *      ncrx      ncrz
3002 *      2          1
3003 *      nopowr    nridr      modez      liqlev      iaxcnd
3004 *      1          1          1          0          0
3005 *      idbci      idco
3006 *      0          2
3007 *      width      ipatch
3008 *      8.6944e-01  0
3009 *      nrods      nodes      irftr      nzmax      irftr2
3010 *      2          1          0          5          0
3011 *      dtxht(1)  dtxht(2)  dznht      hgapo      shelv
3012 *      3.0000e+00  1.0000e+01  0.0000e+00  0.0000e+00  5.7480e+00
3013 *      nhcomo * f      1e
3014 *      nhcelo *      -11      11      12e
3015 *      dz * f      5.8900e-01e
3016 *      grav * f      1.0000e+00e
3017 *      idrod *      3          5e
3018 *      rdx * f      1.0000e+00e
3019 *      radrd * f      6.2000e-02e
3020 *      matrd * f      6e
3021 *      nfax * f      1e
3022 *      rftn * f      3.930e+02e
3023 *      rftn * f      3.930e+02e
3024 *
3025 *****
3026 * Slab for PV Level 11, cell 7
3027 *****
3028 *      type      num      id      ctitle
3029 slab      933      933 $933$ slab level 11, cell 7

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3030 *      ncrx      ncrz
3031      1          1
3032 *      nopowr   nridr      modez      liqlev      iaxcnd
3033      1          1          1          0          0
3034 *      idbci      idco
3035      0          2
3036 *      width      ipatch
3037      7.8217e-01  0
3038 *      nrods      nodes      irftr      nzmax      irftr2
3039      1          1          0          5          0
3040 *      dtxht(1)   dtxht(2)   dznht      hgapo      shelv
3041      3.0000e+00  1.0000e+01  0.0000e+00  0.0000e+00  5.7480e+00
3042 * nhcomo * f      1e
3043 * nhcelo *      -11          11          12e
3044 * dz * f      5.8900e-01e
3045 * grav * f      1.0000e+00e
3046 * idrod *      7e
3047 * rdx * f      1.0000e+00e
3048 * radrd * f      8.2000e-03e
3049 * matr * f      6e
3050 * nfax * f      1e
3051 * rftn * f      3.930e+02e
3052 *
3053 *****
3054 * Slab for PV Level 11, cell 8
3055 *****
3056 *      type      num      id      ctitle
3057 slab      910      910 $910$ slab level 11, cell 8
3058 *      ncrx      ncrz
3059      1          1
3060 *      nopowr   nridr      modez      liqlev      iaxcnd
3061      1          1          1          0          0
3062 *      idbci      idco
3063      0          2
3064 *      width      ipatch
3065      3.3277e-02  0
3066 *      nrods      nodes      irftr      nzmax      irftr2
3067      1          1          0          5          0
3068 *      dtxht(1)   dtxht(2)   dznht      hgapo      shelv
3069      3.0000e+00  1.0000e+01  0.0000e+00  0.0000e+00  5.7480e+00
3070 * nhcomo * f      1e
3071 * nhcelo *      -11          11          12e
3072 * dz * f      5.8900e-01e
3073 * grav * f      1.0000e+00e
3074 * idrod *      8e
3075 * rdx * f      1.0000e+00e
3076 * radrd * f      3.0000e-02e
3077 * matr * f      6e
3078 * nfax * f      1e
3079 * rftn * f      3.930e+02e
3080 *
3081 *****
3082 * Slab for PV Level 11, cells 9 and 10
3083 *****
3084 *      type      num      id      ctitle
3085 slab      932      932 $932$ slab level 11, cell 9 and 10
3086 *      ncrx      ncrz
3087      2          1
3088 *      nopowr   nridr      modez      liqlev      iaxcnd
3089      1          1          1          0          0
3090 *      idbci      idco
3091      0          2
3092 *      width      ipatch
3093      0.229883    0
3094 *      nrods      nodes      irftr      nzmax      irftr2
3095      2          1          0          5          0
3096 *      dtxht(1)   dtxht(2)   dznht      hgapo      shelv
3097      3.0000e+00  1.0000e+01  0.0000e+00  0.0000e+00  5.7480e+00
3098 * nhcomo * f      1e
3099 * nhcelo *      -11          11          12e
3100 * dz * f      5.8900e-01e
3101 * grav * f      1.0000e+00e
3102 * idrod *      9      10 e
3103 * rdx * 0.358195  0.641805 e
3104 * radrd * f      4.7730e-01e
3105 * matr * f      6e
3106 * nfax * f      1e
3107 * rftn * f      3.930e+02e
3108 * rftn * f      3.930e+02e
3109 *
3110 *****
3111 *****
3112 * Slab for PV Level 12, cells 1 - 8
3113 *****
3114 *      type      num      id      ctitle
3115 slab      930      930 $930$ slab level 12, cells 1-8
3116 *      ncrx      ncrz
3117      8          1
3118 *      nopowr   nridr      modez      liqlev      iaxcnd
3119      1          1          1          0          0
3120 *      idbci      idco
3121      0          2

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3122 *          width          ipatch
3123 * 4.3668e-01              0
3124 *          nrods          nodes          irftr          nzmax          irftr2
3125 *          8              1              0              5              0
3126 *          dtxht(1)      dtxht(2)      dznht          hgapo          shelv
3127 * 3.0000e+00          1.0000e+01      0.0000e+00      0.0000e+00      6.3370e+00
3128 * nhcomo * f              1e
3129 * nhcelo *                  -12              12              13e
3130 * dz * f              4.8500e-01e
3131 * grav * f              1.0000e+00e
3132 * idrod *                  1
3133 *                  5              6              7              4s
3134 * rdx * f              1.0000e+00e
3135 * radrd * f              1.2000e-02e
3136 * matrdr * f              6e
3137 * nfax * f              1e
3138 * rftn * f              3.930e+02e
3139 * rftn * f              3.930e+02e
3140 * rftn * f              3.930e+02e
3141 * rftn * f              3.930e+02e
3142 * rftn * f              3.930e+02e
3143 * rftn * f              3.930e+02e
3144 * rftn * f              3.930e+02e
3145 * rftn * f              3.930e+02e
3146 *
3147 *****
3148 * Slab for PV Level 12, cells 9 and 10
3149 *****
3150 *          type          num          id          ctitle
3151 * slab          929          929 $929$ slab level 12, cells 9 and 10
3152 *          ncrx          ncrz
3153 *          2              1
3154 *          nopowr          nrldr          modez          liqlev          iaxcnd
3155 *          1              1              1              0              0
3156 *          idbci          idco
3157 *          0              2
3158 *          width          ipatch
3159 * 0.12002              0
3160 *          nrods          nodes          irftr          nzmax          irftr2
3161 *          2              1              0              5              0
3162 *          dtxht(1)      dtxht(2)      dznht          hgapo          shelv
3163 * 3.0000e+00          1.0000e+01      0.0000e+00      0.0000e+00      6.3370e+00
3164 * nhcomo * f              1e
3165 * nhcelo *                  -12              12              13e
3166 * dz * f              4.8500e-01e
3167 * grav * f              1.0000e+00e
3168 * idrod *          9          10 e
3169 * rdx * 0.35836          0.64164 e
3170 * radrd * f              5.9994e-03e
3171 * matrdr * f              6e
3172 * nfax * f              1e
3173 * rftn * f              3.930e+02e
3174 * rftn * f              3.930e+02e
3175 *
3176 *****
3177 * Slab for PV Level 12, cell 11 & 12
3178 *****
3179 *          type          num          id          ctitle
3180 * slab          927          927 $927$ slab level 12, cells 11 and 12
3181 *          ncrx          ncrz
3182 *          2              1
3183 *          nopowr          nrldr          modez          liqlev          iaxcnd
3184 *          1              1              1              0              0
3185 *          idbci          idco
3186 *          0              2
3187 *          width          ipatch
3188 * 3.1699e-01              0
3189 *          nrods          nodes          irftr          nzmax          irftr2
3190 *          2              1              0              5              0
3191 *          dtxht(1)      dtxht(2)      dznht          hgapo          shelv
3192 * 3.0000e+00          1.0000e+01      0.0000e+00      0.0000e+00      6.3370e+00
3193 * nhcomo * f              1e
3194 * nhcelo *                  -12              12              13e
3195 * dz * f              4.8500e-01e
3196 * grav * f              1.0000e+00e
3197 * idrod *                  11
3198 * rdx * f              1.0000e+00e
3199 * radrd * f              5.9998e-03e
3200 * matrdr * f              6e
3201 * nfax * f              1e
3202 * rftn * f              3.930e+02e
3203 * rftn * f              3.930e+02e
3204 *
3205 *****
3206 * Slab for PV Level 13, cells 1 - 8
3207 *****
3208 *          type          num          id          ctitle
3209 * slab          926          926 $926$ slab level 13, cells 1-8
3210 *          ncrx          ncrz
3211 *          7              1
3212 *          nopowr          nrldr          modez          liqlev          iaxcnd
3213 *          1              1              1              0              0

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3214 *      idbci      idco
3215 *      width      0      2
3216 *      ipatch
3217 *      4.3668e-01  0
3218 *      nrods      nodes      irftr      nzmax      irftr2
3219 *      7          1          0          5          0
3220 *      dtxht(1)   dtxht(2)   dznht      hgapo      shelv
3221 *      3.0000e+00  1.0000e+01  0.0000e+00  0.0000e+00  6.8220e+00
3222 * nhcomo * f      1e
3223 * nhcelo * f      -13      13      14e
3224 * dz * f      7.3700e-01e
3225 * grav * f      1.0000e+00e
3226 * idrod * f      1          2          3          4s
3227 *          5          6          7e
3228 * rdx * f      1.0000e+00e
3229 * radrd * f      1.2000e-02e
3230 * matrdr * f      6e
3231 * nfax * f      1e
3232 * rftn * f      3.930e+02e
3233 * rftn * f      3.930e+02e
3234 * rftn * f      3.930e+02e
3235 * rftn * f      3.930e+02e
3236 * rftn * f      3.930e+02e
3237 * rftn * f      3.930e+02e
3238 * rftn * f      3.930e+02e
3239 *
3240 *****
3241 * Slab for PV Level 13, cells 9-12
3242 *****
3243 *      type      num      id      ctitle
3244 slab      925      925 $925$ slab level 13, cells 9-12
3245 *      ncrx      ncrz
3246 *      4          1
3247 *      nopowr      nrldr      modez      liqlv      iaxcnd
3248 *      1          1          1          0          0
3249 *      idbci      idco
3250 *      0          2
3251 *      width      ipatch
3252 *      0.754014  0
3253 *      nrods      nodes      irftr      nzmax      irftr2
3254 *      4          1          0          5          0
3255 *      dtxht(1)   dtxht(2)   dznht      hgapo      shelv
3256 *      3.0000e+00  1.0000e+01  0.0000e+00  0.0000e+00  6.8220e+00
3257 * nhcomo * f      1e
3258 * nhcelo * f      -13      13      14e
3259 * dz * f      7.3700e-01e
3260 * grav * f      1.0000e+00e
3261 * idrod * f      9      10      11      12 e
3262 * rdx * 0.05702  0.10214  0.42042  0.42042 e
3263 * radrd * f      5.9994e-03e
3264 * matrdr * f      6e
3265 * nfax * f      1e
3266 * rftn * f      3.930e+02e
3267 * rftn * f      3.930e+02e
3268 * rftn * f      3.930e+02e
3269 * rftn * f      3.930e+02e
3270 *
3271 *****
3272 * Slab for PV Level 14, cells 1, 3, 5 - 7
3273 *****
3274 *      type      num      id      ctitle
3275 slab      922      922 $922$ slab level 14, cells 1,3,5-7
3276 *      ncrx      ncrz
3277 *      5          1
3278 *      nopowr      nrldr      modez      liqlv      iaxcnd
3279 *      1          1          1          0          0
3280 *      idbci      idco
3281 *      0          2
3282 *      width      ipatch
3283 *      4.3668e-01  0
3284 *      nrods      nodes      irftr      nzmax      irftr2
3285 *      5          1          0          5          0
3286 *      dtxht(1)   dtxht(2)   dznht      hgapo      shelv
3287 *      3.0000e+00  1.0000e+01  0.0000e+00  0.0000e+00  7.5590e+00
3288 * nhcomo * f      1e
3289 * nhcelo * f      -14      14      15e
3290 * dz * f      4.3700e-01e
3291 * grav * f      1.0000e+00e
3292 * idrod * f      1          3          5          6s
3293 *          7e
3294 * rdx * f      1.0000e+00e
3295 * radrd * f      1.2000e-02e
3296 * matrdr * f      6e
3297 * nfax * f      1e
3298 * rftn * f      3.930e+02e
3299 * rftn * f      3.930e+02e
3300 * rftn * f      3.930e+02e
3301 * rftn * f      3.930e+02e
3302 * rftn * f      3.930e+02e
3303 *
3304 *****
3305 * Slab for PV Level 14, cells 2, 4, & 8

```

```

3306 *****
3307 *      type      num      id      ctitle
3308 slab      921      921 $921$ slab level 14, cells 2,4,8
3309 *      ncrx      ncrz
3310 *      3          1
3311 *      nopowr      nridr      modez      liqlev      iaxcnd
3312 *      1          1          1          0          0
3313 *      idbci      idco
3314 *      0          2
3315 *      width      ipatch
3316 *      1.9481e+00      0
3317 *      nrods      nodes      irftr      nzmax      irftr2
3318 *      3          1          0          5          0
3319 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
3320 *      3.0000e+00      1.0000e+01      0.0000e+00      0.0000e+00      7.5590e+00
3321 * nhcomo * f      1e
3322 * nhcelo *      -14          14          15e
3323 * dz * f      4.3700e-01e
3324 * grav * f      1.0000e+00e
3325 * idrod *      2          4          8e
3326 * rdx * f      1.0000e+00e
3327 * radrd * f      3.0000e-02e
3328 * matrdr * f      6e
3329 * nfax * f      1e
3330 * rftn * f      3.930e+02e
3331 * rftn * f      3.930e+02e
3332 * rftn * f      3.930e+02e
3333 *
3334 *****
3335 * Slab for PV Level 14, cells 9-12
3336 *****
3337 *      type      num      id      ctitle
3338 slab      920      920 $920$ slab level 14, cells 9-12
3339 *      ncrx      ncrz
3340 *      4          1
3341 *      nopowr      nridr      modez      liqlev      iaxcnd
3342 *      1          1          1          0          0
3343 *      idbci      idco
3344 *      0          2
3345 *      width      ipatch
3346 *      0.7540      0
3347 *      nrods      nodes      irftr      nzmax      irftr2
3348 *      4          1          0          5          0
3349 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
3350 *      3.0000e+00      1.0000e+01      0.0000e+00      0.0000e+00      7.5590e+00
3351 * nhcomo * f      1e
3352 * nhcelo *      -14          14          15e
3353 * dz * f      4.3700e-01e
3354 * grav * f      1.0000e+00e
3355 * idrod * 9 10 11 12 e
3356 * rdx * 0.05703 0.10213 0.42042 0.42042 e
3357 * radrd * f      5.9994e-03e
3358 * matrdr * f      6e
3359 * nfax * f      1e
3360 * rftn * f      3.930e+02e
3361 * rftn * f      3.930e+02e
3362 * rftn * f      3.930e+02e
3363 * rftn * f      3.930e+02e
3364 *
3365 *****
3366 * Slab for PV Level 15, cells 1-12
3367 *****
3368 *      type      num      id      ctitle
3369 slab      917      917 $917$ slab level 15, cells 1-12
3370 *      ncrx      ncrz
3371 *      12         1
3372 *      nopowr      nridr      modez      liqlev      iaxcnd
3373 *      1          1          1          0          0
3374 *      idbci      idco
3375 *      0          2
3376 *      width      ipatch
3377 *      8.43332      0
3378 *      nrods      nodes      irftr      nzmax      irftr2
3379 *      12         1          0          5          0
3380 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
3381 *      3.0000e+00      1.0000e+01      0.0000e+00      0.0000e+00      7.9960e+00
3382 * nhcomo * f      1e
3383 * nhcelo *      -15          15          16e
3384 * dz * f      6.6100e-01e
3385 * grav * f      1.0000e+00e
3386 * idrod * 1 2 3 4 5 s
3387 * idrod * 6 7 8 9 10 s
3388 * idrod * 11 12 e
3389 * rdx * 0.09605 r7 0.06732 r2 0.12587 0.07611 0.10486 e
3390 * radrd * f      9.7072e-02e
3391 * matrdr * f      6e
3392 * nfax * f      1e
3393 * rftn * f      3.930e+02e
3394 * rftn * f      3.930e+02e
3395 * rftn * f      3.930e+02e
3396 * rftn * f      3.930e+02e
3397 * rftn * f      3.930e+02e

```

```

3398 * rftn * f 3.930e+02e
3399 * rftn * f 3.930e+02e
3400 * rftn * f 3.930e+02e
3401 * rftn * f 3.930e+02e
3402 * rftn * f 3.930e+02e
3403 * rftn * f 3.930e+02e
3404 * rftn * f 3.930e+02e
3405 *
3406 *****
3407 * Slab for S/W Sep. Level 1, cells 1 & 2
3408 *****
3409 * type num id ctitle
3410 slab 908 908 $908$ slab level 1, cells 1-2
3411 * ncrx ncrz
3412 * 2 1
3413 * nopowr nrldr modez liqlev iaxcnd
3414 * 1 1 1 0 0
3415 * idbci idco
3416 * 0 2
3417 * width ipatch
3418 * 2.4802e+00 0
3419 * nrods nodes irftr nzmax irftr2
3420 * 2 1 0 5 0
3421 * dtxht(1) dtxht(2) dznht hgapo shelv
3422 * 3.0000e+00 1.0000e+01 0.0000e+00 0.0000e+00 0.0000e+00
3423 * nhcomo * f 6e
3424 * nhcelo * -1 1 2e
3425 * dz * f 9.5000e-01e
3426 * grav * f 1.0000e+00e
3427 * idrod * 1 2e
3428 * rdx * f 1.0000e+00e
3429 * radrd * 8.0000e-03e
3430 * matrdr * 6e
3431 * nfax * f 1e
3432 * rftn * f 3.930e+02e
3433 * rftn * f 3.930e+02e
3434 *
3435 *****
3436 * Slab for S/W Sep. Level 2, cells 1 & 2
3437 *****
3438 * type num id ctitle
3439 slab 907 907 $907$ slab level 2, cells 1-2
3440 * ncrx ncrz
3441 * 2 1
3442 * nopowr nrldr modez liqlev iaxcnd
3443 * 1 1 1 0 0
3444 * idbci idco
3445 * 0 2
3446 * width ipatch
3447 * 9.9000e-01 0
3448 * nrods nodes irftr nzmax irftr2
3449 * 2 1 0 5 0
3450 * dtxht(1) dtxht(2) dznht hgapo shelv
3451 * 3.0000e+00 1.0000e+01 0.0000e+00 0.0000e+00 9.5000e-01
3452 * nhcomo * f 6e
3453 * nhcelo * -2 2 3e
3454 * dz * f 2.3800e+00e
3455 * grav * f 1.0000e+00e
3456 * idrod * 1 2e
3457 * rdx * f 1.0000e+00e
3458 * radrd * 8.0000e-03e
3459 * matrdr * 6e
3460 * nfax * f 1e
3461 * rftn * f 3.930e+02e
3462 * rftn * f 3.930e+02e
3463 *
3464 *****
3465 * Slab for S/W Sep. Level 3, cell 1
3466 *****
3467 * type num id ctitle
3468 slab 906 906 $906$ slab level 3, cells 1
3469 * ncrx ncrz
3470 * 1 1
3471 * nopowr nrldr modez liqlev iaxcnd
3472 * 1 1 1 0 0
3473 * idbci idco
3474 * 0 2
3475 * width ipatch
3476 * 1.6888e+00 0
3477 * nrods nodes irftr nzmax irftr2
3478 * 1 1 0 5 0
3479 * dtxht(1) dtxht(2) dznht hgapo shelv
3480 * 3.0000e+00 1.0000e+01 0.0000e+00 0.0000e+00 3.3300e+00
3481 * nhcomo * f 6e
3482 * nhcelo * -3 3 4e
3483 * dz * f 1.7300e+00e
3484 * grav * f 1.0000e+00e
3485 * idrod * 1e
3486 * rdx * f 1.0000e+00e
3487 * radrd * 8.0000e-03e
3488 * matrdr * 6e
3489 * nfax * f 1e

```

```

3490 * rftn * f 3.930e+02e
3491 *
3492 *****
3493 * Slab for S/W Sep. Level 3, cell 2
3494 *****
3495 * type num id ctitle
3496 slab 909 909 $909$ slab level 3, cell 2
3497 * ncrx ncrz
3498 * 1 1
3499 * nopowr nridr modez liqlev iaxcnd
3500 * 1 1 1 0 0
3501 * idbci idco
3502 * 0 2
3503 * width ipatch
3504 * 1.0896e+00 0
3505 * nrods nodes irftr nzmax irftr2
3506 * 1 1 0 5 0
3507 * dtxht(1) dtxht(2) dznht hgapo shelv
3508 * 3.0000e+00 1.0000e+01 0.0000e+00 0.0000e+00 3.3300e+00
3509 * nhcomo * f 6e
3510 * nhcelo * -3 3 4e
3511 * dz * f 1.7300e+00e
3512 * grav * f 1.0000e+00e
3513 * idrod * 2e
3514 * rdx * f 1.0000e+00e
3515 * radrd * 8.0000e-03e
3516 * matrdr * 6e
3517 * nfax * f 1e
3518 * rftn * f 3.930e+02e
3519 *
3520 *****
3521 * Slab for S/W Sep. Level 4, cells 1 & 2
3522 *****
3523 * type num id ctitle
3524 slab 905 905 $905$ slab level 4, cells 1-2
3525 * ncrx ncrz
3526 * 2 1
3527 * nopowr nridr modez liqlev iaxcnd
3528 * 1 1 1 0 0
3529 * idbci idco
3530 * 0 2
3531 * width ipatch
3532 * 2.6180e+00 0
3533 * nrods nodes irftr nzmax irftr2
3534 * 2 1 0 5 0
3535 * dtxht(1) dtxht(2) dznht hgapo shelv
3536 * 3.0000e+00 1.0000e+01 0.0000e+00 0.0000e+00 5.0600e+00
3537 * nhcomo * f 6e
3538 * nhcelo * -4 4 5e
3539 * dz * f 9.0000e-01e
3540 * grav * f 1.0000e+00e
3541 * idrod * 1 2e
3542 * rdx * f 1.0000e+00e
3543 * radrd * 8.0000e-03e
3544 * matrdr * 6e
3545 * nfax * f 1e
3546 * rftn * f 3.930e+02e
3547 * rftn * f 3.930e+02e
3548 *
3549 end
3550 *
3551 *****
3552 * time-step data *
3553 *****
3554 *
3555 * dtmin dtmax tend rtwfp
3556 * 1.0000e-06 1.0000e-01 500.000e+00 1.0000e+01
3557 * edint gfint dmpint sedint
3558 * 5.0000e+01 1.0000e+00 5.0000e+01 5.0000e+01
3559 *
3560 * endflag
3561 * -1.0000e+04

```



## APPENDIX V

### EFFECT OF INSULATION MATERIAL PROPERTIES ON HEATER-ROD CLADDING TEMPERATURES

A sensitivity study was performed to determine the effect of different insulation material properties on the heater-rod cladding temperatures. The reason for this study is that the SCTF heater rods has two different insulation materials between the nichrome heating element and the outer cladding as shown in Fig. 5.4-3. Boron nitrate (BN) is used in the center region of the rod while magnesium oxide (MgO) is used in the upper and lower regions of the rod. TRAC can only model one insulation material for the entire length of the heater rod as shown in Fig. 5.4-7. To determine the effect of the insulation material properties on cladding temperature, we performed three sensitivity calculations. Case 1 assumed magnesium oxide for the entire heater rod length. Case 2 assumed boron nitride for the entire heater rod length. Both Cases 1 and 2 used the incorrect six-step axial power shape. Case 3 assumed magnesium oxide but with the correct 17-step axial power shape. We calculated the cladding temperatures for the first 120 s of the test, which is the heatup period of the test. The calculated temperatures are compared to the measured temperature at each of the 10 thermocouple locations along the heater rod as shown in Fig. 5.4-6. Figures V-1 through V-10 present the calculated and measured temperatures for rod bundle 2 and Figs. V-11 through V-20 present the calculated and measured temperatures for rod bundle 8. These comparison plots show that the insulation material had a minor effect on the calculated temperatures and that the axial power shape had a greater effect.

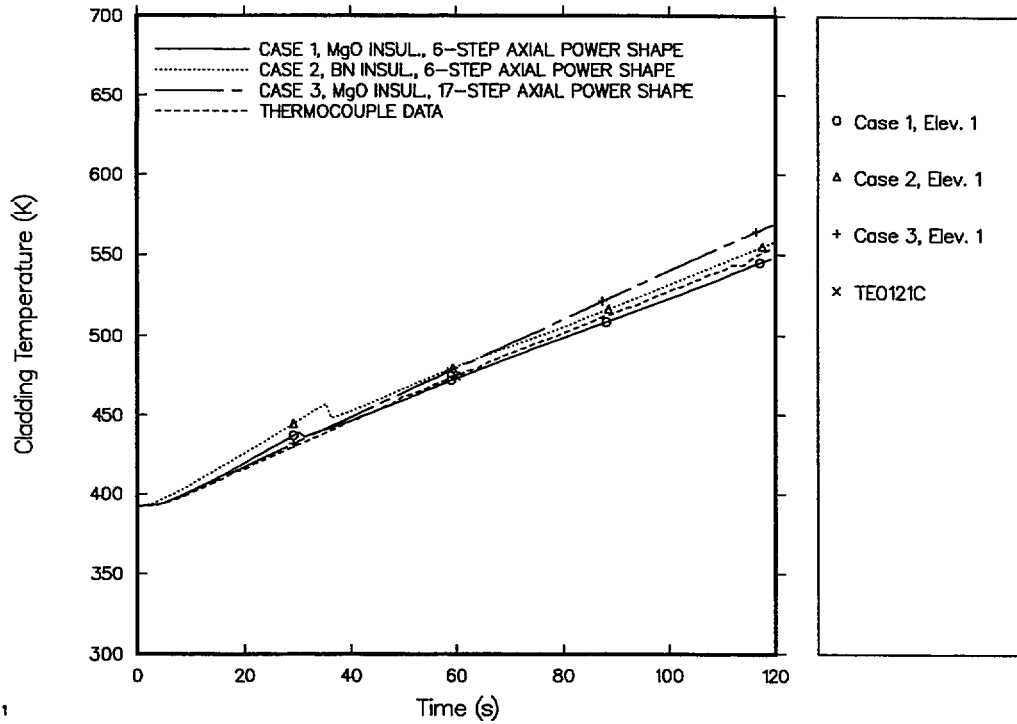


Fig. V-1. Calculated and measured cladding temperatures at level 1 for rod bundle 2.

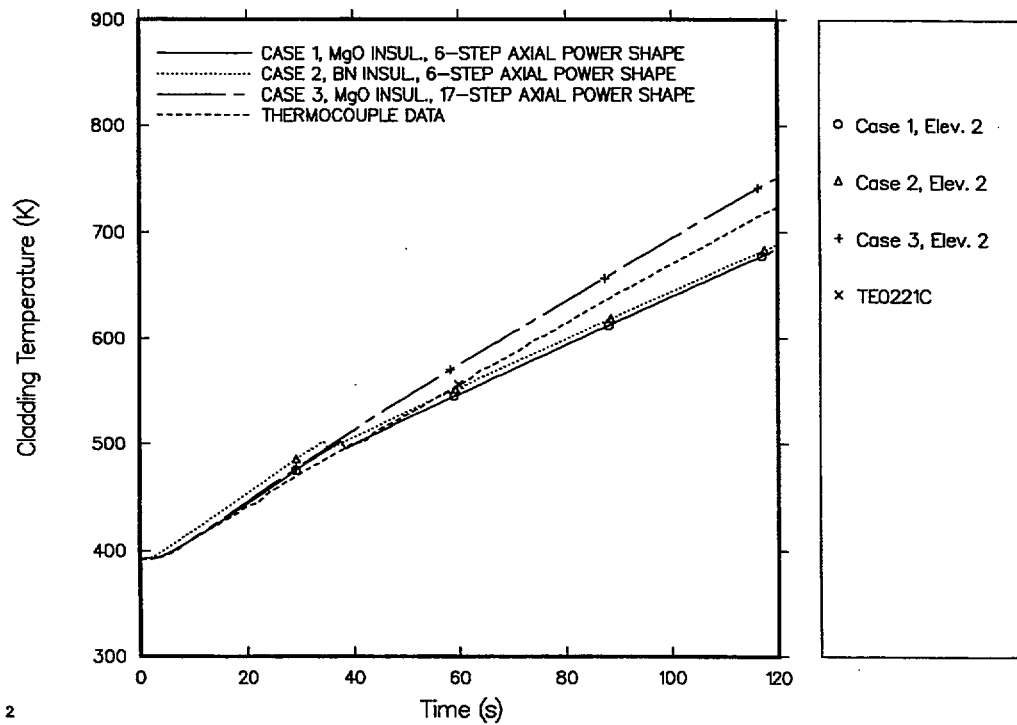


Fig. V-2. Calculated and measured cladding temperatures at level 2 for rod bundle 2.

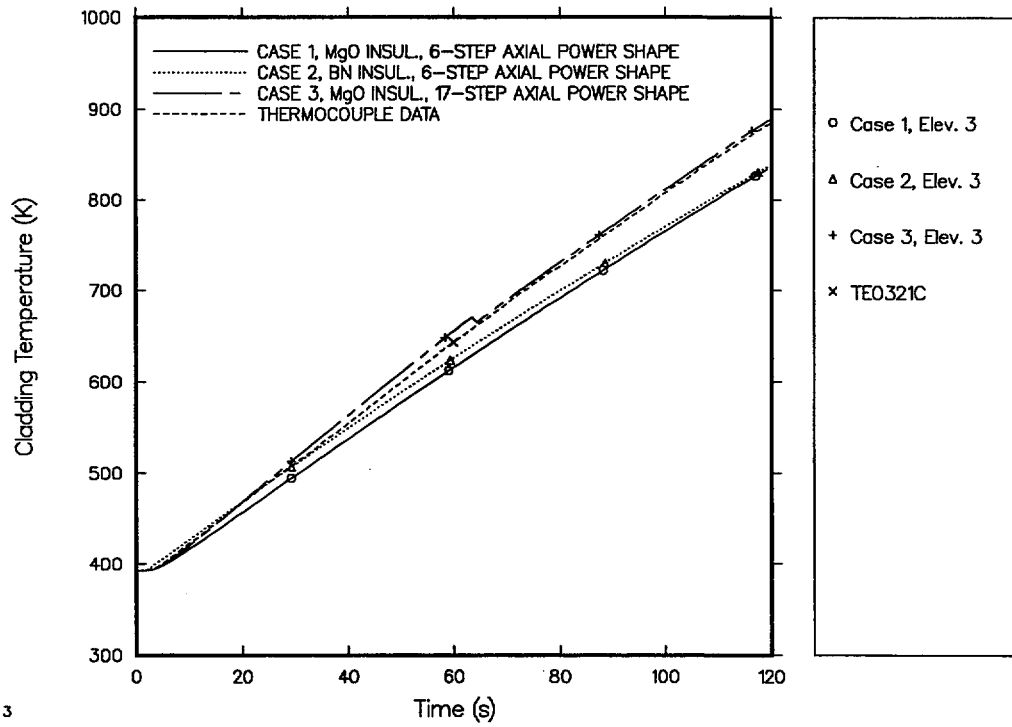


Fig. V-3. Calculated and measured cladding temperatures at level 3 for rod bundle 2.

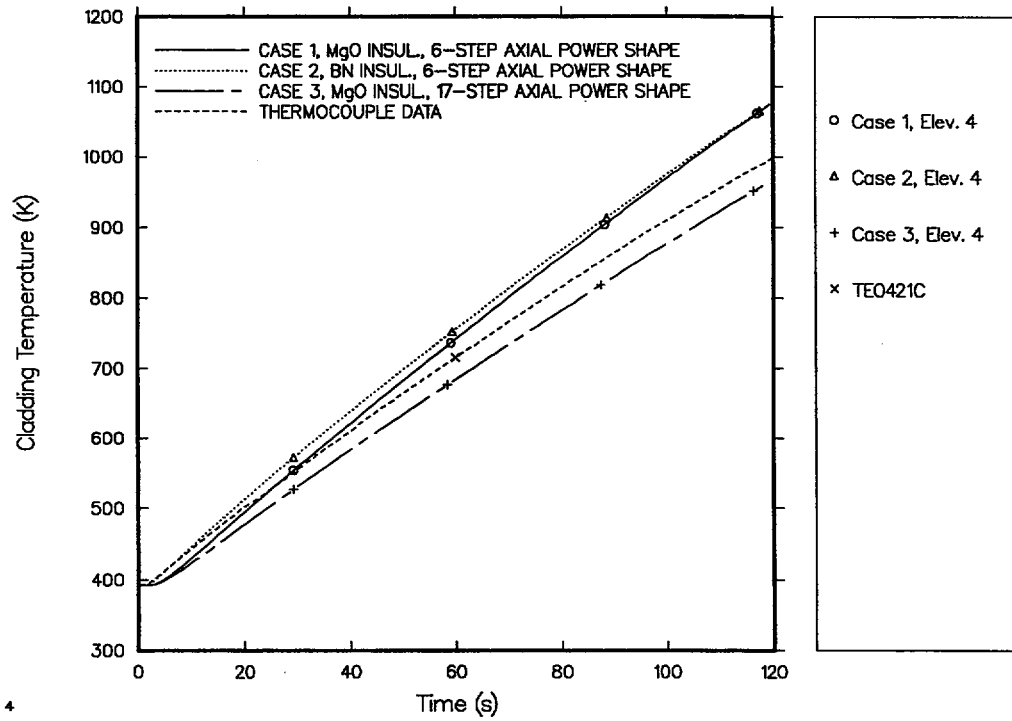


Fig. V-4. Calculated and measured cladding temperatures at level 4 for rod bundle 2.

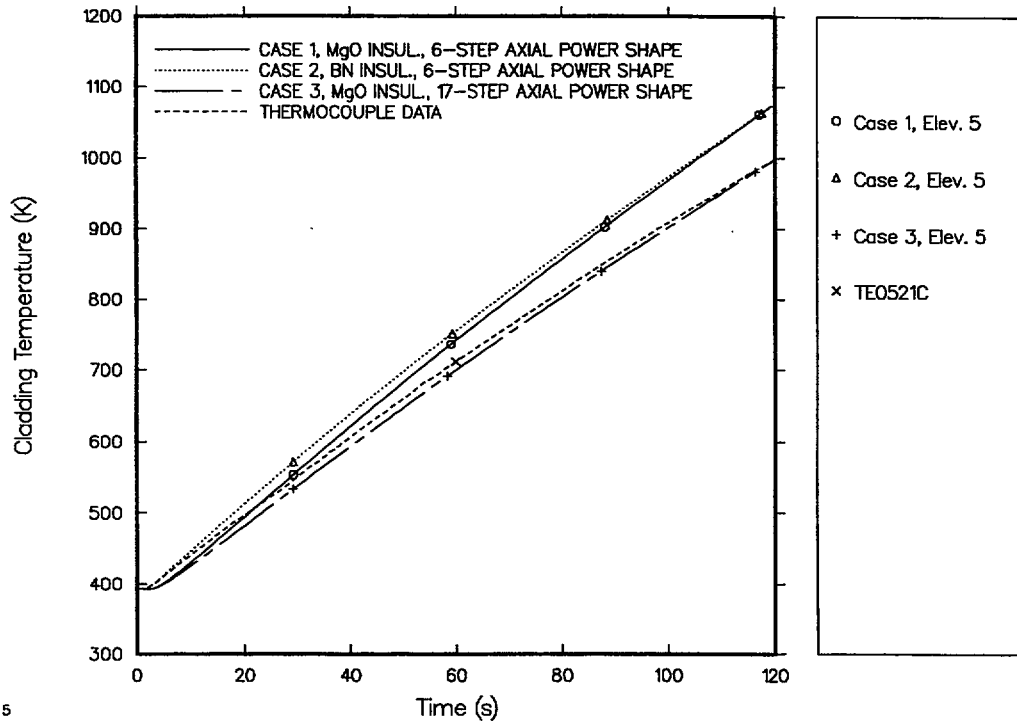


Fig. V-5. Calculated and measured cladding temperatures at level 5 for rod bundle 2.

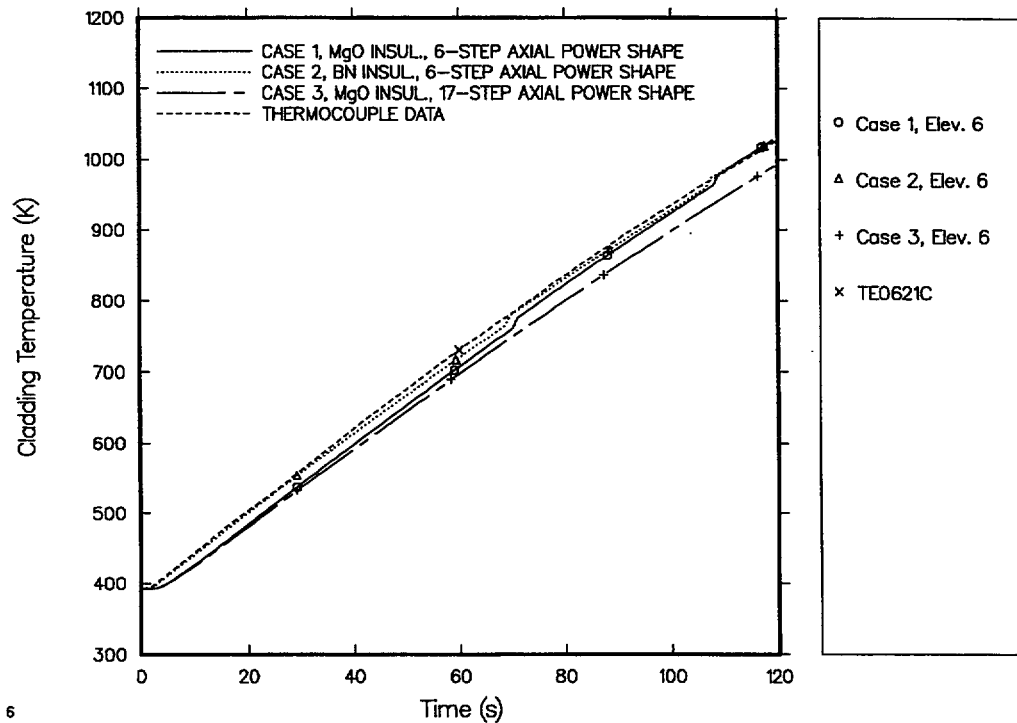


Fig. V-6. Calculated and measured cladding temperatures at level 6 for rod bundle 2.

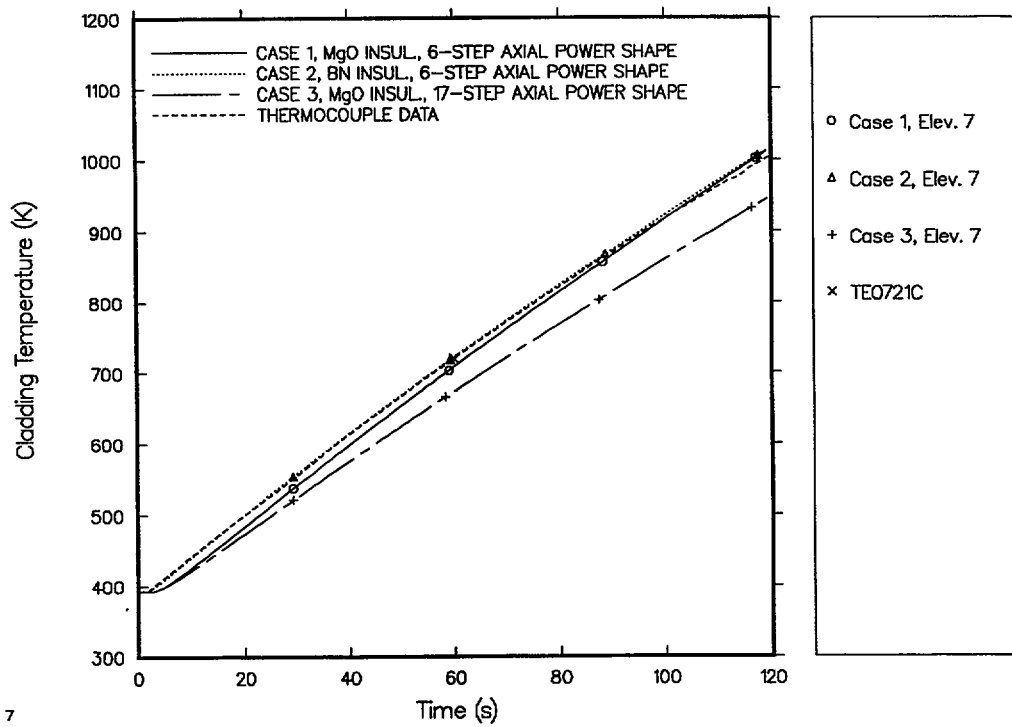


Fig. V-7. Calculated and measured cladding temperatures at level 7 for rod bundle 2.

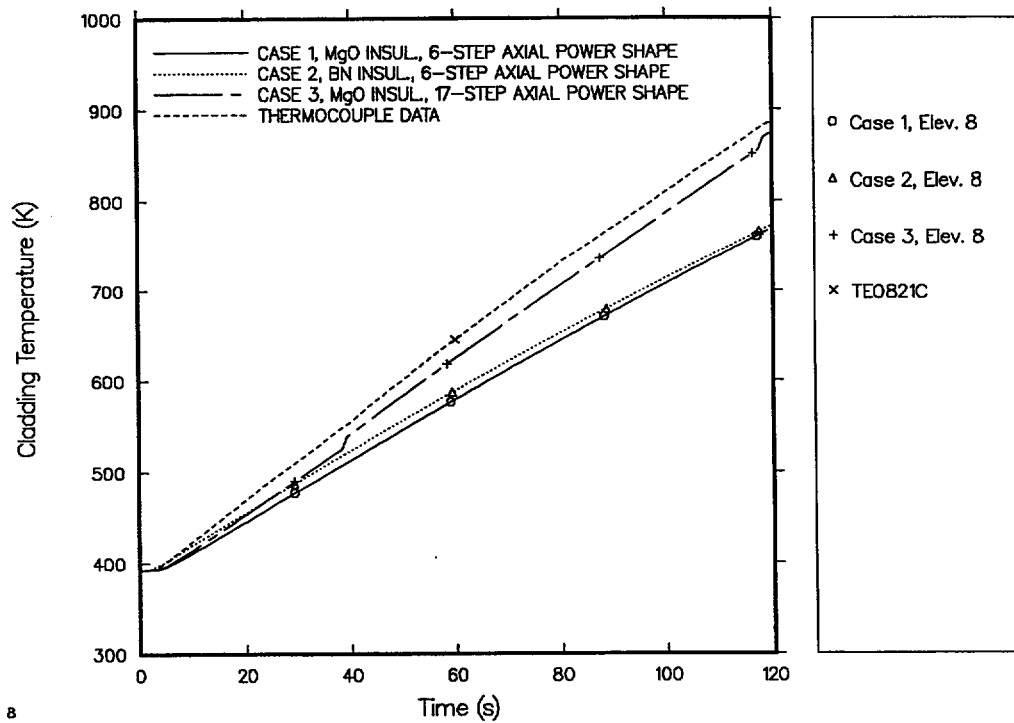


Fig. V-8. Calculated and measured cladding temperatures at level 8 for rod bundle 2.

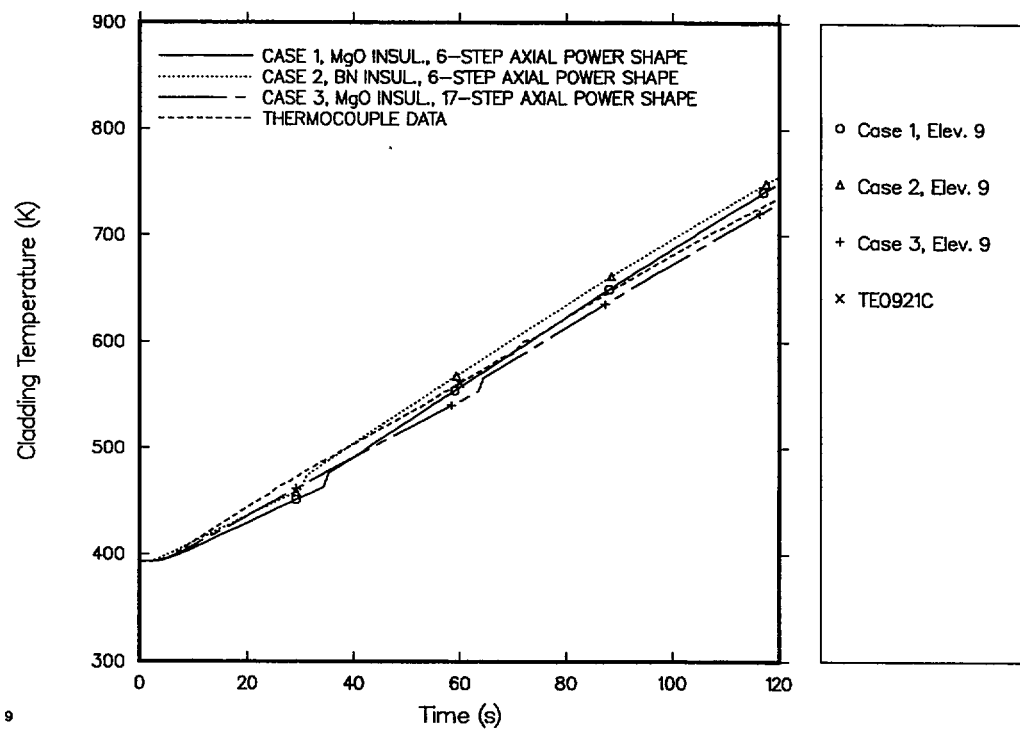


Fig. V-9. Calculated and measured cladding temperatures at level 9 for rod bundle 2.

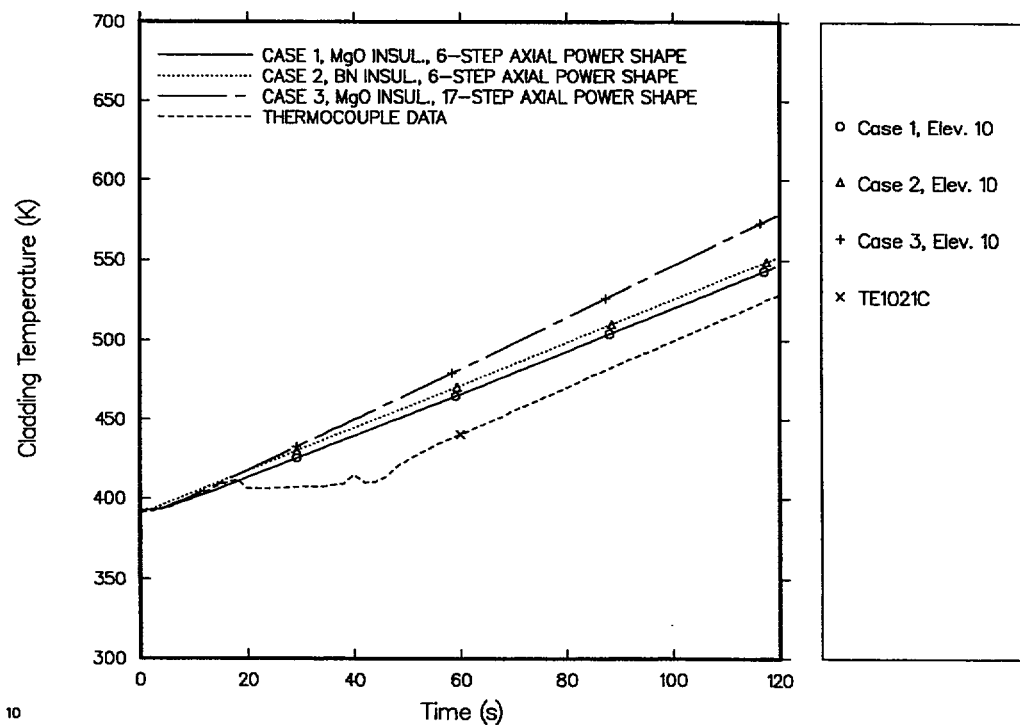


Fig. V-10. Calculated and measured cladding temperatures at level 10 for rod bundle 2.

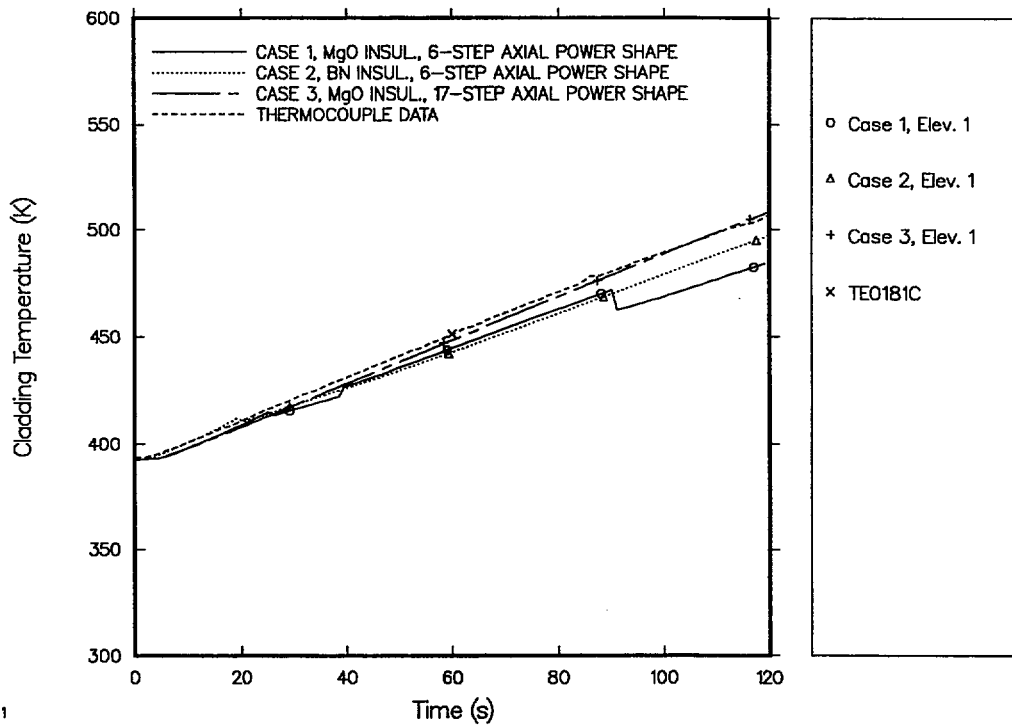


Fig. V-11. Calculated and measured cladding temperatures at level 1 for rod bundle 8.

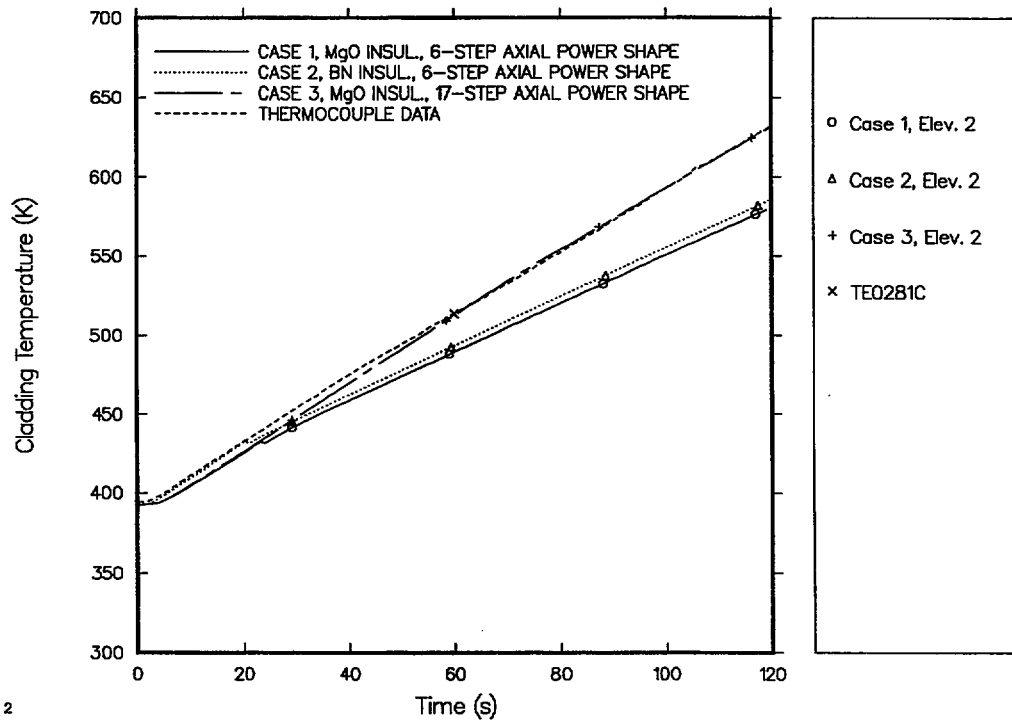


Fig. V-12. Calculated and measured cladding temperatures at level 2 for rod bundle 8.

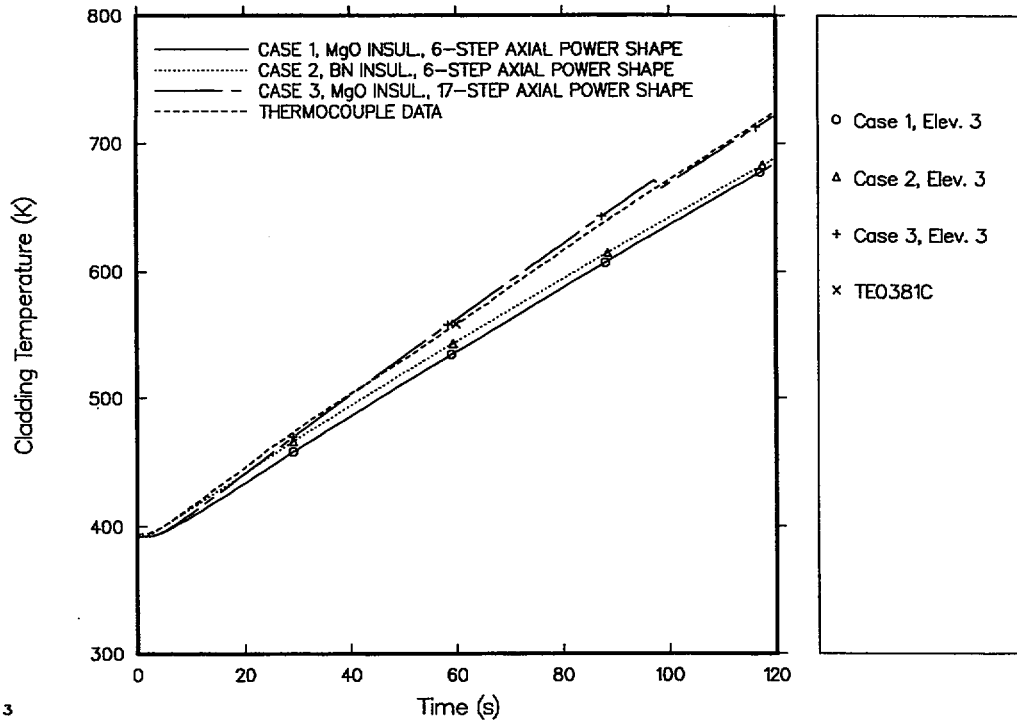


Fig. V-13. Calculated and measured cladding temperatures at level 3 for rod bundle 8.

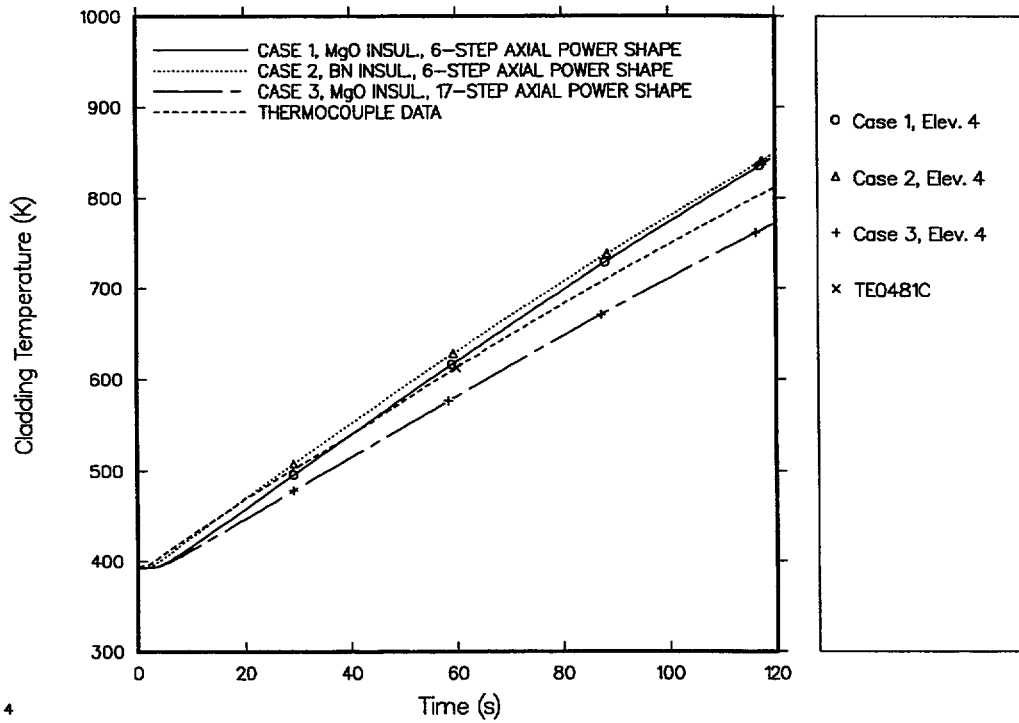


Fig. V-14. Calculated and measured cladding temperatures at level 4 for rod bundle 8.



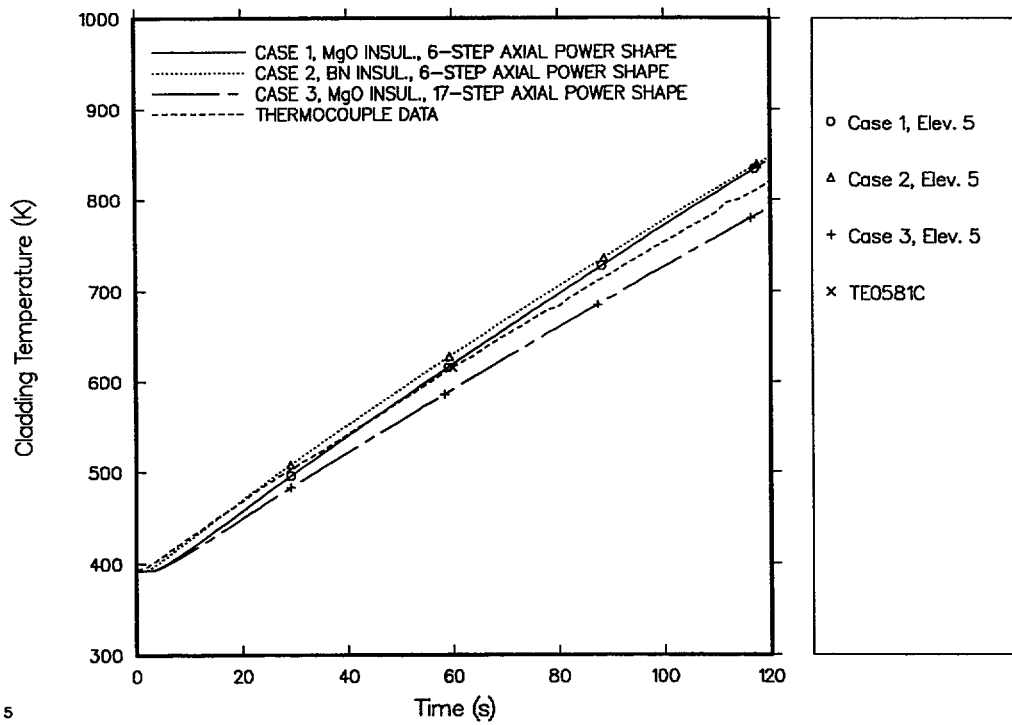


Fig. V-15. Calculated and measured cladding temperatures at level 5 for rod bundle 8.

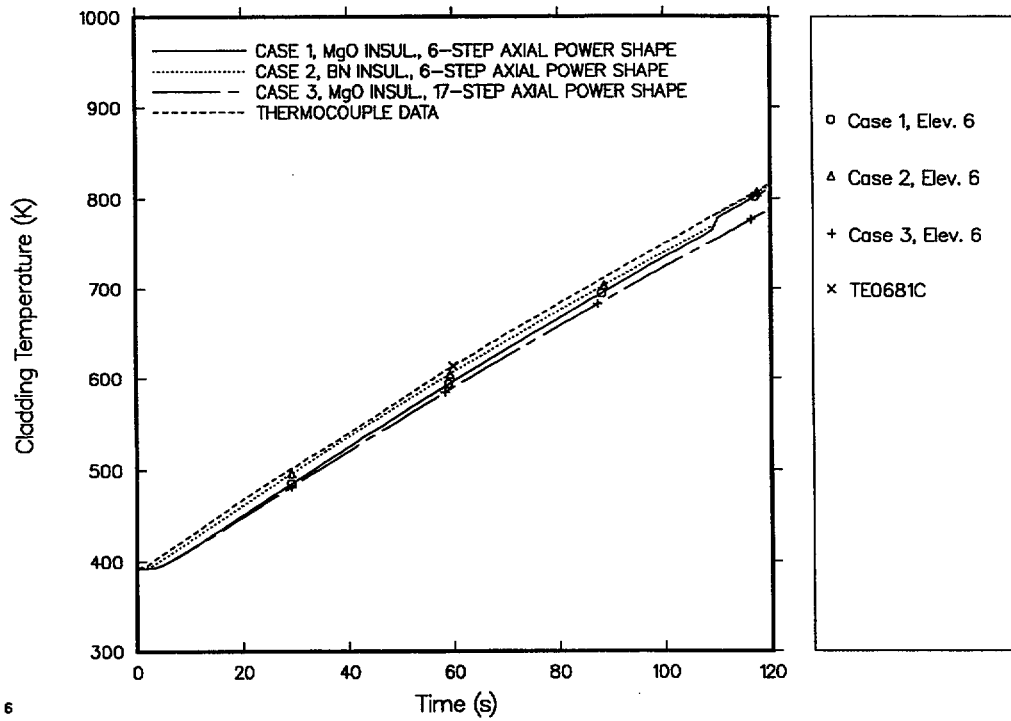


Fig. V-16. Calculated and measured cladding temperatures at level 6 for rod bundle 8.

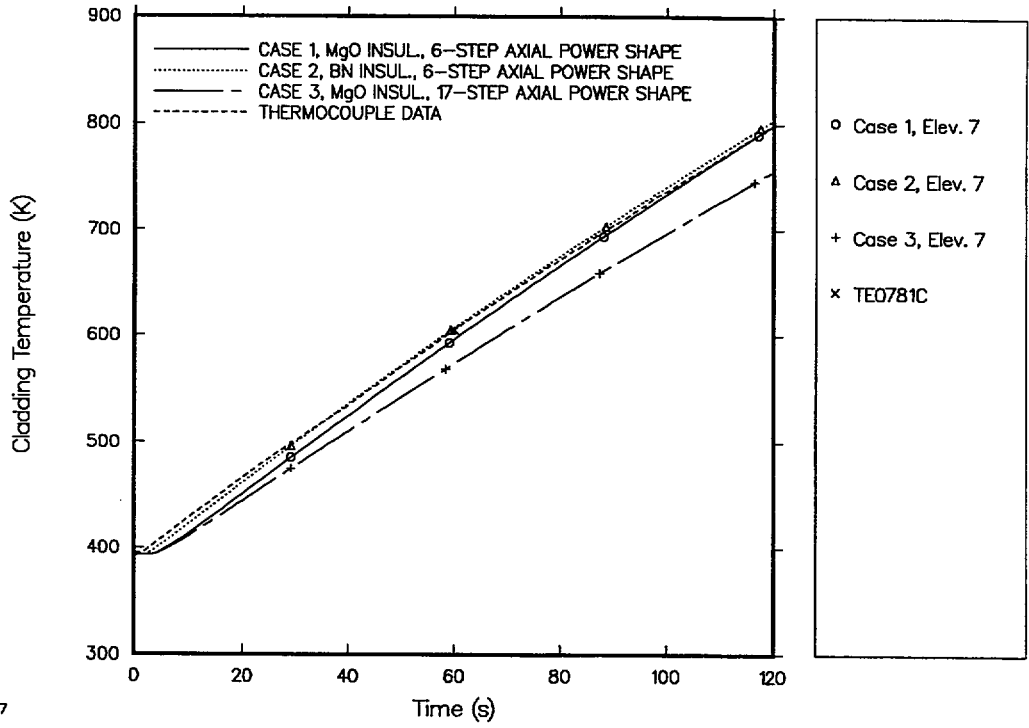


Fig. V-17. Calculated and measured cladding temperatures at level 7 for rod bundle 8.

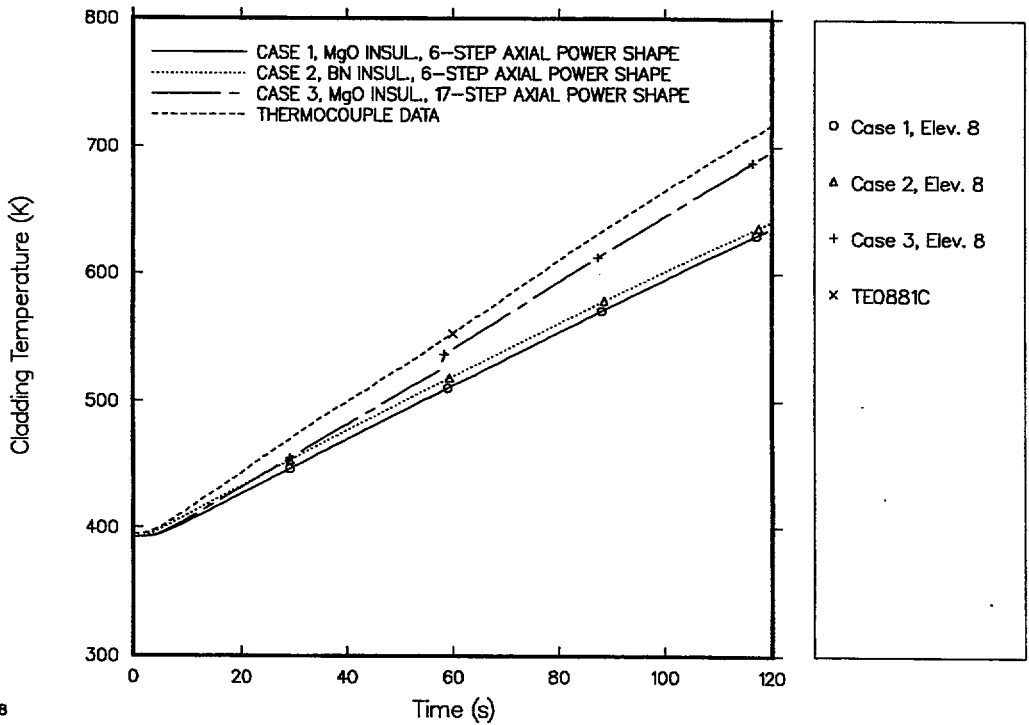


Fig. V-18. Calculated and measured cladding temperatures at level 8 for rod bundle 8.

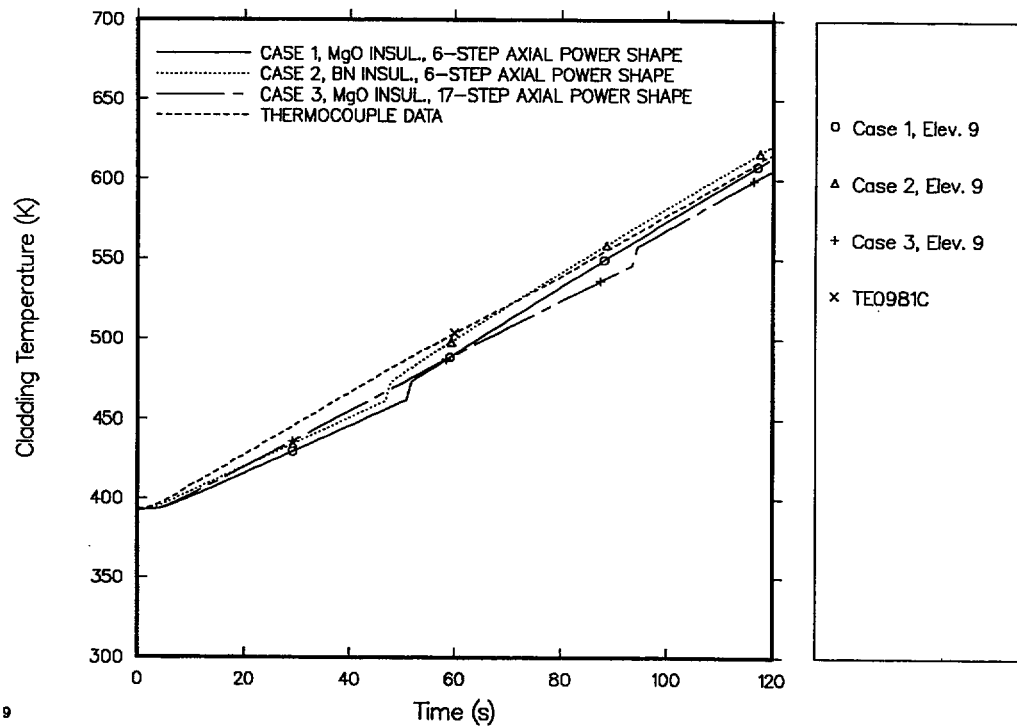


Fig. V-19. Calculated and measured cladding temperatures at level 9 for rod bundle 8.

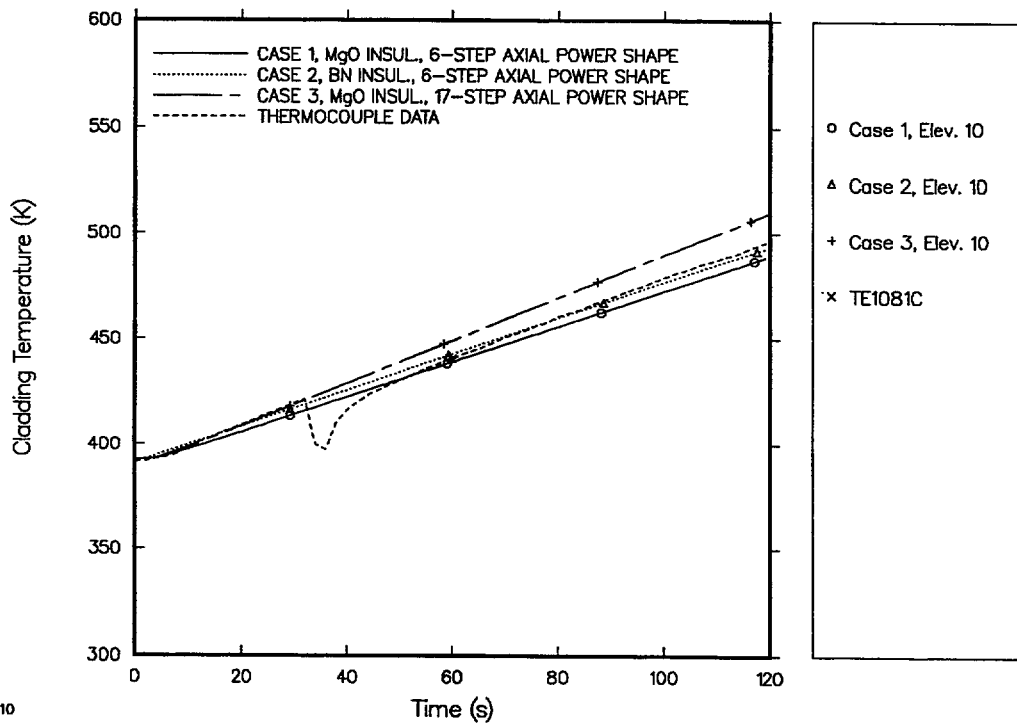


Fig. V-20. Calculated and measured cladding temperatures at level 10 for rod bundle 8.

# APPENDIX W

## RENODED CCTF RUN 14 INPUT LISTING

```

1 free format
2 *
3 *****
4 * main data *
5 *****
6 *
7 *          numctr          ieos          inopt          nmat
8           20              0              1              4
9 CCTF Core I Test C1-5 (Run 14)
10 *
11 revised by j. f. lime, october 1999
12 (1) fill component mass flow modified to reflect measured
13     mass flow entering the lower plenum.
14 (2) renoded core into 6 axial levels for sensitivity study
15 *
16 cctf run 14 core separate calculation
17 jaeri recommendation used for some heater rod material properties
18 vessel nodding:
19     one radial rings
20     one azimuthal zones
21     12 axial levels
22         one level in lower plenum
23         6 levels in core
24         5 levels in upper plenum
25 system nodding:
26     a break component --- upper plenum boundary condition
27     a fill component --- core inlet conditions
28 *****
29 *
30 *****
31 * namelist data *
32 *****
33 *
34 &inopts
35     nhtstr=3, iadded=20, ithd=1, nrslv=1, newrfd=3, imfr=3,
36     nsend=2,
37 &end
38 *
39 *          dstep          timet
40           0          0.0000e+00
41 *          stdyst          transi          ncomp          njun          ipak
42           0              1              8              4              1
43 *          eps0          epss
44     1.0000e-04    1.0000e-04
45 *          oitmax          sitmax          isolut          ncontr          nccfl
46           10             10             0              0              0
47 *          ntsv          ntcbl          ntcfl          ntrp          ntcp
48           1              5             200             2              1
49 *
50 *****
51 * component-number data *
52 *****
53 *
54 * iorder*          1          2          3          4          5
55 * iorder*          6          7          100e
56 *
57 *****
58 * material-properties data *
59 *****
60 *
61 * math *          55          58          59          60e
62 * ptbln * r02          8          7          6e
63 *
64 * prptb(1,i) prptb(2,i) prptb(3,i) prptb(4,i) prptb(5,i)
65     3.0000e+02    8.3500e+03    4.4490e+02    1.2340e+01    1.0000e+00
66     5.0000e+02    8.3500e+03    4.9040e+02    1.5830e+01    1.0000e+00
67     7.0000e+02    8.3500e+03    5.3950e+02    1.9330e+01    1.0000e+00
68     9.0000e+02    8.3500e+03    5.8890e+02    2.2830e+01    1.0000e+00
69     1.1000e+03    8.3500e+03    6.3940e+02    2.6320e+01    1.0000e+00
70     1.3000e+03    8.3500e+03    6.8590e+02    2.9820e+01    1.0000e+00
71     2.0000e+03    8.3500e+03    8.6440e+02    4.2070e+01    1.0000e+00
72     2.5000e+03    8.3500e+03    8.6440e+02    4.2070e+01    1.0000e+00
73 e
74 *
75 * prptb(1,i) prptb(2,i) prptb(3,i) prptb(4,i) prptb(5,i)
76     3.0000e+02    3.8000e+03    8.4970e+02    3.5870e+01    1.0000e+00

```

```

77      5.0000e+02      3.8000e+03      9.6550e+02      2.0170e+01      1.0000e+00
78      7.0000e+02      3.8000e+03      1.0810e+03      1.2530e+01      1.0000e+00
79      9.0000e+02      3.8000e+03      1.1970e+03      8.9510e+00      1.0000e+00
80      1.1000e+03      3.8000e+03      1.3130e+03      7.1620e+00      1.0000e+00
81      1.3000e+03      3.8000e+03      1.4290e+03      6.1230e+00      1.0000e+00
82      2.0000e+03      3.8000e+03      1.8350e+03      2.4870e+00      1.0000e+00
83      2.5000e+03      3.8000e+03      1.8350e+03      2.4870e+00      1.0000e+00
84      e
85      *
86      *      prpth(1,i)      prpth(2,i)      prpth(3,i)      prpth(4,i)      prpth(5,i)
87      3.0000e+02      2.8000e+03      9.8640e+01      1.6300e+00      1.0000e+00
88      6.0000e+02      2.8000e+03      1.1360e+03      1.4200e+00      1.0000e+00
89      9.0000e+02      2.8000e+03      1.2850e+03      1.2100e+00      1.0000e+00
90      1.2000e+03      2.8000e+03      1.4350e+03      1.0000e+00      1.0000e+00
91      1.5000e+03      2.8000e+03      1.8000e+03      7.9000e-01      1.1000e+00
92      2.0000e+03      2.8000e+03      2.0000e+03      4.9000e-01      1.1000e+00
93      2.5000e+03      2.8000e+03      2.0000e+03      4.9000e-01      1.1000e+00
94      e
95      *
96      *      prpth(1,i)      prpth(2,i)      prpth(3,i)      prpth(4,i)      prpth(5,i)
97      3.0000e+02      8.4100e+03      4.4030e+02      1.4340e+01      8.4000e-01
98      6.0000e+02      8.2930e+03      5.0640e+02      1.9330e+01      8.4000e-01
99      9.0000e+02      8.1750e+03      5.7240e+02      2.4320e+01      8.4000e-01
100     1.2000e+03      8.0570e+03      6.3840e+02      2.9310e+01      8.4000e-01
101     2.0000e+03      7.7420e+03      8.1440e+02      4.2610e+01      8.4000e-01
102     2.5000e+03      7.7420e+03      8.1440e+02      4.2610e+01      8.4000e-01
103     e
104     *
105     *****
106     * control-parameter data *
107     *****
108     *
109     *
110     * signal variables
111     *      idsv      isvn      ilcn      icn1      icn2
112     *      101      0      0      0      0
113     *
114     * control blocks
115     *
116     *      idcb      icbn      funct      icb1      icb2      icb3
117     *      cbgain      cbxmin      cbxmax      cbcon1      cbcon2
118     *
119     *      constant 1.0
120     -1      9      *const*
121     1.0      1.0      1.0      1.0      0.0
122     *
123     *      constant 0.0
124     -2      9      *const*
125     1.0      0.0      0.0      0.0      0.0
126     *
127     *      constant pressure
128     -3      9      *const*
129     1.0      3.0e05      3.0e05      3.0e05      0.0
130     *
131     *      table lookup of mass flow vs time
132     -4      101      *table*      101      64
133     1.0      -100.0      100.0      0.0      0.0
134     5.300e+01      0.0 s
135     5.800e+01      9.000e+00 s
136     6.300e+01      1.612e+01 s
137     6.805e+01      1.565e+01 s
138     7.067e+01      1.186e+01 s
139     7.239e+01      9.095e+00 s
140     7.600e+01      6.500e+00 s
141     8.059e+01      5.172e+00 s
142     1.017e+02      5.158e+00 s
143     1.057e+02      5.837e+00 s
144     1.238e+02      5.825e+00 s
145     1.409e+02      6.495e+00 s
146     1.649e+02      4.547e+00 s
147     1.790e+02      5.674e+00 s
148     1.850e+02      5.215e+00 s
149     1.901e+02      5.666e+00 s
150     1.990e+02      4.864e+00 s
151     2.031e+02      5.998e+00 s
152     2.161e+02      4.625e+00 s
153     2.221e+02      3.712e+00 s
154     2.312e+02      5.411e+00 s
155     2.380e+02      5.188e+00 s
156     2.481e+02      6.209e+00 s
157     2.531e+02      5.167e+00 s
158     2.549e+02      3.785e+00 s
159     2.590e+02      3.780e+00 s

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160      2.642e+02      6.186e+00 s
161      2.673e+02      6.182e+00 s
162      2.710e+02      3.763e+00 s
163      2.740e+02      3.759e+00 s
164      2.804e+02      6.394e+00 s
165      2.834e+02      6.390e+00 s
166      2.872e+02      4.086e+00 s
167      2.901e+02      3.852e+00 s
168      2.952e+02      4.534e+00 s
169      3.004e+02      5.677e+00 s
170      3.084e+02      5.551e+00 s
171      3.144e+02      4.738e+00 s
172      3.213e+02      3.923e+00 s
173      3.295e+02      4.602e+00 s
174      3.346e+02      5.170e+00 s
175      3.425e+02      4.699e+00 s
176      3.487e+02      5.725e+00 s
177      3.537e+02      5.258e+00 s
178      3.566e+02      4.679e+00 s
179      3.628e+02      5.706e+00 s
180      3.687e+02      4.203e+00 s
181      3.746e+02      3.045e+00 s
182      3.870e+02      6.822e+00 s
183      3.948e+02      3.707e+00 s
184      4.008e+02      3.699e+00 s
185      4.050e+02      5.188e+00 s
186      4.101e+02      5.985e+00 s
187      4.201e+02      5.052e+00 s
188      4.279e+02      3.432e+00 s
189      4.361e+02      5.030e+00 s
190      4.433e+02      6.284e+00 s
191      4.503e+02      5.240e+00 s
192      4.533e+02      5.466e+00 s
193      4.631e+02      2.808e+00 s
194      4.744e+02      4.977e+00 s
195      4.813e+02      3.473e+00 s
196      4.907e+02      6.909e+00 s
197      4.991e+02      1.069e+01 e
198 *
199 *      table lookup of liquid temperature vs time
200      -5      101      *table*      101      18
201      1.0      300.0      500.0      0.0      0.0
202      0.0000e+00      3.9400e+02      5.3000e+01      3.9400e+02      6.8000e+01 s
203      3.7000e+02      7.5000e+01      3.8000e+02      8.8000e+01      3.8050e+02 s
204      9.7000e+01      3.8200e+02      1.4000e+02      3.7700e+02      1.5000e+02 s
205      3.7800e+02      1.8500e+02      3.8300e+02      1.9300e+02      3.8300e+02 s
206      2.2100e+02      3.8680e+02      3.0000e+02      3.9400e+02      5.0000e+02 s
207      3.9940e+02      6.5000e+02      3.9940e+02      6.6800e+02      3.9860e+02 s
208      6.8700e+02      3.9520e+02      8.2400e+02      3.9000e+02      1.0000e+03 s
209      3.9000e+02 e
210 *
211 * trips
212 *      ntse      ntct      ntsf      ntgp      ntsd
213 *      0      0      0      0      0
214 *
215 *      idtp      isrt      iset      itst      idsg
216 *      1001      2      0      1      101
217 *      setp(1)      setp(2)
218 *      6.2500e+01      6.2510e+01
219 *      dtsp(1)      dtsp(2)
220 *      0.0000e+00      0.0000e+00
221 *      ifsp(1)      ifsp(2)
222 *      0      0
223 *
224 *      idtp      isrt      iset      itst      idsg
225 *      1002      2      0      1      101
226 *      setp(1)      setp(2)
227 *      0.0      1.0e-06
228 *      dtsp(1)      dtsp(2)
229 *      0.0000e+00      0.0000e+00
230 *      ifsp(1)      ifsp(2)
231 *      0      0
232 *
233 *****
234 * component data *
235 *****
236 *
237 ***** type      num      id      ctitle
238 vessel      3      3 $$$ vessel
239 *      nasx      nrxx      ntsx      ncsr      ivssbf
240 *      12      1      1      2      0
241 *      idcu      idcl      idcr      icru      icrl
242 *      0      0      0      19      1

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	icrr	ilcsp	iucsp	iuhp	iconc
243	*				
244	*	icrr	iucsp	iuhp	iconc
245	*	igeom	nvvtb	nsgrid	0
246	*	shelv	0	*6*	0
247	*	0.0000e+00	eps		
248	*	z	2.0000e-01	8.1000e-01	s
249	*	z	1.4200e+00	2.0300e+00	s
250	*	z	2.6400e+00		
251	*	z	3.2500e+00	3.8600e+00	3.9800e+00
252	*	z	4.2170e+00	4.7170e+00	5.5370e+00
253	*	rad	6.6644e-01e		6.7470e+00e
254	*	th	6.6644e-01e		
255	*	funh	1.0000e-01e		
256	*	nhsca	5e		
257	*	zsgrid	8.3000e-01	1.4750e+00	2.1400e+00
258	*	zsgrid	3.4600e+00	3.8780e+00e	2.8050e+00s
259	*				
260	*				
261	*	lisrl	lisrc	lisrf	ljuns
262	*	ii	i	3	3
263	*	1	1	3	2
264	*				
265	*	level	1		
266	*				
267	*	cfzlj-t*	0.0000e+00e		
268	*	cfzlj-z*	-0.0001	e	
269	*	cfzlj-r*	0.0000e+00e		
270	*	cfzlv-t*	0.0000e+00e		
271	*	cfzlv-z*	0.0000e+00e		
272	*	cfzlv-r*	0.0000e+00e		
273	*	vol	1.2637e-01e		
274	*	fa-t	0.0000e+00e		
275	*	fa-z	1.2637e-01e		
276	*	fa-r	0.0000e+00e		
277	*	hd-t	1.0000e+00e		
278	*	hd-z	6.5000e-03e		
279	*	hd-r	0.0000e+00e		
280	*	alpn	1.0000e+00e		
281	*	vvn-t	0.0000e+00e		
282	*	vvn-z	0.0000e+00e		
283	*	vvn-r	0.0000e+00e		
284	*	vln-t	0.0000e+00e		
285	*	vln-z	0.0000e+00e		
286	*	vln-r	0.0000e+00e		
287	*	tvn	3.9300e+02e		
288	*	tln	3.9100e+02e		
289	*	pn	1.9680e+05e		
290	*	pan	0.0000e+00e		
291	*				
292	*	level	2		
293	*				
294	*	cfzlj-t*	0.0000e+00e		
295	*	cfzlj-z*	7.3500e-02e		
296	*	cfzlj-r*	0.0000e+00e		
297	*	cfzlv-t*	0.0000e+00e		
298	*	cfzlv-z*	7.3500e-02e		
299	*	cfzlv-r*	0.0000e+00e		
300	*	vol	5.8472e-01e		
301	*	fa-t	0.0000e+00e		
302	*	fa-z	5.8472e-01e		
303	*	fa-r	0.0000e+00e		
304	*	hd-t	6.3440e-03e		
305	*	hd-z	1.3531e-02e		
306	*	hd-r	0.0000e+00e		
307	*	alpn	1.0000e+00e		
308	*	vvn-t	0.0000e+00e		
309	*	vvn-z	0.0000e+00e		
310	*	vvn-r	0.0000e+00e		
311	*	vln-t	0.0000e+00e		
312	*	vln-z	0.0000e+00e		
313	*	vln-r	0.0000e+00e		
314	*	tvn	3.9300e+02e		
315	*	tln	3.9300e+02e		
316	*	pn	1.9680e+05e		
317	*	pan	0.0000e+00e		
318	*				
319	*	level	3		
320	*				
321	*	cfzlj-t*	0.0000e+00e		
322	*	cfzlj-z*	7.3500e-02e		
323	*	cfzlj-r*	0.0000e+00e		
324	*	cfzlv-t*	0.0000e+00e		
325	*	cfzlv-z*	7.3500e-02e		

326 \* cfzv-r\* 0.0000e+00e  
327 \* vol 5.8472e-01e  
328 \* fa-t \* 0.0000e+00e  
329 \* fa-z \* 5.8472e-01e  
330 \* fa-r \* 0.0000e+00e  
331 \* hd-t \* 6.3440e-03e  
332 \* hd-z \* 1.3531e-02e  
333 \* hd-r \* 0.0000e+00e  
334 \* alpn \* 1.0000e+00e  
335 \* vvn-t \* 0.0000e+00e  
336 \* vvn-z \* 0.0000e+00e  
337 \* vvn-r \* 0.0000e+00e  
338 \* vln-t \* 0.0000e+00e  
339 \* vln-z \* 0.0000e+00e  
340 \* vln-r \* 0.0000e+00e  
341 \* tvn \* 3.9300e+02e  
342 \* tln \* 3.9300e+02e  
343 \* pn \* 1.9680e+05e  
344 \* pan \* 0.0000e+00e  
345

346 \* level 4

347 \*  
348 \* cfzl-t\* 0.0000e+00e  
349 \* cfzl-z\* 7.3500e-02e  
350 \* cfzl-r\* 0.0000e+00e  
351 \* cfzv-t\* 0.0000e+00e  
352 \* cfzv-z\* 7.3500e-02e  
353 \* cfzv-r\* 0.0000e+00e  
354 \* vol 5.8472e-01e  
355 \* fa-t \* 0.0000e+00e  
356 \* fa-z \* 5.8472e-01e  
357 \* fa-r \* 0.0000e+00e  
358 \* hd-t \* 6.3440e-03e  
359 \* hd-z \* 1.3531e-02e  
360 \* hd-r \* 0.0000e+00e  
361 \* alpn \* 1.0000e+00e  
362 \* vvn-t \* 0.0000e+00e  
363 \* vvn-z \* 0.0000e+00e  
364 \* vvn-r \* 0.0000e+00e  
365 \* vln-t \* 0.0000e+00e  
366 \* vln-z \* 0.0000e+00e  
367 \* vln-r \* 0.0000e+00e  
368 \* tvn \* 3.9300e+02e  
369 \* tln \* 3.9300e+02e  
370 \* pn \* 1.9680e+05e  
371 \* pan \* 0.0000e+00e  
372

373 \* level 5

374 \*  
375 \* cfzl-t\* 0.0000e+00e  
376 \* cfzl-z\* 7.3500e-02e  
377 \* cfzl-r\* 0.0000e+00e  
378 \* cfzv-t\* 0.0000e+00e  
379 \* cfzv-z\* 7.3500e-02e  
380 \* cfzv-r\* 0.0000e+00e  
381 \* vol 5.8472e-01e  
382 \* fa-t \* 0.0000e+00e  
383 \* fa-z \* 5.8472e-01e  
384 \* fa-r \* 0.0000e+00e  
385 \* hd-t \* 6.3440e-03e  
386 \* hd-z \* 1.3531e-02e  
387 \* hd-r \* 0.0000e+00e  
388 \* alpn \* 1.0000e+00e  
389 \* vvn-t \* 0.0000e+00e  
390 \* vvn-z \* 0.0000e+00e  
391 \* vvn-r \* 0.0000e+00e  
392 \* vln-t \* 0.0000e+00e  
393 \* vln-z \* 0.0000e+00e  
394 \* vln-r \* 0.0000e+00e  
395 \* tvn \* 3.9300e+02e  
396 \* tln \* 3.9300e+02e  
397 \* pn \* 1.9680e+05e  
398 \* pan \* 0.0000e+00e  
399

400 \* level 6

401 \*  
402 \* cfzl-t\* 0.0000e+00e  
403 \* cfzl-z\* 7.3500e-02e  
404 \* cfzl-r\* 0.0000e+00e  
405 \* cfzv-t\* 0.0000e+00e  
406 \* cfzv-z\* 7.3500e-02e  
407 \* cfzv-r\* 0.0000e+00e  
408 \* vol 5.8472e-01e



409 \* fa-t \* 0.0000e+00e  
410 \* fa-z \* 5.8472e-01e  
411 \* fa-r \* 0.0000e+00e  
412 \* hd-t \* 6.3440e-03e  
413 \* hd-z \* 1.3531e-02e  
414 \* hd-r \* 0.0000e+00e  
415 \* alpn \* 1.0000e+00e  
416 \* vvn-t \* 0.0000e+00e  
417 \* vvn-z \* 0.0000e+00e  
418 \* vvn-r \* 0.0000e+00e  
419 \* vln-t \* 0.0000e+00e  
420 \* vln-z \* 0.0000e+00e  
421 \* vln-r \* 0.0000e+00e  
422 \* tvn \* 3.9300e+02e  
423 \* tln \* 3.9300e+02e  
424 \* pn \* 1.9680e+05e  
425 \* pan \* 0.0000e+00e  
426 \* \* \*

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427 \* level \*  
428 \* \*  
429 \* cfzl-t\* 0.0000e+00e  
430 \* cfzl-z\* 7.3500e-02e  
431 \* cfzl-r\* 0.0000e+00e  
432 \* cfzv-t\* 0.0000e+00e  
433 \* cfzv-z\* 7.3500e-02e  
434 \* cfzv-r\* 0.0000e+00e  
435 \* vol \* 5.8472e-01e  
436 \* fa-t \* 0.0000e+00e  
437 \* fa-z \* 5.8472e-01e  
438 \* fa-r \* 0.0000e+00e  
439 \* hd-t \* 6.3440e-03e  
440 \* hd-z \* 1.3531e-02e  
441 \* hd-r \* 0.0000e+00e  
442 \* alpn \* 1.0000e+00e  
443 \* vvn-t \* 0.0000e+00e  
444 \* vvn-z \* 0.0000e+00e  
445 \* vvn-r \* 0.0000e+00e  
446 \* vln-t \* 0.0000e+00e  
447 \* vln-z \* 0.0000e+00e  
448 \* vln-r \* 0.0000e+00e  
449 \* tvn \* 3.9300e+02e  
450 \* tln \* 3.9300e+02e  
451 \* pn \* 1.9680e+05e  
452 \* pan \* 0.0000e+00e  
453 \* \* \*

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454 \* level \*  
455 \* \*  
456 \* cfzl-t\* 0.0000e+00e  
457 \* cfzl-z\* 6.2300e-02e  
458 \* cfzl-r\* 0.0000e+00e  
459 \* cfzv-t\* 0.0000e+00e  
460 \* cfzv-z\* 6.2300e-02e  
461 \* cfzv-r\* 0.0000e+00e  
462 \* vol \* 5.8472e-01e  
463 \* fa-t \* 0.0000e+00e  
464 \* fa-z \* 5.8472e-01e  
465 \* fa-r \* 0.0000e+00e  
466 \* hd-t \* 6.3440e-03e  
467 \* hd-z \* 1.3531e-02e  
468 \* hd-r \* 0.0000e+00e  
469 \* alpn \* 1.0000e+00e  
470 \* vvn-t \* 0.0000e+00e  
471 \* vvn-z \* 0.0000e+00e  
472 \* vvn-r \* 0.0000e+00e  
473 \* vln-t \* 0.0000e+00e  
474 \* vln-z \* 0.0000e+00e  
475 \* vln-r \* 0.0000e+00e  
476 \* tvn \* 3.9300e+02e  
477 \* tln \* 3.9300e+02e  
478 \* pn \* 1.9680e+05e  
479 \* pan \* 0.0000e+00e  
480 \* \* \*

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481 \* level \*  
482 \* \*  
483 \* cfzl-t\* 0.0000e+00e  
484 \* cfzl-z\* 0.0000e+00e  
485 \* cfzl-r\* 0.0000e+00e  
486 \* cfzv-t\* 0.0000e+00e  
487 \* cfzv-z\* 0.0000e+00e  
488 \* cfzv-r\* 0.0000e+00e  
489 \* vol \* 1.2900e+00e  
490 \* fa-t \* 0.0000e+00e  
491 \* fa-z \* 3.5930e-01e

492	* fa-r *	0.0000e+00e
493	* hd-t *	2.8150e-01e
494	* hd-z *	8.2855e-02e
495	* hd-r *	0.0000e+00e
496	* alpn *	1.0000e+00e
497	* vvm-t *	0.0000e+00e
498	* vvm-z *	0.0000e+00e
499	* vvm-r *	0.0000e+00e
500	* vln-t *	0.0000e+00e
501	* vln-z *	0.0000e+00e
502	* vln-r *	0.0000e+00e
503	* tvn *	3.9300e+02e
504	* tln *	3.9300e+02e
505	* pn *	1.9680e+05e
506	* pan *	0.0000e+00e
507	*	
508	* level 10	
509	*	
510	* cfzl-t*	0.0000e+00e
511	* cfzl-z*	0.0000e+00e
512	* cfzl-r*	0.0000e+00e
513	* cfzv-t*	0.0000e+00e
514	* cfzv-z*	0.0000e+00e
515	* cfzv-r*	0.0000e+00e
516	* vol *	1.2681e+00e
517	* fa-t *	0.0000e+00e
518	* fa-z *	1.2681e+00e
519	* fa-r *	0.0000e+00e
520	* hd-t *	7.2090e-02e
521	* hd-z *	1.7809e-01e
522	* hd-r *	0.0000e+00e
523	* alpn *	1.0000e+00e
524	* vvm-t *	0.0000e+00e
525	* vvm-z *	0.0000e+00e
526	* vvm-r *	0.0000e+00e
527	* vln-t *	0.0000e+00e
528	* vln-z *	0.0000e+00e
529	* vln-r *	0.0000e+00e
530	* tvn *	3.9300e+02e
531	* tln *	3.9300e+02e
532	* pn *	1.9680e+05e
533	* pan *	0.0000e+00e
534	*	
535	* level 11	
536	*	
537	* cfzl-t*	0.0000e+00e
538	* cfzl-z*	0.0000e+00e
539	* cfzl-r*	0.0000e+00e
540	* cfzv-t*	0.0000e+00e
541	* cfzv-z*	0.0000e+00e
542	* cfzv-r*	0.0000e+00e
543	* vol *	1.2681e+00e
544	* fa-t *	0.0000e+00e
545	* fa-z *	1.2681e+00e
546	* fa-r *	0.0000e+00e
547	* hd-t *	7.2090e-02e
548	* hd-z *	1.7809e-01e
549	* hd-r *	0.0000e+00e
550	* alpn *	1.0000e+00e
551	* vvm-t *	0.0000e+00e
552	* vvm-z *	0.0000e+00e
553	* vvm-r *	0.0000e+00e
554	* vln-t *	0.0000e+00e
555	* vln-z *	0.0000e+00e
556	* vln-r *	0.0000e+00e
557	* tvn *	3.9300e+02e
558	* tln *	3.9300e+02e
559	* pn *	1.9680e+05e
560	* pan *	0.0000e+00e
561	*	
562	* level 12	
563	*	
564	* cfzl-t*	0.0000e+00e
565	* cfzl-z*	0.0000e+00e
566	* cfzl-r*	0.0000e+00e
567	* cfzv-t*	0.0000e+00e
568	* cfzv-z*	0.0000e+00e
569	* cfzv-r*	0.0000e+00e
570	* vol *	1.4407e+00e
571	* fa-t *	0.0000e+00e
572	* fa-z *	1.4407e+00e
573	* fa-r *	0.0000e+00e
574	* hd-t *	7.2090e-02e

```

575 * hd-z *      1.1844e+00e
576 * hd-r *      0.0000e+00e
577 * alp  *      1.0000e+00e
578 * vvn-t *      0.0000e+00e
579 * vvn-z *      0.0000e+00e
580 * vvn-r *      0.0000e+00e
581 * vln-t *      0.0000e+00e
582 * vln-z *      0.0000e+00e
583 * vln-r *      0.0000e+00e
584 * tvn  *      3.9300e+02e
585 * tln  *      3.9300e+02e
586 * pn   *      1.9680e+05e
587 * pan  *      0.0000e+00e
588 *
589 ***** type          num          id          ctitle
590 pipe                2          2 $2$ pipe connection to lower plen.
591 *          ncells      nodes          jun1          jun2          epsw
592 *          1          0          1          2          0.0000e+00
593 *          ichf        iconc          iacc          ipow
594 *          0          0          0          0
595 *          radin       th          houtl        houtv          toutl
596 *          7.7600e-02  1.0000e-03  0.0000e+00  0.0000e+00  2.9300e+02
597 *          toutv
598 *          2.9300e+02
599 *
600 * dx   *      2.0000e-01e
601 * vol  *      8.8820e-02e
602 * fa   * f      4.4410e-01e
603 * fric * f      0.0000e+00e
604 * grav * f      0.0000e+00e
605 * hd   * f      1.5520e-01e
606 * nff  * f      -1e
607 * alp  *      0.6000e+00e
608 * vl   * f      0.0000e+00e
609 * vv   * f      0.0000e+00e
610 * tl   *      3.9100e+02e
611 * tv   *      3.9100e+02e
612 * p    *      1.9680e+05e
613 * pa   *      0.0000e+00e
614 *
615 ***** type          num          id          ctitle
616 fill                1          1 $1$ core inlet conditions
617 *          jun1        ifty          ioff
618 *          1          10          0
619 *          iftr        ifsv          nftb          nfsv          nfrf
620 *          1002       101          0          0          0
621 *          twtold      rfmX          concin        felv
622 *          9.0000e-01  1.0000e+20  0.0000e+00  0.0000e+00
623 *          dxin       volin        alpin        vlin          tlin
624 *          1.0000e-01  1.8900e-04  0.0000e+00  0.0000e+00  3.9400e+02
625 *          pin        pain         flowin       vvin          tvin
626 *          3.0000e+05  0.0000e+00  0.0000e+00  0.0000e+00  3.9400e+02
627 * fill signal variables or control blocks
628 * mliq mvap          tliq          tvap          alp
629 * -4 -2 -5 -5 -2
630 * p pa
631 * -3 -2
632 *
633 ***** type          num          id          ctitle
634 break                5          5 $5$ break-up pressure
635 *          jun1        ibty          isat          ioff
636 *          4          1          3          0
637 *          ibtr        ibsv          nbtb          nbsv          nbrf
638 *          0          101         20          0          0
639 *          dxin       volin        alpin        tin          pin
640 *          1.0000e+00  4.4410e+01  1.0000e+00  3.9300e+02  1.9700e+05
641 *          pain       concin       rbmx         poff         belv
642 *          0.0000e+00  0.0000e+00  1.0000e+06  0.0000e+00  0.0000e+00
643 *          pscl      t1scl       tvscl        pascl        conscl
644 *          1.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
645 * ptb *      0.0000e+00  1.9680e+05  5.2000e+01  1.9680e+05  6.3000e+01
646 * ptb *      2.0120e+05  6.9000e+01  2.2400e+05  8.1000e+01  2.3060e+05
647 * ptb *      2.3600e+02  2.6320e+05  2.7500e+02  2.6450e+05  3.0000e+02
648 * ptb *      2.6000e+05  3.5000e+02  2.5630e+05  4.1400e+02  2.5500e+05
649 * ptb *      4.8000e+02  2.5690e+05  5.1100e+02  2.5500e+05  5.6300e+02
650 * ptb *      2.4380e+05  6.0000e+02  2.4940e+05  6.5000e+02  2.4940e+05
651 * ptb *      6.6300e+02  2.1810e+05  6.8300e+02  1.9650e+05  7.0000e+02
652 * ptb *      1.9500e+05  7.4100e+02  1.7670e+05  1.0000e+03  1.8690e+05
653 * ptb * e
654 *
655 ***** type          num          id          ctitle
656 pipe                4          4 $4$ pipe connecting up to break
657 *          ncells      nodes          jun1          jun2          epsw

```

```

658      1      0      3      4      0.0000e+00
659 *      ichf      iconc      iacc      ipow
660      0      0      0      0
661 *      radin      th      houtl      houtv      toutl
662      7.7600e-02      1.0000e-03      0.0000e+00      0.0000e+00      2.9300e+02
663 *      toutv
664      2.9300e+02
665 *
666 * dx *      1.0000e+00e
667 * vol *      4.4410e-01e
668 * fa * f      4.4410e-01e
669 * fric * f      0.0000e+00e
670 * grav * f      0.0000e+00e
671 * hd * f      1.5520e-01e
672 * nff * f      -1e
673 * alp * *      1.0000e+00e
674 * vl * f      0.0000e+00e
675 * vv * f      0.0000e+00e
676 * tl * *      3.9300e+02e
677 * tv * *      3.9300e+02e
678 * p * *      1.9680e+05e
679 * pa * *      0.0000e+00e
680 *
681 ***** type num id ctitle
682 rod 6 6 $6$ heated rod
683 * ncrx ncrz
684      1      6
685 * nopowr nrldr modez liqlev iaxcnd
686      0      0      0      *1* 0      1
687 * idbci idbco hdri hdro
688      0      2      0.0000e+00      1.3650e-02      *0.01069*
689 * nrods nodes irftr nzmax irftr2
690      1      6      *1001* 1002      250      1001
691 * dtxht(1) dtxht(2) dznht hgapo shelv
692      2.5000e+00      1.0000e+01      1.0000e-03      1.0000e+10      2.0000e-01
693 * irpwtv ndgx ndhx nrts nhist
694      7      0      0      10      0
695 * irpwtr irpwsv nrpwtb nrpwsv nrpwrf
696      *1001* 1002      101      15      0      0
697 * izpwtr izpwsv nzpwtb nzpwsv nzpwrp
698      0      101      1      0      0
699 * nmwrx nfcil nfcil
700      0      0      0
701 * nzpwz nzpwi nfbpwt
702      36      1      0
703 * react tneut rpwoff rrpwmx rpwscl
704      0.0000e+00      1.6250e-05      0.0000e+00      1.0000e+30      1.0000e+00
705 * rpowri zpwin zpwoff rzpwmx
706      9.3600e+06      0.0000e+00      0.0000e+00      *-1.0000e+20*      0.0
707 * extsou pldr pdrat fucrac
708      0.0000e+00      0.0000e+00      1.3364e+00      1.0000e+00
709 *
710 * nhcom* f      3e
711 * nhcelo*      1      2      3      4      5
712 * nhcelo*      6      7      8 e
713 * z *      2.0000e-01      8.1000e-01 s
714 * z *      1.4200e+00      2.0300e+00 s
715 * z *      2.6400e+00 s
716 * z *      3.2500e+00      3.8600e+00e
717 * grav * f      1.0000e+00e
718 * rdx *      1.8240e+03e
719 * radrd *      0.0000e+00      2.7000e-03      3.3000e-03      4.3500e-03      4.8500e-03
720 * radrd *      5.3500e-03e
721 * matrdr *      58      55      59r02      60e
722 * nfax * f      1e
723 * rftn * f      3.9100e+02 e
724 * rdpwr *      0.0000e+00r02      1.0000e+00r03      0.0000e+00e
725 * cpowr *      1.0000e+00e
726 * zpwzt array (new)
727      0.2s
728      0.2001s
729      0.455s
730      0.45501s
731      0.705s
732      0.70501s
733      0.915s
734      0.91501s
735      1.115s
736      1.11501s
737      1.315s
738      1.31501s
739      1.525s
740      1.52501s

```

```

741 1.725s
742 1.72501s
743 1.925s
744 1.92501s
745 2.135s
746 2.13501s
747 2.335s
748 2.33501s
749 2.535s
750 2.53501s
751 2.745s
752 2.74501s
753 2.945s
754 2.94501s
755 3.145s
756 3.14501s
757 3.355s
758 3.35501s
759 3.605s
760 3.60501s
761 3.85999s
762 3.86e
763 * zpwtb array (new)
764 r02 0.0s
765 r02 0.275s
766 r02 0.568s
767 r02 0.815s
768 r02 1.011s
769 r02 1.176s
770 r02 1.312s
771 r02 1.412s
772 r02 1.471s
773 r02 1.492s
774 r02 1.471s
775 r02 1.412s
776 r02 1.312s
777 r02 1.176s
778 r02 1.011s
779 r02 0.815s
780 r02 0.568s
781 r02 0.275s
782 0.0 e
783 * rpwtb * r02 0.0000e+00 5.0000e+00 9.3600e+06 6.3000e+01 9.3600e+06
784 * rpwtb * 7.3000e+01 8.9100e+06 8.8000e+01 8.4500e+06 1.0800e+02
785 * rpwtb * 8.0200e+06 1.3300e+02 7.6400e+06 1.6300e+02 7.3100e+06
786 * rpwtb * 2.2300e+02 6.8200e+02 2.8300e+02 6.2200e+02 3.8300e+02
787 * rpwtb * 5.8100e+06 4.8300e+02 5.4300e+06 6.3300e+02 5.0600e+06
788 * rpwtb * 8.3300e+02 4.6600e+06 1.0330e+03 4.3900e+06e
789 * fpuo2 * 0.0000e+00e
790 * ftd * 1.0000e+00e
791 * gmix * f 0.0000e+00e
792 * gmles * 0.0000e+00e
793 * pgapt * 0.0000e+00e
794 * plvol * 0.0000e+00e
795 * pslen * 0.0000e+00e
796 * clenm * 0.0000e+00e
797 * burn * f 0.0000e+00e
798 *
799 ***** type num id ctitle
800 slab 7 7 $7$ downcomer heat structure
801 * ncrx ncrz
802 1 7
803 * nopowr nridr modez liqlev iaxcnd
804 1 0 0 0 1
805 * idbci idbco hdri hdro
806 0 2 0.0000e+00 1.3650e-02
807 * width ipatch
808 7.6000e+00 0
809 * nrods nodes irftr nzmax
810 1 5 1001 200
811 * dtxht(1) dtxht(2) dznht hgapo shelv
812 2.5000e+00 1.0000e+01 1.0000e-03 1.0000e+10 2.0000e-01
813 *
814 * nhcomco* f 3e
815 * nhcelo* 1 2 3 4 5
816 * nhcelo* 6 7 8 9 e
817 * z * 2.0000e-01 8.1000e-01 s
818 * z * 1.4200e+00 2.0300e+00 s
819 * z * 2.6400e+00 s
820 * z * 3.2500e+00 3.8600e+00 3.9800e+00 e
821 * grav * f 1.0000e+00e
822 * rdx * 1.0000e+00e
823 * radrd * 0.0000e+00 2.0000e-03 4.0000e-03 5.5000e-03 6.9000e-03

```

```

824 * radrd * e
825 * matrdr * f          6e
826 * nfax * f          1e
827 * rftn * f 3.9300e+02 e
828 *
829 ***** type          num          id          ctitle
830 slab          100      100 $100$ lower plenum slab
831 *            ncrx          ncrz
832            1          1
833 *            nopowr        nrldr          modez          liqlev          iaxcnd
834            1          0          1          0          0
835 *            idbci          idbco          hdri          hdro
836            2          0      1.3650e-02      0.0000e+00
837 *            width          ipatch
838            2.8400e+02      0
839 *            nrods          nodes          irftr          nzmax
840            1          4          0          3
841 *            dtxht(1)      dtxht(2)      dznht          hgapo          shelv
842            3.0000e+00      1.0000e+01      1.0000e-01      1.0000e+10      0.0000e+00
843 *
844 * nhcomi* f          3e
845 * nhceli* r02          1          2e
846 * dz *          2.0000e-01e
847 * grav *          1.0000e+00e
848 * rdx *          1.0000e+00e
849 * radrd *          9.1770e+00      9.1784e+00      9.1799e+00      9.1813e+00e
850 * matrdr * f          6e
851 * nfax *          1e
852 * rftn * f          3.9100e+02e
853 *
854 end
855 *
856 *****
857 *            time step data
858 *****
859 *
860 *            dtmin          dtmax          tend          rtwfp
861            1.0e-6          0.020          5.0          10.0
862 *            edint          gfint          dmpint          sedint
863            5.0          0.5          5.0          5.0
864 *
865 *            dtmin          dtmax          tend          rtwfp
866            1.0e-6          0.050          50.0          10.0
867 *            edint          gfint          dmpint          sedint
868            45.0          0.5          45.0          45.0
869 *
870 *            dtmin          dtmax          tend          rtwfp
871            1.0e-6          0.050          100.0          10.0
872 *            edint          gfint          dmpint          sedint
873            50.0          0.5          50.0          50.0
874 *
875 *            dtmin          dtmax          tend          rtwfp
876            1.0e-6          0.100          450.0          10.0
877 *            edint          gfint          dmpint          sedint
878            50.0          0.5          50.0          50.0
879 *
880 *            endflag
881            -1.0000e+00

```

## APPENDIX X

### CODE-DATA COMPARISON FOR CCTF RUN 14 FOR THE RENODED CCTF INPUT MODEL WITH NEWRFD=3

This appendix presents the calculation results for the renoded CCTF input model for the reflood option newrfd=3, without and with grid spacers modeled. These calculations can be compared to the finely noded CCTF input model calculations that are presented in the main body of the report.

Without Grid Spacers		With Grid Spacers	
Coarsely noded model	Finely noded model	Coarsely noded model	Finely noded model
X-1	4.7-8	X-16	4.7-23
X-2	4.7-9	X-17	4.7-24
X-3	4.7-10	X-18	4.7-25
X-4	4.7-11	X-19	4.7-26
X-5	4.7-12	X-20	4.7-27
X-6	4.7-13	X-21	4.7-28
X-7	4.7-14	X-22	4.7-29
X-8	4.7-15	X-23	4.7-30
X-9	4.7-16	X-24	4.7-31
X-10	4.7-17	X-25	4.7-32
X-11	4.7-18	X-26	4.7-33
X-12	4.7-19	X-27	4.7-34
X-13	4.7-20	X-28	4.7-35
X-14	4.7-21	X-29	4.7-36
X-15	4.7-22	X-30	4.7-37

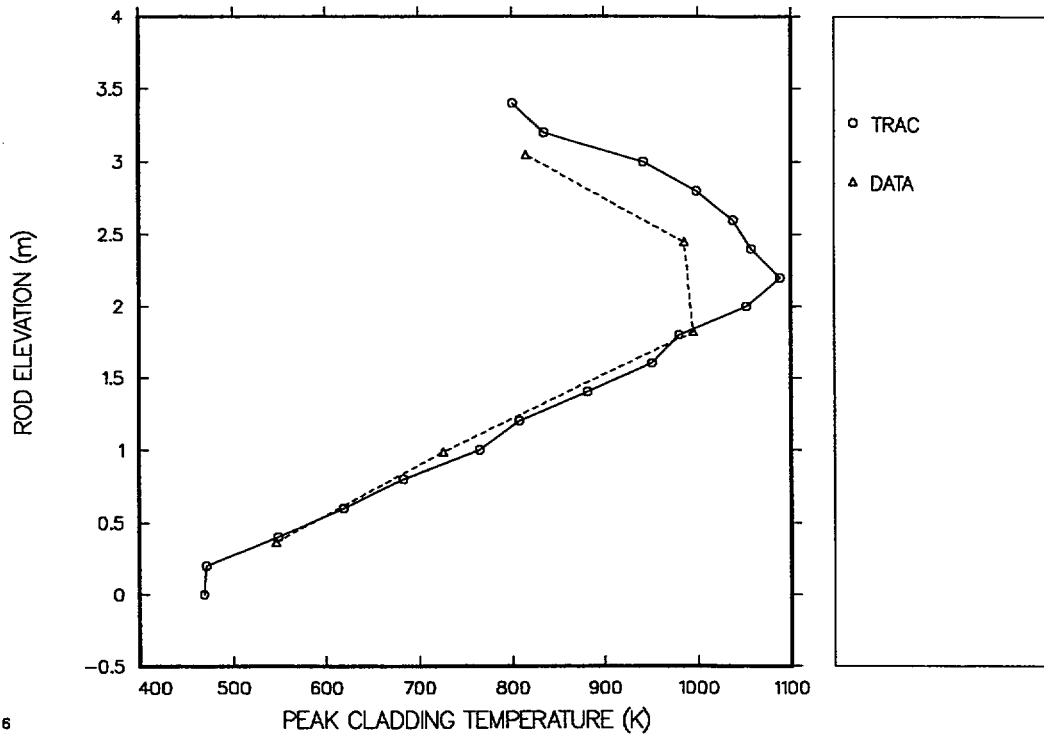


Fig. X-1. Comparison of predicted and measured PCTs (experimental data from Ref. 4.7-7).

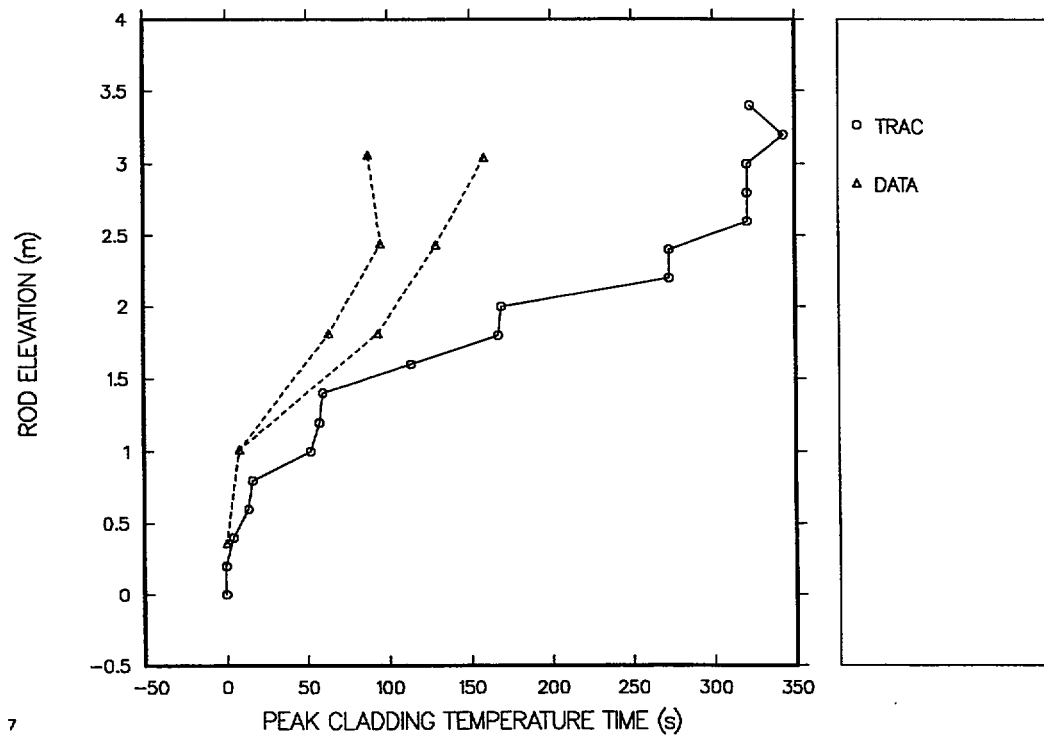
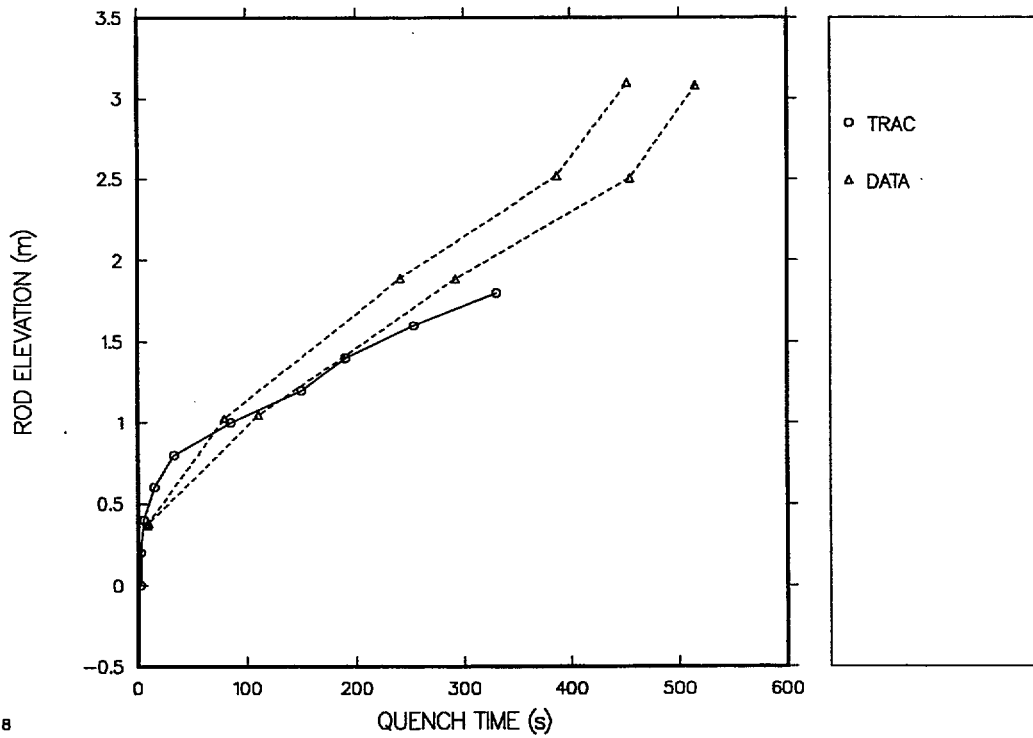


Fig. X-2. Comparison of predicted and measured PCT times (experimental data from Ref. 4.7-7).





8

Fig. X-3. Comparison of predicted and measured quench times (experimental data from Ref. 4.7-7).

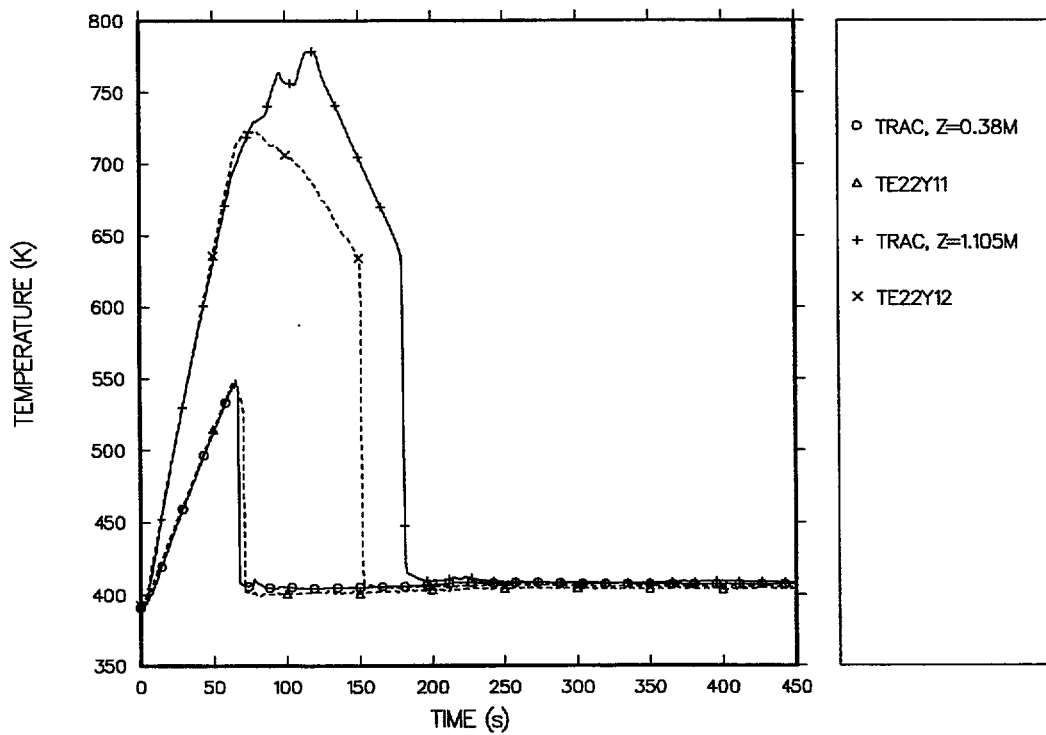


Fig. X-4. CCTF-14 run: Wall-temperature histories at 0.38- and 1.105-m elevations.

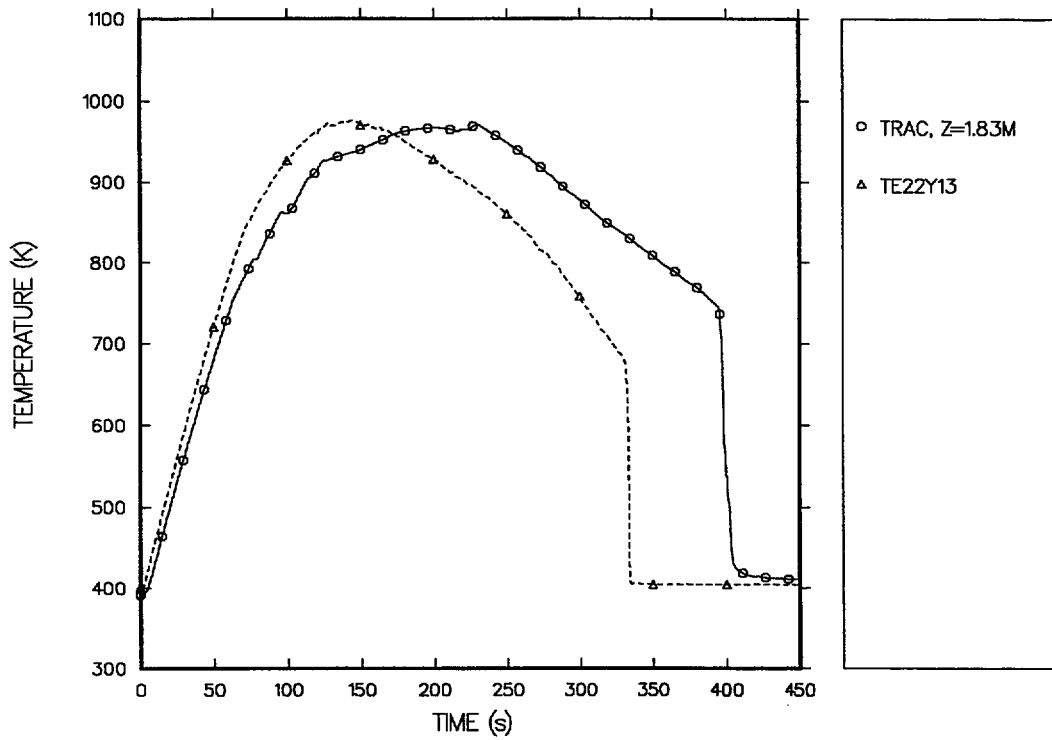


Fig. X-5. CCTF-14 run: Wall-temperature histories at 1.83-m elevations.

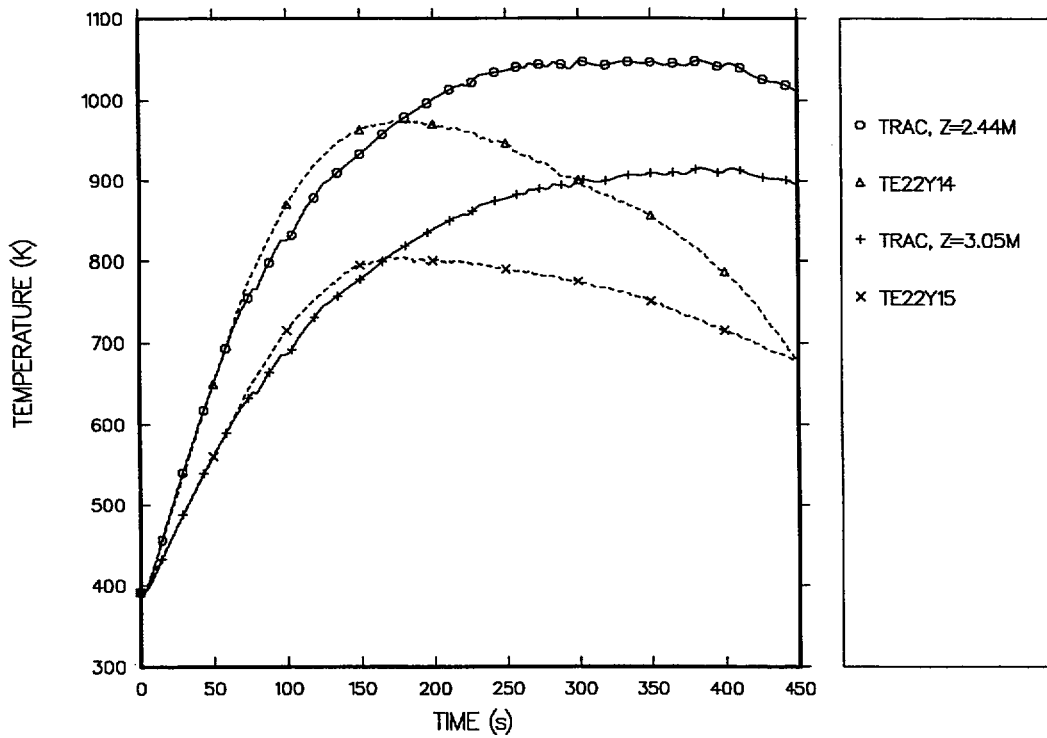
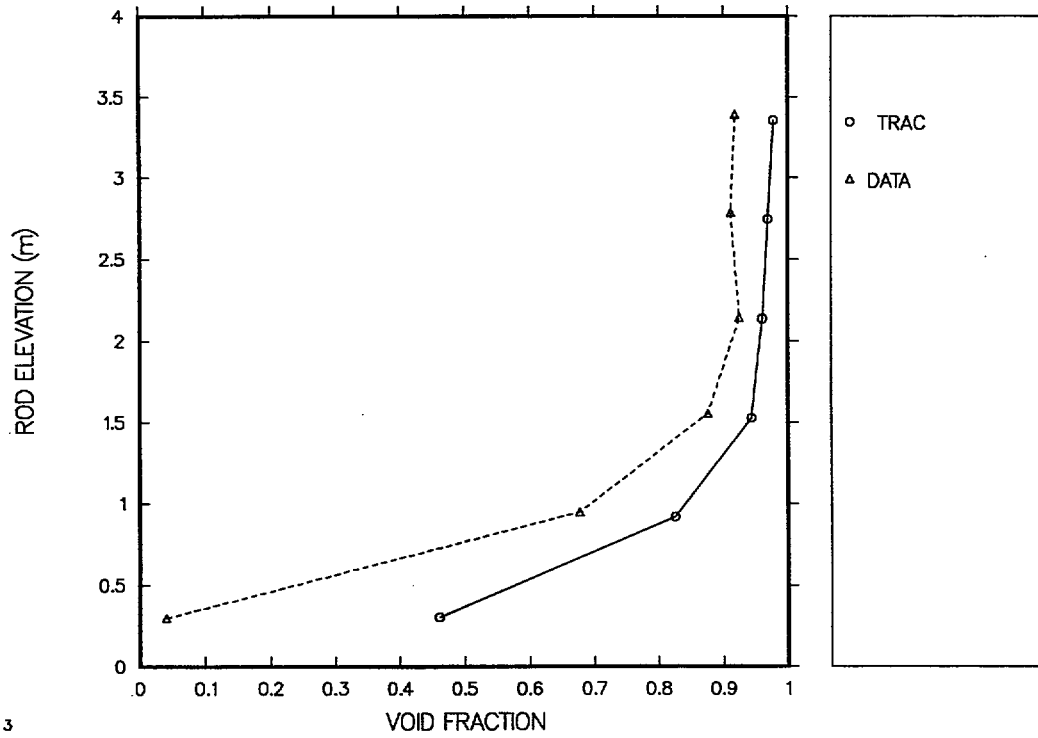
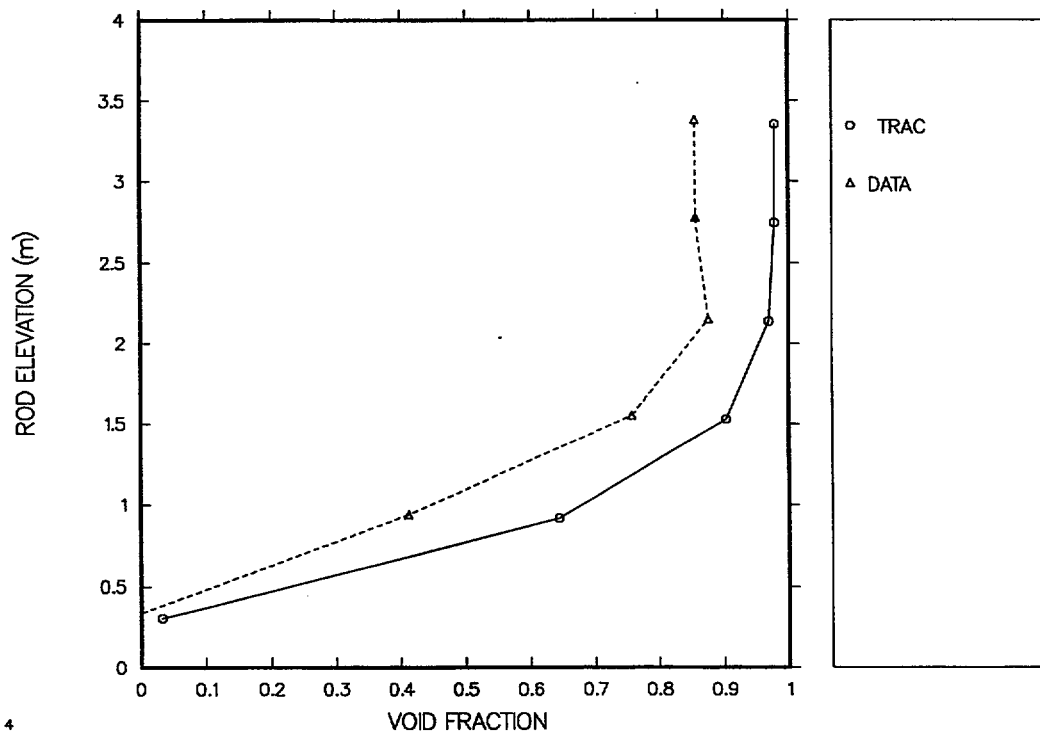


Fig. X-6. CCTF-14 run: Wall-temperature histories at 2.44- and 3.05-m elevations.



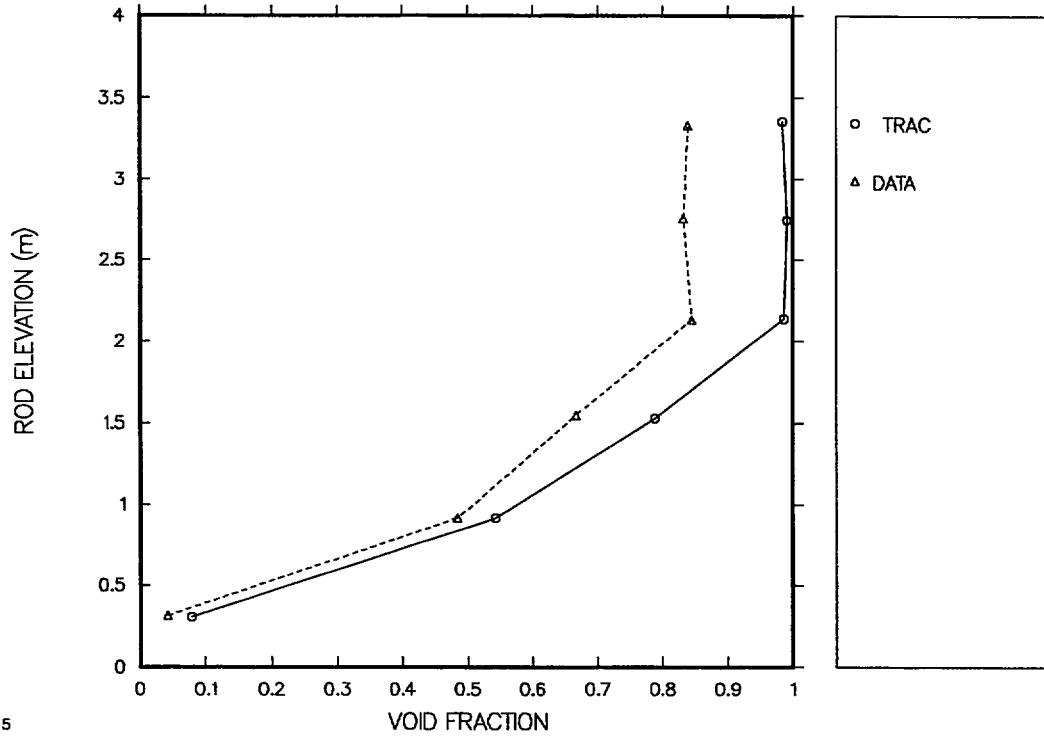
3

Fig. X-7. Comparison of predicted and measured core-axial void-fraction profiles at 37 s (experimental data from Ref. 4.7-7).



4

Fig. X-8. Comparison of predicted and measured core-axial void-fraction profiles at 137 s (experimental data from Ref. 4.7-7).



5

Fig. X-9. Comparison of predicted and measured core-axial void-fraction profiles at 237 s (experimental data from Ref. 4.7-7).

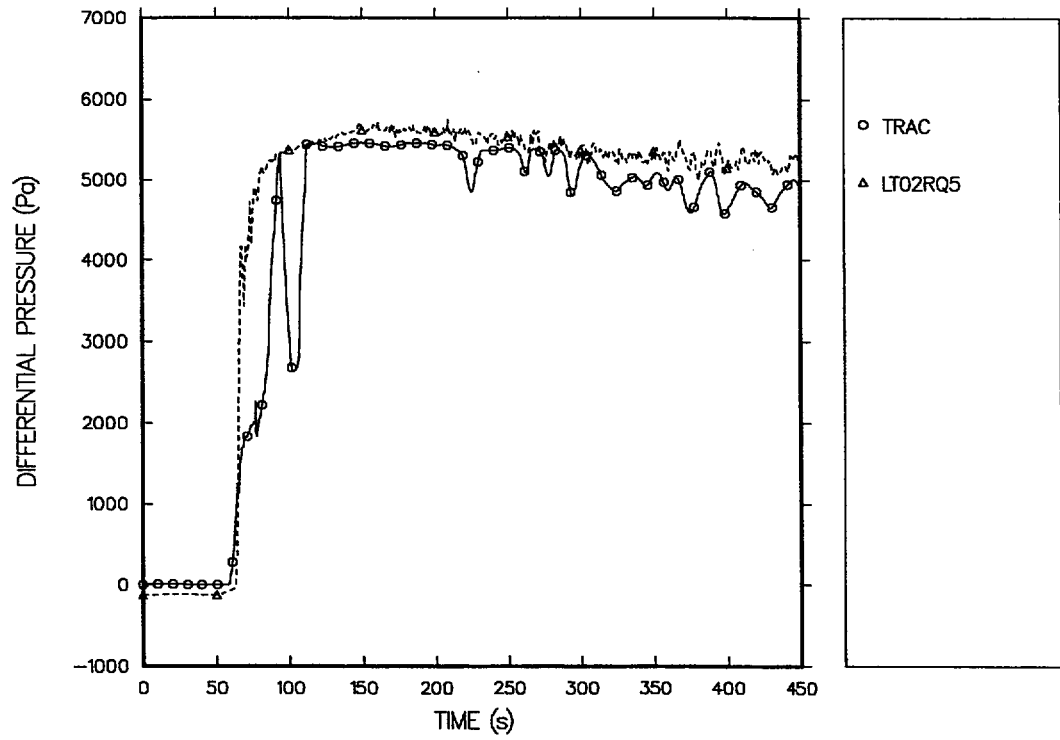


Fig. X-10. CCTF-14 run: Core  $\Delta P$  history between the 0.0- and 0.61-m elevations.

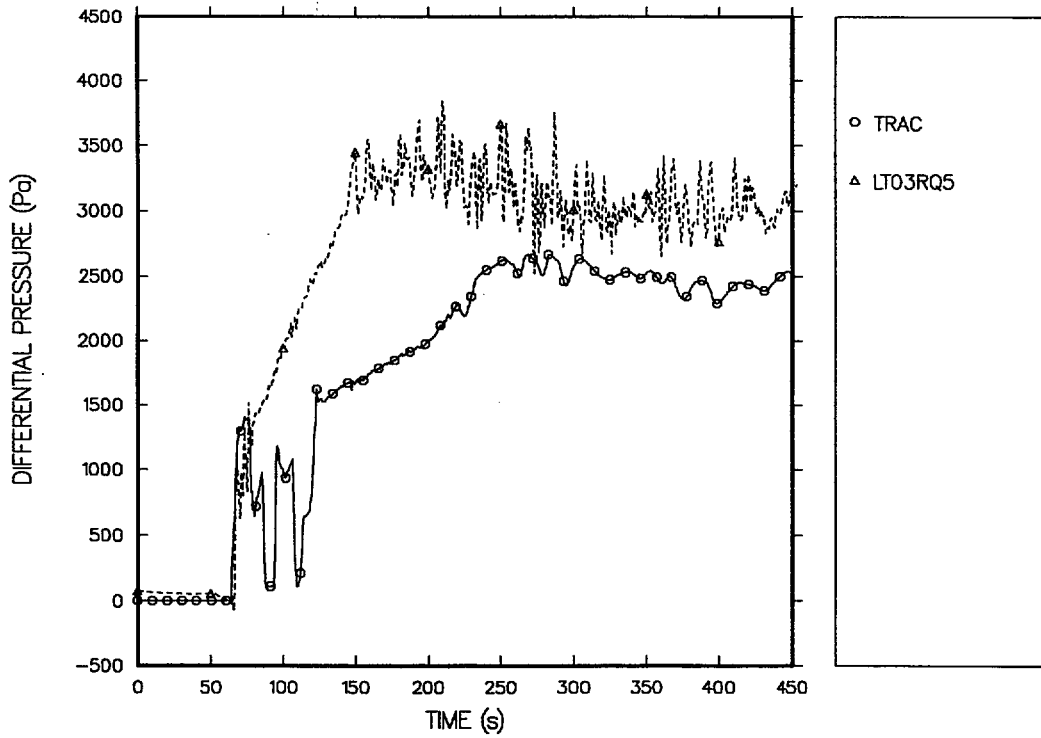


Fig. X-11. CCTF-14 run: Core  $\Delta P$  history between the 0.61- and 1.22-m elevations.

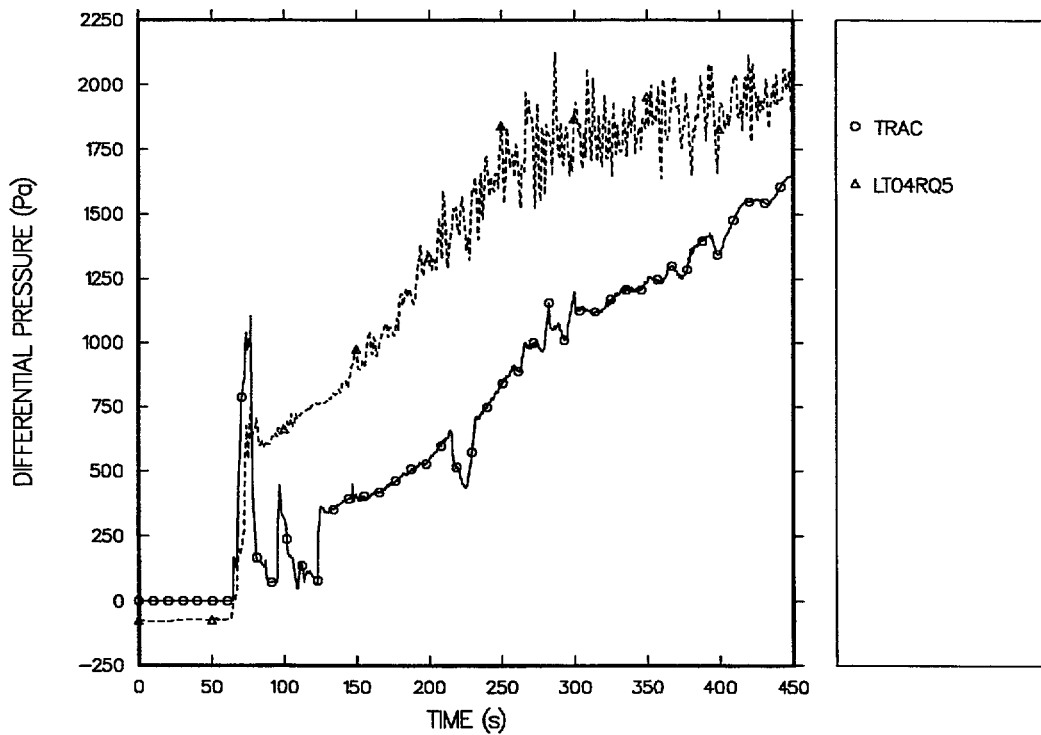


Fig. X-12. CCTF-14 run: Core  $\Delta P$  history between the 1.22- and 1.83-m elevations.

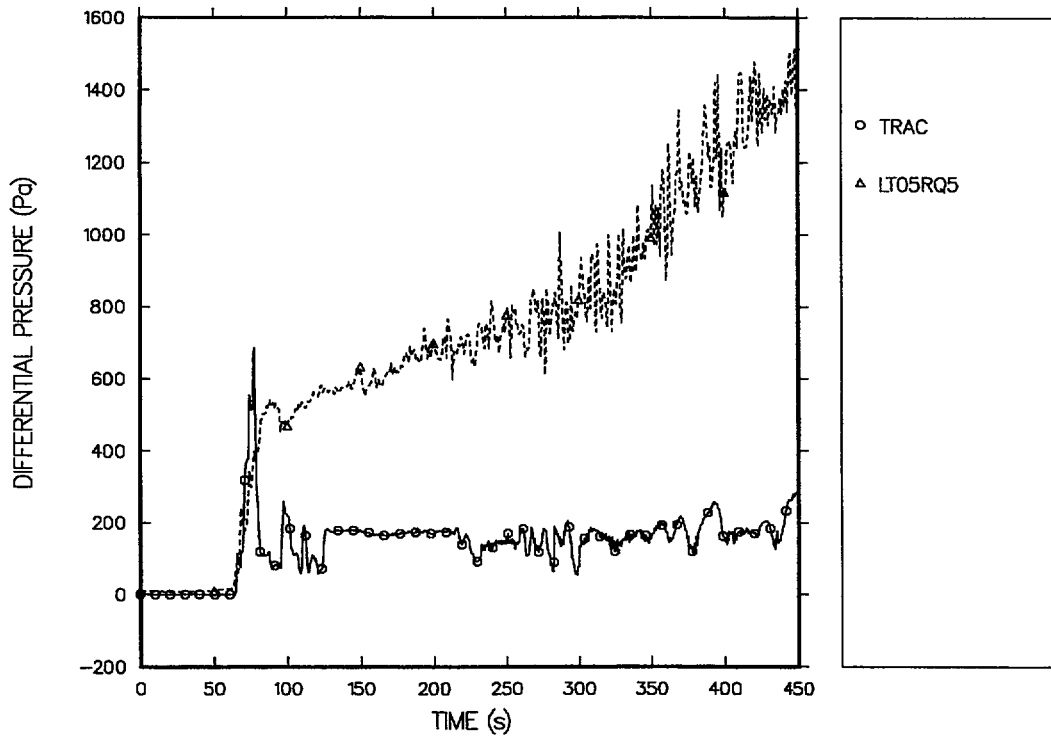


Fig. X-13. CCTF-14 run: Core  $\Delta P$  history between the 1.83- and 2.44-m elevations.

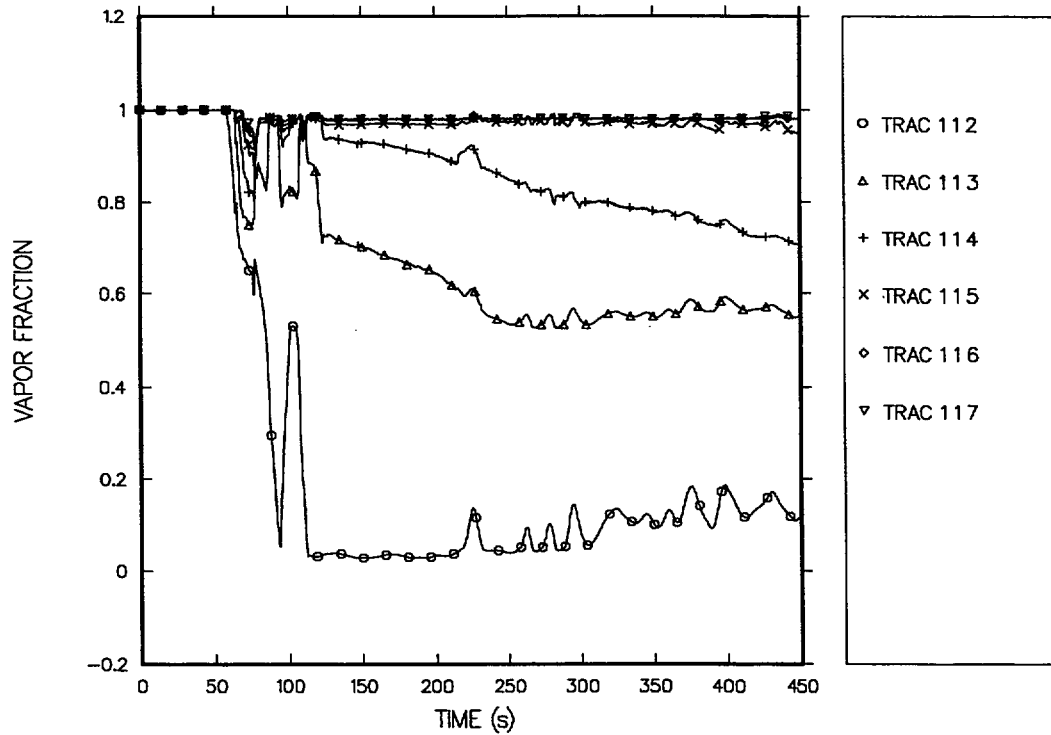


Fig. X-14. CCTF-14 run: Predicted void-fraction histories within the core.

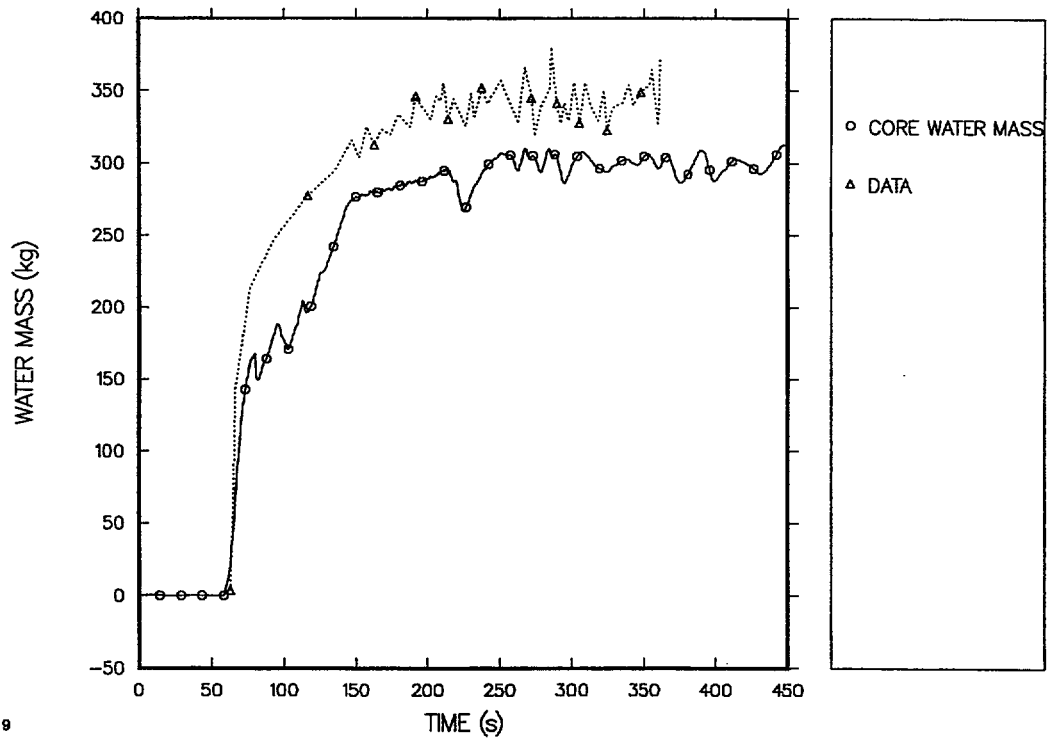


Fig. X-15. CCTF-14 run: Comparison of predicted and measured core mass.

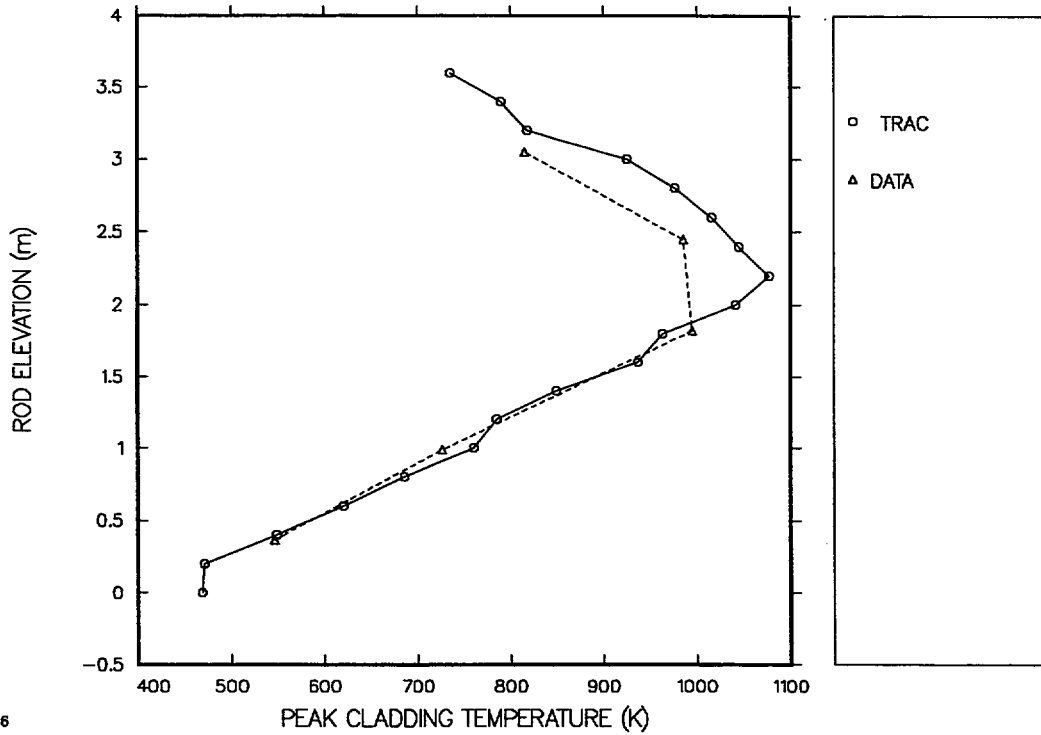


Fig. X-16. Comparison of predicted and measured PCTs with the grid-spacer model (experimental data from Ref. 4.7-7).

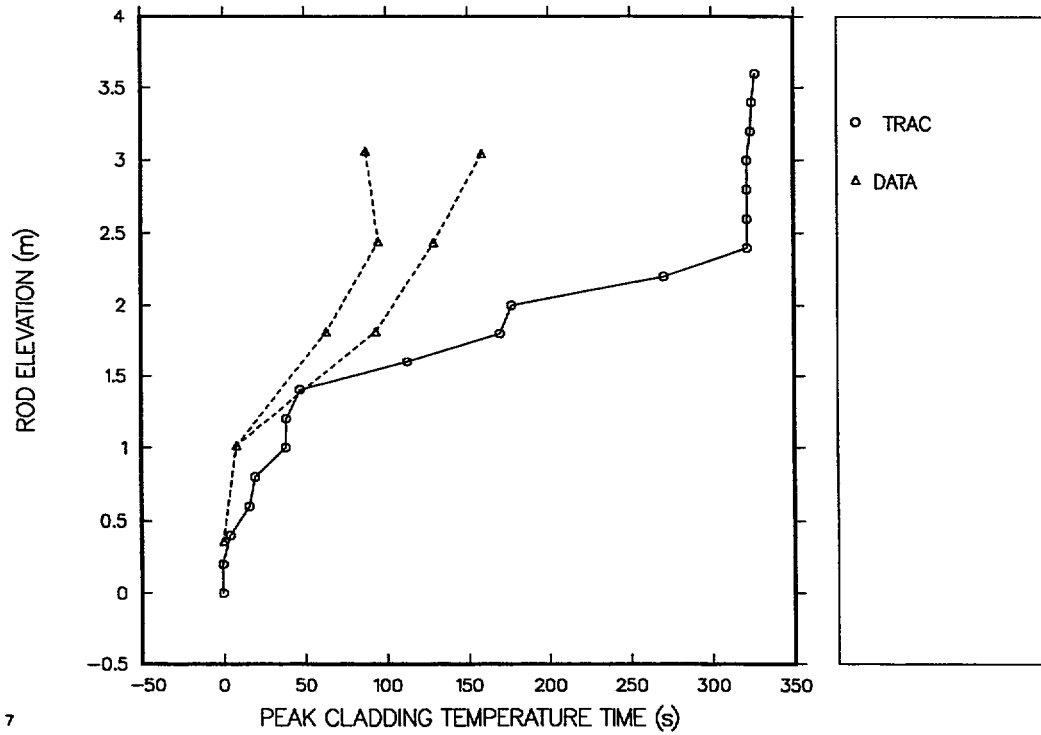
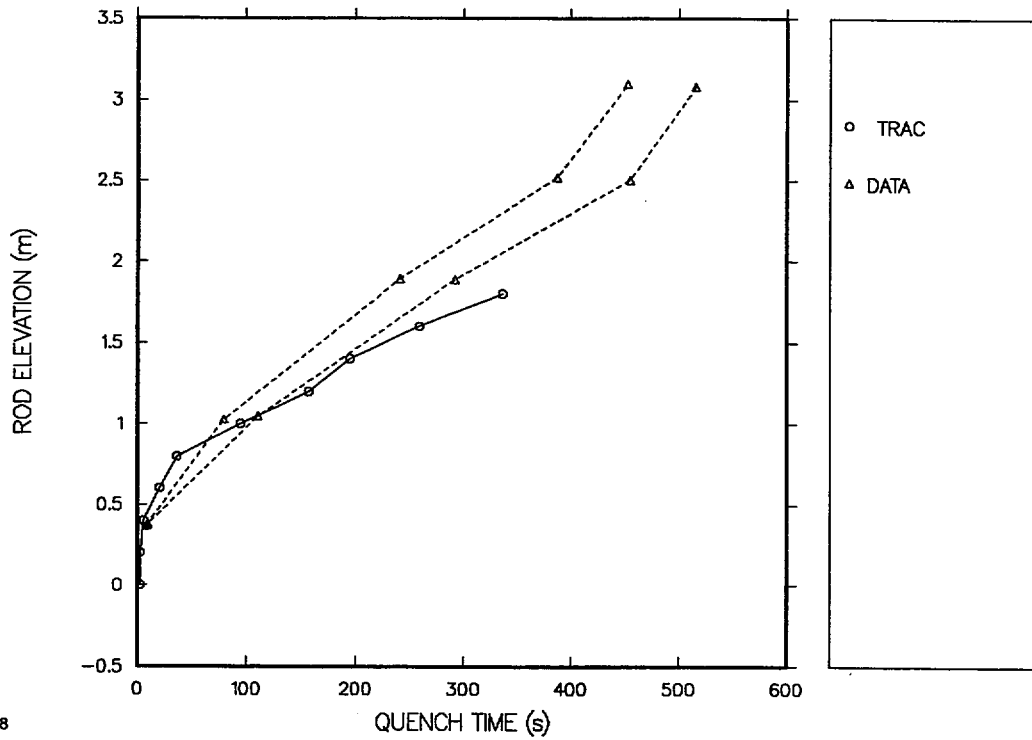


Fig. X-17. Comparison of predicted and measured PCT times with the grid-spacer model (experimental data from Ref. 4.7-7).





8

Fig. X-18. Comparison of predicted and measured quench times with the grid-spacer model (experimental data from Ref. 4.7-7).

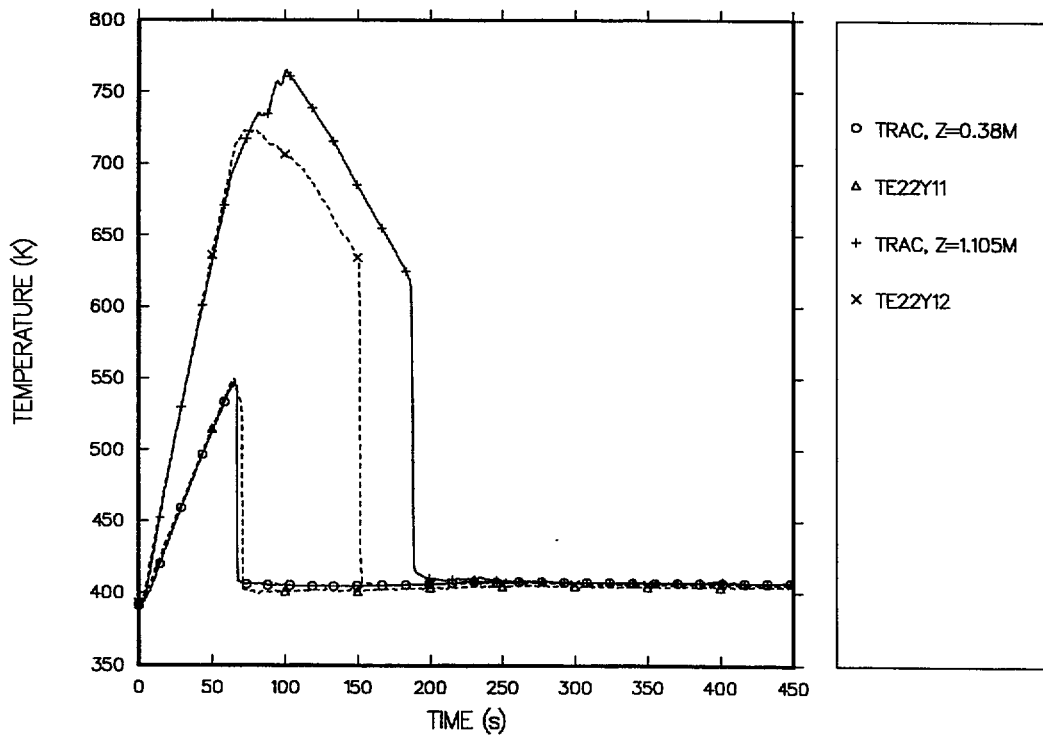


Fig. X-19. CCTF-14 run: Wall-temperature histories at 0.38- and 1.105-m elevations with the grid-spacer model.

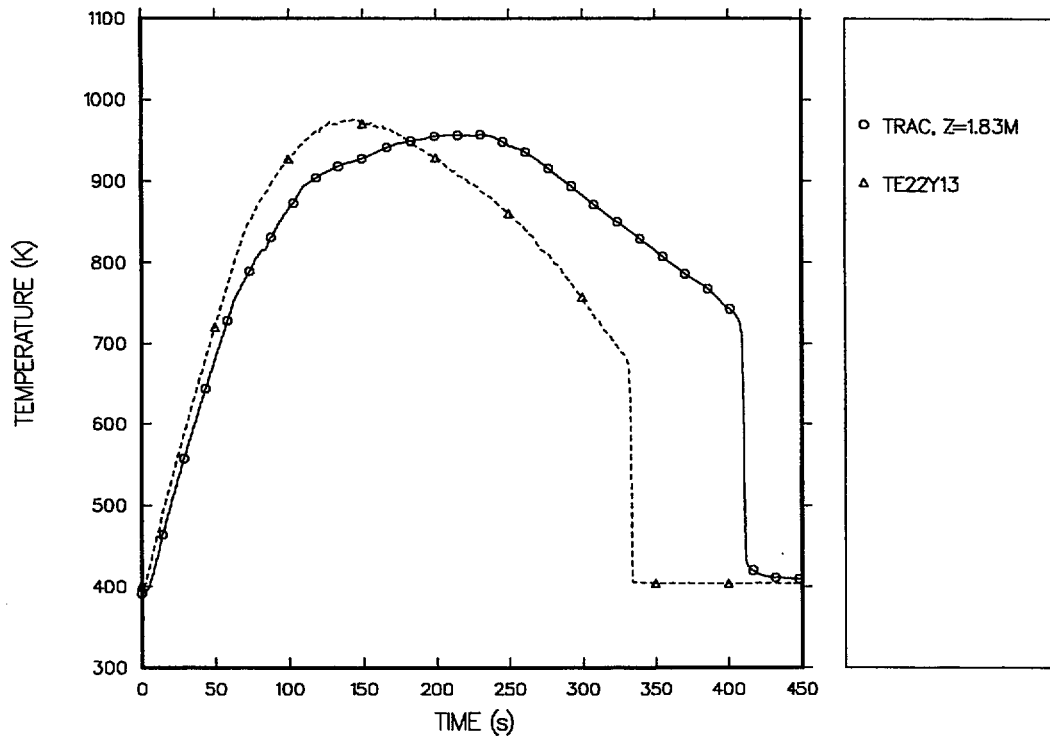


Fig. X-20. CCTF-14 run: Wall-temperature histories at 1.83-m elevations with the grid-spacer model.

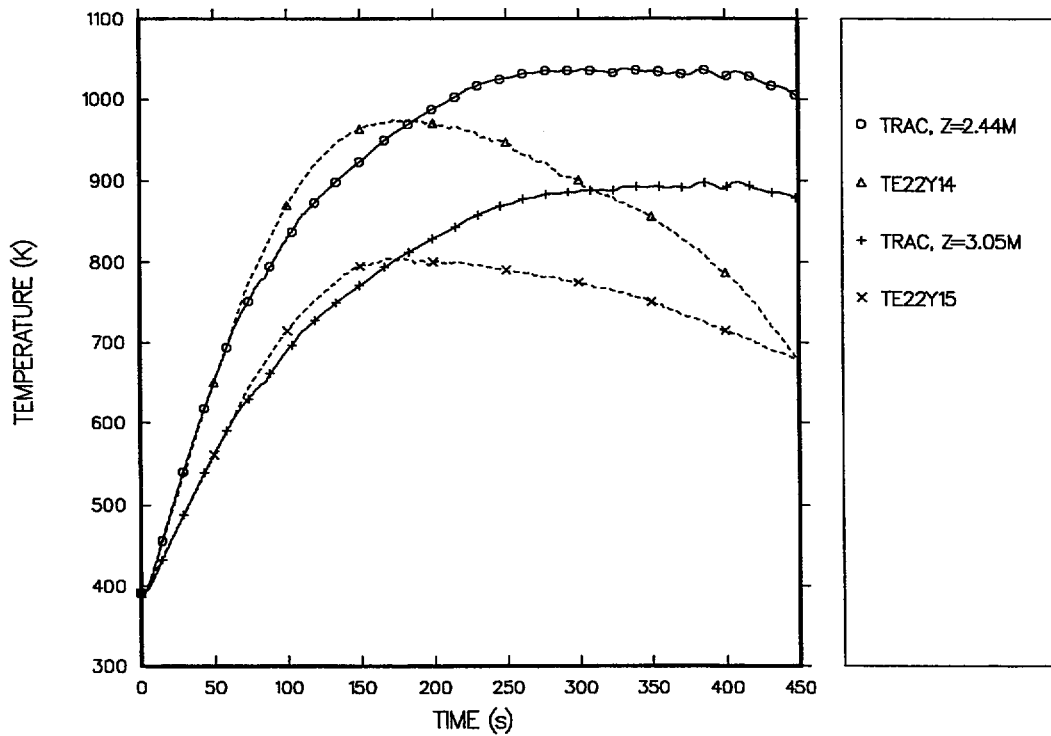


Fig. X-21. CCTF-14 run: Wall-temperature histories at 2.44- and 3.05-m elevations with the grid-spacer model.

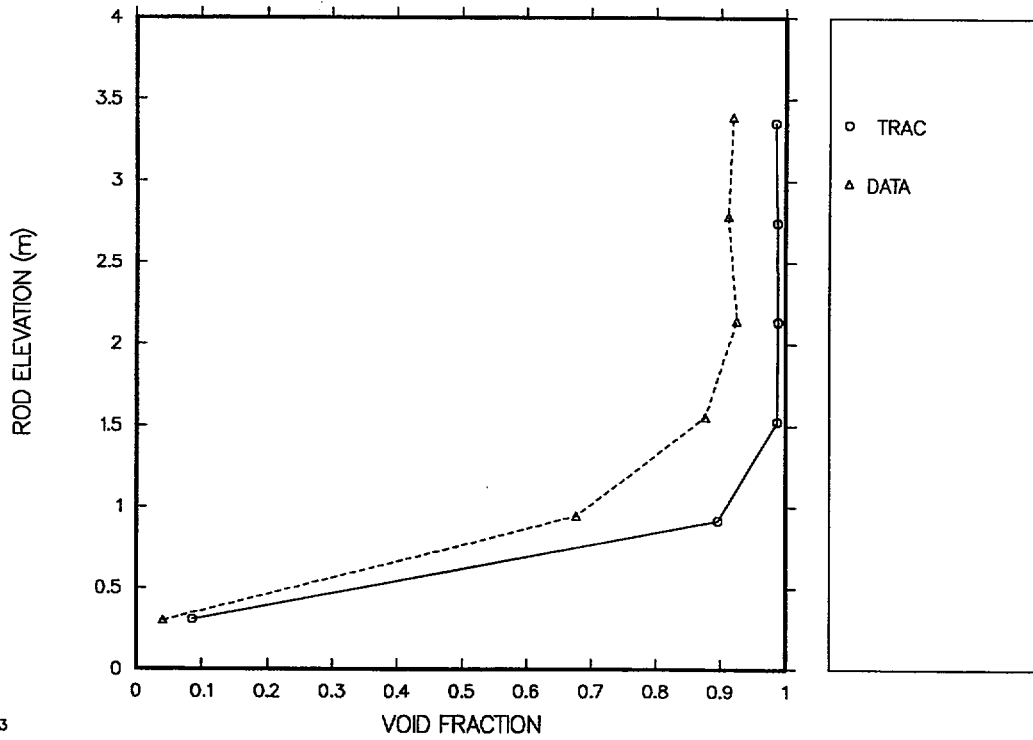


Fig. X-22. Comparison of predicted and measured core-axial void-fraction profiles at 37 s with the grid-spacer model (experimental data from Ref. 4.7-7).

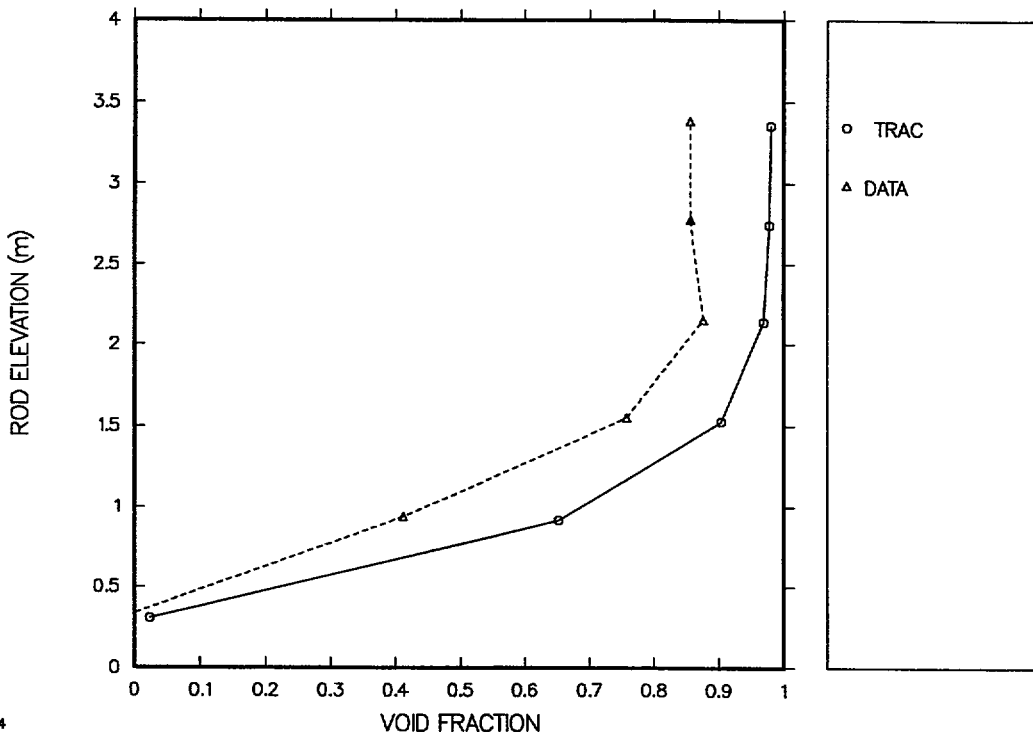


Fig. X-23. Comparison of predicted and measured core-axial void-fraction profiles at 137 s with the grid-spacer model (experimental data from Ref. 4.7-7).

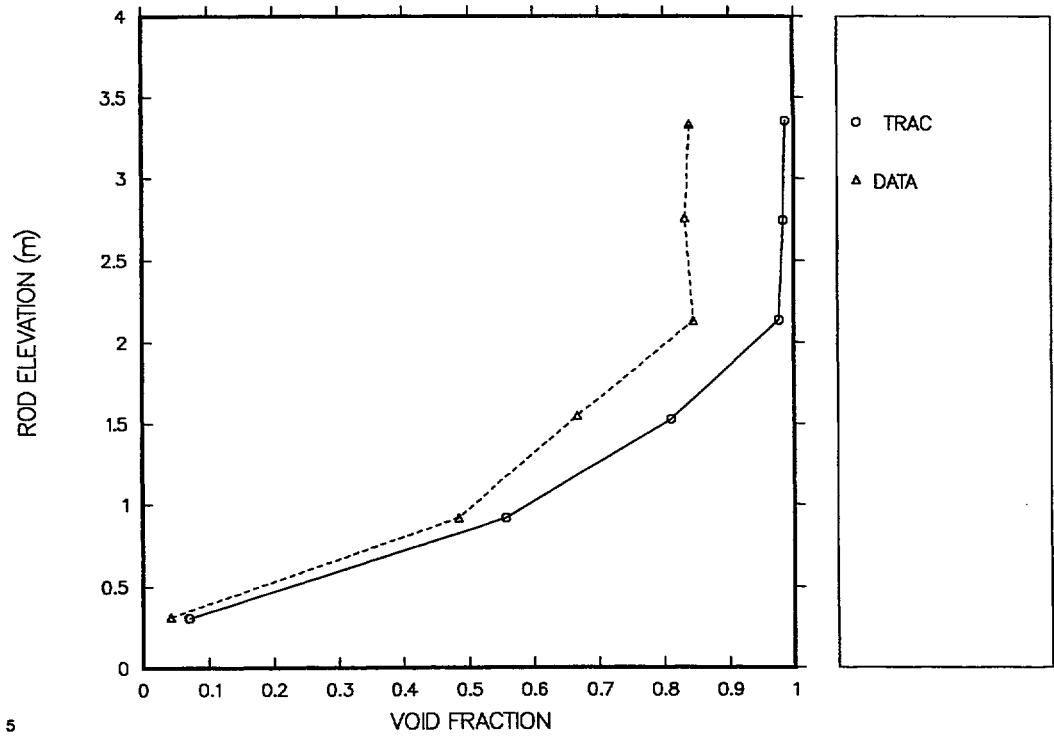


Fig. X-24. Comparison of predicted and measured core-axial void-fraction profiles at 237 s with the grid-spacer model (experimental data from Ref. 4.7-7).

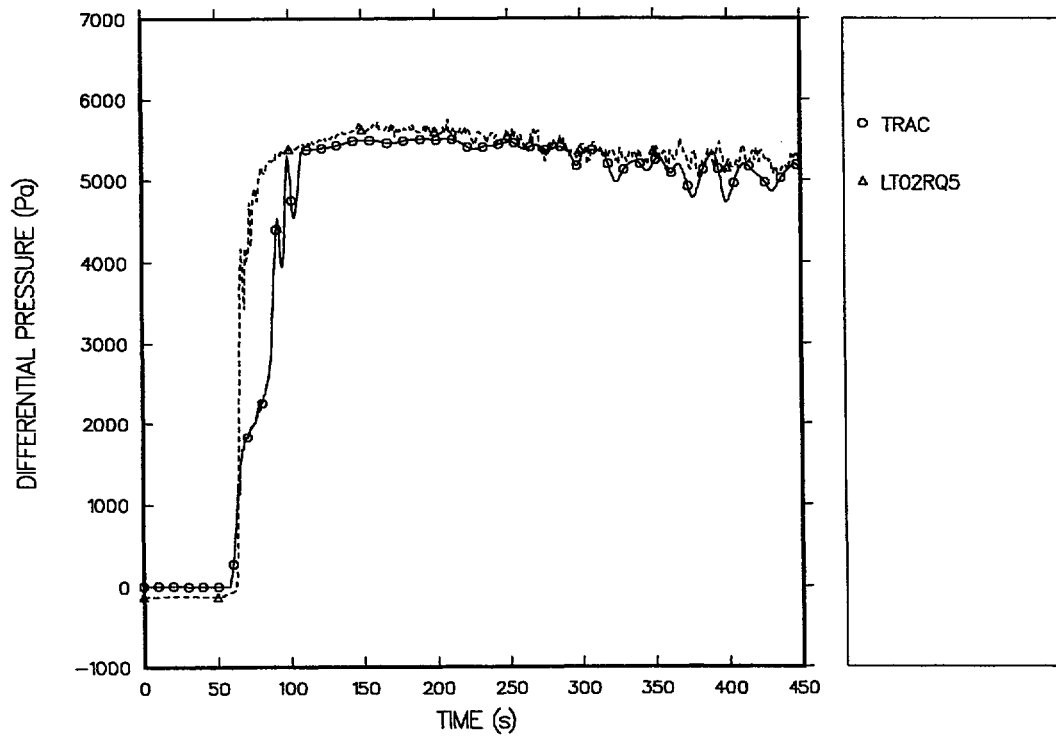


Fig. X-25. CCTF-14 run: Core- $\Delta P$  history between the 0.0- and 0.61-m elevations with the grid-spacer model.

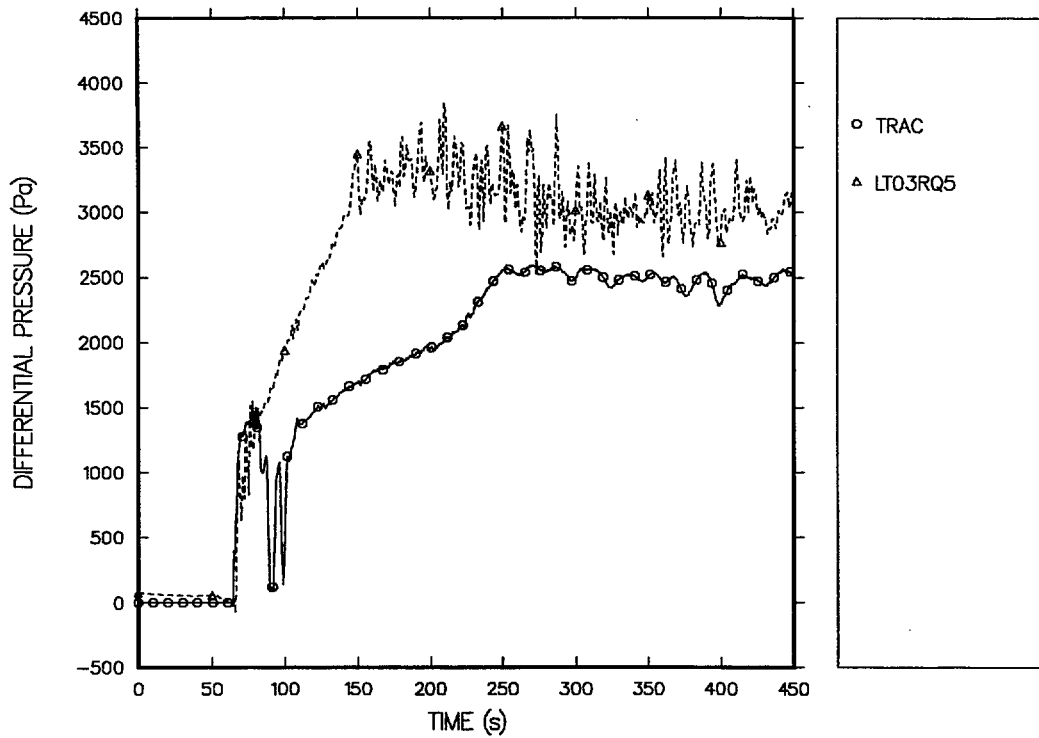


Fig. X-26. CCTF-14 run: Core- $\Delta P$  history between the 0.61- and 1.22-m elevations with the grid-spacer model.

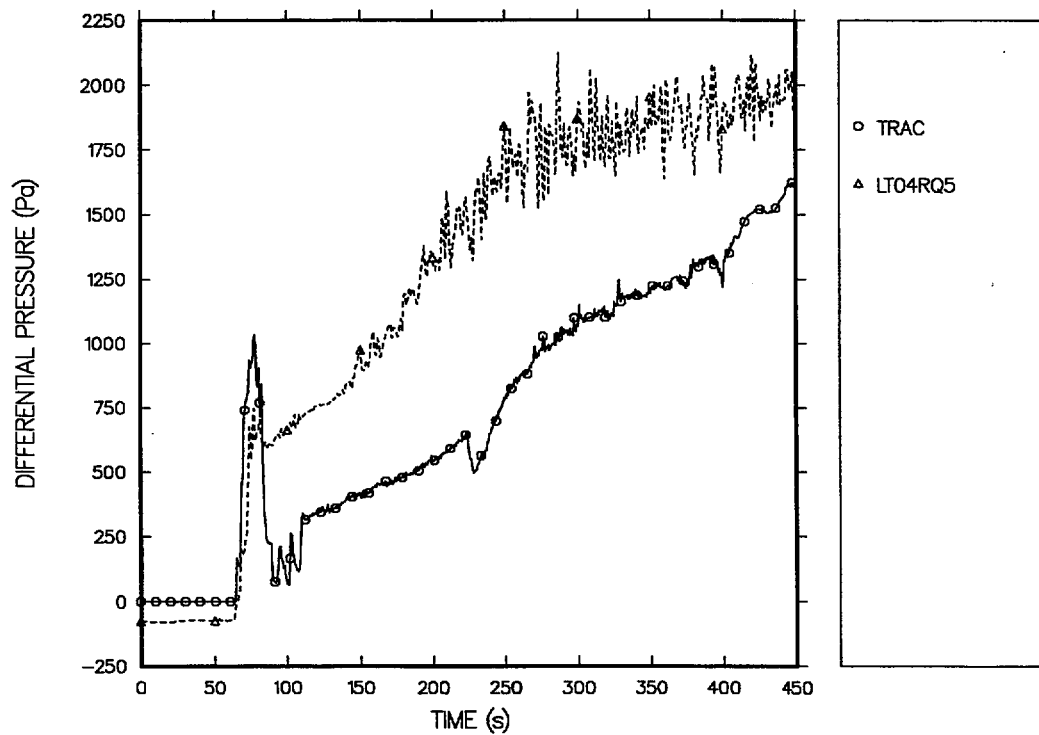


Fig. X-27. CCTF-14 run: Core- $\Delta P$  history between the 1.22- and 1.83-m elevations with the grid-spacer model.

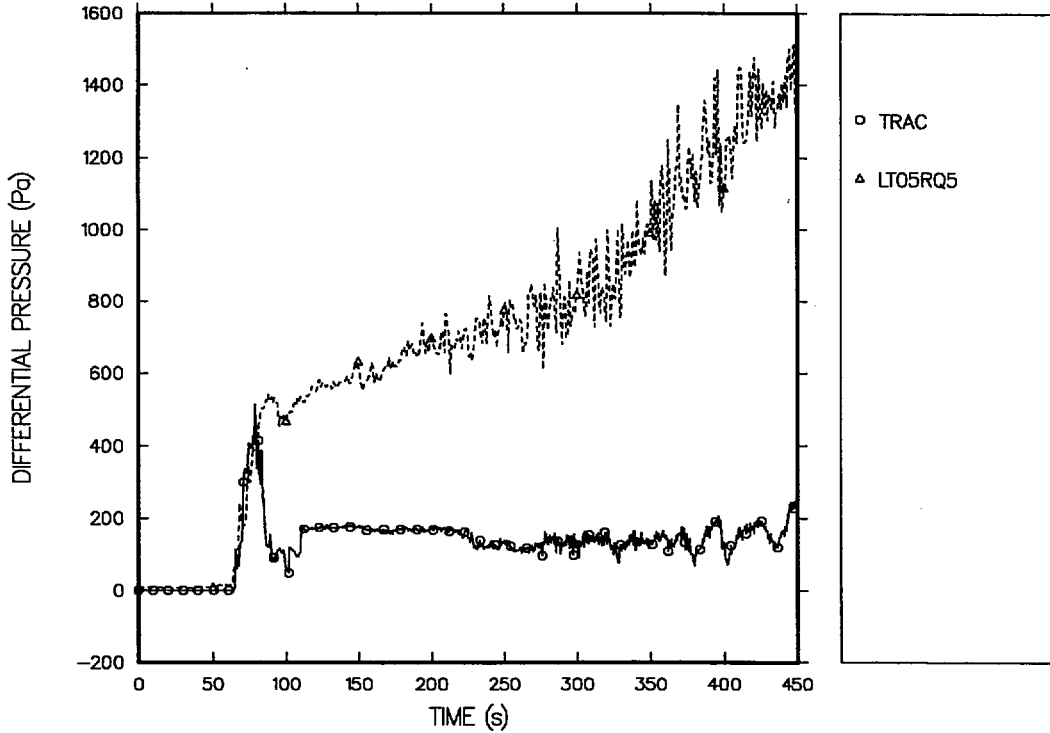


Fig. X-28. CCTF-14 run: Core- $\Delta P$  history between the 1.83- and 2.44-m elevations with the grid-spacer model.

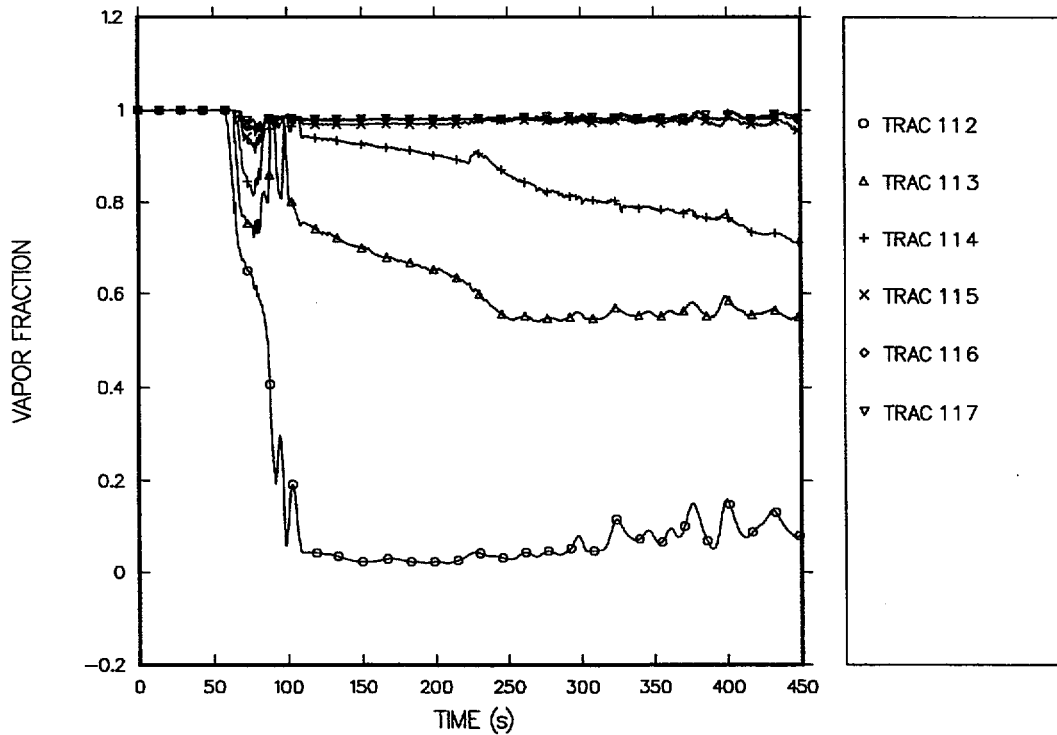


Fig. X-29. CCTF-14 run: Predicted void-fraction histories within the core with the grid-spacer model.

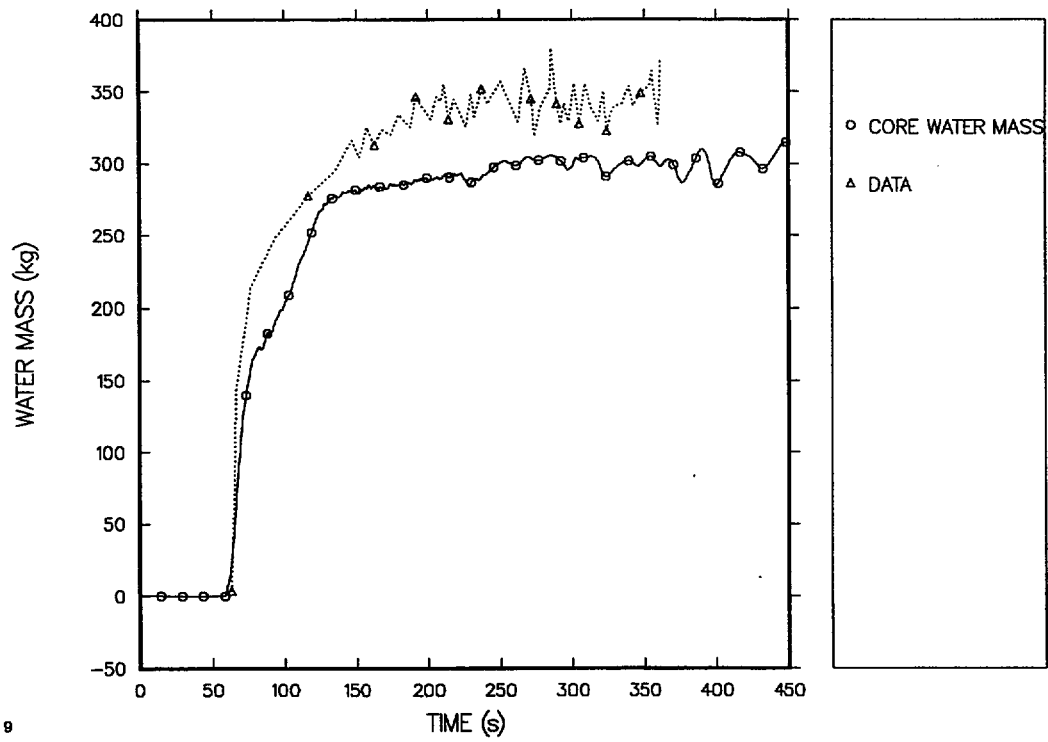


Fig. X-30. CCTF-14 run: Comparison of predicted and measured core mass with the grid-spacer model.

## APPENDIX Y

### CODE-DATA COMPARISON FOR CCTF RUN 14 FOR THE RENODED CCTF INPUT MODEL WITH NEWRFD=1

This appendix presents the calculation results for the renoded CCTF input model for the reflood option newrfd=1, without and with grid spacers modeled. The same set of plots that is presented in Appendix X for the reflood option newrfd=3 is also presented for the reflood option newrfd=1. For reference purposes, the figure numbers for the two reflood options are listed below.

Without Grid Spacers		With Grid Spacers	
newrfd=1	newrfd=3	newrfd=1	newrfd=3
Y-1	X-1	Y-16	X-16
Y-2	X-2	Y-17	X-17
Y-3	X-3	Y-18	X-18
Y-4	X-4	Y-19	X-19
Y-5	X-5	Y-20	X-20
Y-6	X-6	Y-21	X-21
Y-7	X-7	Y-22	X-22
Y-8	X-8	Y-23	X-23
Y-9	X-9	Y-24	X-24
Y-10	X-10	Y-25	X-25
Y-11	X-11	Y-26	X-26
Y-12	X-12	Y-27	X-27
Y-13	X-13	Y-28	X-28
Y-14	X-14	Y-29	X-29
Y-15	X-15	Y-30	X-30



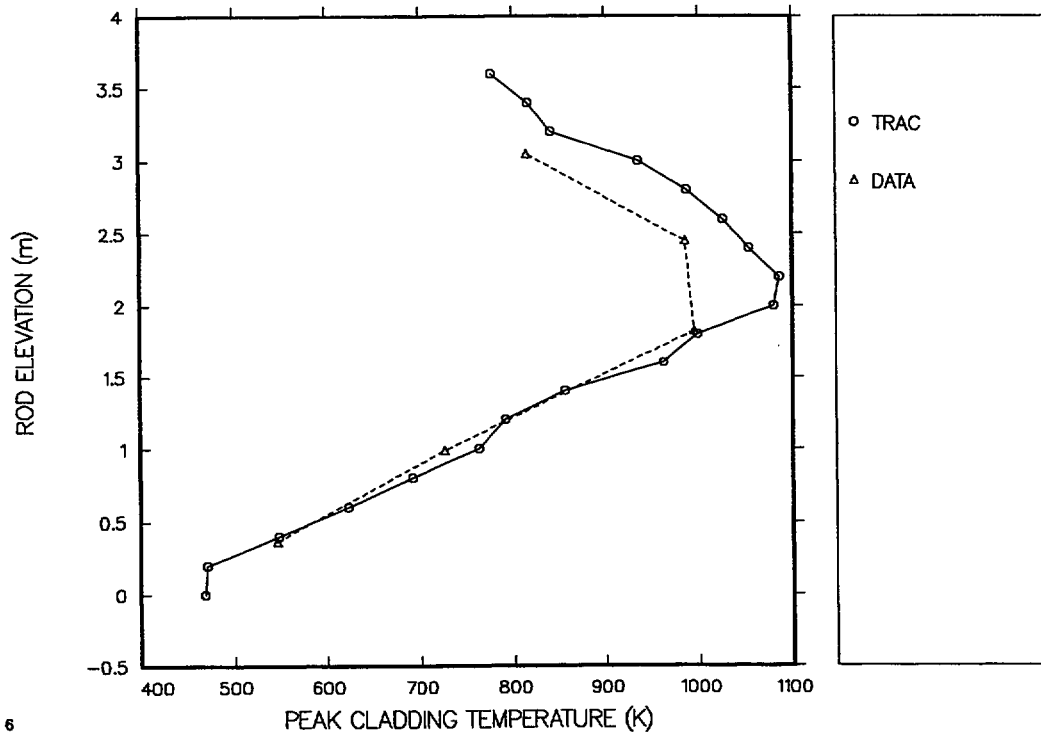


Fig. Y-1. Comparison of predicted and measured PCTs (experimental data from Ref. 4.7-7).

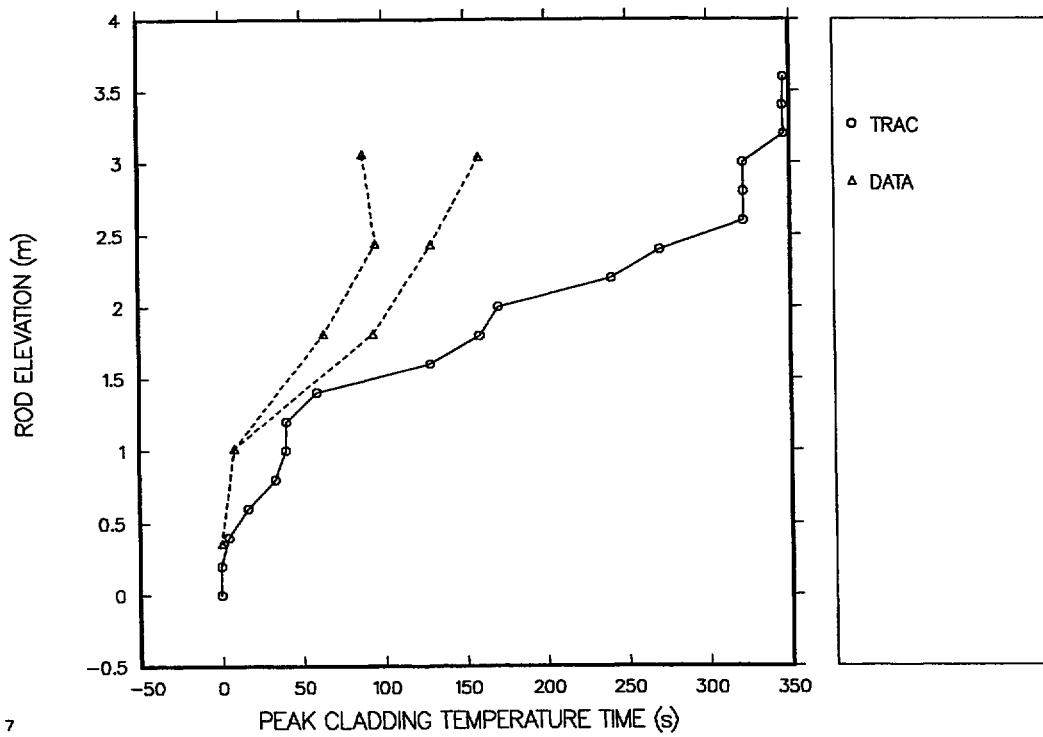


Fig. Y-2. Comparison of predicted and measured PCT times (experimental data from Ref. 4.7-7).

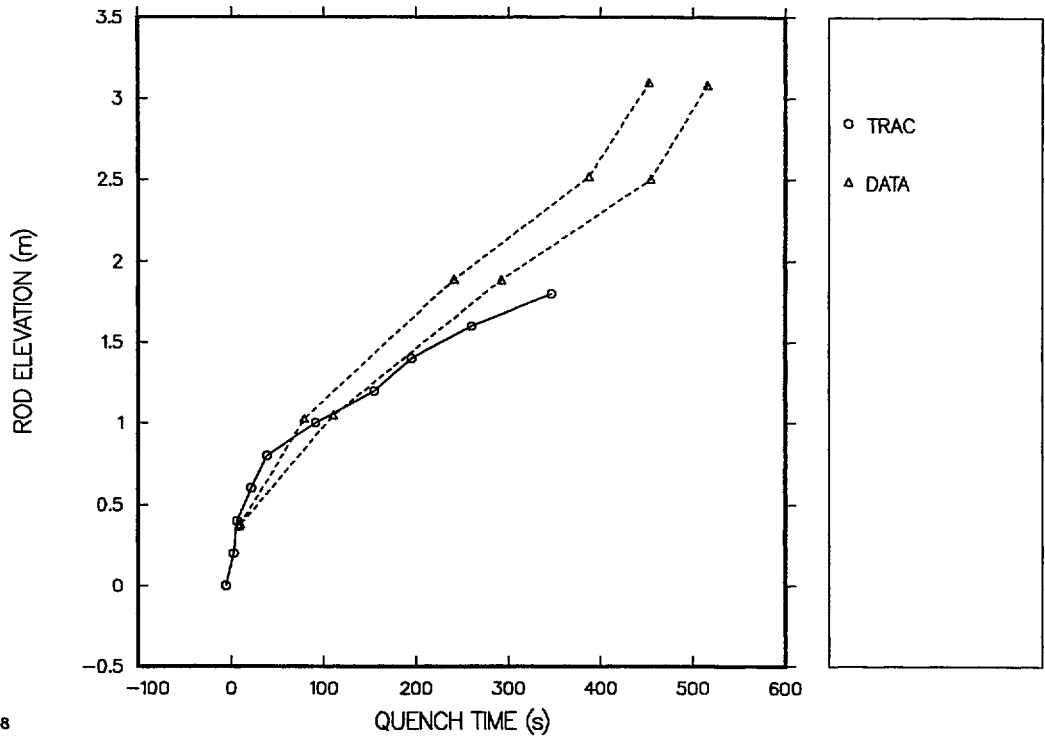


Fig. Y-3. Comparison of predicted and measured quench times (experimental data from Ref. 4.7-7).

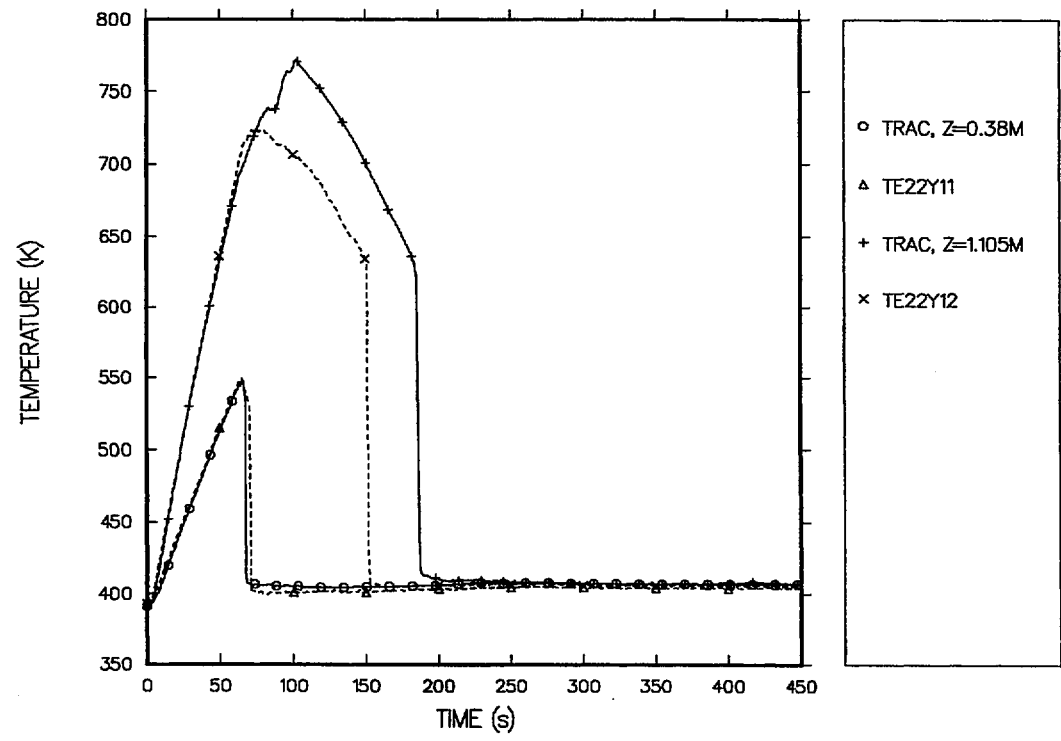


Fig. Y-4. CCTF-14 run: Wall-temperature histories at 0.38- and 1.105-m elevations.

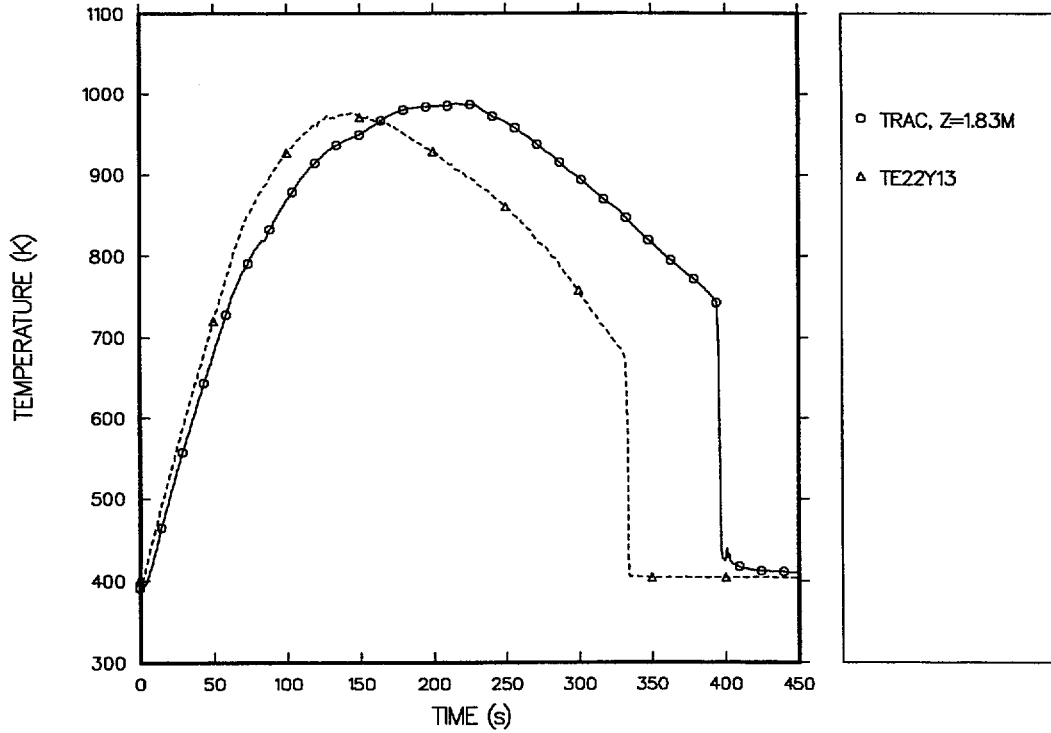


Fig. Y-5. CCTF-14 run: Wall-temperature histories at 1.83-m elevations.

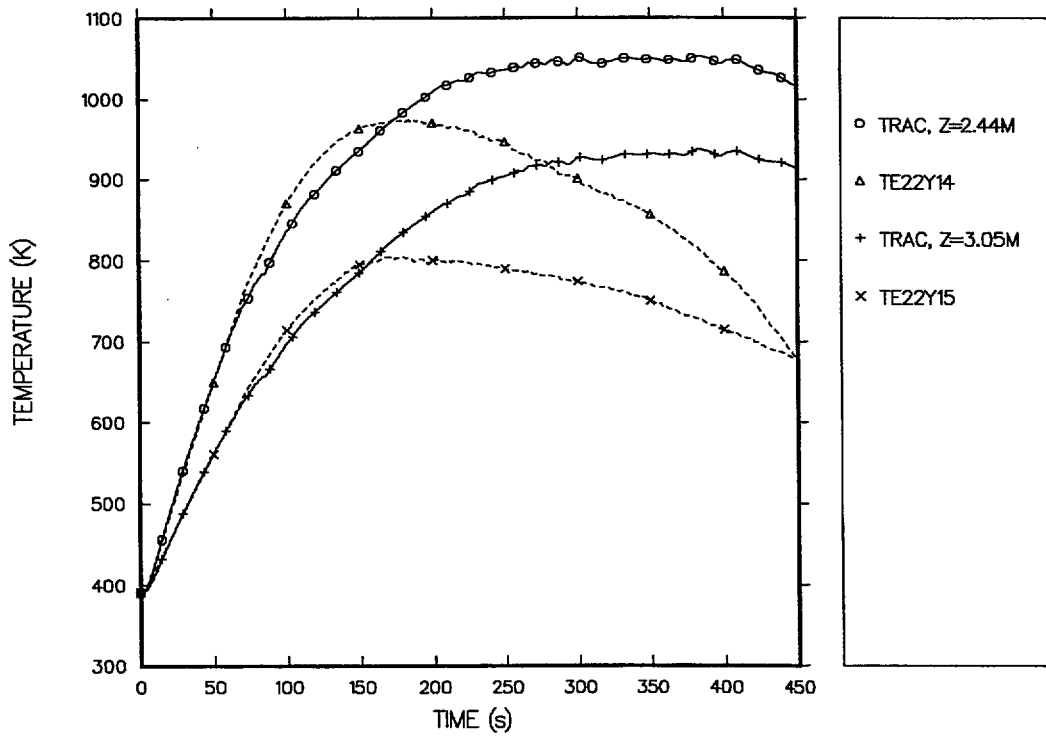
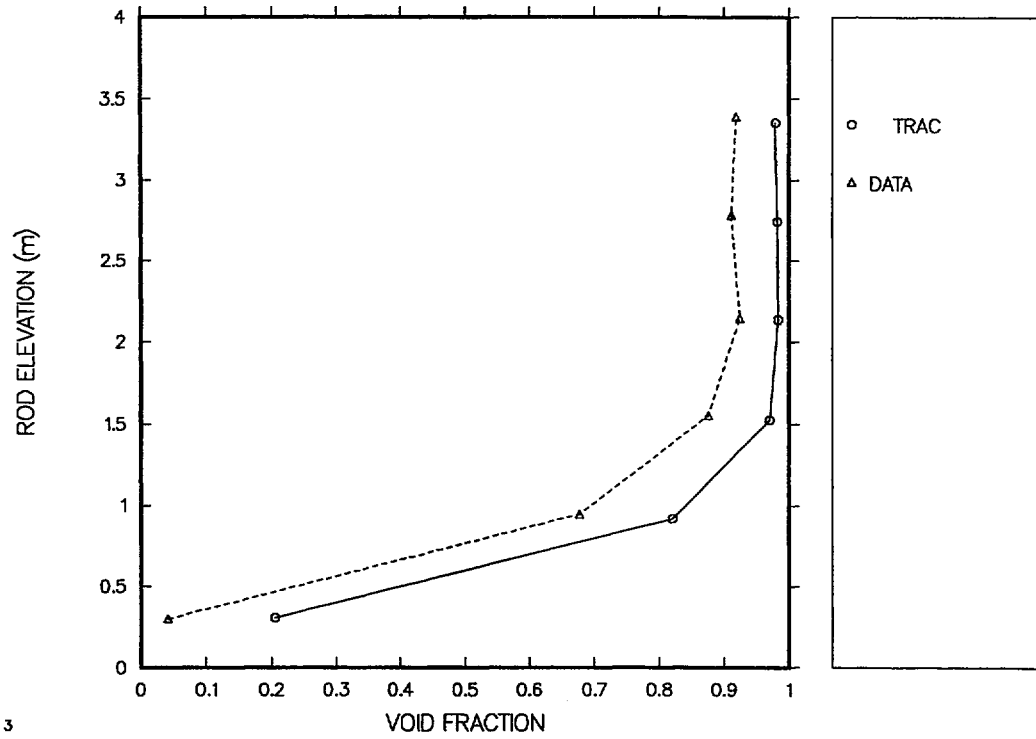
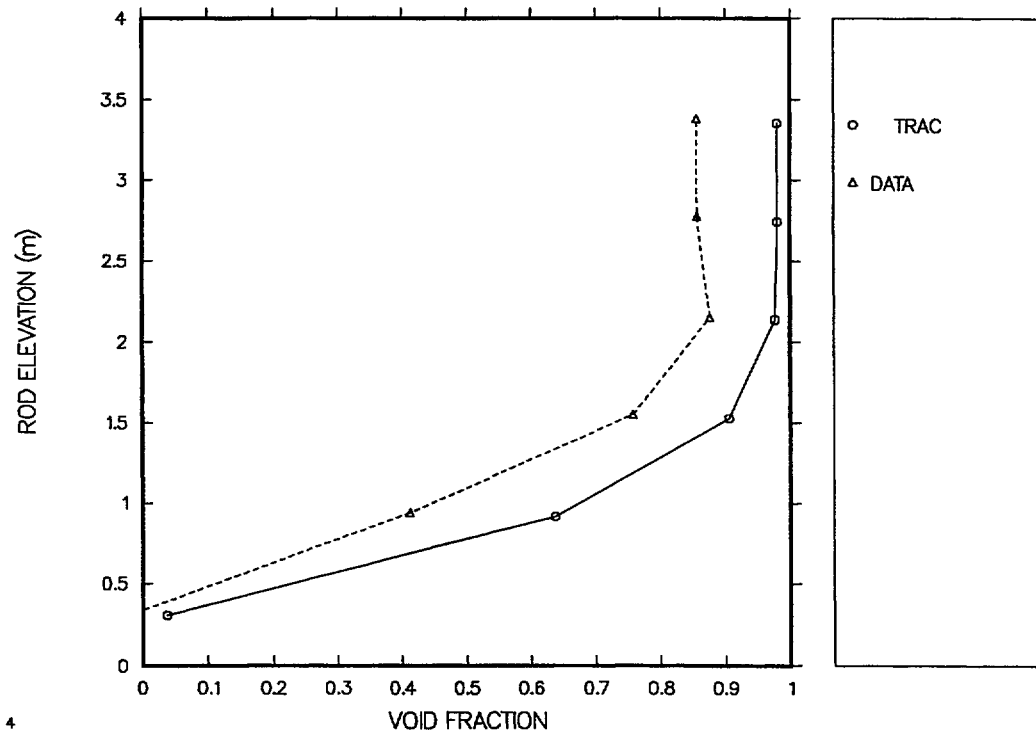


Fig. Y-6. CCTF-14 run: Wall-temperature histories at 2.44- and 3.05-m elevations.



3

Fig. Y-7. Comparison of predicted and measured core-axial void-fraction profiles at 37 s (experimental data from Ref. 4.7-7).



4

Fig. Y-8. Comparison of predicted and measured core-axial void-fraction profiles at 137 s (experimental data from Ref. 4.7-7).

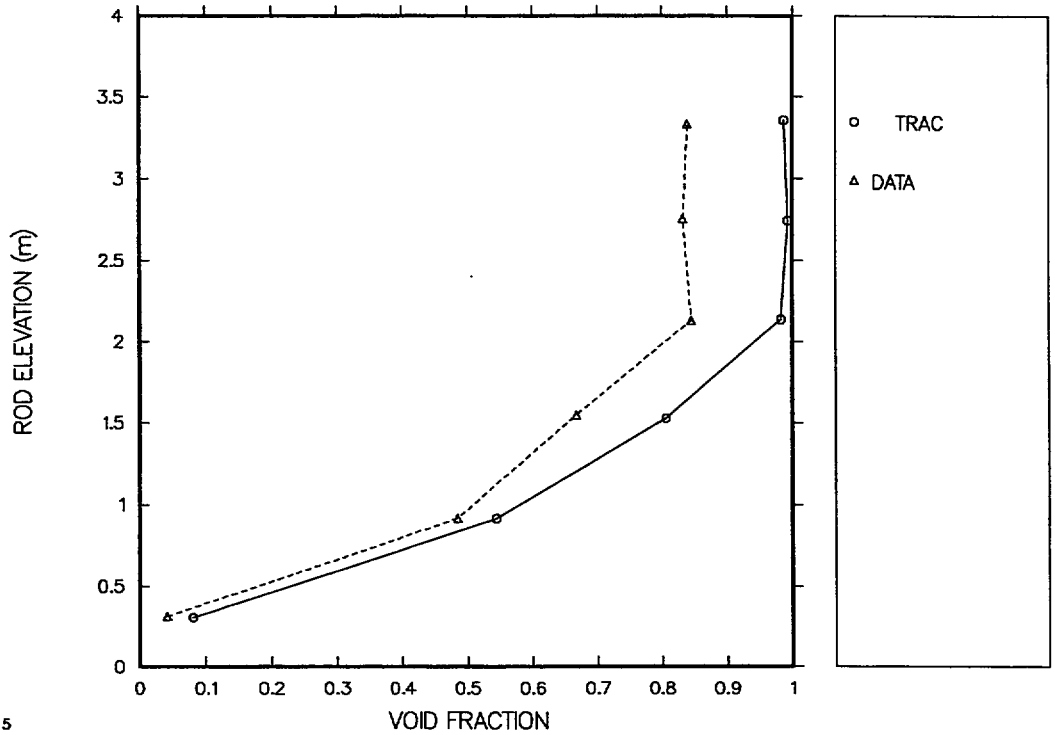


Fig. Y-9. Comparison of predicted and measured core-axial void-fraction profiles at 237 s (experimental data from Ref. 4.7-7).

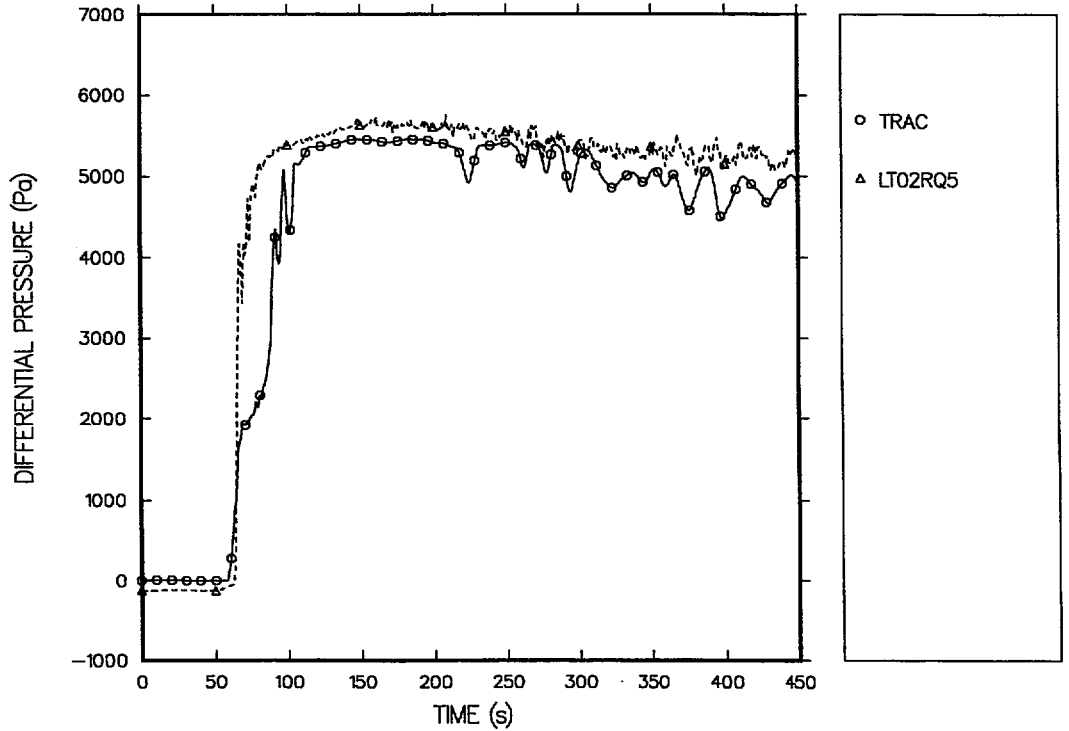


Fig. Y-10. CCTF-14 run: Core  $\Delta P$  history between the 0.0- and 0.61-m elevations.

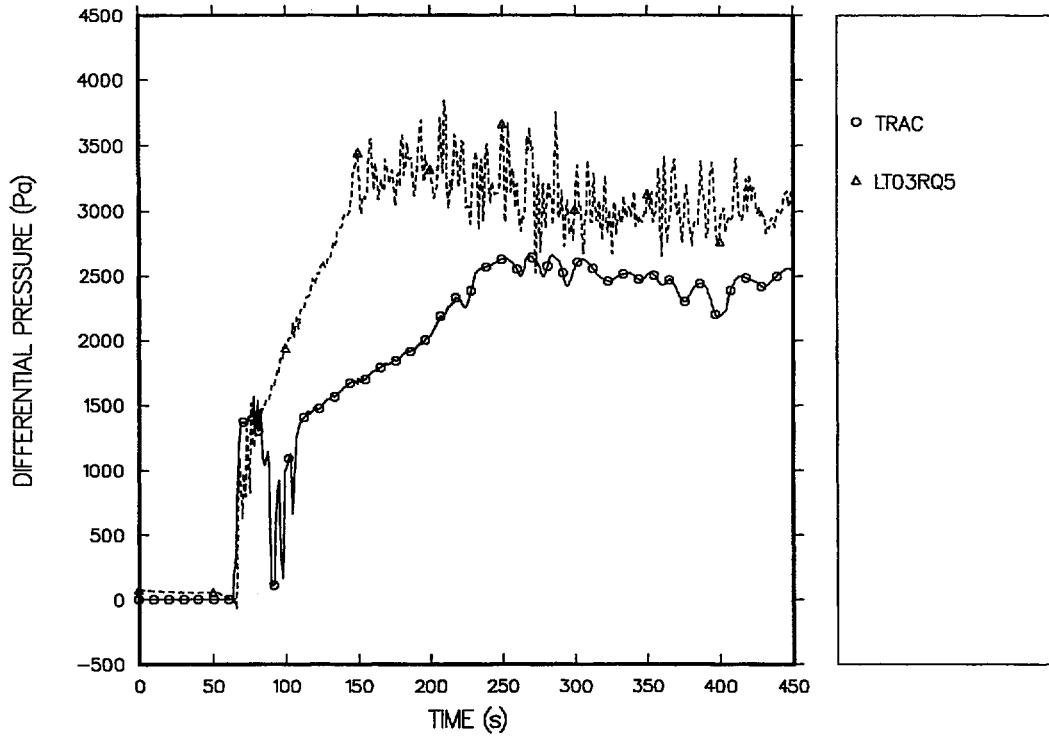


Fig. Y-11. CCTF-14 run: Core  $\Delta P$  history between the 0.61- and 1.22-m elevations.

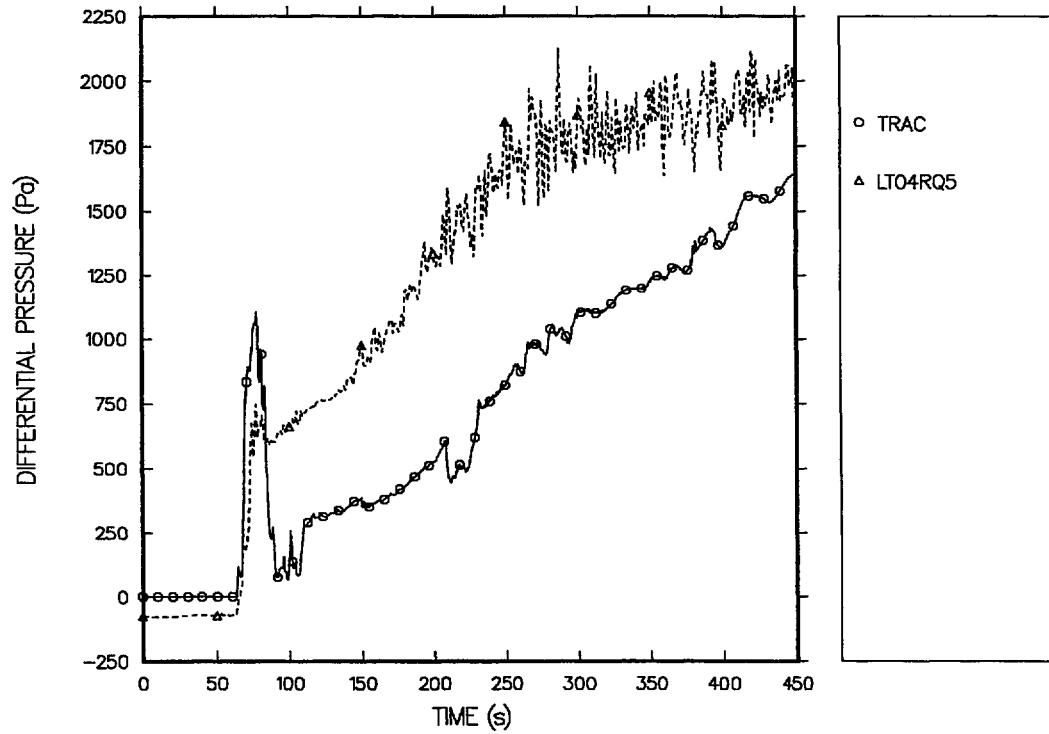


Fig. Y-12. CCTF-14 run: Core  $\Delta P$  history between the 1.22- and 1.83-m elevations.

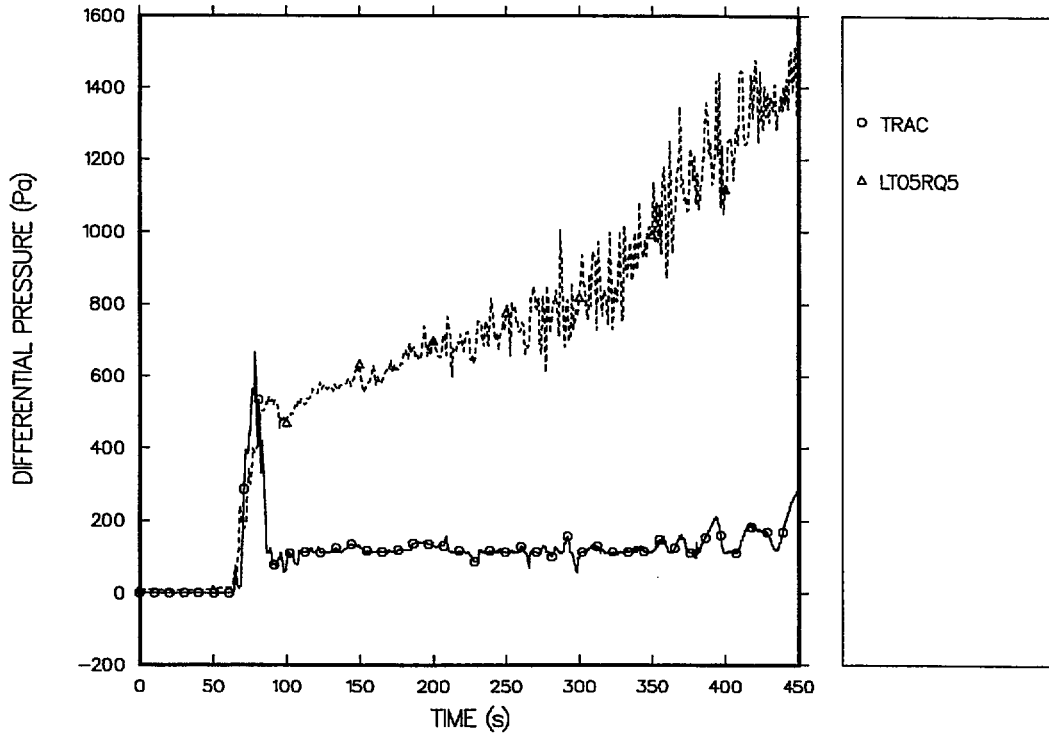


Fig. Y-13. CCTF-14 run: Core  $\Delta P$  history between the 1.83- and 2.44-m elevations.

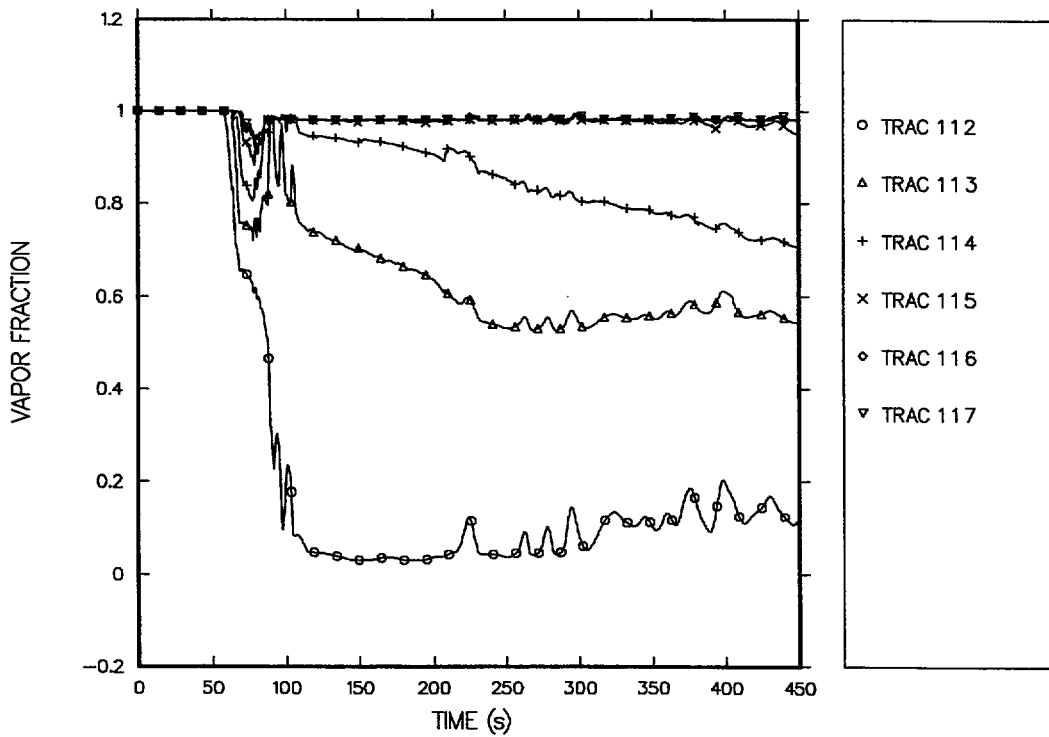


Fig. Y-14. CCTF-14 run: Predicted void-fraction histories within the core.

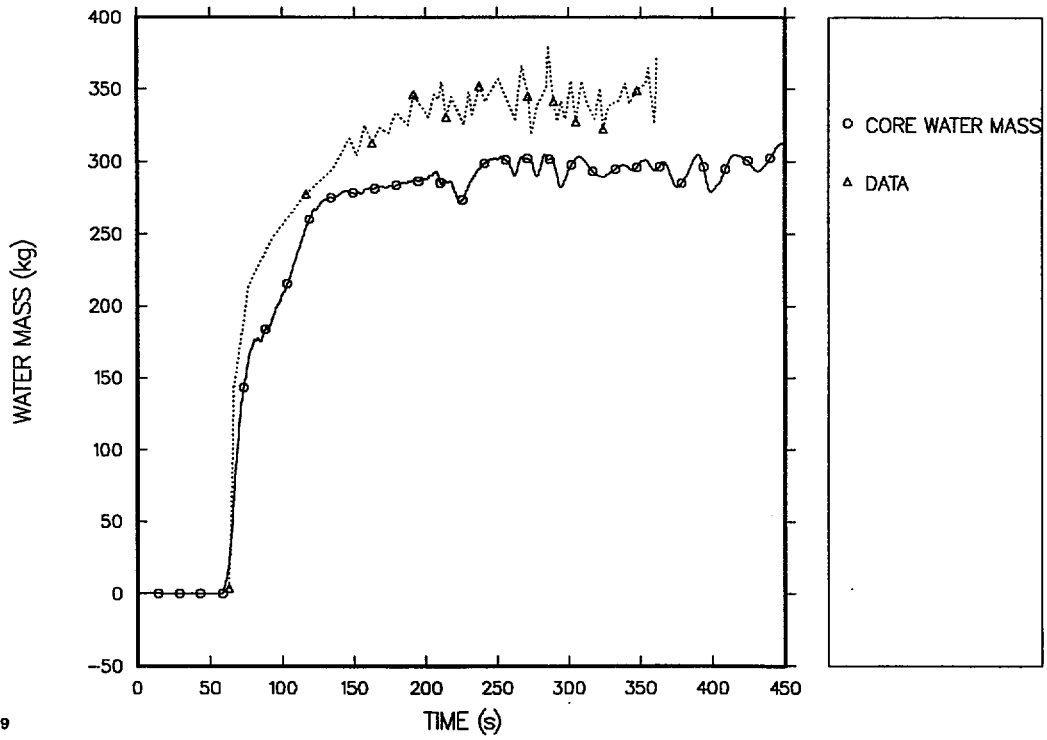


Fig. Y-15. CCTF-14 run: Comparison of predicted and measured core mass.



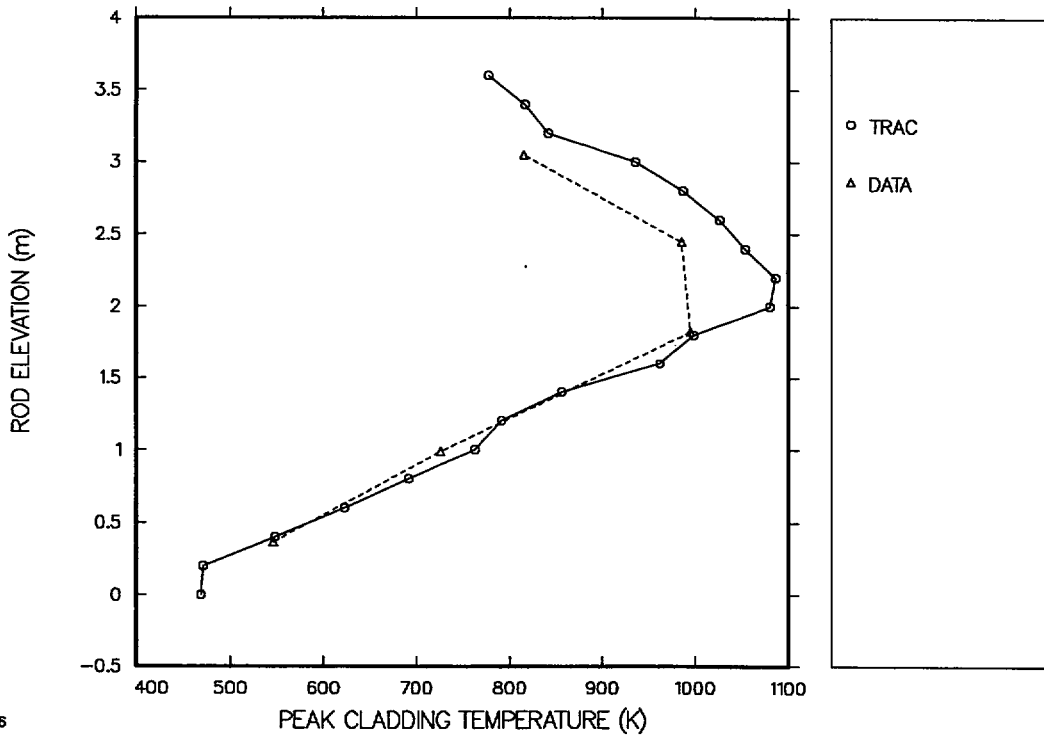


Fig. Y-16. Comparison of predicted and measured PCTs with the grid-spacer model (experimental data from Ref. 4.7-7).

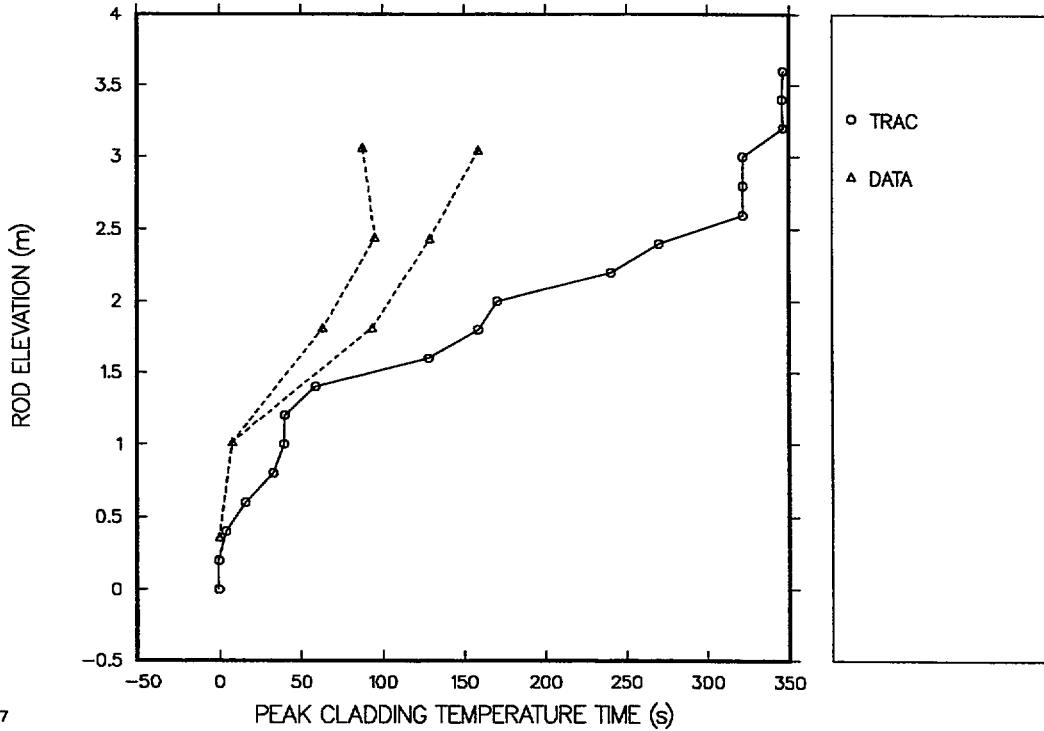


Fig. Y-17. Comparison of predicted and measured PCT times with the grid-spacer model (experimental data from Ref. 4.7-7).

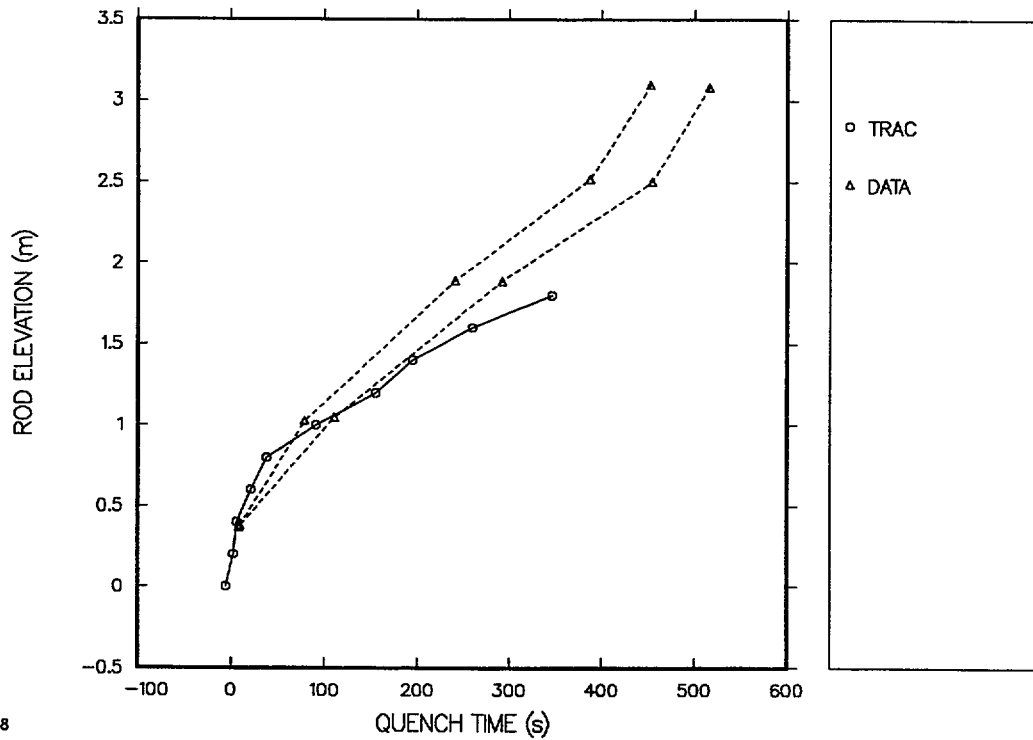


Fig. Y-18. Comparison of predicted and measured quench times with the grid-spacer model (experimental data from Ref. 4.7-7).

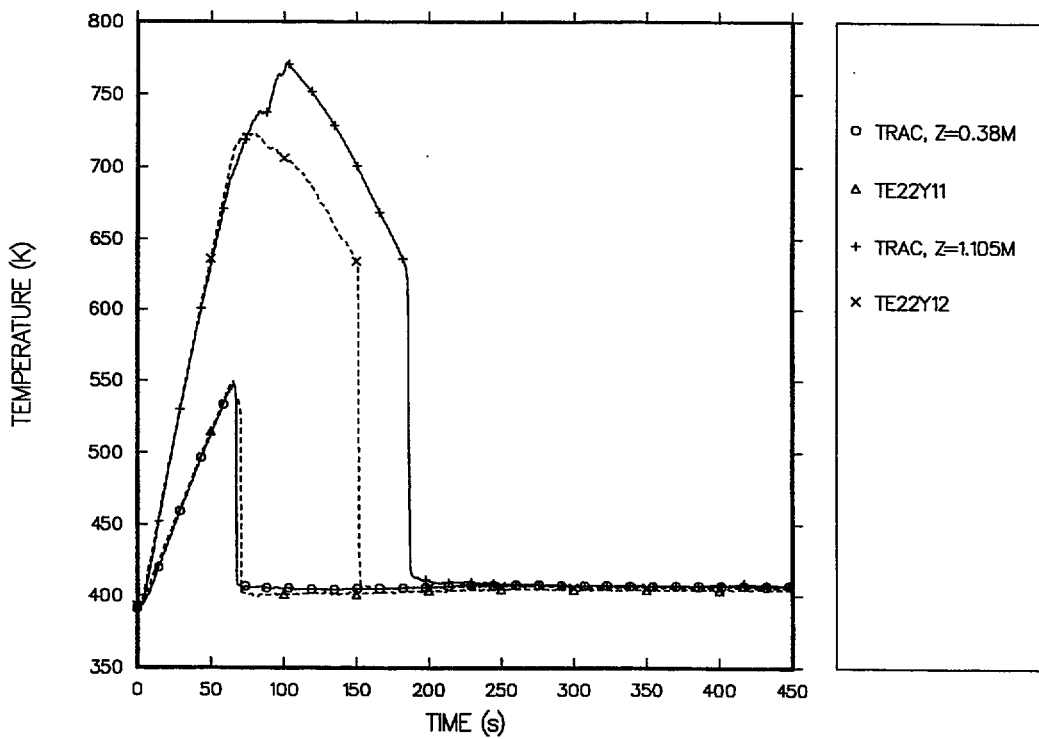


Fig. Y-19. CCTF-14 run: Wall-temperature histories at 0.38- and 1.105-m elevations with the grid-spacer model.

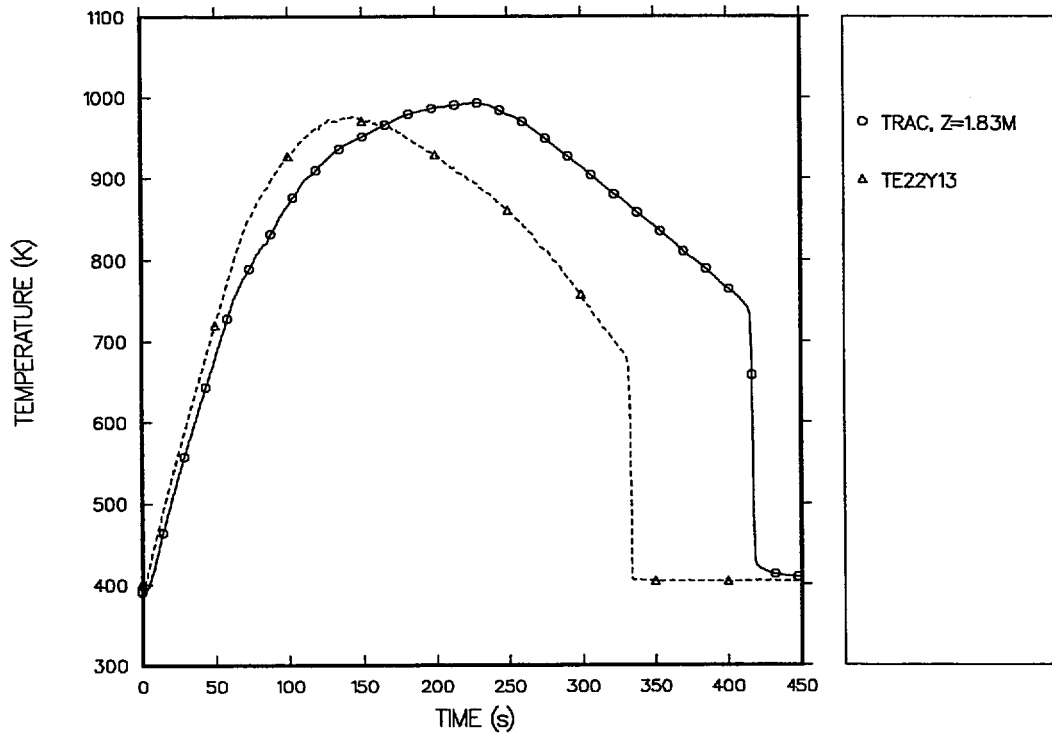


Fig. Y-20. CCTF-14 run: Wall-temperature histories at 1.83-m elevations with the grid-spacer model.

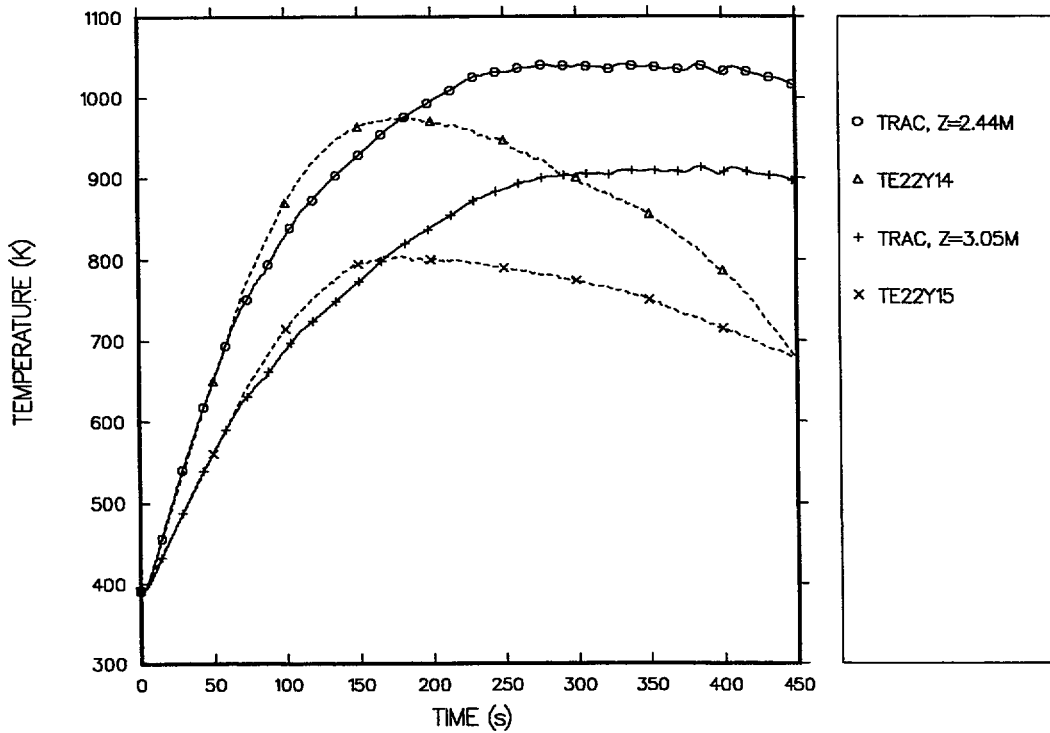


Fig. Y-21. CCTF-14 run: Wall-temperature histories at 2.44- and 3.05-m elevations with the grid-spacer model.

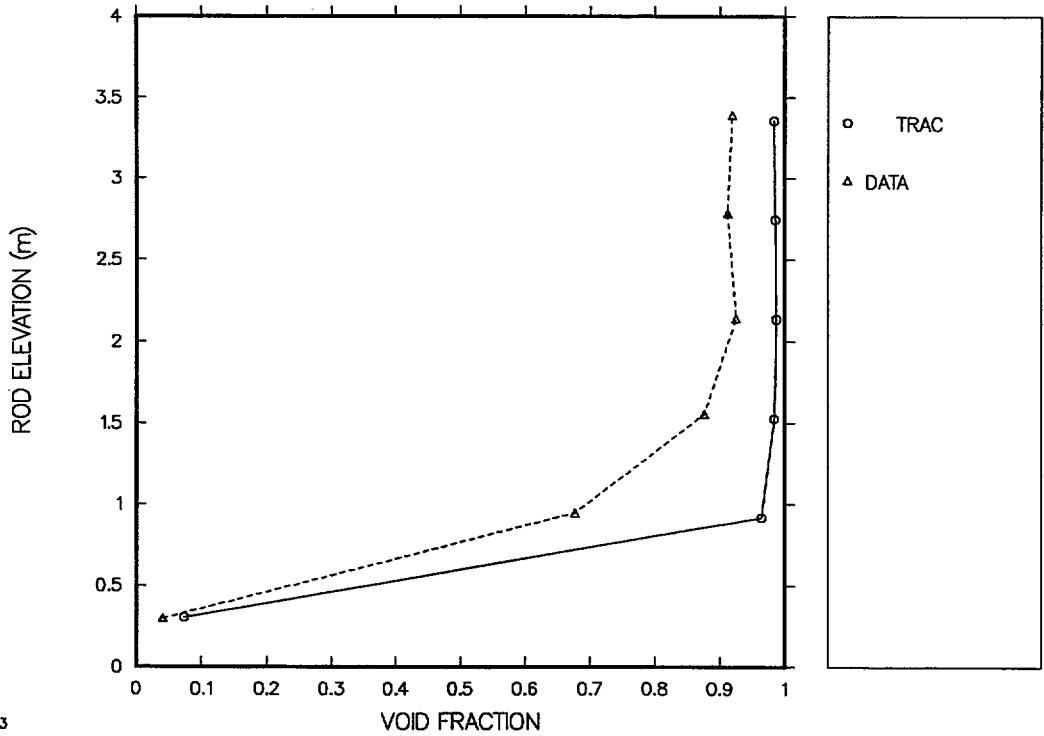


Fig. Y-22. Comparison of predicted and measured core-axial void-fraction profiles at 37 s with the grid-spacer model (experimental data from Ref. 4.7-7).

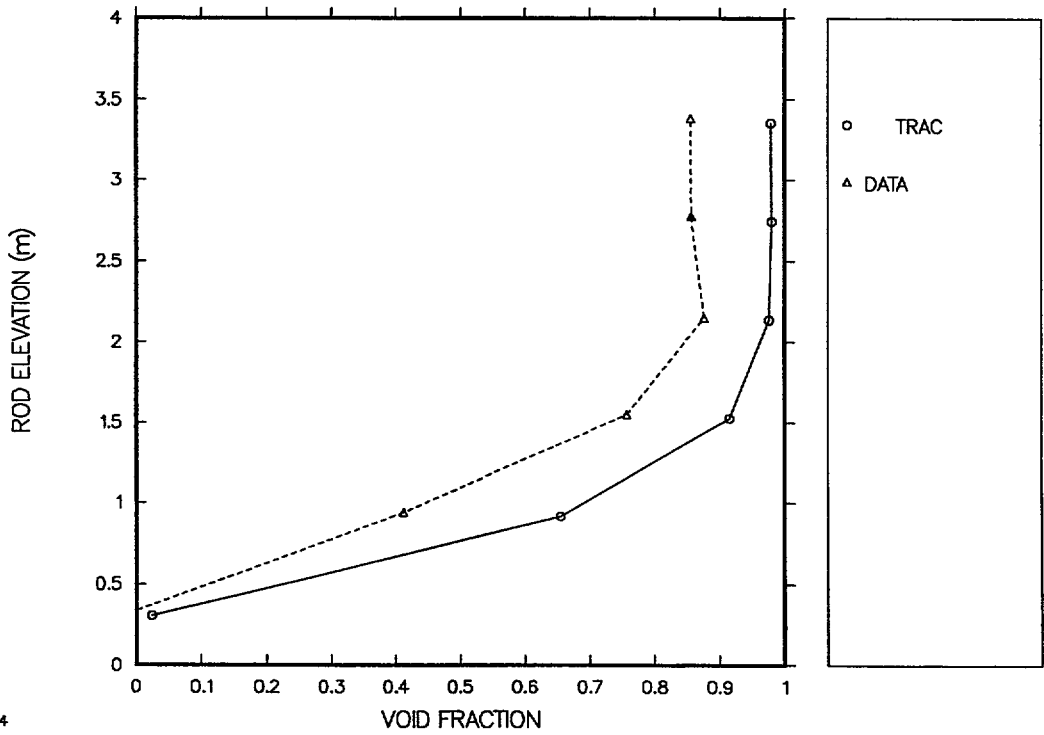


Fig. Y-23. Comparison of predicted and measured core-axial void-fraction profiles at 137 s with the grid-spacer model (experimental data from Ref. 4.7-7).

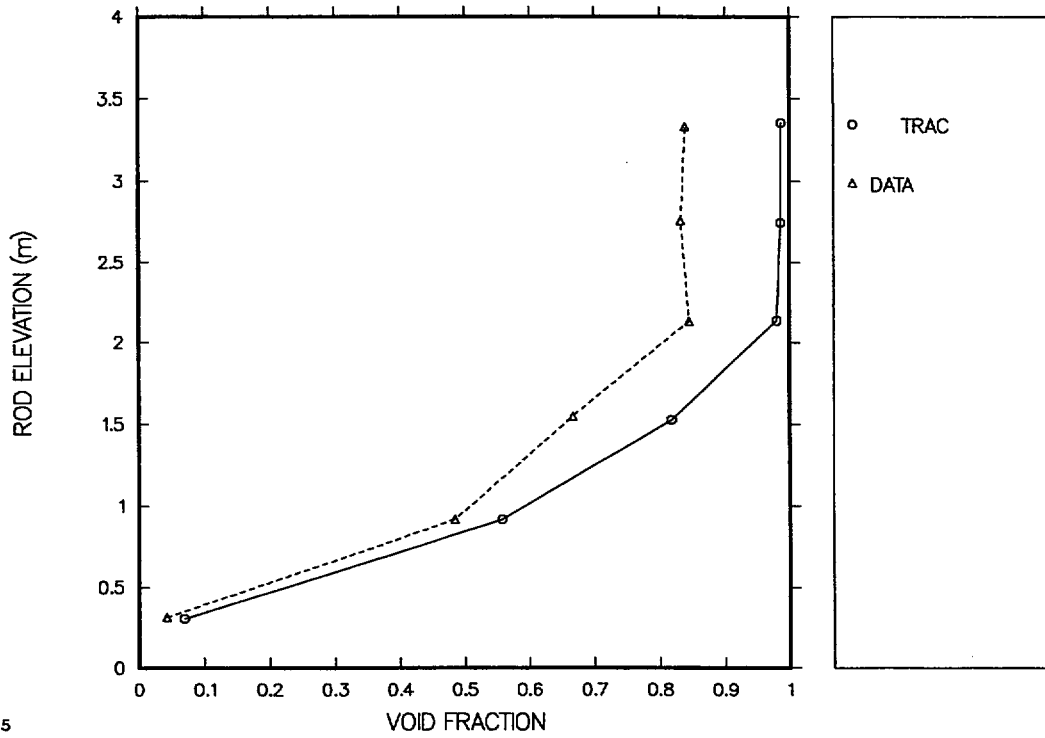


Fig. Y-24. Comparison of predicted and measured core-axial void-fraction profiles at 237 s with the grid-spacer model (experimental data from Ref. 4.7-7).

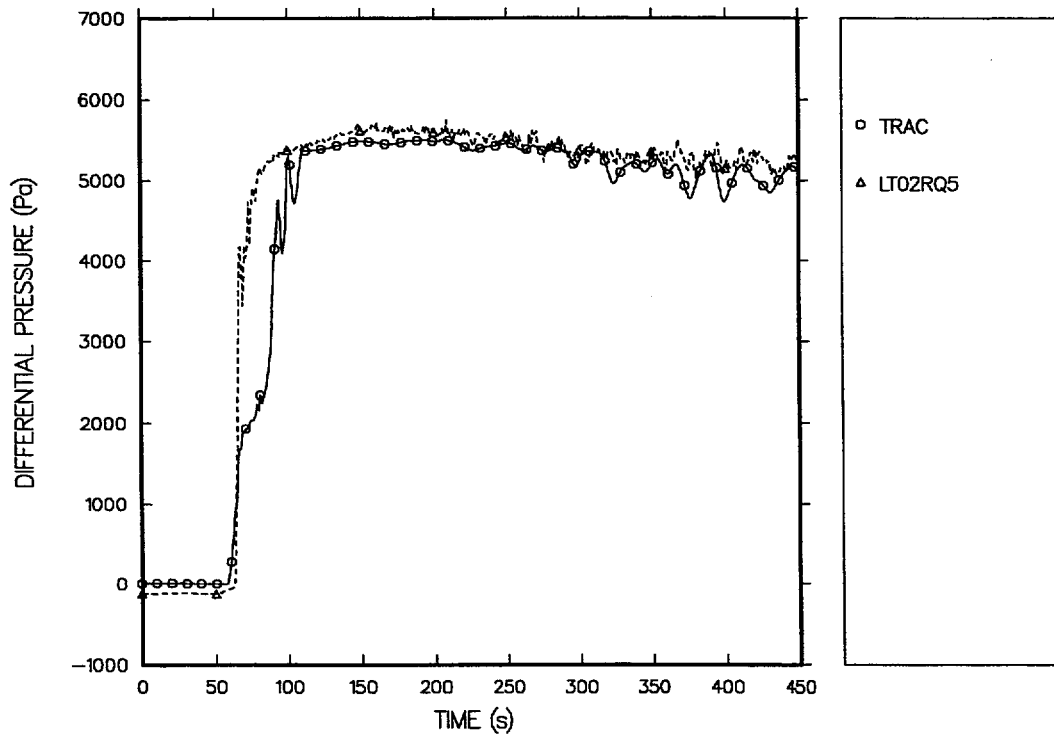


Fig. Y-25. CCTF-14 run: Core- $\Delta P$  history between the 0.0- and 0.61-m elevations with the grid-spacer model.

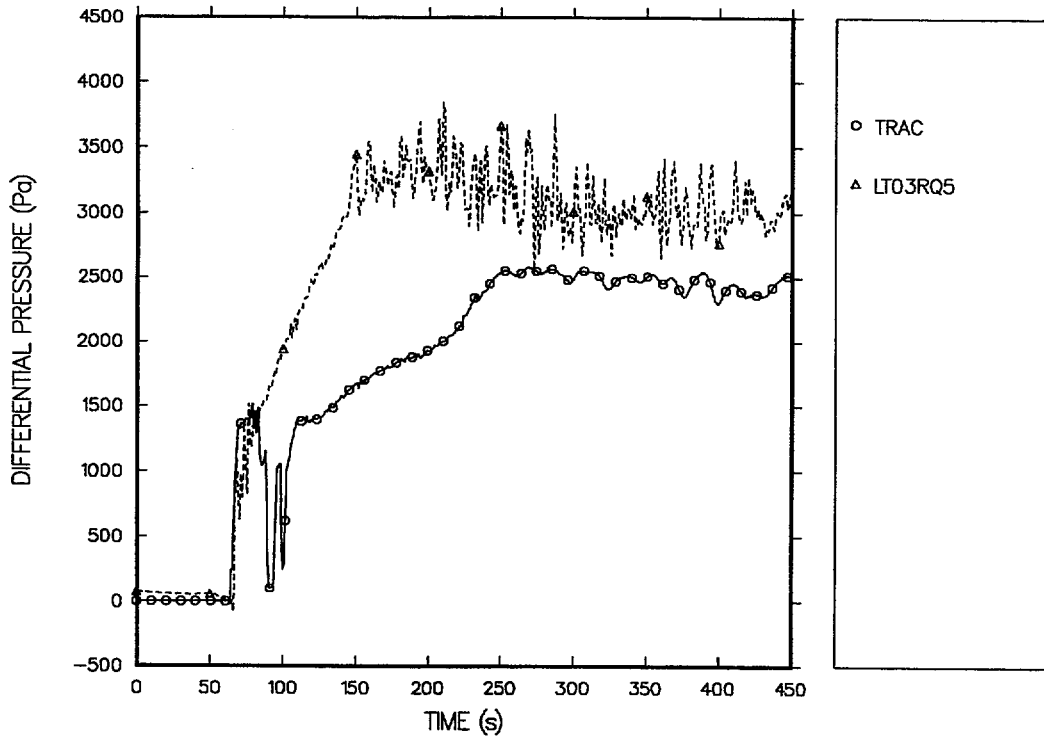


Fig. Y-26. CCTF-14 run: Core- $\Delta P$  history between the 0.61- and 1.22-m elevations with the grid-spacer model.

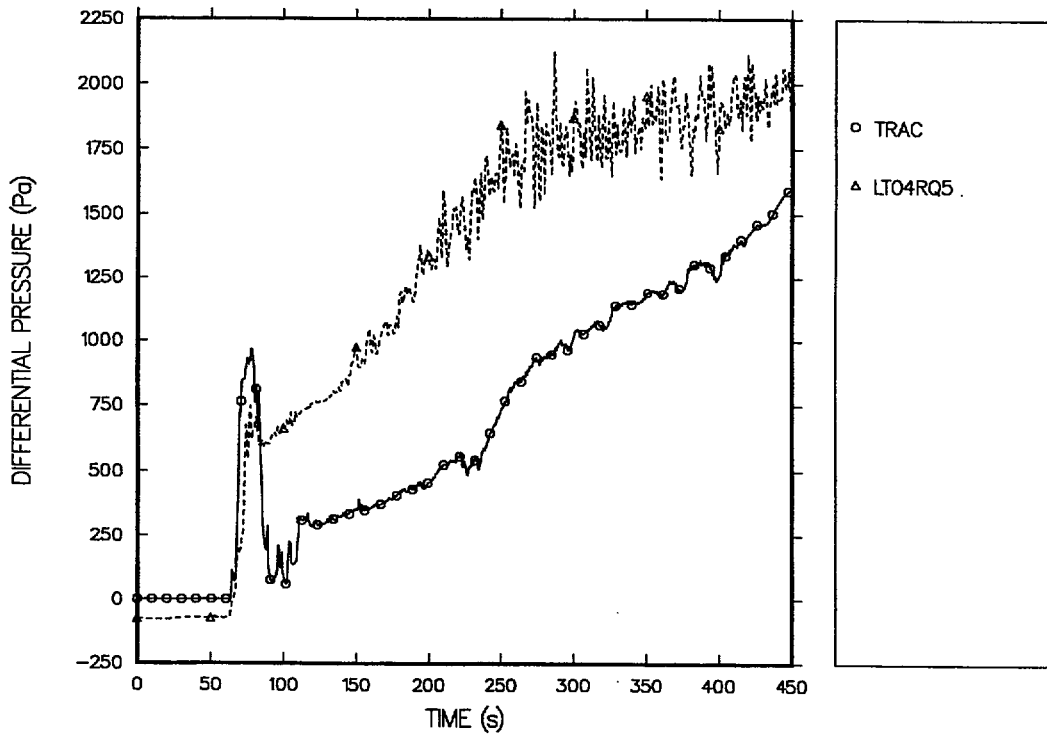


Fig. Y-27. CCTF-14 run: Core- $\Delta P$  history between the 1.22- and 1.83-m elevations with the grid-spacer model.

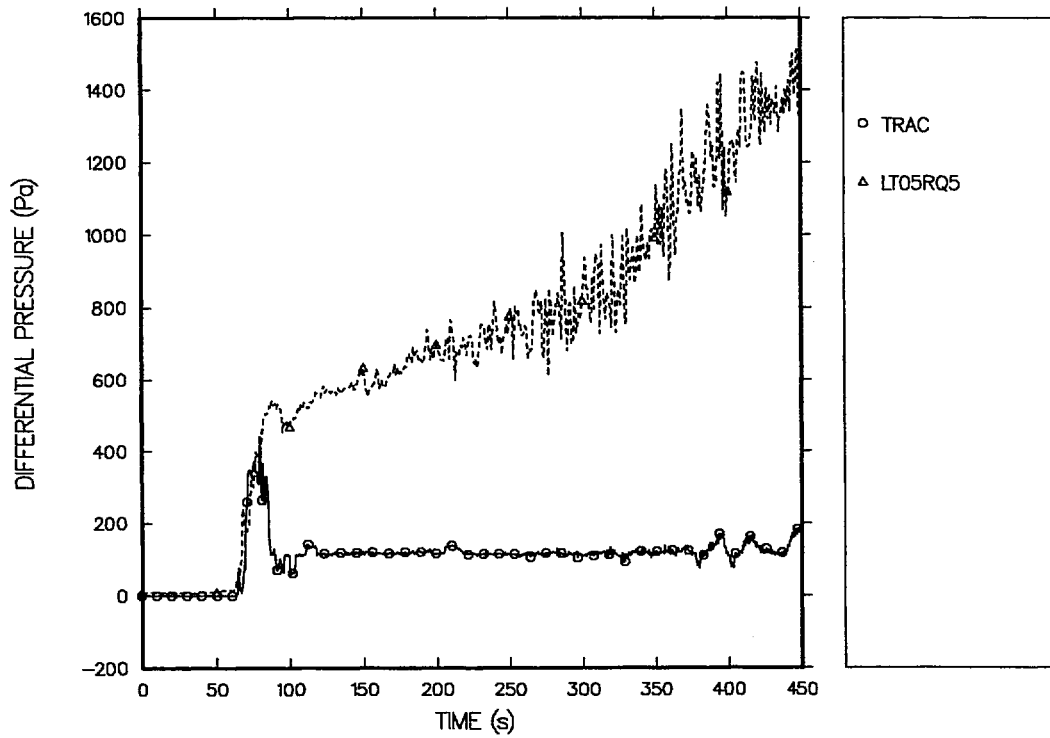


Fig. Y-28. CCTF-14 run: Core- $\Delta P$  history between the 1.83- and 2.44-m elevations with the grid-spacer model.

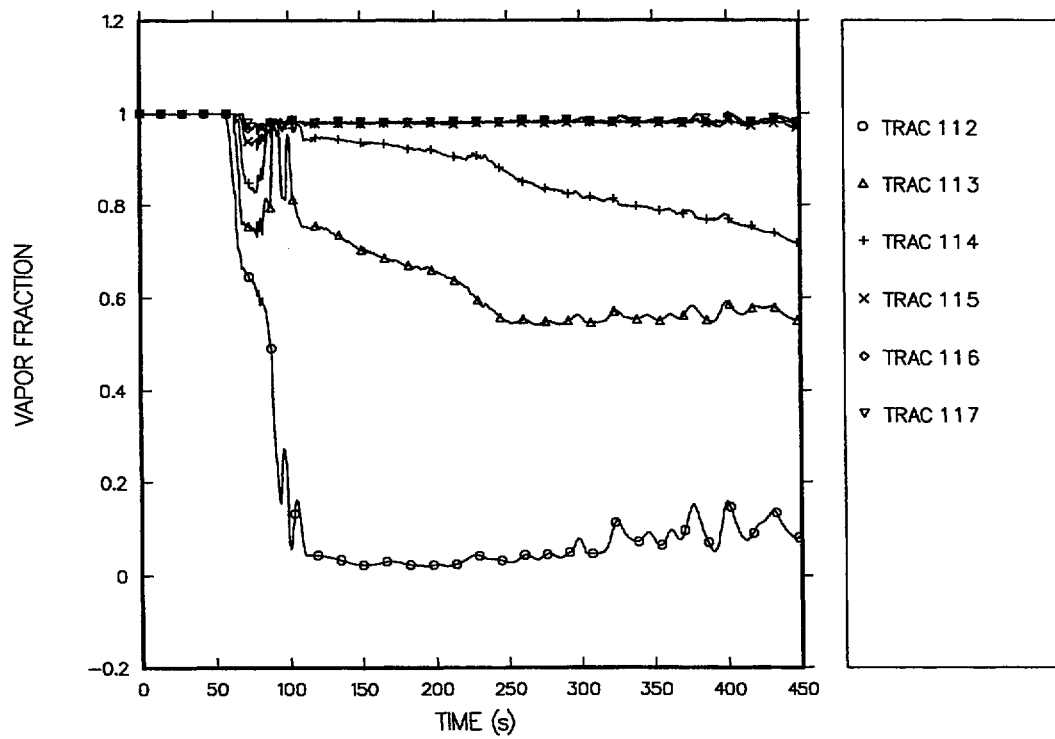


Fig. Y-29. CCTF-14 run: Predicted void-fraction histories within the core with the grid-spacer model.

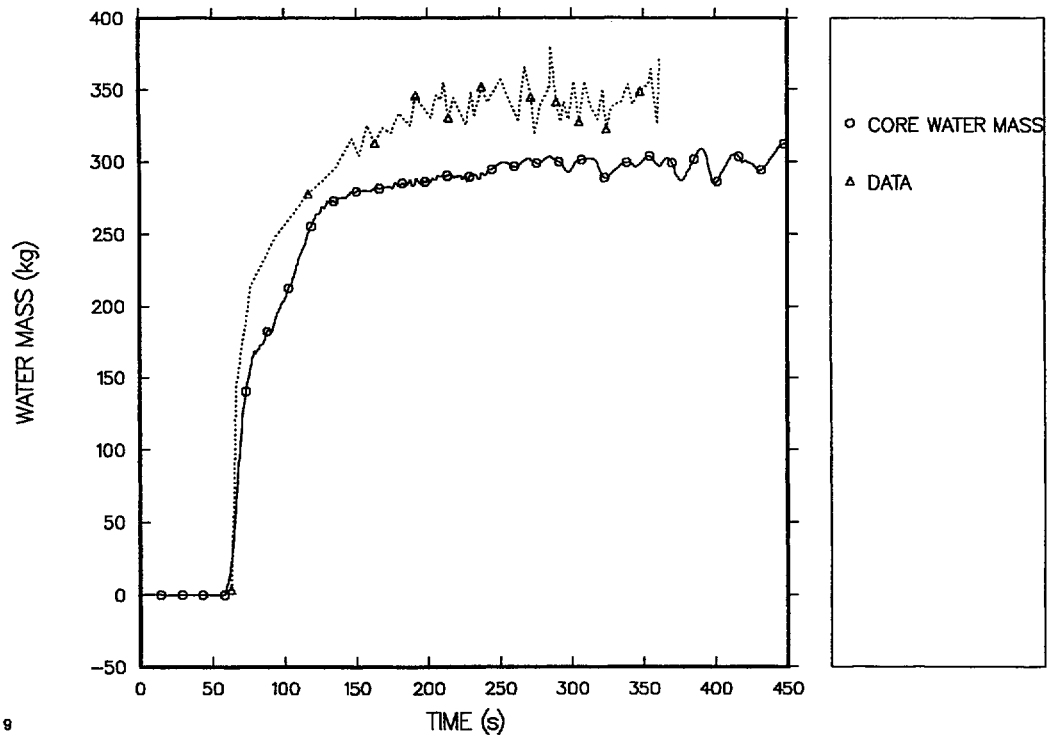


Fig. Y-30. CCTF-14 run: Comparison of predicted and measured core mass with the grid-spacer model.



## APPENDIX Z

### RENODED CCTF RUN 54 INPUT LISTING

The renoded CCTF-54 input model generally required one or more transient restarts after the first transient calculation to complete the calculation. A second transient restart input listing starts on p. Z-44.

```
1 free format
2 *
3 *****
4 * main data *
5 *****
6 *
7 *      numtcr      ieos      inopt      rmat
8      150          0          1          4
9 Renoded CCTF-54 Input Model By J. F. Lime Oct 1999
10 The 7-level core model of the corrected CCTF-54 input model
11 was renoded into 17 levels. The 17 levels match the 17-step
12 axial power profile.
13 *
14 Corrected CCTF-54 Input Model By J. F. Lime Oct 1999
15 Two corrections were made to the CCTF-54 input model:
16 (1) The azimuthal nodding was corrected from 180/180 degrees to 90/270 degrees
17 to matched the intact loop nodding. The three intact loops were modeled as one
18 combined intact loop. Therefore, the azimuthal nodding of the vessel should
19 match how the intact loops were modeled.
20 (2) The axial power shape was corrected to model the 17-step axial-power profile
21 of the actual heater rod. The previous CCTF-54 model had a coarsely-noded
22 7-level axial-power shape.
23 *
24 cctf run54 developmental assessment calculation
25 trac-pf1 mod2 version 5.0
26 this model was developed by running the trac input deck from
27 /cctf/run54/tracin through gocvrt. the following changes were
28 made to the original model.
29 a) the junction flow areas were adjusted to take care of the following
30 error messages:
31 the junction flow area 1.6604e-01 of component 3 is greater than the vol/dx
32 flow area 8.8885e-02 of the cell across the junction and 1.5532e-01 of cell 1
33
34 the junction flow area 4.9812e-01 of component 8 is greater than the vol/dx
35 flow area 4.6593e-01 of the cell across the junction and 2.6665e-01 of cell 12
36
37 the azimuthal flow area 1.0797e-01 of vessel 1 interface (r= 3,t= 1,z= 1) is
38 greater than the cell vol/rdt flow areas 8.3137e-02 and 8.3137e-02 on each side
39
40 the azimuthal flow area 1.0797e-01 of vessel 1 interface (r= 3,t= 2,z= 1) is
41 greater than the cell vol/rdt flow areas 8.3137e-02 and 8.3137e-02 on each side
42
43 the azimuthal flow area 1.5189e-01 of vessel 1 interface (r= 4,t= 1,z= 1) is
44 greater than the cell vol/rdt flow areas 1.3670e-01 and 1.3670e-01 on each side
45
46 the azimuthal flow area 1.5189e-01 of vessel 1 interface (r= 4,t= 2,z= 1) is
47 greater than the cell vol/rdt flow areas 1.3670e-01 and 1.3670e-01 on each side
48
49 the axial flow area 2.6140e-02 of vessel 1 interface (r= 1,t= 1,z=11) is
50 greater than the cell vol/dz flow areas 2.1173e-02 and 1.8559e-02 on each side
51
52 the axial flow area 2.6140e-02 of vessel 1 interface (r= 1,t= 2,z=11) is
53 greater than the cell vol/dz flow areas 2.1173e-02 and 1.8559e-02 on each side
54
55 the axial flow area 7.8419e-02 of vessel 1 interface (r= 2,t= 1,z=11) is
56 greater than the cell vol/dz flow areas 6.3519e-02 and 5.5678e-02 on each side
57
58 the axial flow area 7.8419e-02 of vessel 1 interface (r= 2,t= 2,z=11) is
59 greater than the cell vol/dz flow areas 6.3519e-02 and 5.5677e-02 on each side
60
61 the axial flow area 1.1751e-01 of vessel 1 interface (r= 3,t= 1,z=11) is
62 greater than the cell vol/dz flow areas 9.8712e-02 and 8.3435e-02 on each side
63
64 the axial flow area 1.1751e-01 of vessel 1 interface (r= 3,t= 2,z=11) is
65 greater than the cell vol/dz flow areas 9.8712e-02 and 8.3435e-02 on each side
66
67 b) the hydraulic diameter of the first and last junctions of the
68 steam generator secondary were set to a non-zero value (even though
69 the flow area is zero) to get the code to run.
70
71 c) the nff's were all set to -1
72 to cause an automatic calculation of
73 abrupt expansion/contraction additive form losses.
74
75 d) the new reflood model was turned on (namelist newrfd=1 was added)
76 and added funh, nhsca, and zsgrid arrays.
```

```

77
78 e) the time step sizes were increased.
79
80 f) the rod axial power shape was adjusted to take advantage of mod2's
81 ability to input an exact power distribution. this involved
82 reworking the zpwzt and zpwtb arrays. the number of coarse mesh
83 nodes went from 7 to 19, the maximum number of fine mesh cells went
84 from 100 to 200, and the dtxht criterial was reduced.
85
86 g) the rod power history was expanded from 10 points to over 1200 points
87 (based on experimental data) to better match the input power.
88
89 h) the temperatures everywhere except the lower plenum and fills were
90 changed from 393.0 to 414.2 (the average of the te30yxx thermocouple
91 data from the test) to better match the initial fluid and wall temps.
92
93 i) took out the bump in the cold leg ecc fill liquid temperature table
94
95 j) extended the material property tables in case the code wants to
96 calculate temperatures in excess of 1200 k.
97
98 k) added namelist variable nosets=2 to cause the code to calculate the
99 sets3d equation every time step.
100
101 l) increase the maximum time step size beyond 84 seconds.
102
103 m) set all of the vessel cfzl-z's to negative numbers to get an automatic
104 calculation of abrupt expansion/contraction form losses.
105
106 n) the rod nodalization was set back the way it originally was (7 coarse
107 meshes with a 1-to-1 relationship with the hydro cells). the
108 integration option was also set back the way it originally was as well.
109
110 o) to damp the loop oscillations, all the roughness numbers were
111 changed from 0.0 to 4.5720e-05
112
113 p) the heat conductor temperatures in the reactor vessel, ring 4 were set
114 from 4.142e+02 to 4.680e+02 for levels 2 and above. the inner rings
115 were changed from 4.142e+02 to 4.230e+02. this is consistent with the
116 initial conditions in the data report, page 31 table 3.1
117
118 q) the maximum time step size was reduced to avoid the water hammer in
119 the downcomer soon after cold leg injection begins.
120
121 r) added 30 heat slabs to represent the core barrel
122
123 s) moved the location of the ring 3-ring 4 boundary from inside the core
124 barrel to outside of the core barrel. the vessel rad(3), vol, fa-t,
125 fa-z, hd-t and hd-z arrays were recomputed. this was done to eliminate
126 vol and fa values greater than 1.0
127
128 t) the radial cfzl-r in level 1 was set to a small negative number to
129 cause form loss computation.
130
131 u) set idcu=idcl=idcr=0 to turn off special downcomer models
132
133 v) set the dtxht(1), dtxht(2), dznht, and nzmax parameters back to the
134 old mod1 values, and took out the core barrel heat slabs to make the
135 calculation directly comparable to the original MOD1 calculation.
136
137
138
139 -----
140
141 the original comment cards are as follows:
142
143 cctf run 54 posttest analysis with trac-pf1(mod 1) ver 11.8 (8/24/84)
144 * * * * * revised loop components * * * * *
145 jaeri recommendations used for some heater rod material properties.
146 new vapor loss coefficients in vessel core
147 new radial loss coefficients in levels 4 - 10
148 akimotos nodding for combined and broken cold legs
149 vessel nodding:
150     four radial rings
151     two azimuthal zones
152     sixteen axial levels
153         three levels in lower plenum
154         seven levels in core
155         six levels in upper plenum
156 system nodding:
157     three intact loops lumped into one loop
158     cold leg between vessel and break is modeled without the expansion
159 *
160 *****
161 * namelist data *
162 *****
163 *
164 &inopts
165   nrslv=1,iadded=10,nhtstr=24,newrfd=3,
166   iblaus=1, imfr=3,
167   &end
168 *

```

```

169 *      dstep      timet
170      0      0.0000e+00
171 *      stdyst      transi      ncomp      njun      ipak
172      0      1      43      17      1
173 *      epso      epss
174      1.0000e-04      1.0000e-04
175 *      oitmax      sitmax      isolut      ncontr
176      10      10      0      0
177 *      ntsv      ntcb      ntcf      ntrp      ntcp
178      9      8      0      3      1
179 *
180 *****
181 * component-number data *
182 *****
183 *
184 * iorder*      1      2      3      4      5
185 * iorder*      6      7      8      11      12
186 * iorder*      13      14      15      16      17
187 * iorder*      18      19      25      28s      17
188      999      998      997      996      995
189      994      993s
190      974      973s
191      918      917      916      915s
192      914      913      912      911      910
193      909      908      907s
194 784s
195 670 669e
196 *
197 *
198 *****
199 * material-properties data *
200 *****
201 *
202 * math *      55      58      59      60e
203 * ptbln * r02      7r02      5e
204 *
205 * prptb(1,i) prptb(2,i) prptb(3,i) prptb(4,i) prptb(5,i)
206      3.0000e+02      8.3500e+03      4.4487e+02      1.2337e+01      1.0000e+00
207      5.0000e+02      8.3500e+03      4.9042e+02      1.5834e+01      1.0000e+00
208      7.0000e+02      8.3500e+03      5.3948e+02      1.9331e+01      1.0000e+00
209      9.0000e+02      8.3500e+03      5.8987e+02      2.2828e+01      1.0000e+00
210      1.1000e+03      8.3500e+03      6.3939e+02      2.6324e+01      1.0000e+00
211      1.3000e+03      8.3500e+03      6.8588e+02      2.9821e+01      1.0000e+00
212      2.0000e+03      8.3500e+03      6.8588e+02      2.9821e+01      1.0000e+00
213 e
214 *
215 * prptb(1,i) prptb(2,i) prptb(3,i) prptb(4,i) prptb(5,i)
216      3.0000e+02      3.8000e+03      8.4970e+02      3.5870e+01      1.0000e+00
217      5.0000e+02      3.8000e+03      9.6550e+02      2.0173e+01      1.0000e+00
218      7.0000e+02      3.8000e+03      1.0813e+03      1.2529e+01      1.0000e+00
219      9.0000e+02      3.8000e+03      1.1971e+03      8.9514e+00      1.0000e+00
220      1.1000e+03      3.8000e+03      1.3129e+03      7.1615e+00      1.0000e+00
221      1.3000e+03      3.8000e+03      1.4287e+03      6.1228e+00      1.0000e+00
222      2.0000e+03      3.8000e+03      1.4287e+03      6.1228e+00      1.0000e+00
223 e
224 *
225 * prptb(1,i) prptb(2,i) prptb(3,i) prptb(4,i) prptb(5,i)
226      3.0000e+02      2.8000e+03      9.8640e+02      1.6300e+00      1.0000e+00
227      6.0000e+02      2.8000e+03      1.1358e+03      1.4200e+00      1.0000e+00
228      9.0000e+02      2.8000e+03      1.2852e+03      1.2100e+00      1.0000e+00
229      1.3000e+03      2.8000e+03      1.4844e+03      9.3000e-01      1.0000e+00
230      2.0000e+03      2.8000e+03      1.4844e+03      9.3000e-01      1.0000e+00
231 e
232 *
233 * prptb(1,i) prptb(2,i) prptb(3,i) prptb(4,i) prptb(5,i)
234      3.0000e+02      8.4103e+03      4.4029e+02      1.4340e+01      8.4000e-01
235      6.0000e+02      8.2925e+03      5.0636e+02      1.9331e+01      8.4000e-01
236      9.0000e+02      8.1747e+03      5.7242e+02      2.4322e+01      8.4000e-01
237      1.2000e+03      8.0569e+03      6.3839e+02      2.9314e+01      8.4000e-01
238      2.0000e+03      8.0569e+03      6.3839e+02      2.9314e+01      8.4000e-01
239 e
240 *
241 *
242 *****
243 * control-parameter data *
244 *****
245 *
246 *
247 * signal variables
248 * idsv isvn ilcn icn1 icn2
249      101      0      0      0      0 * problem time
250      102      0      1      0      0 * time-step size
251      103      27      1      1001      -8001 * lower-plenum level-1 vap. vol. fr.
252      104      27      1      1002      -6003 * lower-plenum levels 2 and 3 vap. vol. fr.
253      105      27      1      7002      -8026 * downcomer vap. vol. fr.
254      106      27      1      1004      -6020 * core vap. vol. fr.
255      107      27      1      1021      -6026 * upper-plenum vap. vol. fr.
256      108      75      1      1001      -8001 * lower-plenum level-1 liquid density
257      109      76      1      1002      -6003 * lower-plenum levels 2 and 3 liquid density
258 *
259 * control blocks
260 * icb icbn icb1 icb2 icb3

```

```

261 *          cbgain  cbxmin  cbxmax  cbcon1  cbcon2
262 *
263 *          constant number 1
264 -1          9          *const*
265          1.0          1.0          1.0          1.0
266 *
267 *          weighted lower-plenum vapor volume fraction
268 -2          59          *wsum*          103          104
269          1.0          0.0          1.0          0.5396          0.4604
270 *
271 *          lower-plenum liquid volume fraction
272 -3          54          *subtr*          -1          -2
273          0.0          0.0          0.0          0.0          0.0
274 *
275 *          downcomer liquid volume fraction
276 -4          54          *subtr*          -1          105
277          0.0          0.0          0.0          0.0          0.0
278 *
279 *          core liquid volume fraction
280 -5          54          *subtr*          -1          106
281          0.0          0.0          0.0          0.0          0.0
282 *
283 *          upper plenum liquid volume fraction
284 -6          54          *subtr*          -1          107
285          0.0          0.0          0.0          0.0          0.0
286 *
287 *          weighted lower-plenum liquid density
288 -7          59          *wsum*          108          109
289          1.0          0.0          1.0e20          0.5396          0.4604
290 *
291 *          lower plenum delta-p=2.0594e-05 x rholiq x liquid volume fraction
292 -8          39          *multi*          -7          -3
293          2.0594e-05          -1.0e20          1.0e20          0.0          0.0
294 *
295 * trips
296 *          ntse          ntct          ntsf          ntqp          ntsd
297          0          0          0          3          0
298 *          idtp          isrt          iset          itst          idsg
299          1001          2          0          1          101
300 *          setp(1)          setp(2)
301          8.3999e+01          8.4000e+01
302 *          dtsp(1)          dtsp(2)
303          0.0000e+00          0.0000e+00
304 *          ifsp(1)          ifsp(2)
305          0          0
306 *          idtp          isrt          iset          itst          idsg
307          1002          2          1          1          101
308 *          setp(1)          setp(2)
309          0.0000e+00          0.0000e+00
310 *          dtsp(1)          dtsp(2)
311          0.0000e+00          0.0000e+00
312 *          ifsp(1)          ifsp(2)
313          0          0
314 *          idtp          isrt          iset          itst          idsg
315          1003          2          0          1          101
316 *          setp(1)          setp(2)
317          0.0000e+00          0.0000e+00
318 *          dtsp(1)          dtsp(2)
319          0.0000e+00          0.0000e+00
320 *          ifsp(1)          ifsp(2)
321          0          0
322 *          ndmp
323          3
324 *          idmp()
325          1001          1002          1003
326 *
327 *****
328 * component data *
329 *****
330 *
331 ***** type          num          id          ctitle
332 vessel          1          1 $1$ cctf reactor vessel
333 *          nasx          nrsx          ntsx          ncsr          ivssbf
334          26          4          2          5          0
335 *          idcu          idcl          idcr          icru          icrl
336          26          1          3          20          3
337 *          icrr          ilcsp          iucsp          iuhp          iconc
338          3          0          0          0          0
339 *          igeom          nvent          nvvtb          nsgrid
340          0          0          0          *6* 0
341 *          shelv          epsw
342          0.0000e+00          4.5720e-05
343 * z          *          9.1500e-01          1.9000e+00 s
344 * z          *          2.100          2.355          2.605          2.815          3.015 s
345 * z          *          3.215          3.425          3.625          3.825          4.035 s
346 * z          *          4.235          4.435          4.645          4.845          5.045 s
347 * z          *          5.255          5.505          5.760 s
348 * z          *          6.0000e+00          6.2400e+00          6.5000e+00          6.9600e+00          7.4000e+00
349 * z          *          8.6470e+00e
350 * rad          *          1.2900e-01          2.5800e-01          4.8050e-01          5.4200e-01e
351 * th          *          90.0          360.0 e
352 * funh          * r2 0.11948214 r2 0.15865495 s

```

```

353 * funh * r2 0.20909698 r2 1.0 e
354 * nhsca * f 999 e
355 * zsgrid 2.670 3.335 4.000 s
356 * zsgrid 4.665 5.330 5.758 e
357 *      lisrl          lisrc          lisrf          ljuns
358      25              7              3              1
359      25              5              3              2
360      25              8              3              3
361      25              6              3              4
362      1              7              3              5
363 *
364 * level 1
365 *
366 * cfzl-t* f -1.0000e-04e
367 * cfzl-z* f -1.0000e-04e
368 * cfzl-r* f -1.0000e-04e
369 * cfzv-t* f 0.0000e-04e
370 * cfzv-z* f 0.0000e-04e
371 * cfzv-r* f 0.0000e-04e
372 * vol * r04 7.4000e-01r02 8.0254e-01r02 1.0000e+00e
373 * fa-t * r04 4.0000e-01r02 8.0342e-01r02 1.0000e+00e
374 * fa-z * r04 4.2000e-01r02 3.4356e-01r02 1.0000e+00e
375 * fa-r * r04 4.0000e-01r02 5.9471e-01r02 0.0000e+00e
376 * hd-t * r04 2.2800e-02r02 0.39676 r02 0.119e
377 * hd-z * r04 1.3000e-02r02 2.8800e-02r02 0.123e
378 * hd-r * r04 2.2800e-02r02 0.4855r02 0.0000e+00e
379 * alpn * f 0.0000e+00e
380 * vvn-t * f 0.0000e+00e
381 * vvn-z * f 0.0000e+00e
382 * vvn-r * f 0.0000e+00e
383 * vln-t * f 0.0000e+00e
384 * vln-z * f 0.0000e+00e
385 * vln-r * f 0.0000e+00e
386 * tvn * f 3.9300e+02e
387 * tln * f 3.9300e+02e
388 * pn * f 2.0000e+05e
389 * pan * f 0.0000e+00e
390 *
391 * level 2
392 *
393 * cfzl-t* f -1.0000e-04e
394 * cfzl-z* f -1.0000e-04e
395 * cfzl-r* f 0.0000e-04e
396 * cfzv-t* f 0.0000e-04e
397 * cfzv-z* f 0.0000e-04e
398 * cfzv-r* f 0.0000e-04e
399 * vol * r04 7.4000e-01r02 7.3602e-01r02 1.0000e+00e
400 * fa-t * r04 4.0000e-01r02 2.4692e-01 r02 1.0000e+00e
401 * fa-z * r04 5.9000e-01r02 6.7592e-01r02 1.0000e+00e
402 * fa-r * r04 4.0000e-01r04 0.0000e+00e
403 * hd-t * r04 2.2800e-02r02 2.4060e-01r02 0.123e+00e
404 * hd-z * r04 1.3000e-02r02 4.6000e-02r02 1.2300e-01e
405 * hd-r * r04 2.2800e-02r04 0.0000e+00e
406 * alpn * f 1.0000e+00e
407 * vvn-t * f 0.0000e+00e
408 * vvn-z * f 0.0000e+00e
409 * vvn-r * f 0.0000e+00e
410 * vln-t * f 0.0000e+00e
411 * vln-z * f 0.0000e+00e
412 * vln-r * f 0.0000e+00e
413 * tvn * f 4.1420e+02e
414 * tln * f 4.1420e+02e
415 * pn * f 2.0000e+05e
416 * pan * f 0.0000e+00e
417 *
418 * level 3
419 *
420 * cfzl-t* f -1.0000e-04e
421 * cfzl-z* r04 -1.1102e-01r02 -1.2189e-01r02 -1.0000e-04e
422 * cfzl-r* f 0.0000e-04e
423 * cfzv-t* f 0.0000e-04e
424 * cfzv-z* r04 4.4407e-01r02 4.8756e-01r02 0.0000e-04e
425 * cfzv-r* f 0.0000e-04e
426 * vol * r04 5.9000e-01r02 0.45738r02 1.0000e+00e
427 * fa-t * r04 2.5000e-01r02 0.24692 r02 1.0 e
428 * fa-z * r02 1.1400e-01r02 1.1460e-01r02 0.04944r02 1.00e
429 * fa-r * r04 2.5000e-01r04 0.0000e+00e
430 * hd-t * r04 1.4400e-02r02 2.4060e-01r02 0.123e
431 * hd-z * r04 1.2460e-02r02 1.3680e-02r02 1.2300e-01e
432 * hd-r * r04 1.4400e-02r04 0.0000e+00e
433 * alpn * f 1.0000e+00e
434 * vvn-t * f 0.0000e+00e
435 * vvn-z * f 0.0000e+00e
436 * vvn-r * f 0.0000e+00e
437 * vln-t * f 0.0000e+00e
438 * vln-z * f 0.0000e+00e
439 * vln-r * f 0.0000e+00e
440 * tvn * f 4.1420e+02e
441 * tln * f 4.1420e+02e
442 * pn * f 2.0000e+05e
443 * pan * f 0.0000e+00e
444 *

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```

445 * level 4
446 * cfzl-t* f -1.0000e-04e
447 * cfzl-z* f -1.0000e-04e
448 * cfzl-r* r04 8.7633e-02r02 1.3910e+01r02 0.0000e-04e
449 * cfzv-t* f 0.0000e-04e
450 * cfzv-z* f 0.0000e-04e
451 * cfzv-r* r04 8.7633e-02r02 1.3910e+01r02 0.0000e-04e
452 * vol * r04 5.3000e-01r02 0.26161 r02 1.0e
453 * fa-t * r04 2.5000e-01r02 0.09312 r02 1.0e
454 * fa-z * r04 5.3000e-01r02 0.26161 r02 1.0e
455 * fa-r * r04 2.5000e-01r04 0.0000e+00e
456 * hd-t * r06 6.3000e-03r02 1.2300e-01e
457 * hd-z * r04 1.2460e-02r02 1.3680e-02r02 0.123e
458 * hd-r * r04 6.3000e-03r04 0.0000e+00e
459 * alpn * f 1.0000e+00e
460 * vvn-t * f 0.0000e+00e
461 * vvn-z * f 0.0000e+00e
462 * vvn-r * f 0.0000e+00e
463 * vln-t * f 0.0000e+00e
464 * vln-z * f 0.0000e+00e
465 * vln-r * f 0.0000e+00e
466 * tvn * f 4.1420e+02e
467 * tln * f 4.1420e+02e
468 * pn * f 2.0000e+05e
469 * pan * f 0.0000e+00e
470 *
471 * level 5
472 *
473 * cfzl-t* f -1.0000e-04e
474 * cfzl-z* r04 -2.4509e-02r02 -2.6909e-02r02 -1.0000e-04e
475 * cfzl-r* r04 8.7633e-02r02 1.3910e+01r02 0.0000e-04e
476 * cfzv-t* f 0.0000e-04e
477 * cfzv-z* r04 2.4509e-02r02 2.6909e-02r02 0.0000e-04e
478 * cfzv-r* r04 8.7633e-02r02 1.3910e+01r02 0.0000e-04e
479 * vol * r04 5.3000e-01r02 0.26161 r02 1.0e
480 * fa-t * r04 2.5000e-01r02 0.09312 r02 1.0e
481 * fa-z * r04 5.3000e-01r02 0.26161 r02 1.0e
482 * fa-r * r04 2.5000e-01r04 0.0000e+00e
483 * hd-t * r06 6.3000e-03r02 1.2300e-01e
484 * hd-z * r04 1.2460e-02r02 1.3680e-02r02 0.123e
485 * hd-r * r04 6.3000e-03r04 0.0000e+00e
486 * alpn * f 1.0000e+00e
487 * vvn-t * f 0.0000e+00e
488 * vvn-z * f 0.0000e+00e
489 * vvn-r * f 0.0000e+00e
490 * vln-t * f 0.0000e+00e
491 * vln-z * f 0.0000e+00e
492 * vln-r * f 0.0000e+00e
493 * tvn * f 4.1420e+02e
494 * tln * f 4.1420e+02e
495 * pn * f 2.0000e+05e
496 * pan * f 0.0000e+00e
497 *
498 * level 6
499 *
500 repeat level 5
501 *
502 * level 7
503 *
504 repeat level 5
505 *
506 * level 8
507 *
508 repeat level 5
509 *
510 * level 9
511 *
512 repeat level 5
513 *
514 * level 10
515 *
516 repeat level 5
517 *
518 * level 11
519 *
520 repeat level 5
521 *
522 * level 12
523 *
524 repeat level 5
525 *
526 * level 13
527 *
528 repeat level 5
529 *
530 * level 14
531 *
532 repeat level 5
533 *
534 * level 15
535 *
536 repeat level 5

```

```

537 *
538 * level 16
539 *
540 repeat level 5
541 *
542 * level 17
543 *
544 repeat level 5
545 *
546 * level 18
547 *
548 repeat level 5
549 *
550 * level 19
551 *
552 repeat level 5
553 *
554 * level 20
555 *
556 * cfz1-t* f -1.0000e-04e
557 * cfz1-z* r04 -5.7191e-02r02 -6.2791e-02r02 -1.0000e-04e
558 * cfz1-r* r04 8.7633e-02r02 1.3910e+01r02 0.0000e-04e
559 * cfzv-t* f 0.0000e-04e
560 * cfzv-z* r04 5.7191e-02r02 6.2791e-02r02 0.0000e-04e
561 * cfzv-r* r04 8.7633e-02r02 1.3910e+01r02 0.0000e-04e
562 * vol * r04 5.3000e-01r02 0.26161 r02 1.0e
563 * fa-t * r04 2.5000e-01r02 0.09312 r02 1.0e
564 * fa-z * r04 5.3000e-01r02 0.26161 r02 1.0e
565 * fa-r * r04 2.5000e-01r04 0.0000e+00e
566 * hd-t * r06 6.3000e-03r02 1.2300e-01e
567 * hd-z * r04 1.2460e-02r02 1.3680e-02r02 0.123e
568 * hd-r * r04 6.3000e-03r04 0.0000e+00e
569 * alpn * f 1.0000e+00e
570 * vvn-t * f 0.0000e+00e
571 * vvn-z * f 0.0000e+00e
572 * vvn-r * f 0.0000e+00e
573 * vln-t * f 0.0000e+00e
574 * vln-z * f 0.0000e+00e
575 * vln-r * f 0.0000e+00e
576 * tvn * f 4.1420e+02e
577 * tln * f 4.1420e+02e
578 * pn * f 2.0000e+05e
579 * pan * f 0.0000e+00e
580 *
581 * level 21
582 *
583 * cfz1-t* f -1.0000e-04e
584 * cfz1-z* r04 -6.2300e-02r02 -6.8400e-02r02 -1.0000e-04e
585 * cfz1-r* f 0.0000e-04e
586 * cfzv-t* f 0.0000e-04e
587 * cfzv-z* r04 6.2300e-02r02 6.8400e-02r02 0.0000e-04e
588 * cfzv-r* f 0.0000e-04e
589 * vol * r04 8.1000e-01r02 0.37998 r02 1.0e
590 * fa-t * r04 6.2000e-01r02 0.32647 r02 1.0e
591 * fa-z * r04 8.1000e-01r02 0.37998 r02 1.0e
592 * fa-r * r04 6.2000e-01r04 0.0000e+00e
593 * hd-t * r06 6.3000e-03r02 0.123e
594 * hd-z * r04 1.2460e-02r02 1.3680e-02r02 0.123e
595 * hd-r * r04 6.3000e-03r04 0.0000e+00e
596 * alpn * f 1.0000e+00e
597 * vvn-t * f 0.0000e+00e
598 * vvn-z * f 0.0000e+00e
599 * vvn-r * f 0.0000e+00e
600 * vln-t * f 0.0000e+00e
601 * vln-z * f 0.0000e+00e
602 * vln-r * f 0.0000e+00e
603 * tvn * f 4.1420e+02e
604 * tln * f 4.1420e+02e
605 * pn * f 2.0000e+05e
606 * pan * f 0.0000e+00e
607 *
608 * level 22
609 *
610 * cfz1-t* f -1.0000e-04e
611 * cfz1-z* f -1.0000e-04e
612 * cfz1-r* f 0.0000e-04e
613 * cfzv-t* f 0.0000e-04e
614 * cfzv-z* f 0.0000e-04e
615 * cfzv-r* f 0.0000e-04e
616 * vol * r04 7.1000e-01r02 0.3208 r02 1.0e
617 * fa-t * r04 5.0000e-01r02 0.29465 r02 1.0 e
618 * fa-z * r02 3.8180e-01r02 3.3700e-01r02 1.6499e-01r02 1.00e
619 * fa-r * r04 5.0000e-01r04 0.0000e+00e
620 * hd-t * r06 1.2800e-02r02 0.123e
621 * hd-z * r06 1.2800e-02r02 0.123e
622 * hd-r * r04 1.2800e-02r04 0.0000e+00e
623 * alpn * f 1.0000e+00e
624 * vvn-t * f 0.0000e+00e
625 * vvn-z * f 0.0000e+00e
626 * vvn-r * f 0.0000e+00e
627 * vln-t * f 0.0000e+00e
628 * vln-z * f 0.0000e+00e

```

629 \* vln-r \* f 0.0000e+00e  
630 \* tvn \* f 4.1420e+02e  
631 \* tln \* f 4.1420e+02e  
632 \* pn \* f 2.0000e+05e  
633 \* pan \* f 0.0000e+00e  
634 \* level 23  
635 \*  
636 \*  
637 \* cfzl-t\* f -1.0000e-04e  
638 \* cfzl-z\* f -1.0000e-04e  
639 \* cfzl-r\* f 0.0000e-04e  
640 \* cfzv-t\* f 0.0000e-04e  
641 \* cfzv-z\* f 0.0000e-04e  
642 \* cfzv-r\* f 0.0000e-04e  
643 \* vol \* r02 9.2900e-01r02 9.1000e-01r02 0.67137r02 1.0e  
644 \* fa-t \* r04 9.0000e-01r02 4.4845e-01r02 1.00e  
645 \* fa-z \* r02 9.2900e-01r02 6.5000e-01r02 3.9774e-01r02 1.00e  
646 \* fa-r \* r04 7.9000e-01r04 0.0000e+00e  
647 \* hd-t \* r06 2.5000e-01r02 0.123e  
648 \* hd-z \* r02 6.1500e-01r02 2.3780e-01r02 2.1260e-01r02 0.123e  
649 \* hd-r \* r04 2.5000e-01r04 0.0000e+00e  
650 \* alpn \* f 1.0000e+00e  
651 \* vvn-t \* f 0.0000e+00e  
652 \* vvn-z \* f 0.0000e+00e  
653 \* vvn-r \* f 0.0000e+00e  
654 \* vln-t \* f 0.0000e+00e  
655 \* vln-z \* f 0.0000e+00e  
656 \* vln-r \* f 0.0000e+00e  
657 \* tvn \* f 4.1420e+02e  
658 \* tln \* f 4.1420e+02e  
659 \* pn \* f 2.0000e+05e  
660 \* pan \* f 0.0000e+00e  
661 \* level 24  
662 \*  
663 \*  
664 \* cfzl-t\* f -1.0000e-04e  
665 \* cfzl-z\* f -1.0000e-04e  
666 \* cfzl-r\* f 0.0000e-04e  
667 \* cfzv-t\* f 0.0000e-04e  
668 \* cfzv-z\* f 0.0000e-04e  
669 \* cfzv-r\* f 0.0000e-04e  
670 \* vol \* r02 9.2900e-01r02 9.2000e-01r02 0.67137r02 1.0 e  
671 \* fa-t \* r04 6.0000e-01r02 0.45375 r02 1.00e  
672 \* fa-z \* r02 9.2900e-01r02 9.1000e-01r02 0.3686 r02 1.0 e  
673 \* fa-r \* r04 6.0000e-01r04 0.0000e+00e  
674 \* hd-t \* r06 2.5000e-01r02 0.123e  
675 \* hd-z \* r02 6.1500e-01r02 2.3780e-01r02 2.1260e-01r02 0.123e  
676 \* hd-r \* r04 2.5000e-01r04 0.0000e+00e  
677 \* alpn \* f 1.0000e+00e  
678 \* vvn-t \* f 0.0000e+00e  
679 \* vvn-z \* f 0.0000e+00e  
680 \* vvn-r \* f 0.0000e+00e  
681 \* vln-t \* f 0.0000e+00e  
682 \* vln-z \* f 0.0000e+00e  
683 \* vln-r \* f 0.0000e+00e  
684 \* tvn \* f 4.1420e+02e  
685 \* tln \* f 4.1420e+02e  
686 \* pn \* f 2.0000e+05e  
687 \* pan \* f 0.0000e+00e  
688 \* level 25  
689 \*  
690 \*  
691 \* cfzl-t\* f -1.0000e-04e  
692 \* cfzl-z\* f -1.0000e-04e  
693 \* cfzl-r\* f 0.0000e-04e  
694 \* cfzv-t\* f 0.0000e-04e  
695 \* cfzv-z\* f 0.0000e-04e  
696 \* cfzv-r\* f 0.0000e-04e  
697 \* vol \* r02 9.2900e-01r02 9.2000e-01r02 0.67137r02 1.0 e  
698 \* fa-t \* r04 6.0000e-01r02 0.45375 r02 1.00e  
699 \* fa-z \* r02 9.2900e-01r02 9.2000e-01r02 0.3686 r02 1.0 e  
700 \* fa-r \* r04 6.0000e-01r04 0.0000e+00e  
701 \* hd-t \* r06 2.5000e-01r02 0.123e  
702 \* hd-z \* r02 6.1500e-01r02 2.3780e-01r02 2.1260e-01r02 0.123e  
703 \* hd-r \* r04 2.5000e-01r04 0.0000e+00e  
704 \* alpn \* f 1.0000e+00e  
705 \* vvn-t \* f 0.0000e+00e  
706 \* vvn-z \* f 0.0000e+00e  
707 \* vvn-r \* f 0.0000e+00e  
708 \* vln-t \* f 0.0000e+00e  
709 \* vln-z \* f 0.0000e+00e  
710 \* vln-r \* f 0.0000e+00e  
711 \* tvn \* f 4.1420e+02e  
712 \* tln \* f 4.1420e+02e  
713 \* pn \* f 2.0000e+05e  
714 \* pan \* f 0.0000e+00e  
715 \* level 26  
716 \*  
717 \*  
718 \* cfzl-t\* f -1.0000e-04e  
719 \* cfzl-z\* f -1.0000e-04e  
720 \* cfzl-r\* f 0.0000e-04e



```

721 * cfzv-t* f 0.0000e-04e
722 * cfzv-z* f 0.0000e-04e
723 * cfzv-r* f 0.0000e-04e
724 * vol * r02 9.2900e-01r02 9.2000e-01r02 0.67137r02 1.0 e
725 * fa-t * r04 6.0000e-01r02 0.45375 r02 1.00e
726 * fa-z * r02 9.2900e-01r02 9.2000e-01r02 0.3686 r02 1.0 e
727 * fa-r * r04 6.0000e-01r04 0.0000e+00e
728 * hd-t * r06 2.5000e-01r02 0.123e
729 * hd-z * r02 6.1500e-01r02 2.3780e-01r02 2.1260e-01r02 0.123e
730 * hd-r * r04 2.5000e-01r04 0.0000e+00e
731 * alpn * f 1.0000e+00e
732 * vvn-t * f 0.0000e+00e
733 * vvn-z * f 0.0000e+00e
734 * vvn-r * f 0.0000e+00e
735 * vln-t * f 0.0000e+00e
736 * vln-z * f 0.0000e+00e
737 * vln-r * f 0.0000e+00e
738 * tvn * f 4.1420e+02e
739 * tln * f 4.1420e+02e
740 * pn * f 2.0000e+05e
741 * pan * f 0.0000e+00e
742 *
743 ***** type num id ctitle
744 tee 6 6 $6$ cold leg--combined loop
745 * jcell nodes ichf cost epsw
746 18 2 1 7.0700e-01 4.5720e-05
747 * iconc1 ncell1 jun1 jun2 ipow1
748 0 22 12 3 0
749 * iqptr1 iqpsv1 nqptb1 nqpsv1 nqprf1
750 0 0 0 0 0
751 * radin1 th1 hout11 houtv1 tout11
752 3.0200e-01 1.0000e-02 0.0000e+00 0.0000e+00 2.9300e+02
753 * toutv1
754 2.9300e+02
755 * qpin1 qpoff1 rqpms1 qpscl1
756 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
757 * iconc2 ncell2 jun3 ipow2
758 0 1 11 0
759 * iqptr2 iqpsv2 nqptb2 nqpsv2 nqprf2
760 0 0 0 0 0
761 * radin2 th2 hout12 houtv2 tout12
762 4.0700e-02 4.0000e-03 0.0000e+00 0.0000e+00 2.9300e+02
763 * toutv2
764 2.9300e+02
765 * qpin2 qpoff2 rqpms2 qpscl2
766 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
767 *
768 * dx * 3.0000e-01 2.1650e-01 2.1310e-01 9.9140e-01 1.8866e+00
769 * dx * 2.1400e+00 2.2800e+00 9.4000e-01 9.0000e-01 3.2900e-01
770 * dx * 2.7500e-01 2.5200e-01 5.2400e-01 2.6000e-01 4.4000e-01
771 * dx * r02 6.8500e-01 8.0000e-01r03 8.5730e-01 8.0000e-01e
772 * vol * 1.3978e-01 1.7177e-01 8.7117e-02 5.6265e-02 1.0707e-01
773 * vol * 1.2145e-01 1.2940e-01 5.3349e-02 5.1078e-02 3.0387e-02
774 * vol * 5.6388e-02 2.2821e-02 4.7454e-02 2.8650e-01 2.4972e-02
775 * vol * r02 3.8868e-02 4.5402e-02r03 4.8654e-02 4.5402e-02e
776 * fa * 4.659e-01 4.3413e-01 3.4821e-01r07 5.6760e-02 2.1265e-02
777 * fa * r03 9.0561e-02r09 5.6760e-02e
778 * fric * r10 0.0000e+00 2.1500e-01r06 0.0r02 .001 f 0.0000e+00e
779 * grav * r03-1.0000e+00 -7.6604e-01r02-1.0000e+00r02 0.0000e+00r06 1.0000e+00
780 * grav * r09 0.0000e+00e
781 * hd * 3.9570e-01 3.6880e-01 3.2940e-01r07 1.5520e-01 9.5000e-02
782 * hd * r03 4.7340e-02r09 1.5520e-01e
783 * nff * r17 -1r02 1 f -1e
784 * alp * f 1.0000e+00e
785 * vl * f 0.0000e+00e
786 * vv * f 0.0000e+00e
787 * tl * f 4.1420e+02e
788 * tv * f 4.1420e+02e
789 * p * f 2.0000e+05e
790 * pa * f 0.0000e+00e
791 * qppp * f 0.0000e+00e
792 * matid * 6e
793 * tw * f 4.1420e+02e
794 *
795 * dx * 1.0000e+00e
796 * vol * 5.2050e-03e
797 * fa * f 5.2050e-03e
798 * fric * .001 f 0.0000e+00e
799 * grav * f 7.0700e-01e
800 * hd * f 4.7000e-02e
801 * nff * 1 -1e
802 * alp * 1.0000e+00e
803 * vl * f 0.0000e+00e
804 * vv * f 0.0000e+00e
805 * tl * 4.1420e+02e
806 * tv * 4.1420e+02e
807 * p * 2.0000e+05e
808 * pa * 0.0000e+00e
809 * qppp * f 0.0000e+00e
810 * matid * 6e
811 * tw * f 3.6250e+02e
812 *

```

```

813 ***** type num id ctitle
814 pipe 7 7 $7$ hot leg--combined loop
815 * ncells nodes jun1 jun2 epsw
816 * 3 2 4 13 4.5720e-05
817 * ichf iconc iacc ipow
818 * 1 0 0 0
819 * iq3tr iq3sv nqp3tb nqp3sv nqp3rf
820 * 0 0 0 0 0
821 * radin th hout1 houtv tout1
822 * 2.3280e-01 5.0000e-03 0.0000e+00 0.0000e+00 2.9300e+02
823 * toutv
824 * 2.9300e+02
825 * qp3in qp3off rqp3mx qp3scl
826 * 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
827 *
828 * dx * 3.3810e+00 2.4860e+00 7.9800e-01e
829 * vol * 1.9190e-01 1.4110e-01 2.9700e-01e
830 * fa * r03 5.6750e-02 3.7240e-01e
831 * fric * f 0.0000e+00e
832 * grav * r02 0.0000e+00 7.6600e-01 1.0000e+00e
833 * hd * r03 1.5520e-01 4.7960e-01e
834 * nff * f -1e
835 * alp * f 1.0000e+00e
836 * vl * f 0.0000e+00e
837 * vv * f 0.0000e+00e
838 * tl * f 4.1420e+02e
839 * tv * f 4.1420e+02e
840 * p * f 2.0000e+05e
841 * pa * f 0.0000e+00e
842 * qppp * f 0.0000e+00e
843 * matid * 6e
844 * tw * f 4.1420e+02e
845 *
846 ***** type num id ctitle
847 pipe 8 8 $8$ ilsg primary
848 *
849 * ncells nodes jun1 jun2 epsw
850 * 12 0 13 12 4.5720e-5
851 *
852 * ichf iconc iacc ipow
853 * 1 0 0 0
854 *
855 * radin th hout1 houtv tout1
856 * 9.8000e-03 2.9000e-03 0.0 0.0 300.0
857 *
858 * toutv powin powoff rpowmx powsc1
859 * 300.0 0. 0. 0. 1.
860 *
861 * dx * 7.9800e-01r02 5.0000e-01 1.5240e+00r04 2.5240e+00 1.5240e+00
862 * dx * r02 5.0000e-01 7.9800e-01e
863 * vol * 2.9700e-01r02 7.1500e-02 2.1780e-01r04 3.6090e-01 2.1780e-01
864 * vol * r02 7.1500e-02 2.1279e-01e
865 * fa * 3.7240e-01r11 1.4300e-01 4.659e-01e
866 * fric * f 0.0000e+00e
867 * grav * r06 1.0000e+00 0.0000e+00r06-1.0000e+00e
868 * hd * 4.7960e-01r11 1.9600e-02 3.9570e-01e
869 * nff * f -1e
870 * alp * f 1.0000e+00e
871 * vl * f 0.0000e+00e
872 * vv * f 0.0000e+00e
873 * tl * f 4.1420e+02e
874 * tv * f 4.1420e+02e
875 * p * f 2.0000e+05e
876 * pa * f 0.0000e+00e
877 *
878 ***** type num id ctitle
879 pipe 28 28 $28$ ilsg secondary
880 *
881 * ncells nodes jun1 jun2 epsw
882 * 5 0 16 17 4.5720e-5
883 *
884 * ichf iconc iacc ipow
885 * 1 0 0 0
886 *
887 * radin th hout1 houtv tout1
888 * 0. 0. 0.0 0.0 300.0
889 *
890 * toutv powin powoff rpowmx powsc1
891 * 300.0 0. 0. 0. 1.
892 *
893 * dx * r02 5.0000e-01 1.5240e+00 2.5240e+00 2.7510e+00e
894 * vol * 1.7940e+00 5.9400e-01 1.8060e+00 2.9920e+00 3.3150e+00
895 *
896 * fa * 0.0000e+00r04 1.1853e+00 0.0000e+00e
897 * fric * f 0.0000e+00e
898 * grav * f 1.0000e+00e
899 * hd * f 1.0240e-01 e
900 * nff * f -1e
901 * alp * r04 0.0000e+00 2.5400e-01e
902 * vl * f 0.0000e+00e
903 * vv * f 0.0000e+00e
904 * tl * 4.8000e+02 5.2500e+02r03 5.4000e+02e

```

```

905 * tv * 4.8000e+02 5.2500e+02r03 5.4000e+02e
906 * p * 5.2500e+06 5.2400e+06 5.2300e+06 5.2200e+06 5.2100e+06
907 e
908 * pa * f 0.0000e+00e
909 *
910 ***** type num id ctitle
911 pipe 2 2 $2$ broken cold leg-vessel side
912 * ncells nodes jun1 jun2 epsw
913 * 6 3 1 7 4.5720e-05
914 * ichf iconc iacc ipow
915 * 1 0 0 0
916 * iqp3tr iqp3sv nqp3tb nqp3sv nqp3rf
917 * 0 0 0 0 0
918 * radin th houtl houtv toutl
919 * 1.3000e-01 5.0000e-03 0.0000e+00 0.0000e+00 2.9300e+02
920 * toutv
921 * 2.9300e+02
922 * qp3in qp3off rqp3mx qp3scl
923 * 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
924 *
925 * dx * r02 1.3700e+00 9.7000e-01r02 1.7600e+00 2.0000e+00e
926 * vol * r02 2.5850e-02 7.1340e-02r02 1.2940e-01 1.4710e-01e
927 * fa * r03 1.8870e-02r04 7.3540e-02e
928 * fric * r02 0.0000e+00 9.0000e-02r02 2.0000e-02r02 1.0000e-02e
929 * grav * r03 0.0000e+00 -7.5000e-01 -1.0000e+00 -5.5000e-01 0.0000e+00
930 e
931 * hd * r03 1.5500e-01r04 3.0600e-01e
932 * nff * f -1e
933 * alp * f 1.0000e+00e
934 * vl * f 0.0000e+00e
935 * vv * f 0.0000e+00e
936 * tl * f 4.1420e+02e
937 * tv * f 4.1420e+02e
938 * p * f 2.0000e+05e
939 * pa * f 0.0000e+00e
940 * qppp * f 0.0000e+00e
941 * matid * f 6e
942 * tw * f 4.1420e+02e
943 *
944 ***** type num id ctitle
945 pipe 3 3 $3$ broken cold leg-st gen side
946 * ncells nodes jun1 jun2 epsw
947 * 21 2 9 8 4.5720e-05
948 * ichf iconc iacc ipow
949 * 1 0 0 0
950 * iqp3tr iqp3sv nqp3tb nqp3sv nqp3rf
951 * 0 0 0 0 0
952 * radin th houtl houtv toutl
953 * 1.0100e-01 9.0000e-03 0.0000e+00 0.0000e+00 2.9300e+02
954 * toutv
955 * 2.9300e+02
956 * qp3in qp3off rqp3mx qp3scl
957 * 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
958 *
959 * dx * 3.0000e-01 2.1650e-01 2.1310e-01 9.9140e-01 1.8866e+00
960 * dx * 2.1400e+00 2.2800e+00 9.4000e-01 9.0000e-01 3.2900e-01
961 * dx * 2.7500e-01 2.5200e-01 5.2400e-01 2.6000e-01 4.4000e-01
962 * dx * r02 6.8500e-01 8.0000e-01 8.8990e-01 3.5250e+00 2.1500e+00
963 e
964 * vol * 4.6595e-02 5.7256e-02 2.9039e-02 1.8755e-02 3.5691e-02
965 * vol * 4.0484e-02 4.3133e-02 1.7783e-02 1.7026e-02 1.0129e-02
966 * vol * 1.8796e-02 7.6070e-03 1.5818e-02 9.5500e-02 8.3240e-03
967 * vol * r02 1.2956e-02 1.5134e-02 1.6837e-02 6.6690e-02 1.4990e-01
968 e
969 * fa * 1.5532e-01 1.4471e-01 1.1607e-01r07 1.8920e-02 7.0882e-03
970 * fa * r03 3.0187e-02r07 1.8920e-02 6.9700e-02e
971 * fric * r10 0.0000e+00 2.1500e-01r11 0.0000e+00e
972 * grav * r03 -1.0000e+00 -7.6604e-01r02 -1.0000e+00r02 0.0000e+00r06 1.0000e+00
973 * grav * r06 0.0000e+00 4.5820e-01 0.0000e+00e
974 * hd * 3.9570e-01 3.6880e-01 3.2940e-01r07 1.5520e-01 9.5000e-02
975 * hd * r03 4.7340e-02r07 1.5520e-01 2.9790e-01e
976 * nff * f -1e
977 * alp * f 1.0000e+00e
978 * vl * f 0.0000e+00e
979 * vv * f 0.0000e+00e
980 * tl * f 4.1420e+02e
981 * tv * f 4.1420e+02e
982 * p * f 2.0000e+05e
983 * pa * f 0.0000e+00e
984 * qppp * f 0.0000e+00e
985 * matid * f 6e
986 * tw * f 4.1420e+02e
987 *
988 ***** type num id ctitle
989 pipe 4 4 $4$ hot leg--broken loop
990 * ncells nodes jun1 jun2 epsw
991 * 3 2 2 10 4.5720e-05
992 * ichf iconc iacc ipow
993 * 1 0 0 0
994 * iqp3tr iqp3sv nqp3tb nqp3sv nqp3rf
995 * 0 0 0 0 0
996 * radin th houtl houtv toutl

```

```

997      7.7600e-02      5.0000e-03      0.0000e+00      0.0000e+00      2.9300e+02
998 *      toutv
999      2.9300e+02
1000 *      qp3in      qp3off      rqp3mx      qp3scl
1001      0.0000e+00      0.0000e+00      0.0000e+00      0.0000e+00
1002 *
1003 * dx *      3.3810e+00      2.4860e+00      7.9800e-01e
1004 * vol *      6.3960e-02      4.7030e-02      9.9000e-02e
1005 * fa * r03 1.8920e-02      1.2410e-01e
1006 * fric * f 0.0000e+00e
1007 * grav * r02 0.0000e+00      7.6600e-01      1.0000e+00e
1008 * hd * r03 1.5520e-01      4.7960e-01e
1009 * nff * f -1e
1010 * alp * f 1.0000e+00e
1011 * vl * f 0.0000e+00e
1012 * vv * f 0.0000e+00e
1013 * tl * f 4.1420e+02e
1014 * tv * f 4.1420e+02e
1015 * p * f 2.0000e+05e
1016 * pa * f 0.0000e+00e
1017 * qppp * f 0.0000e+00e
1018 * matid * 6e
1019 * tw * f 4.1420e+02e
1020 *
1021 ***** type num id ctitle
1022 pipe 5 5 $$$ blsg primary
1023 *
1024 * ncells nodes jun1 jun2 epsw
1025 12 0 10 9 4.5720e-5
1026 *
1027 * ichf iconc iacc ipow
1028 1 0 0 0
1029 *
1030 * radin th hout1 houtv tout1
1031 9.8000e-03 2.9000e-03 0.0 0.0 300.0
1032 *
1033 * toutv powin powoff rpowmx pow scl
1034 300.0 0. 0. 0. 1.
1035 *
1036 * dx * r02 7.9800e-01r02 5.0000e-01 1.5240e+00r04 2.5240e+00 1.5240e+00
1037 * dx * r02 5.0000e-01 7.9800e-01e
1038 * vol * r02 9.9000e-02r02 2.3800e-02 7.2600e-02r04 1.2030e-01 7.2600e-02
1039 * vol * r02 2.3800e-02 7.0930e-02e
1040 * fa * r11 1.2410e-01r11 4.7670e-02 1.5532e-01e
1041 * fric * f 0.0000e+00e
1042 * grav * r06 1.0000e+00 0.0000e+00r06-1.0000e+00e
1043 * hd * r11 4.7960e-01r11 1.9600e-02 3.9570e-01e
1044 * nff * f -1e
1045 * alp * f 1.0000e+00e
1046 * vl * f 0.0000e+00e
1047 * vv * f 0.0000e+00e
1048 * tl * f 4.1420e+02e
1049 * tv * f 4.1420e+02e
1050 * p * f 2.0000e+05e
1051 * pa * f 0.0000e+00e
1052 *
1053 ***** type num id ctitle
1054 pipe 25 25 $$$ blsg secondary
1055 *
1056 * ncells nodes jun1 jun2 epsw
1057 5 0 14 15 4.5720e-5
1058 *
1059 * ichf iconc iacc ipow
1060 1 0 0 0
1061 *
1062 * radin th hout1 houtv tout1
1063 0. 0. 0.0 0.0 300.0
1064 *
1065 * toutv powin powoff rpowmx pow scl
1066 300.0 0. 0. 0. 1.
1067 *
1068 * dx * r02 5.0000e-01 1.5240e+00 2.5240e+00 2.7510e+00e
1069 * vol * r02 5.9800e-01 1.9800e-01 6.0200e-01 9.9720e-01 1.1050e+00
1070 e
1071 * fa * r04 0.0000e+00r04 3.9510e-01 0.0000e+00e
1072 * fric * f 0.0000e+00e
1073 * grav * f 1.0000e+00e
1074 * hd * f 1.0240e-01e
1075 * nff * f -1e
1076 * alp * r04 0.0000e+00 2.5400e-01e
1077 * vl * f 0.0000e+00e
1078 * vv * f 0.0000e+00e
1079 * tl * 4.8400e+02 5.2200e+02r03 5.4000e+02e
1080 * tv * 4.8400e+02 5.2200e+02r03 5.4000e+02e
1081 * p * 5.2500e+06 5.2400e+06 5.2300e+06 5.2200e+06 5.2100e+06
1082 e
1083 * pa * f 0.0000e+00e
1084 *
1085 ***** type num id ctitle
1086 pipe 11 11 $$$ lower plenum ecc pipe
1087 * ncells nodes jun1 jun2 epsw
1088 1 0 5 6 4.5720e-05

```

```

1089 *      ichf      iconc      iacc      ipow
1090      0          0          0          0
1091 *      radin      th      houtl      houtv      toutl
1092      7.7600e-02  1.0000e-03  0.0000e+00  0.0000e+00  2.9300e+02
1093 *      toutv
1094      2.9300e+02
1095 *
1096 * dx *      1.0000e-01e
1097 * vol *      1.8900e-03e
1098 * fa * f 1.8900e-02e
1099 * fric * f 0.0000e+00e
1100 * grav * f 0.0000e+00e
1101 * hd * f 1.5200e-01e
1102 * nff * f -1e
1103 * alp *      0.0000e+00e
1104 * vl * f 0.0000e+00e
1105 * vv * f 0.0000e+00e
1106 * tl *      4.1420e+02e
1107 * tv *      4.1420e+02e
1108 * p *      2.0000e+05e
1109 * pa *      0.0000e+00e
1110 *
1111 * type num id ctitle
1112 fill 12 12 $12$ lower plenum ecc fill
1113 *      jun1 ifty ioff
1114      6      9      0
1115 *      iftr ifsv nftb nfsv nfrf
1116      1003 101 7 0 0
1117 *      twtold rfmxcnccin felv
1118      0.0000e+00 1.0000e+05 0.0000e+00 0.0000e+00
1119 *      dxin volin alpin vlin tlin
1120      1.0000e-01 1.8900e-02 0.0000e+00 0.0000e+00 4.1420e+02
1121 *      pin pain flowin vvin tvin
1122      2.0000e+05 0.0000e+00 0.0000e+00 0.0000e+00 4.1420e+02
1123 *      vmscl vvscl
1124      1.0000e+00 1.0000e+00
1125 *      t1scl tvscl pscl pascl conscl
1126      1.0000e+00 1.0000e+00 1.0000e+00 1.0000e+00 1.0000e+00
1127 *
1128 * vmtb * r02 0.0000e+00 8.0000e+01 0.0000e+00 8.4000e+01 4.8681e+00
1129 * vmtb * 9.1000e+01 5.5105e+00 9.4000e+01 5.0868e+00 9.9000e+01
1130 * vmtb * 0.0000e+00 6.0000e+02 0.0000e+00e 0.0000e+00e
1131 * vvtb * r02 0.0000e+00 5.0000e+01 0.0000e+00 1.0000e+02 0.0000e+00
1132 * vvtb * 1.5000e+02 0.0000e+00 2.0000e+02 0.0000e+00 3.0000e+02
1133 * vvtb * 0.0000e+00 6.0000e+02 0.0000e+00e 0.0000e+00e
1134 * tltb * 0.0000e+00 3.9300e+02 8.0000e+01 3.9300e+02 8.8200e+01
1135 * tltb * 3.9300e+02 8.8500e+01 3.1000e+02 1.6000e+02 3.1000e+02
1136 * tltb * 2.0000e+02 3.1000e+02 6.0000e+02 3.1000e+02e
1137 * tvtb * 0.0000e+00 4.1420e+02 5.0000e+01 4.1420e+02 1.0000e+02
1138 * tvtb * 4.1420e+02 1.5000e+02 4.1420e+02 2.0000e+02 4.1420e+02
1139 * tvtb * 3.0000e+02 4.1420e+02 6.0000e+02 4.1420e+02e
1140 * alptb * r02 0.0000e+00 5.0000e+01 0.0000e+00 1.0000e+02 0.0000e+00
1141 * alptb * 1.5000e+02 0.0000e+00 2.0000e+02 0.0000e+00 3.0000e+02
1142 * alptb * 0.0000e+00 6.0000e+02 0.0000e+00e 0.0000e+00e
1143 * ptb * 0.0000e+00 2.0000e+05 5.0000e+01 2.0000e+05 1.0000e+02
1144 * ptb * 2.0000e+05 1.5000e+02 2.0000e+05 2.0000e+02 2.0000e+05
1145 * ptb * 3.0000e+02 2.0000e+05 6.0000e+02 2.0000e+05e
1146 * patb * r02 0.0000e+00 5.0000e+01 0.0000e+00 1.0000e+02 0.0000e+00
1147 * patb * 1.5000e+02 0.0000e+00 2.0000e+02 0.0000e+00 3.0000e+02
1148 * patb * 0.0000e+00 6.0000e+02 0.0000e+00e 0.0000e+00e
1149 *
1150 * type num id ctitle
1151 fill 13 13 $13$ cold leg ecc fill
1152 *      jun1 ifty ioff
1153      11      9      0
1154 *      iftr ifsv nftb nfsv nfrf
1155      1003 101 8 0 0
1156 *      twtold rfmxcnccin felv
1157      0.0000e+00 1.0000e+05 0.0000e+00 0.0000e+00
1158 *      dxin volin alpin vlin tlin
1159      1.0000e+00 5.2050e-03 0.0000e+00 0.0000e+00 3.8300e+02
1160 *      pin pain flowin vvin tvin
1161      2.0000e+05 0.0000e+00 0.0000e+00 0.0000e+00 4.1420e+02
1162 *      vmscl vvscl
1163      1.0000e+00 1.0000e+00
1164 *      t1scl tvscl pscl pascl conscl
1165      1.0000e+00 1.0000e+00 1.0000e+00 1.0000e+00 1.0000e+00
1166 *
1167 * vmtb * r02 0.0000e+00 9.2000e+01 0.0000e+00 9.6000e+01 1.3660e+01
1168 * vmtb * 9.9000e+01 1.6442e+01 1.0400e+02 1.6473e+01 1.0900e+02
1169 * vmtb * 3.1820e+00 1.2100e+00 2.1810e+00 6.0000e+02 2.1864e+00
1170 e
1171 * vvtb * r02 0.0000e+00 5.0000e+01 0.0000e+00 1.0000e+02 0.0000e+00
1172 * vvtb * 1.5000e+02 0.0000e+00 2.0000e+02 0.0000e+00 3.0000e+02
1173 * vvtb * 0.0000e+00 5.0000e+02 0.0000e+00 6.0000e+02 0.0000e+00
1174 e
1175 * tltb * 0.0000e+00 3.8700e+02 8.1000e+01 3.8700e+02 9.2000e+01
1176 * tltb * 3.8700e+02 9.5000e+01 3.1000e+02 9.6000e+01 3.0900e+02
1177 * tltb * 1.0700e+02 3.0800e+02 1.2300e+02 3.1100e+02 6.0000e+02
1178 * tltb * 3.1100e+02e
1179 * tvtb * 0.0000e+00 4.1420e+02 5.0000e+01 4.1420e+02 1.0000e+02
1180 * tvtb * 4.1420e+02 1.5000e+02 4.1420e+02 2.0000e+02 4.1420e+02

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1181 * tvtb * 3.0000e+02 4.1420e+02 5.0000e+02 4.1420e+02 6.0000e+02
1182 * tvtb * 4.1420e+02e
1183 * alptb * r02 0.0000e+00 5.0000e+01 0.0000e+00 1.0000e+02 0.0000e+00
1184 * alptb * 1.5000e+02 0.0000e+00 2.0000e+02 0.0000e+00 3.0000e+02
1185 * alptb * 0.0000e+00 5.0000e+02 0.0000e+00 6.0000e+02 0.0000e+00
1186 e
1187 * ptb * 0.0000e+00 2.0000e+05 5.0000e+01 2.0000e+05 1.0000e+02
1188 * ptb * 2.0000e+05 1.5000e+02 2.0000e+05 2.0000e+02 2.0000e+05
1189 * ptb * 3.0000e+02 2.0000e+05 5.0000e+02 2.0000e+05 6.0000e+02
1190 * ptb * 2.0000e+05e
1191 * patb * r02 0.0000e+00 5.0000e+01 0.0000e+00 1.0000e+02 0.0000e+00
1192 * patb * 1.5000e+02 0.0000e+00 2.0000e+02 0.0000e+00 3.0000e+02
1193 * patb * 0.0000e+00 5.0000e+02 0.0000e+00 6.0000e+02 0.0000e+00
1194 e
1195 *
1196 ***** type num id ctitle
1197 break 14 14 $14$ cold leg break-vessel side
1198 * jun1 ibty isat ioff
1199 7 1 3 1
1200 * ibtr ibsv nbtt nbsv nbrf
1201 0 101 23 0 0
1202 * dxin volin alpin tin pin
1203 1.6670e+00 3.1500e-02 1.0000e+00 4.1420e+02 2.0000e+05
1204 * pain concin rfm x poff belv
1205 0.0000e+00 0.0000e+00 1.5000e+05 0.0000e+00 0.0000e+00
1206 * pscl tlsc1 tvscl pascl conscl
1207 1.0000e+00 1.0000e-06 1.0000e+00 1.0000e+00 1.0000e+00
1208 * ptb * 0.0000e+00 2.0280e+05 2.6000e+01 2.0280e+05 2.7000e+01
1209 * ptb * 2.0310e+05 8.2000e+01 2.0310e+05 9.4000e+01 2.2080e+05
1210 * ptb * 9.6000e+01 2.2390e+05 1.0400e+02 2.0700e+05 1.0800e+02
1211 * ptb * 2.1100e+05 1.1400e+02 2.0920e+05 1.2700e+02 2.2060e+05
1212 * ptb * 1.8500e+02 2.0550e+05 2.2000e+02 2.0280e+05 2.5600e+02
1213 * ptb * 2.0180e+05 3.0200e+02 2.0280e+05 3.3200e+02 2.0460e+05
1214 * ptb * 3.6500e+02 2.0490e+05 3.9100e+02 2.0460e+05 4.8000e+02
1215 * ptb * 2.0370e+05 5.0400e+02 2.0430e+05 5.3600e+02 2.0280e+05
1216 * ptb * 5.5400e+02 2.0120e+05 5.7000e+02 2.0240e+05 6.0000e+02
1217 * ptb * 2.0340e+05e
1218 *
1219 ***** type num id ctitle
1220 break 15 15 $15$ cold leg break-st gen side
1221 * jun1 ibty isat ioff
1222 8 1 3 1
1223 * ibtr ibsv nbtt nbsv nbrf
1224 0 101 23 0 0
1225 * dxin volin alpin tin pin
1226 2.1500e+00 1.4990e-01 1.0000e+00 4.1420e+02 2.0000e+05
1227 * pain concin rfm x poff belv
1228 0.0000e+00 0.0000e+00 1.5000e+05 0.0000e+00 0.0000e+00
1229 * pscl tlsc1 tvscl pascl conscl
1230 1.0000e+00 1.0000e-06 1.0000e+00 1.0000e+00 1.0000e+00
1231 * ptb * 0.0000e+00 2.0280e+05 2.6000e+01 2.0280e+05 2.7000e+01
1232 * ptb * 2.0310e+05 8.2000e+01 2.0310e+05 9.4000e+01 2.2080e+05
1233 * ptb * 9.6000e+01 2.2390e+05 1.0400e+02 2.0700e+05 1.0800e+02
1234 * ptb * 2.1100e+05 1.1400e+02 2.0920e+05 1.2700e+02 2.2060e+05
1235 * ptb * 1.8500e+02 2.0550e+05 2.2000e+02 2.0280e+05 2.5600e+02
1236 * ptb * 2.0180e+05 3.0200e+02 2.0280e+05 3.3200e+02 2.0460e+05
1237 * ptb * 3.6500e+02 2.0490e+05 3.9100e+02 2.0460e+05 4.8000e+02
1238 * ptb * 2.0370e+05 5.0400e+02 2.0430e+05 5.3600e+02 2.0280e+05
1239 * ptb * 5.5400e+02 2.0120e+05 5.7000e+02 2.0240e+05 6.0000e+02
1240 * ptb * 2.0340e+05e
1241 *
1242 ***** type num id ctitle
1243 fill 18 18 $18$ st. gen. sec.-combined loop
1244 * jun1 ifty ioff
1245 16 1 0
1246 * twtold rfm x concin felv
1247 0.0000e+00 1.0000e+05 0.0000e+00 0.0000e+00
1248 * dxin volin alpin vlin tlin
1249 2.5240e+00 2.9916e+00 0.0000e+00 0.0000e+00 5.4000e+02
1250 * pain pin flowin vvin tvin
1251 5.2500e+06 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
1252 *
1253 ***** type num id ctitle
1254 fill 19 19 $19$ st. gen. sec.-combined loop
1255 * jun1 ifty ioff
1256 17 1 0
1257 * twtold rfm x concin felv
1258 0.0000e+00 1.0000e+05 0.0000e+00 0.0000e+00
1259 * dxin volin alpin vlin tlin
1260 2.7510e+00 3.3153e+00 0.0000e+00 0.0000e+00 5.4000e+02
1261 * pain pin flowin vvin tvin
1262 5.2500e+06 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
1263 *
1264 ***** type num id ctitle
1265 fill 16 16 $16$ st. gen. sec.-broken loop
1266 * jun1 ifty ioff
1267 14 1 0
1268 * twtold rfm x concin felv
1269 0.0000e+00 1.0000e+05 0.0000e+00 0.0000e+00
1270 * dxin volin alpin vlin tlin
1271 2.5240e+00 9.9720e-01 0.0000e+00 0.0000e+00 5.4000e+02
1272 * pain pin flowin vvin tvin

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1273      5.2500e+06  0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
1274 *
1275 ***** type num id ctitle
1276 fill 17 17 $17$ st. gen. sec.-broken loop
1277 * jun1 ifty ioff
1278 * 15 1 0
1279 * twtold rfmX concin felv
1280 0.0000e+00 1.0000e+05 0.0000e+00 0.0000e+00
1281 * dxin volin alpin vlin tlin
1282 2.7510e+00 1.1051e+00 0.0000e+00 0.0000e+00 5.4000e+02
1283 * pin pain flowin vvin tvin
1284 5.2500e+06 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
1285 *
1286 * type num id ctitle
1287 * type num id ctitle
1288 rod 999 999 $999$ fuel rod component
1289 * ncrx ncrz
1290 * 6 17
1291 * nopowr nrldr modez liqlev iaxcnd * card 2
1292 * 0 0 0 1 1 * card 3
1293 * idbci idbco hdri hdro
1294 * 0 2 0.0000e+00 1.3650e-02
1295 * nrods nodes irftr nzmaz irftr2
1296 * 6 6 1002 250 1002
1297 * dtxht(1) dtxht(2) dznht hgapo shelv
1298 2.5000e+00 1.0000e+01 1.0000e-03 1.0000e+10 2.1000e+00
1299 * irpwtY ndgx ndhx nrts nhist
1300 * 7 0 0 10 0 * card 11
1301 * irpwtr irpwsv nrpwtb nrpwsv nrpwrf
1302 * 1002 101 -1201 0 0 * card 14
1303 * izpwtr izpwsv nzpwtb nzpwsv nzpwrfl
1304 * 1002 101 1 0 0 * card 15
1305 * nmwrx nfci nfcil
1306 * 0 0 0
1307 * nzpwtz nzpwi nfbpwt
1308 * 18 -1 0
1309 * react tneut rpwoff rrpwmX rpwscl * card 17
1310 0.0000e+00 0.0000e+00 0.0000e+00 1.0000e+30 1.0000e+00 * card 18
1311 * rpwri zpwri zpwoff rrpwmX
1312 2.5713e+03 0.0000e+00 0.0000e+00 1.0000e+09 * card 19
1313 * extsou pldr pdrat fucrac
1314 0.0000e+00 0.0000e+00 1.3364e+00 1.0000e+00 * card 20
1315 * nhcomo
1316 f 1e
1317 * nhcelo * -4 4 5 6 7 s
1318 * nhcelo * 8 9 10 11 12 s
1319 * nhcelo * 13 14 15 16 17 s
1320 * nhcelo * 18 19 20 21 e
1321 * z * 2.100 2.355 2.605 2.815 3.015 s
1322 * z * 3.215 3.425 3.625 3.825 4.035 s
1323 * z * 4.235 4.435 4.645 4.845 5.045 s
1324 * z * 5.255 5.505 5.760 s
1325 * grav * f 1.0e
1326 * rdx * 57.0 171.0 171.0 513.0 s
1327 * rdx * 228.0 684.0 e
1328 * radrd * 0.0000e+00 2.7000e-03 3.3000e-03 4.3500e-03 4.8500e-03
1329 * radrd * 5.3500e-03e
1330 * matrd * 58 55 59r02 60e
1331 * nfax * f 1e
1332 * rftn * f 414.2 e
1333 * rftn * f 414.2 e
1334 * rftn * f 414.2 e
1335 * rftn * f 414.2 e
1336 * rftn * f 414.2 e
1337 * rftn * f 414.2 e
1338 * rdpwr * 0.0000e+00 7.0980e-01 1.0000e+00r03 0.0000e+00e
1339 * cpowr * r02 1.3600e+00r02 1.2000e+00r02 7.6000e-01e
1340 * rpkf * f 1. e
1341 * zpwzt *
1342 2.1 s
1343 2.355 s
1344 2.605 s
1345 2.815 s
1346 3.015 s
1347 3.215 s
1348 3.425 s
1349 3.625 s
1350 3.825 s
1351 4.035 s
1352 4.235 s
1353 4.435 s
1354 4.645 s
1355 4.845 s
1356 5.045 s
1357 5.255 s
1358 5.505 s
1359 5.76 e
1360 * zpwtb *
1361 0.0 s
1362 0.406 s
1363 0.651 s
1364 0.854 s

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1365 1.01 s
1366 1.15 s
1367 1.26 s
1368 1.34 s
1369 1.38 s
1370 1.4 s
1371 1.38 s
1372 1.34 s
1373 1.26 s
1374 1.15 s
1375 1.01 s
1376 0.854 s
1377 0.651 s
1378 0.406 s
1379 0.0 e
1380 *
1381 * rpwtb computed from experimental data by summing
1382 * data channels wt01m, wt02m, . . . wt09m
1383 *
1384 0.e+00 2.5713e+03 s
1385 5.e-01 5.9609e+03 s
1386 1.e+00 1.64843e+05 s
1387 1.5e+00 1.51367e+06 s
1388 2.e+00 4.0619e+06 s
1389 2.5e+00 6.7131e+06 s
1390 3.e+00 8.343e+06 s
1391 3.5e+00 8.7462e+06 s
1392 4.e+00 8.6925e+06 s
1393 4.5e+00 8.6017e+06 s
1394 5.e+00 8.6903e+06 s
1395 5.5e+00 8.931e+06 s
1396 6.e+00 9.1316e+06 s
1397 6.5e+00 9.202e+06 s
1398 7.e+00 9.2066e+06 s
1399 7.5e+00 9.2016e+06 s
1400 8.e+00 9.2215e+06 s
1401 8.5e+00 9.2696e+06 s
1402 9.e+00 9.3102e+06 s
1403 9.5e+00 9.3192e+06 s
1404 1.e+01 9.313e+06 s
1405 1.05e+01 9.3117e+06 s
1406 1.1e+01 9.3278e+06 s
1407 1.15e+01 9.3434e+06 s
1408 1.2e+01 9.3462e+06 s
1409 1.25e+01 9.3429e+06 s
1410 1.3e+01 9.3417e+06 s
1411 1.35e+01 9.3424e+06 s
1412 1.4e+01 9.3451e+06 s
1413 1.45e+01 9.3482e+06 s
1414 1.5e+01 9.3494e+06 s
1415 1.55e+01 9.3465e+06 s
1416 1.6e+01 9.3409e+06 s
1417 1.65e+01 9.3431e+06 s
1418 1.7e+01 9.3483e+06 s
1419 1.75e+01 9.3507e+06 s
1420 1.8e+01 9.3517e+06 s
1421 1.85e+01 9.3491e+06 s
1422 1.9e+01 9.3463e+06 s
1423 1.95e+01 9.3479e+06 s
1424 2.e+01 9.3518e+06 s
1425 2.05e+01 9.3537e+06 s
1426 2.1e+01 9.3525e+06 s
1427 2.15e+01 9.3503e+06 s
1428 2.2e+01 9.3544e+06 s
1429 2.25e+01 9.3547e+06 s
1430 2.3e+01 9.3506e+06 s
1431 2.35e+01 9.3484e+06 s
1432 2.4e+01 9.3469e+06 s
1433 2.45e+01 9.3472e+06 s
1434 2.5e+01 9.3471e+06 s
1435 2.55e+01 9.3503e+06 s
1436 2.6e+01 9.3527e+06 s
1437 2.65e+01 9.35e+06 s
1438 2.7e+01 9.3473e+06 s
1439 2.75e+01 9.3485e+06 s
1440 2.8e+01 9.3499e+06 s
1441 2.85e+01 9.3503e+06 s
1442 2.9e+01 9.348e+06 s
1443 2.95e+01 9.349e+06 s
1444 3.e+01 9.3508e+06 s
1445 3.05e+01 9.3705e+06 s
1446 3.1e+01 9.4026e+06 s
1447 3.15e+01 9.4152e+06 s
1448 3.2e+01 9.3908e+06 s
1449 3.25e+01 9.368e+06 s
1450 3.3e+01 9.3592e+06 s
1451 3.35e+01 9.3635e+06 s
1452 3.4e+01 9.3635e+06 s
1453 3.45e+01 9.358e+06 s
1454 3.5e+01 9.3551e+06 s
1455 3.55e+01 9.3541e+06 s
1456 3.6e+01 9.356e+06 s

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1457 3.65e+01 9.3548e+06 s  
1458 3.7e+01 9.3527e+06 s  
1459 3.75e+01 9.3529e+06 s  
1460 3.8e+01 9.3519e+06 s  
1461 3.85e+01 9.3498e+06 s  
1462 3.9e+01 9.3496e+06 s  
1463 3.95e+01 9.3493e+06 s  
1464 4.e+01 9.3495e+06 s  
1465 4.05e+01 9.3502e+06 s  
1466 4.1e+01 9.3508e+06 s  
1467 4.15e+01 9.3502e+06 s  
1468 4.2e+01 9.3495e+06 s  
1469 4.25e+01 9.3508e+06 s  
1470 4.3e+01 9.3512e+06 s  
1471 4.35e+01 9.3496e+06 s  
1472 4.4e+01 9.3475e+06 s  
1473 4.45e+01 9.3488e+06 s  
1474 4.5e+01 9.3503e+06 s  
1475 4.55e+01 9.3492e+06 s  
1476 4.6e+01 9.3461e+06 s  
1477 4.65e+01 9.3463e+06 s  
1478 4.7e+01 9.3491e+06 s  
1479 4.75e+01 9.3491e+06 s  
1480 4.8e+01 9.3479e+06 s  
1481 4.85e+01 9.3487e+06 s  
1482 4.9e+01 9.3493e+06 s  
1483 4.95e+01 9.3493e+06 s  
1484 5.e+01 9.3512e+06 s  
1485 5.05e+01 9.3528e+06 s  
1486 5.1e+01 9.3532e+06 s  
1487 5.15e+01 9.3503e+06 s  
1488 5.2e+01 9.3493e+06 s  
1489 5.25e+01 9.3493e+06 s  
1490 5.3e+01 9.3507e+06 s  
1491 5.35e+01 9.3516e+06 s  
1492 5.4e+01 9.3517e+06 s  
1493 5.45e+01 9.3508e+06 s  
1494 5.5e+01 9.352e+06 s  
1495 5.55e+01 9.3516e+06 s  
1496 5.6e+01 9.3502e+06 s  
1497 5.65e+01 9.3499e+06 s  
1498 5.7e+01 9.3529e+06 s  
1499 5.75e+01 9.3518e+06 s  
1500 5.8e+01 9.3497e+06 s  
1501 5.85e+01 9.3496e+06 s  
1502 5.9e+01 9.3501e+06 s  
1503 5.95e+01 9.3506e+06 s  
1504 6.e+01 9.3534e+06 s  
1505 6.05e+01 9.3552e+06 s  
1506 6.1e+01 9.3558e+06 s  
1507 6.15e+01 9.3536e+06 s  
1508 6.2e+01 9.3529e+06 s  
1509 6.25e+01 9.3525e+06 s  
1510 6.3e+01 9.3518e+06 s  
1511 6.35e+01 9.3533e+06 s  
1512 6.4e+01 9.3536e+06 s  
1513 6.45e+01 9.3523e+06 s  
1514 6.5e+01 9.3502e+06 s  
1515 6.55e+01 9.3518e+06 s  
1516 6.6e+01 9.3524e+06 s  
1517 6.65e+01 9.3525e+06 s  
1518 6.7e+01 9.3514e+06 s  
1519 6.75e+01 9.3517e+06 s  
1520 6.8e+01 9.3533e+06 s  
1521 6.85e+01 9.3534e+06 s  
1522 6.9e+01 9.3528e+06 s  
1523 6.95e+01 9.3489e+06 s  
1524 7.e+01 9.3499e+06 s  
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1526 7.1e+01 9.3586e+06 s  
1527 7.15e+01 9.3569e+06 s  
1528 7.2e+01 9.3539e+06 s  
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1531 7.35e+01 9.3537e+06 s  
1532 7.4e+01 9.3538e+06 s  
1533 7.45e+01 9.3531e+06 s  
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1536 7.6e+01 9.3557e+06 s  
1537 7.65e+01 9.3537e+06 s  
1538 7.7e+01 9.3514e+06 s  
1539 7.75e+01 9.35e+06 s  
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1543 7.95e+01 9.3553e+06 s  
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1545 8.05e+01 9.3543e+06 s  
1546 8.1e+01 9.3534e+06 s  
1547 8.15e+01 9.3533e+06 s  
1548 8.2e+01 9.353e+06 s

1549 8.25e+01 9.352e+06 s  
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1551 8.35e+01 9.35e+06 s  
1552 8.4e+01 9.3525e+06 s  
1553 8.45e+01 9.3546e+06 s  
1554 8.5e+01 9.3543e+06 s  
1555 8.55e+01 9.3533e+06 s  
1556 8.6e+01 9.3546e+06 s  
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1560 8.8e+01 9.3539e+06 s  
1561 8.85e+01 9.3543e+06 s  
1562 8.9e+01 9.3531e+06 s  
1563 8.95e+01 9.3531e+06 s  
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1566 9.1e+01 8.8152e+06 s  
1567 9.15e+01 8.1582e+06 s  
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1596 1.06e+02 7.3656e+06 s  
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1900 2.58e+02 5.7424e+06 s  
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1907 2.615e+02 5.7257e+06 s  
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1910 2.63e+02 5.693e+06 s  
1911 2.635e+02 5.6938e+06 s  
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1913 2.645e+02 5.6917e+06 s  
1914 2.65e+02 5.6901e+06 s  
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1916 2.66e+02 5.6923e+06 s

1917 2.665e+02 5.6844e+06 s  
1918 2.67e+02 5.6722e+06 s  
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1920 2.68e+02 5.658e+06 s  
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1926 2.71e+02 5.6548e+06 s  
1927 2.715e+02 5.6449e+06 s  
1928 2.72e+02 5.6288e+06 s  
1929 2.725e+02 5.6173e+06 s  
1930 2.73e+02 5.6123e+06 s  
1931 2.735e+02 5.6114e+06 s  
1932 2.74e+02 5.6113e+06 s  
1933 2.745e+02 5.6124e+06 s  
1934 2.75e+02 5.6141e+06 s  
1935 2.755e+02 5.6132e+06 s  
1936 2.76e+02 5.6107e+06 s  
1937 2.765e+02 5.6106e+06 s  
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2370 4.93e+02 4.6473e+06 s  
2371 4.935e+02 4.646e+06 s  
2372 4.94e+02 4.6454e+06 s  
2373 4.945e+02 4.6444e+06 s  
2374 4.95e+02 4.6437e+06 s  
2375 4.955e+02 4.6428e+06 s  
2376 4.96e+02 4.6423e+06 s

2377 4.965e+02 4.643e+06 s  
2378 4.97e+02 4.6427e+06 s  
2379 4.975e+02 4.6414e+06 s  
2380 4.98e+02 4.6412e+06 s  
2381 4.985e+02 4.6424e+06 s  
2382 4.99e+02 4.6435e+06 s  
2383 4.995e+02 4.6447e+06 s  
2384 5.e+02 4.6456e+06 s  
2385 5.005e+02 4.6442e+06 s  
2386 5.01e+02 4.6426e+06 s  
2387 5.015e+02 4.6403e+06 s  
2388 5.02e+02 4.6323e+06 s  
2389 5.025e+02 4.6208e+06 s  
2390 5.03e+02 4.613e+06 s  
2391 5.035e+02 4.6122e+06 s  
2392 5.04e+02 4.6136e+06 s  
2393 5.045e+02 4.6146e+06 s  
2394 5.05e+02 4.6156e+06 s  
2395 5.055e+02 4.6157e+06 s  
2396 5.06e+02 4.6143e+06 s  
2397 5.065e+02 4.6125e+06 s  
2398 5.07e+02 4.6123e+06 s  
2399 5.075e+02 4.6127e+06 s  
2400 5.08e+02 4.6124e+06 s  
2401 5.085e+02 4.6114e+06 s  
2402 5.09e+02 4.6106e+06 s  
2403 5.095e+02 4.6099e+06 s  
2404 5.1e+02 4.6087e+06 s  
2405 5.105e+02 4.6089e+06 s  
2406 5.11e+02 4.6098e+06 s  
2407 5.115e+02 4.6086e+06 s  
2408 5.12e+02 4.6012e+06 s  
2409 5.125e+02 4.5889e+06 s  
2410 5.13e+02 4.5803e+06 s  
2411 5.135e+02 4.5793e+06 s  
2412 5.14e+02 4.5811e+06 s  
2413 5.145e+02 4.5812e+06 s  
2414 5.15e+02 4.5802e+06 s  
2415 5.155e+02 4.5811e+06 s  
2416 5.16e+02 4.5828e+06 s  
2417 5.165e+02 4.5823e+06 s  
2418 5.17e+02 4.5813e+06 s  
2419 5.175e+02 4.5812e+06 s  
2420 5.18e+02 4.5813e+06 s  
2421 5.185e+02 4.5813e+06 s  
2422 5.19e+02 4.5813e+06 s  
2423 5.195e+02 4.581e+06 s  
2424 5.2e+02 4.581e+06 s  
2425 5.205e+02 4.5817e+06 s  
2426 5.21e+02 4.5822e+06 s  
2427 5.215e+02 4.5817e+06 s  
2428 5.22e+02 4.5811e+06 s  
2429 5.225e+02 4.5771e+06 s  
2430 5.23e+02 4.5711e+06 s  
2431 5.235e+02 4.5671e+06 s  
2432 5.24e+02 4.5661e+06 s  
2433 5.245e+02 4.5659e+06 s  
2434 5.25e+02 4.5649e+06 s  
2435 5.255e+02 4.5639e+06 s  
2436 5.26e+02 4.5633e+06 s  
2437 5.265e+02 4.5634e+06 s  
2438 5.27e+02 4.5629e+06 s  
2439 5.275e+02 4.5577e+06 s  
2440 5.28e+02 4.5502e+06 s  
2441 5.285e+02 4.5468e+06 s  
2442 5.29e+02 4.5459e+06 s  
2443 5.295e+02 4.5474e+06 s  
2444 5.3e+02 4.5475e+06 s  
2445 5.305e+02 4.5474e+06 s  
2446 5.31e+02 4.5484e+06 s  
2447 5.315e+02 4.5499e+06 s  
2448 5.32e+02 4.5497e+06 s  
2449 5.325e+02 4.5449e+06 s  
2450 5.33e+02 4.5386e+06 s  
2451 5.335e+02 4.5358e+06 s  
2452 5.34e+02 4.5358e+06 s  
2453 5.345e+02 4.5369e+06 s  
2454 5.35e+02 4.5375e+06 s  
2455 5.355e+02 4.5371e+06 s  
2456 5.36e+02 4.5366e+06 s  
2457 5.365e+02 4.5365e+06 s  
2458 5.37e+02 4.5367e+06 s  
2459 5.375e+02 4.5368e+06 s  
2460 5.38e+02 4.5359e+06 s  
2461 5.385e+02 4.5347e+06 s  
2462 5.39e+02 4.5335e+06 s  
2463 5.395e+02 4.5323e+06 s  
2464 5.4e+02 4.5308e+06 s  
2465 5.405e+02 4.5299e+06 s  
2466 5.41e+02 4.5299e+06 s  
2467 5.415e+02 4.5302e+06 s  
2468 5.42e+02 4.53e+06 s

2469 5.425e+02 4.5217e+06 s  
2470 5.43e+02 4.5088e+06 s  
2471 5.435e+02 4.5003e+06 s  
2472 5.44e+02 4.4984e+06 s  
2473 5.445e+02 4.4993e+06 s  
2474 5.45e+02 4.5011e+06 s  
2475 5.455e+02 4.5024e+06 s  
2476 5.46e+02 4.5018e+06 s  
2477 5.465e+02 4.5014e+06 s  
2478 5.47e+02 4.5017e+06 s  
2479 5.475e+02 4.4988e+06 s  
2480 5.48e+02 4.4937e+06 s  
2481 5.485e+02 4.4899e+06 s  
2482 5.49e+02 4.4894e+06 s  
2483 5.495e+02 4.4914e+06 s  
2484 5.5e+02 4.4937e+06 s  
2485 5.505e+02 4.4966e+06 s  
2486 5.51e+02 4.4969e+06 s  
2487 5.515e+02 4.4947e+06 s  
2488 5.52e+02 4.4933e+06 s  
2489 5.525e+02 4.4927e+06 s  
2490 5.53e+02 4.4921e+06 s  
2491 5.535e+02 4.4918e+06 s  
2492 5.54e+02 4.4919e+06 s  
2493 5.545e+02 4.4918e+06 s  
2494 5.55e+02 4.4913e+06 s  
2495 5.555e+02 4.4915e+06 s  
2496 5.56e+02 4.4919e+06 s  
2497 5.565e+02 4.4915e+06 s  
2498 5.57e+02 4.4904e+06 s  
2499 5.575e+02 4.4847e+06 s  
2500 5.58e+02 4.4767e+06 s  
2501 5.585e+02 4.4719e+06 s  
2502 5.59e+02 4.4693e+06 s  
2503 5.595e+02 4.469e+06 s  
2504 5.6e+02 4.47e+06 s  
2505 5.605e+02 4.4716e+06 s  
2506 5.61e+02 4.4712e+06 s  
2507 5.615e+02 4.4693e+06 s  
2508 5.62e+02 4.4679e+06 s  
2509 5.625e+02 4.4646e+06 s  
2510 5.63e+02 4.4603e+06 s  
2511 5.635e+02 4.4578e+06 s  
2512 5.64e+02 4.4569e+06 s  
2513 5.645e+02 4.4564e+06 s  
2514 5.65e+02 4.4559e+06 s  
2515 5.655e+02 4.4562e+06 s  
2516 5.66e+02 4.4575e+06 s  
2517 5.665e+02 4.4592e+06 s  
2518 5.67e+02 4.4602e+06 s  
2519 5.675e+02 4.46e+06 s  
2520 5.68e+02 4.4591e+06 s  
2521 5.685e+02 4.4581e+06 s  
2522 5.69e+02 4.458e+06 s  
2523 5.695e+02 4.458e+06 s  
2524 5.7e+02 4.4581e+06 s  
2525 5.705e+02 4.4577e+06 s  
2526 5.71e+02 4.4582e+06 s  
2527 5.715e+02 4.4598e+06 s  
2528 5.72e+02 4.4601e+06 s  
2529 5.725e+02 4.4556e+06 s  
2530 5.73e+02 4.449e+06 s  
2531 5.735e+02 4.4458e+06 s  
2532 5.74e+02 4.4453e+06 s  
2533 5.745e+02 4.446e+06 s  
2534 5.75e+02 4.4467e+06 s  
2535 5.755e+02 4.4467e+06 s  
2536 5.76e+02 4.4455e+06 s  
2537 5.765e+02 4.4446e+06 s  
2538 5.77e+02 4.4449e+06 s  
2539 5.775e+02 4.4414e+06 s  
2540 5.78e+02 4.4331e+06 s  
2541 5.785e+02 4.4259e+06 s  
2542 5.79e+02 4.4231e+06 s  
2543 5.795e+02 4.4237e+06 s  
2544 5.8e+02 4.4247e+06 s  
2545 5.805e+02 4.4262e+06 s  
2546 5.81e+02 4.4262e+06 s  
2547 5.815e+02 4.4251e+06 s  
2548 5.82e+02 4.4236e+06 s  
2549 5.825e+02 4.4202e+06 s  
2550 5.83e+02 4.4148e+06 s  
2551 5.835e+02 4.4116e+06 s  
2552 5.84e+02 4.4114e+06 s  
2553 5.845e+02 4.4118e+06 s  
2554 5.85e+02 4.4124e+06 s  
2555 5.855e+02 4.4132e+06 s  
2556 5.86e+02 4.4137e+06 s  
2557 5.865e+02 4.413e+06 s  
2558 5.87e+02 4.4123e+06 s  
2559 5.875e+02 4.4126e+06 s  
2560 5.88e+02 4.4127e+06 s

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2561 5.885e+02 4.4119e+06 s
2562 5.89e+02 4.4114e+06 s
2563 5.895e+02 4.412e+06 s
2564 5.9e+02 4.4132e+06 s
2565 5.905e+02 4.4143e+06 s
2566 5.91e+02 4.415e+06 s
2567 5.915e+02 4.4147e+06 s
2568 5.92e+02 4.412e+06 s
2569 5.925e+02 4.4013e+06 s
2570 5.93e+02 4.3881e+06 s
2571 5.935e+02 4.3801e+06 s
2572 5.94e+02 4.3766e+06 s
2573 5.945e+02 4.3782e+06 s
2574 5.95e+02 4.3811e+06 s
2575 5.955e+02 4.3815e+06 s
2576 5.96e+02 4.3804e+06 s
2577 5.965e+02 4.3801e+06 s
2578 5.97e+02 4.3796e+06 s
2579 5.975e+02 4.3785e+06 s
2580 5.98e+02 4.3786e+06 s
2581 5.985e+02 4.38e+06 s
2582 5.99e+02 4.3804e+06 s
2583 5.995e+02 4.3794e+06 s
2584 6.e+02 4.3786e+06 e
2585 * fpuo2 * f 0.0000e+00e
2586 * ftd * f 1.0000e+00e
2587 * gmix * f 0.0000e+00e
2588 * gmles * f 0.0000e+00e
2589 * pgapt * f 0.0000e+00e
2590 * plvol * f 0.0000e+00e
2591 * pslen * f 0.0000e+00e
2592 * clen * f 0.0000e+00e
2593 * burn * f 0.0000e+00e
2594 * burn * f 0.0000e+00e
2595 * burn * f 0.0000e+00e
2596 * burn * f 0.0000e+00e
2597 * burn * f 0.0000e+00e
2598 * burn * f 0.0000e+00e
2599 *
2600 slab type num id ctitle
2601 * slab 998 998 $998$ lev 1 ring 1-3 slabs
2602 * ncrz ncrz
2603 * 6 1
2604 *
2605 * nopowr nridr modez liqlev iaxcnd
2606 * 1 1 1 0 0
2607 *
2608 * idbci idbco
2609 * 0 2
2610 *
2611 * width
2612 * 1.0929
2613 *
2614 * nrods nodes irftr nzmax irftr2
2615 * 6 4 0 5 0
2616 *
2617 * dtxht(1) dtxht(2) dznht hgapo shelv
2618 * 5. 25. .002 0. 0.
2619 *
2620 * nhcomo
2621 f 1e
2622 *
2623 * nhcelo + + + +
2624 * -1 1 2e
2625 *
2626 * dz + + + +
2627 * .915e
2628 *
2629 * grav
2630 f 1.0000E+00e
2631 *
2632 * idrod + + + +
2633 * 1 2 3 4 5
2634 * 6e
2635 *
2636 * rdx * 1.088 3.264 5.266 15.798 s
2637 * rdx * 5.266 15.798 e
2638 *
2639 * radrd
2640 * 0.0 .002 .0035 .0043e
2641 *
2642 * matrd
2643 f 6e
2644 *
2645 * nfax
2646 f 1e
2647 *
2648 * rftn
2649 f 393.e
2650 f 393.e
2651 f 393.e
2652 f 393.e

```

```

2653 f      393.e
2654 f      393.e
2655 *
2656 *
2657 *   type          num          id      ctitle
2657 slab          997          997 $997$ lev 1 ring 4 slabs
2658 *
2659 *      ncrx          ncrz
2660 *      2              1
2661 *
2662 *      nopowr        nridr          modez          liqlev          iaxcnd
2663 *      1              1              1              0              0
2664 *
2665 *      idbci          idbco
2666 *      0              2
2667 *
2668 *      width
2669 *      1.0929
2670 *
2671 *      nrods          nodes          irftr          nzmax          irftr2
2672 *      2              4              0              5              0
2673 *
2674 *      dtxht(1)      dtxht(2)      dznht          hgapo          shelv
2675 *      5.            25.            .002          0.            0.
2676 *
2677 *      nhcomo
2678 f      1e
2679 *
2680 *      nhcelo          +              +              +              +
2681 *      -1              1              2e
2682 *
2683 *      dz              +              +              +              +
2684 *      .915e
2685 *
2686 *      grav
2687 f      1.0000E+00e
2688 *
2689 *      idrod          +              +              +              +
2690 *      7              8e
2691 *
2692 * rdx * 2.07 6.21 e
2693 *
2694 *      radrd
2695 *      0.0            .04            .08            .09e
2696 *
2697 *      matrdr
2698 r 2          9              6e
2699 *
2700 *      nfax
2701 f      1e
2702 *
2703 *      rftn
2704 f      393.e
2705 f      393.e
2706 *
2707 *
2708 *   type          num          id      ctitle
2709 slab          996          996 $996$ lev 2 ring 1-3 slabs
2710 *
2711 *      ncrx          ncrz
2712 *      6              1
2713 *
2714 *      nopowr        nridr          modez          liqlev          iaxcnd
2715 *      1              1              1              0              0
2716 *
2717 *      idbci          idbco
2718 *      0              2
2719 *
2720 *      width
2721 *      1.0152
2722 *
2723 *      nrods          nodes          irftr          nzmax          irftr2
2724 *      6              4              0              5              0
2725 *
2726 *      dtxht(1)      dtxht(2)      dznht          hgapo          shelv
2727 *      5.            25.            .002          0.            0.
2728 *
2729 *      nhcomo
2730 f      1e
2731 *
2732 *      nhcelo          +              +              +              +
2733 *      -2              2              3e
2734 *
2735 *      dz              +              +              +              +
2736 *      .985e
2737 *
2738 *      grav
2739 f      1.0000E+00e
2740 *
2741 *      idrod          +              +              +              +
2742 *      1              2              3              4              5
2743 *      6e
2744 *

```

```

2745 * rdx * 1.17 3.51 5.67 17.01 s
2746 * rdx * 7.36 11.04 e
2747 *
2748 *      radrd
2749 *      0.0          .002          .0035          .0043e
2750 *
2751 *      matrdr
2752 f      6e
2753 *
2754 *      nfax
2755 f      1e
2756 *
2757 *      rftn
2758 f      393.e
2759 f      393.e
2760 f      393.e
2761 f      393.e
2762 f      393.e
2763 f      393.e
2764 *
2765 *      type          num          id          ctitle
2766 slab          995          995  $995$ lev 2 ring 4 slabs
2767 *
2768 *      ncrx          ncrz
2769 *      2          1
2770 *
2771 *      nopowr          nrldr          modez          liqlev          iaxcnd
2772 *      1          1          1          0          0
2773 *
2774 *      idbci          idbco
2775 *      0          2
2776 *
2777 *      width
2778 *      1.0152
2779 *
2780 *      nrods          nodes          irftr          nzmax          irftr2
2781 *      2          4          0          5          0
2782 *
2783 *      dtxht(1)          dtxht(2)          dznht          hgapo          shelv
2784 *      5.          25.          .002          0.          0.
2785 *
2786 *      nhcomo
2787 f      1e
2788 *
2789 *      nhcelo          +          +          +          +
2790 *      -2          2          3e
2791 *
2792 *      dz          +          +          +          +
2793 *      .985e
2794 *
2795 *      grav
2796 f      1.0000E+00e
2797 *
2798 *      idrod          +          +          +          +
2799 *      7          8e
2800 *
2801 * rdx * 0.79 2.37 e
2802 *
2803 *      radrd
2804 *      0.0          .04          .08          .09e
2805 *
2806 *      matrdr
2807 r 2      9          6e
2808 *
2809 *      nfax
2810 f      1e
2811 *
2812 *      rftn
2813 f      393.e
2814 f      393.e
2815 *
2816 *
2817 *      type          num          id          ctitle
2818 slab          994          994  $994$ lev 3 ring 1-3 slabs
2819 *
2820 *      ncrx          ncrz
2821 *      6          1
2822 *
2823 *      nopowr          nrldr          modez          liqlev          iaxcnd
2824 *      1          1          1          0          0
2825 *
2826 *      idbci          idbco
2827 *      0          2
2828 *
2829 *      width
2830 *      5.0000
2831 *
2832 *      nrods          nodes          irftr          nzmax          irftr2
2833 *      6          4          0          5          0
2834 *
2835 *      dtxht(1)          dtxht(2)          dznht          hgapo          shelv
2836 *      5.          25.          .002          0.          0.

```

```

2837 *
2838 *      nhcomo
2839 f      1e
2840 *
2841 *      nhcelo      +      +      +      +
2842 *      -3          3          4e
2843 *
2844 *      dz          +      +      +      +
2845 *      .200e
2846 *
2847 *      grav
2848 f      1.0000E+00e
2849 *
2850 *      idrod      +      +      +      +
2851 *      1          2          3          4          5
2852 *      6e
2853 *
2854 * rdx * 0.33 0.99 1.608 4.824 s
2855 * rdx * 1.91 5.73 e
2856 *
2857 *      radrd
2858 *      0.0          .002          .0035          .0043e
2859 *
2860 *      matrd
2861 f      6e
2862 *
2863 *      nfax
2864 f      1e
2865 *
2866 *      rftn
2867 f      393.e
2868 f      393.e
2869 f      393.e
2870 f      393.e
2871 f      393.e
2872 f      393.e
2873 *
2874 *      type      num      id      ctitle
2875 slab      993      993      $993$ lev 3 ring 4 slabs
2876 *
2877 *      ncrx      ncrz
2878 *      2          1
2879 *
2880 *      nopowr      nridr      modez      liqlev      iaxcnd
2881 *      1          1          1          0          0
2882 *
2883 *      idbci      idbco
2884 *      0          2
2885 *
2886 *      width
2887 *      5.0000
2888 *
2889 *      nrods      nodes      irftr      nzmax      irftr2
2890 *      2          4          0          5          0
2891 *
2892 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
2893 *      5.          25.          .002          0.          0.
2894 *
2895 *      nhcomo
2896 f      1e
2897 *
2898 *      nhcelo      +      +      +      +
2899 *      -3          3          4e
2900 *
2901 *      dz          +      +      +      +
2902 *      .200e
2903 *
2904 *      grav
2905 f      1.0000E+00e
2906 *
2907 *      idrod      +      +      +      +
2908 *      7          8e
2909 *
2910 * rdx * 0.16 0.48 e
2911 *
2912 *      radrd
2913 *      0.0          .04          .08          .09e
2914 *
2915 *      matrd
2916 r 2      9          6e
2917 *
2918 *      nfax
2919 f      1e
2920 *
2921 *      rftn
2922 f      393.e
2923 f      393.e
2924 *
2925 *      type      num      id      ctitle
2926 slab      974      974      $974$ lev 4-17 ring 1-3 slabs
2927 *
2928 *      ncrx      ncrz

```



```

2929          6          17
2930 *
2931 *      nopowr      nridr      modez      liqlev      iaxcnd
2932 *          1          1          1          0          1
2933 *
2934 *      idbci      idbco
2935 *          0          2
2936 *
2937 *      width
2938 *      1.6393
2939 *
2940 *      nrods      nodes      irftr      nzmax      irftr2
2941 *          6          4          0          35          0
2942 *
2943 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
2944 *          5.          25.          .002          0.          2.1
2945 *
2946 *      nhcomo
2947 f          1e
2948 *
2949 * nhcelo * -4 4 5 6 7 s
2950 * nhcelo * 8 9 10 11 12 s
2951 * nhcelo * 13 14 15 16 17 s
2952 * nhcelo * 18 19 20 21 e
2953 *
2954 * dz * 0.255 0.250 0.210 0.200 0.200 s
2955 * dz * 0.210 0.200 0.200 0.210 0.200 s
2956 * dz * 0.200 0.210 0.200 0.200 0.210 s
2957 * dz * 0.250 0.255 e
2958 *
2959 *      grav
2960 f      1.0000E+00e
2961 *
2962 *      idrod          +          +          +          +
2963 *          1          2          3          4          5
2964 *          6e
2965 *
2966 * rdx * 0.1586 0.4758 0.6612 1.9836 s
2967 * rdx * 1.235 3.705 e
2968 *
2969 *      radrd
2970 *          0.0          .002          .0035          .0043e
2971 *
2972 *      matrd
2973 f          6e
2974 *
2975 *      nfax
2976 f          1e
2977 *
2978 *      rftn
2979 f      393.e
2980 f      393.e
2981 f      393.e
2982 f      393.e
2983 f      393.e
2984 f      393.e
2985 *
2986 *
2987 *      type      num      id      ctitle
2988 slab          973          973 $973$ lev 4-20 ring 4 slabs
2989 *
2990 *      ncrx      ncrz
2991 *          2          17
2992 *
2993 *      nopowr      nridr      modez      liqlev      iaxcnd
2994 *          1          1          1          0          1
2995 *
2996 *      idbci      idbco
2997 *          0          2
2998 *
2999 *      width
3000 *      1.6393
3001 *
3002 *      nrods      nodes      irftr      nzmax      irftr2
3003 *          2          4          0          35          0
3004 *
3005 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
3006 *          5.          25.          .002          0.          2.1
3007 *
3008 *      nhcomo
3009 f          1e
3010 *
3011 * nhcelo * -4 4 5 6 7 s
3012 * nhcelo * 8 9 10 11 12 s
3013 * nhcelo * 13 14 15 16 17 s
3014 * nhcelo * 18 19 20 21 e
3015 *
3016 * dz * .0.255 0.250 0.210 0.200 0.200 s
3017 * dz * 0.210 0.200 0.200 0.210 0.200 s
3018 * dz * 0.200 0.210 0.200 0.200 0.210 s
3019 * dz * 0.250 0.255 e
3020 *

```

```

3021 *      grav
3022 f 1.0000E+00e
3023 *
3024 *      idrod      +      +      +
3025 *              7      8e
3026 *
3027 * rdx * 0.519 1.557 e
3028 *
3029 *      radrd
3030 *      0.0      .04      .08      .09e
3031 *
3032 *      matrd
3033 r 2      9      6e
3034 *
3035 *      nfax
3036 f      1e
3037 *
3038 *      rftn
3039 f      393.e
3040 f      393.e
3041 *
3042 *      type      num      id      ctitle
3043 slab      918      918  $918$ lev 21 ring 1-3 slabs
3044 *
3045 *      ncrx      ncrz
3046 *      6      1
3047 *
3048 *      nopowr      nrldr      modez      liqlev      iaxcnd
3049 *      1      1      1      0      0
3050 *
3051 *      idbci      idbco
3052 *      0      2
3053 *
3054 *      width
3055 *      4.1667
3056 *
3057 *      nrods      nodes      irftr      nzmax      irftr2
3058 *      6      4      0      5      0
3059 *
3060 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
3061 *      5.      25.      .002      0.      0.
3062 *
3063 *      nhcomo
3064 f      1e
3065 *
3066 *      nhcelo      +      +      +      +
3067 *      -21      21      22e
3068 *
3069 *      dz      +      +      +      +
3070 *      .240e
3071 *
3072 *      grav
3073 f 1.0000E+00e
3074 *
3075 *      idrod      +      +      +      +
3076 *      1      2      3      4      5
3077 *      6e
3078 *
3079 * rdx * 0.2 0.6 0.965 2.895 s
3080 * rdx * 1.192 3.576 e
3081 *
3082 *      radrd
3083 *      0.0      .002      .0035      .0043e
3084 *
3085 *      matrd
3086 f      6e
3087 *
3088 *      nfax
3089 f      1e
3090 *
3091 *      rftn
3092 f      393.e
3093 f      393.e
3094 f      393.e
3095 f      393.e
3096 f      393.e
3097 f      393.e
3098 *
3099 *      type      num      id      ctitle
3100 slab      917      917  $917$ lev 21 ring 4 slabs
3101 *
3102 *      ncrx      ncrz
3103 *      2      1
3104 *
3105 *      nopowr      nrldr      modez      liqlev      iaxcnd
3106 *      1      1      1      0      0
3107 *
3108 *      idbci      idbco
3109 *      0      2
3110 *
3111 *      width
3112 *      4.1667

```

```

3113 *
3114 *      nrods      nodes      irftr      nzmax      irftr2
3115 *          2          4          0          5          0
3116 *
3117 *      dtxht(1)  dtxht(2)  dznht      hgapo      shelv
3118 *          5.      25.      .002      0.      0.
3119 *
3120 *      nhcomo
3121 f          1e
3122 *
3123 *      nhcelo      +          +          +          +
3124 *          -21      21      22e
3125 *
3126 *          dz          +          +          +          +
3127 *          .240e
3128 *
3129 *      grav
3130 f      1.0000E+00e
3131 *
3132 *      idrod      +          +          +          +
3133 *          7          8e
3134 *
3135 * rdx * 0.204 0.612 e
3136 *
3137 *      radrd
3138 *          0.0          .04          .08          .09e
3139 *
3140 *      matrd
3141 r 2          9          6e
3142 *
3143 *      nfax
3144 f          1e
3145 *
3146 *      rftn
3147 f          393.e
3148 f          393.e
3149 *
3150 *
3151 *      type      num      id      ctitle
3152 slab      916      916      $916$ lev 22 ring 1-3 slabs
3153 *
3154 *      ncrx      ncrz
3155 *          6          1
3156 *
3157 *      nopowr      nridr      modez      liqlev      iaxcnd
3158 *          1          1          1          0          0
3159 *
3160 *      idbci      idbco
3161 *          0          2
3162 *
3163 *      width
3164 *      4.1667
3165 *
3166 *      nrods      nodes      irftr      nzmax      irftr2
3167 *          6          4          0          5          0
3168 *
3169 *      dtxht(1)  dtxht(2)  dznht      hgapo      shelv
3170 *          5.      25.      .002      0.      0.
3171 *
3172 *      nhcomo
3173 f          1e
3174 *
3175 *      nhcelo      +          +          +          +
3176 *          -22      22      23e
3177 *
3178 *          dz          +          +          +          +
3179 *          .240e
3180 *
3181 *      grav
3182 f      1.0000E+00e
3183 *
3184 *      idrod      +          +          +          +
3185 *          1          2          3          4          5
3186 *          6e
3187 *
3188 * rdx * 0.0369 0.1107 0.1474 0.4422 s
3189 * rdx * 0.374 1.122 e
3190 *
3191 *      radrd
3192 *          0.0          .002          .0035          .0043e
3193 *
3194 *      matrd
3195 f          6e
3196 *
3197 *      nfax
3198 f          1e
3199 *
3200 *      rftn
3201 f          393.e
3202 f          393.e
3203 f          393.e
3204 f          393.e

```

```

3205 f      393.e
3206 f      393.e
3207 *
3208 *      type      num      id      ctitle
3209 slab      915      915  $915$ lev 22 ring 4 slabs
3210 *
3211 *      ncrx      ncrz
3212 *      2      1
3213 *
3214 *      nopowr      nridr      modez      liqlev      iaxcnd
3215 *      1      1      1      0      0
3216 *
3217 *      idbci      idbco
3218 *      0      2
3219 *
3220 *      width
3221 *      4.1667
3222 *
3223 *      nrods      nodes      irftr      nzmax      irftr2
3224 *      2      4      0      5      0
3225 *
3226 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
3227 *      5.      25.      .002      0.      0.
3228 *
3229 *      nhcomo
3230 f      1e
3231 *
3232 *      nhcelo      +      +      +      +
3233 *      -22      22      23e
3234 *
3235 *      dz      +      +      +      +
3236 *      .240e
3237 *
3238 *      grav
3239 f      1.0000E+00e
3240 *
3241 *      idrod      +      +      +      +
3242 *      7      8e
3243 *
3244 * rdx * 0.204 0.612 e
3245 *
3246 *      radrd
3247 *      0.0      .04      .08      .09e
3248 *
3249 *      matrdr
3250 r 2      9      6e
3251 *
3252 *      nfax
3253 f      1e
3254 *
3255 *      rftn
3256 f      393.e
3257 f      393.e
3258 *
3259 *
3260 *      type      num      id      ctitle
3261 slab      914      914  $914$ lev 23 ring 1-3 slabs
3262 *
3263 *      ncrx      ncrz
3264 *      6      1
3265 *
3266 *      nopowr      nridr      modez      liqlev      iaxcnd
3267 *      1      1      1      0      0
3268 *
3269 *      idbci      idbco
3270 *      0      2
3271 *
3272 *      width
3273 *      3.8462
3274 *
3275 *      nrods      nodes      irftr      nzmax      irftr2
3276 *      6      4      0      5      0
3277 *
3278 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
3279 *      5.      25.      .002      0.      0.
3280 *
3281 *      nhcomo
3282 f      1e
3283 *
3284 *      nhcelo      +      +      +      +
3285 *      -23      23      24e
3286 *
3287 *      dz      +      +      +      +
3288 *      .260e
3289 *
3290 *      grav
3291 f      1.0000E+00e
3292 *
3293 *      idrod      +      +      +      +
3294 *      1      2      3      4      5
3295 *      6e
3296 *

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```

3297 * rdx * 0.0195 0.0585 0.156 0.468 s
3298 * rdx * 0.44 1.32 e
3299 *
3300 *      radrd
3301 *      0.0          .002          .0035          .0043e
3302 *
3303 *      matrd
3304 f      6e
3305 *
3306 *      nfax
3307 f      1e
3308 *
3309 *      rftn
3310 f      393.e
3311 f      393.e
3312 f      393.e
3313 f      393.e
3314 f      393.e
3315 f      393.e
3316 *
3317 *      type          num          id          ctitle
3318 slab          913          913  $913$ lev 23 ring 4 slabs
3319 *
3320 *      ncrx          ncrz
3321 *      2            1
3322 *
3323 *      nopowr          nrldr          modez          liqlev          iaxcnd
3324 *      1            1            1            0            0
3325 *
3326 *      idbci          idbco
3327 *      0            2
3328 *
3329 *      width
3330 *      3.8462
3331 *
3332 *      nrods          nodes          irftr          nzmax          irftr2
3333 *      2            4            0            5            0
3334 *
3335 *      dtxht(1)      dtxht(2)      dznht          hgapo          shelv
3336 *      5.          25.          .002          0.          0.
3337 *
3338 *      nhcomo
3339 f      1e
3340 *
3341 *      nhcelo          +          +          +          +
3342 *      -23          23          24e
3343 *
3344 *      dz          +          +          +          +
3345 *      .260e
3346 *
3347 *      grav
3348 f      1.0000E+00e
3349 *
3350 *      idrod          +          +          +          +
3351 *      7            8e
3352 *
3353 * rdx * 0.221 0.663 e
3354 *
3355 *      radrd
3356 *      0.0          .04          .08          .09e
3357 *
3358 *      matrd
3359 r 2      9            6e
3360 *
3361 *      nfax
3362 f      1e
3363 *
3364 *      rftn
3365 f      393.e
3366 f      393.e
3367 *
3368 *      type          num          id          ctitle
3369 slab          912          912  $912$ lev 24 ring 1-3 slabs
3370 *
3371 *      ncrx          ncrz
3372 *      6            1
3373 *
3374 *      nopowr          nrldr          modez          liqlev          iaxcnd
3375 *      1            1            1            0            0
3376 *
3377 *      idbci          idbco
3378 *      0            2
3379 *
3380 *      width
3381 *      2.1739
3382 *
3383 *      nrods          nodes          irftr          nzmax          irftr2
3384 *      6            4            0            5            0
3385 *
3386 *      dtxht(1)      dtxht(2)      dznht          hgapo          shelv
3387 *      5.          25.          .002          0.          0.
3388 *

```

```

3389 *      nhcomo
3390 f      1e
3391 *
3392 *      nhcelo      +      +      +      +
3393 -24      24      25e
3394 *
3395 *      dz      +      +      +      +
3396 .460e
3397 *
3398 *      grav
3399 f      1.0000E+00e
3400 *
3401 *      idrod      +      +      +      +
3402 1      2      3      4      5
3403 6e
3404 *
3405 * rdx * 0.04 0.12 0.2636 0.7908 s
3406 * rdx * 0.667 2.001 e
3407 *
3408 *      radrd
3409 0.0      .002      .0035      .0043e
3410 *
3411 *      matrd
3412 f      6e
3413 *
3414 *      nfax
3415 f      1e
3416 *
3417 *      rftn
3418 f      393.e
3419 f      393.e
3420 f      393.e
3421 f      393.e
3422 f      393.e
3423 f      393.e
3424 *
3425 *      type      num      id      ctitle
3426 slab      911      911      $911$ lev 24 ring 4 slabs
3427 *
3428 *      ncrx      ncrz
3429 2      1
3430 *
3431 *      nopowr      nridr      modez      liqlev      iaxcnd
3432 1      1      1      0      0
3433 *
3434 *      idbei      idbco
3435 0      2
3436 *
3437 *      width
3438 2.1739
3439 *
3440 *      nrods      nodes      irftr      nzmax      irftr2
3441 2      4      0      5      0
3442 *
3443 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
3444 5.      25.      .002      0.      0.
3445 *
3446 *      nhcomo
3447 f      1e
3448 *
3449 *      nhcelo      +      +      +      +
3450 -24      24      25e
3451 *
3452 *      dz      +      +      +      +
3453 .460e
3454 *
3455 *      grav
3456 f      1.0000E+00e
3457 *
3458 *      idrod      +      +      +      +
3459 7      8e
3460 *
3461 * rdx * 0.3916 1.1748 e
3462 *
3463 *      radrd
3464 0.0      .04      .08      .09e
3465 *
3466 *      matrd
3467 r 2      9      6e
3468 *
3469 *      nfax
3470 f      1e
3471 *
3472 *      rftn
3473 f      393.e
3474 f      393.e
3475 *
3476 *
3477 *      type      num      id      ctitle
3478 slab      910      910      $910$ lev 25 ring 1-3 slabs
3479 *
3480 *      ncrx      ncrz

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```

3481      6      1
3482 *
3483 *      nopowr      nrldr      modez      liqlev      iaxcnd
3484      1      1      1      0      0
3485 *
3486 *      idbci      idbco
3487      0      2
3488 *
3489 *      width
3490      2.2727
3491 *
3492 *      nrods      nodes      irftr      nzmax      irftr2
3493      6      4      0      5      0
3494 *
3495 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
3496      5.      25.      .002      0.      0.
3497 *
3498 *      nhcomo
3499 f      1e
3500 *
3501 *      nhcelo      +      +      +      +
3502      -25      25      26e
3503 *
3504 *      dz      +      +      +      +
3505      .440e
3506 *
3507 *      grav
3508 f      1.0000E+00e
3509 *
3510 *      idrod      +      +      +      +
3511      1      2      3      4      5
3512      6e
3513 *
3514 * rdx * 0.06575 0.19725 0.2636 0.7908 s
3515 * rdx * 0.667 2.001 e
3516 *
3517 *      radrd
3518      0.0      .002      .0035      .0043e
3519 *
3520 *      matrdr
3521 f      6e
3522 *
3523 *      nfax
3524 f      1e
3525 *
3526 *      rftn
3527 f      393.e
3528 f      393.e
3529 f      393.e
3530 f      393.e
3531 f      393.e
3532 f      393.e
3533 *
3534 *      type      num      id      ctitle
3535 slab      909      909      $909$ lev 25 ring 4 slabs
3536 *
3537 *      ncrx      ncrz
3538      2      1
3539 *
3540 *      nopowr      nrldr      modez      liqlev      iaxcnd
3541      1      1      1      0      0
3542 *
3543 *      idbci      idbco
3544      0      2
3545 *
3546 *      width
3547      2.2727
3548 *
3549 *      nrods      nodes      irftr      nzmax      irftr2
3550      2      4      0      5      0
3551 *
3552 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
3553      5.      25.      .002      0.      0.
3554 *
3555 *      nhcomo
3556 f      1e
3557 *
3558 *      nhcelo      +      +      +      +
3559      -25      25      26e
3560 *
3561 *      dz      +      +      +      +
3562      .440e
3563 *
3564 *      grav
3565 f      1.0000E+00e
3566 *
3567 *      idrod      +      +      +      +
3568      7      8e
3569 *
3570 * rdx * 0.3916 1.1748 e
3571 *
3572 *      radrd

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```

3573      0.0      .04      .08      .09e
3574 *
3575 *      matrd
3576 r 2      9      6e
3577 *
3578 *      nfax
3579 f      1e
3580 *
3581 *      rftn
3582 f      393.e
3583 f      393.e
3584 *
3585 *
3586 *      type      num      id      ctitle
3587 slab      908      908      $908$ lev 26 ring 1-3 slabs
3588 *
3589 *      ncrx      ncrz
3590 *      6      1
3591 *
3592 *      nopowr      nridr      modez      liqlev      iaxcnd
3593 *      1      1      1      0      0
3594 *
3595 *      idbci      idbco
3596 *      0      2
3597 *
3598 *      width
3599 *      .8019
3600 *
3601 *      nrods      nodes      irftr      nzmax      irftr2
3602 *      6      4      0      5      0
3603 *
3604 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
3605 *      5.      25.      .002      0.      0.
3606 *
3607 *      nhcomo
3608 f      1e
3609 *
3610 *      nhcelo      +      +      +      +
3611 *      -26      26      26e
3612 *
3613 *      dz      +      +      +      +
3614 *      1.247e
3615 *
3616 *      grav
3617 f      1.0000E+00e
3618 *
3619 *      idrod      +      +      +      +
3620 *      1      2      3      4      5
3621 *      6e
3622 *
3623 * rdx * 0.17825 0.53475 0.7146 2.1438 s
3624 * rdx * 1.808 5.424 e
3625 *
3626 *      radrd
3627 *      0.0      .002      .0035      .0043e
3628 *
3629 *      matrd
3630 f      6e
3631 *
3632 *      nfax
3633 f      1e
3634 *
3635 *      rftn
3636 f      393.e
3637 f      393.e
3638 f      393.e
3639 f      393.e
3640 f      393.e
3641 f      393.e
3642 *
3643 *      type      num      id      ctitle
3644 slab      907      907      $907$ lev 26 ring 4 slabs
3645 *
3646 *      ncrx      ncrz
3647 *      2      1
3648 *
3649 *      nopowr      nridr      modez      liqlev      iaxcnd
3650 *      1      1      1      0      0
3651 *
3652 *      idbci      idbco
3653 *      0      2
3654 *
3655 *      width
3656 *      .8019
3657 *
3658 *      nrods      nodes      irftr      nzmax      irftr2
3659 *      2      4      0      5      0
3660 *
3661 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
3662 *      5.      25.      .002      0.      0.
3663 *
3664 *      nhcomo

```



```

3665 f      1e
3666 *
3667 *      nhcelo      +      +      +      +
3668 *      -26      26      26e
3669 *
3670 *      dz      +      +      +      +
3671 *      1.247e
3672 *
3673 *      grav
3674 f      1.0000E+00e
3675 *
3676 *      idrod      +      +      +      +
3677 *      7      8e
3678 *
3679 * rdx * 1.062 3.186 e
3680 *
3681 *      radrd
3682 *      0.0      .04      .08      .09e
3683 *
3684 *      matrdr
3685 r 2      9      6e
3686 *
3687 *      nfax
3688 f      1e
3689 *
3690 *      rftn
3691 f      393.e
3692 f      393.e
3693 *
3694 * start of core barrel heat slabs
3695 *
3696 *      type      num      id      ctitle
3697 slab      784      784 $784$ lev 2-26 ring 4 cb slabs
3698 *
3699 *      ncrx      ncrz
3700 *      2      25
3701 *
3702 *      nopowr      nridr      modez      liqlev      iaxcnd
3703 *      1      2      1      0      1
3704 *
3705 *      idbci      idbco
3706 *      2      2
3707 *
3708 *      width
3709 *      1.4844
3710 *
3711 *      nrods      nodes      irftr      nzmax
3712 *      2      5      0      51
3713 *
3714 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
3715 *      3.      1.      .002      0.      .915
3716 *
3717 *      nhcomi
3718 f      1e
3719 *
3720 *      nhceli      +      +      +      +
3721 *      -2      2      3      4      5
3722 *      6      7      8      9      10
3723 *      11      12      13      14      15
3724 *      16      17      18      19      20
3725 *      21      22      23      24      25
3726 *      26      26 e
3727 *
3728 *
3729 *      nhcomo
3730 f      1e
3731 *
3732 *      nhcelo      +      +      +      +
3733 *      -2      2      3      4      5
3734 *      6      7      8      9      10
3735 *      11      12      13      14      15
3736 *      16      17      18      19      20
3737 *      21      22      23      24      25
3738 *      26      26 e
3739 *
3740 *      dz      +      +      +      +
3741 *      .985      .200 s
3742 * dz * 0.255 0.250 0.210 0.200 0.200 s
3743 * dz * 0.210 0.200 0.200 0.210 0.200 s
3744 * dz * 0.200 0.210 0.200 0.200 0.210 s
3745 * dz * 0.250 0.255 s
3746 *      .240 s
3747 *      .240      .260      .460      .440      1.247e
3748 *
3749 *      grav
3750 f      1.0000E+00e
3751 *
3752 *      idrod      +      +      +      +
3753 *      5      6e
3754 *
3755 *      idrodo      +      +      +      +
3756 *      7      8e

```

```

3757 *
3758 * rdx * 0.5 1.5 e
3759 *
3760 *      radrd      +      +      +
3761 *      0.0      .002      .008      .014      .016e
3762 *
3763 *      matrdr
3764 f      6e
3765 *
3766 *      nfax
3767 f      1e
3768 *
3769 *      rftn
3770 f      423.e
3771 f      423.e
3772 *
3773 * end of core barrel heat slabs
3774 *
3775 *      type      num      id      ctitle
3776 rod      670      670      $670$ ilsg tubes
3777 *
3778 *      ncrx      ncrz      ittc      cd 2
3779 *      1      10      0
3780 *
3781 *      nopowr      nridr      modez      liqlev      iaxcnd      cd 3
3782 *      1      0      1      0
3783 *
3784 *      idbci      idbco      hdri      hdro      cd 4
3785 *      2      2      .0196      .0254
3786 *
3787 *      nrods      nodes      irftr      nzmax      cd 9
3788 *      1      3      0      100
3789 *
3790 *      dtxht(1)      dtxht(2)      dznhht      hgapo      shelv      cd 10
3791 *      3.      10.      5.e-3      6.e4      0.
3792 *
3793 *      nhcomi
3794 f      8e
3795 *
3796 *      nhceli
3797 *      -2s
3798 *      2s
3799 *      3s
3800 *      4s
3801 *      5s
3802 *      6s
3803 *      7s
3804 *      8s
3805 *      9s
3806 *      10s
3807 *      11s
3808 *      12e
3809 *
3810 *      nhcomo
3811 f      28e
3812 *
3813 *      nhcelo
3814 *      -1s
3815 *      1s
3816 *      2s
3817 *      3s
3818 *      4s
3819 *      5s
3820 *      -5s
3821 *      -4s
3822 *      -3s
3823 *      -2s
3824 *      -1s
3825 *      -1e
3826 *
3827 * dz * r02 5.0000e-01      +      +      +      +
3828 * dz * r02 5.0000e-01e      1.5240e+00r04 2.5240e+00      1.5240e+00s
3829 * grav * r04      1.      .7071      -.7071r04      -1.e
3830 * rdx *      474.e
3831 * radrd *      .0098      .01125      .0127e
3832 * matrdr * r02      6e
3833 * nfax * r10      3e
3834 *
3835 * rftn * r03 4.1420e+02r03 4.8000e+02r03 5.2500e+02r12 5.4000e+02s
3836 * rftn * r03 5.2500e+02r03 4.8000e+02r03 4.1420e+02r03 4.1420e+02e
3837 *
3838 *      type      num      id      ctitle
3839 rod      669      669      $669$ blsg tubes
3840 *
3841 *      ncrx      ncrz      ittc      cd 2
3842 *      1      10      0
3843 *
3844 *      nopowr      nridr      modez      liqlev      iaxcnd      cd 3
3845 *      1      0      1      0
3846 *
3847 *      idbci      idbco      hdri      hdro      cd 4
3848 *      2      2      .0196      .0254

```

```

3849 *
3850 *      nrods      nodes      irftr      nzmax      cd 9
3851 *          1          3          0          100
3852 *
3853 *      dtxht(1)  dtxht(2)  dznht      hgapo      shelv      cd 10
3854 *          3.          10.      5.e-3      6.e4          0.
3855 *
3856 *      nhcomi
3857 * f          5e
3858 *
3859 *      nhceli
3860 *          -2s
3861 *          2s
3862 *          3s
3863 *          4s
3864 *          5s
3865 *          6s
3866 *          7s
3867 *          8s
3868 *          9s
3869 *          10s
3870 *          11s
3871 *          12e
3872 *
3873 *      nhcomo
3874 * f          25e
3875 *
3876 *      nhcelo
3877 *          -1s
3878 *          1s
3879 *          2s
3880 *          3s
3881 *          4s
3882 *          5s
3883 *          -5s
3884 *          -4s
3885 *          -3s
3886 *          -2s
3887 *          -1s
3888 *          -1e
3889 *
3890 * dz * r02 5.0000e-01 1.5240e+00r04 2.5240e+00 1.5240e+00s
3891 * dz * r02 5.0000e-01e
3892 * grav * r04 1. .7071 -.7071r04 -1.e
3893 * rdx * 158.e
3894 * radrd * .0098 .01125 .0127e
3895 * matr * r02 6e
3896 * nfax * r10 3e
3897 *
3898 * rftn * r03 4.1420e+02r03 4.8400e+02r03 5.2200e+02r12 5.4000e+02s
3899 * rftn * r03 5.2200e+02r03 4.8400e+02r03 4.1420e+02r03 4.1420e+02e
3900 *
3901 end
3902 *
3903 *****
3904 * time-step data *
3905 *****
3906 *
3907 *      dtmin      dtmax      tend      rtwfp
3908 * 1.0000e-06 2.0000e-02 8.0000e+01 0.0000e+00
3909 *      edint      gfint      dmpint      sedint
3910 * 4.0000e+01 1.0000e+00 4.0000e+01 4.0000e+01
3911 *
3912 *      dtmin      dtmax      tend      rtwfp
3913 * 1.0000e-06 5.0000e-03 1.0000e+02 0.0000e+00
3914 *      edint      gfint      dmpint      sedint
3915 * 2.0000e+01 1.0000e+00 2.0000e+01 2.0000e+01
3916 *
3917 *      dtmin      dtmax      tend      rtwfp
3918 * 1.0000e-06 5.0000e-03 2.0000e+02 0.0000e+00
3919 *      edint      gfint      dmpint      sedint
3920 * 2.5000e+01 1.0000e+00 2.5000e+01 2.5000e+01
3921 *
3922 *      dtmin      dtmax      tend      rtwfp
3923 * 1.0000e-06 1.0000e-02 4.0000e+02 0.0000e+00
3924 *      edint      gfint      dmpint      sedint
3925 * 5.0000e+01 1.0000e+00 5.0000e+01 5.0000e+01
3926 *
3927 *      dtmin      dtmax      tend      rtwfp
3928 * 1.0000e-06 2.0000e-02 6.0000e+02 0.0000e+00
3929 *      edint      gfint      dmpint      sedint
3930 * 1.0000e+02 1.0000e+00 1.0000e+02 1.0000e+02
3931 *
3932 *      dtmin      dtmax      tend      rtwfp
3933 *      endflag
3934 * -1.0000e+00

```

# RENODED CCTF RUN 54 TRANSIENT-RESTART INPUT LISTING

```
1 free format
2 *
3 *****
4 * main data *
5 *****
6 *
7 *      numtcr      ieos      inopt      nmat
8      150          0          1          4
9 Renoded CCTF-54 Input Model By J. F. Lime Oct 1999
10 The 7-level core model of the corrected CCTF-54 input model
11 was renoded into 17 levels. The 17 levels match the 17-step
12 axial power profile.
13 *
14 Corrected CCTF-54 Input Model By J. F. Lime Oct 1999
15 Two corrections were made to the CCTF-54 input model:
16 (1) The azimuthal noding was corrected from 180/180 degrees to 90/270 degrees
17 to matched the intact loop noding. The three intact loops were modeled as one
18 combined intact loop. Therefore, the azimuthal noding of the vessel should
19 match how the intact loops were modeled.
20 (2) The axial power shape was corrected to model the 17-step axial-power profile
21 of the actual heater rod. The previous CCTF-54 model had a coarsely-noded
22 7-level axial-power shape.
23 *
24 cctf run54 developmental assessment calculation
25 trac-pf1 mod2 version 5.0
26 this model was developed by running the trac input deck from
27 /cctf/run54/tracin through gocvrt. the following changes were
28 made to the original model.
29 a) the junction flow areas were adjusted to take care of the following
30 error messages:
31 the junction flow area 1.6604e-01 of component 3 is greater than the vol/dx
32 flow area 8.8885e-02 of the cell across the junction and 1.5532e-01 of cell 1
33
34 the junction flow area 4.9812e-01 of component 8 is greater than the vol/dx
35 flow area 4.6593e-01 of the cell across the junction and 2.6665e-01 of cell 12
36
37 the azimuthal flow area 1.0797e-01 of vessel 1 interface (r= 3,t= 1,z= 1) is
38 greater than the cell vol/rdt flow areas 8.3137e-02 and 8.3137e-02 on each side
39
40 the azimuthal flow area 1.0797e-01 of vessel 1 interface (r= 3,t= 2,z= 1) is
41 greater than the cell vol/rdt flow areas 8.3137e-02 and 8.3137e-02 on each side
42
43 the azimuthal flow area 1.5189e-01 of vessel 1 interface (r= 4,t= 1,z= 1) is
44 greater than the cell vol/rdt flow areas 1.3670e-01 and 1.3670e-01 on each side
45
46 the azimuthal flow area 1.5189e-01 of vessel 1 interface (r= 4,t= 2,z= 1) is
47 greater than the cell vol/rdt flow areas 1.3670e-01 and 1.3670e-01 on each side
48
49 the axial flow area 2.6140e-02 of vessel 1 interface (r= 1,t= 1,z=11) is
50 greater than the cell vol/dz flow areas 2.1173e-02 and 1.8559e-02 on each side
51
52 the axial flow area 2.6140e-02 of vessel 1 interface (r= 1,t= 2,z=11) is
53 greater than the cell vol/dz flow areas 2.1173e-02 and 1.8559e-02 on each side
54
55 the axial flow area 7.8419e-02 of vessel 1 interface (r= 2,t= 1,z=11) is
56 greater than the cell vol/dz flow areas 6.3519e-02 and 5.5678e-02 on each side
57
58 the axial flow area 7.8419e-02 of vessel 1 interface (r= 2,t= 2,z=11) is
59 greater than the cell vol/dz flow areas 6.3519e-02 and 5.5677e-02 on each side
60
61 the axial flow area 1.1751e-01 of vessel 1 interface (r= 3,t= 1,z=11) is
62 greater than the cell vol/dz flow areas 9.8712e-02 and 8.3435e-02 on each side
63
64 the axial flow area 1.1751e-01 of vessel 1 interface (r= 3,t= 2,z=11) is
65 greater than the cell vol/dz flow areas 9.8712e-02 and 8.3435e-02 on each side
66
67 b) the hydraulic diameter of the first and last junctions of the
68 steam generator secondary were set to a non-zero value (even though
69 the flow area is zero) to get the code to run.
70
71 c) the nff's were all set to -1
72 to cause an automatic calculation of
73 abrupt expansion/contraction additive form losses.
74
75 d) the new reflood model was turned on (namelist newrfd=1 was added)
76 and added funh, nhsca, and zsgrid arrays.
77
78 e) the time step sizes were increased.
79
80 f) the rod axial power shape was adjusted to take advantage of mod2's
81 ability to input an exact power distribution. this involved
82 reworking the zpwtz and zpwtb arrays. the number of coarse mesh
83 nodes went from 7 to 19, the maximum number of fine mesh cells went
84 from 100 to 200, and the dtxht criterial was reduced.
85
86 g) the rod power history was expanded from 10 points to over 1200 points
87 (based on experimental data) to better match the input power.
88
```

```

89 h) the temperatures everywhere except the lower plenum and fills were
90 changed from 393.0 to 414.2 (the average of the te30yxx thermocouple
91 data from the test) to better match the initial fluid and wall temps.
92
93 i) took out the bump in the cold leg ecc fill liquid temperature table
94
95 j) extended the material property tables in case the code wants to
96 calculate temperatures in excess of 1200 k.
97
98 k) added namelist variable nosets=2 to cause the code to calculate the
99 sets3d equation every time step.
100
101 l) increase the maximum time step size beyond 84 seconds.
102
103 m) set all of the vessel cfz1-z's to negative numbers to get an automatic
104 calculation of abrupt expansion/contraction form losses.
105
106 n) the rod nodalization was set back the way it originally was (7 coarse
107 meshes with a 1-to-1 relationship with the hydro cells). the
108 integration option was also set back the way it originally was as well.
109
110 o) to damp the loop oscillations, all the roughness numbers were
111 changed from 0.0 to 4.5720e-05
112
113 p) the heat conductor temperatures in the reactor vessel, ring 4 were set
114 from 4.142e+02 to 4.680e+02 for levels 2 and above. the inner rings
115 were changed from 4.142e+02 to 4.230e+02. this is consistent with the
116 initial conditions in the data report, page 31 table 3.1
117
118 q) the maximum time step size was reduced to avoid the water hammer in
119 the downcomer soon after cold leg injection begins.
120
121 r) added 30 heat slabs to represent the core barrel
122
123 s) moved the location of the ring 3-ring 4 boundary from inside the core
124 barrel to outside of the core barrel. the vessel rad(3), vol, fa-t,
125 fa-z, hd-t and hd-z arrays were recomputed. this was done to eliminate
126 vol and fa values greater than 1.0
127
128 t) the radial cfz1-r in level 1 was set to a small negative number to
129 cause form loss computation.
130
131 u) set idcu=idcl=idcr=0 to turn off special downcomer models
132
133 v) set the dtxht(1), dtxht(2), dznht, and nzmax parameters back to the
134 old mod1 values, and took out the core barrel heat slabs to make the
135 calculation directly comparable to the original MOD1 calculation.
136
137
138 -----
139
140 the original comment cards are as follows:
141
142 cctf run 54 posttest analysis with trac-pfl(mod 1) ver 11.8 (8/24/84)
143 * * * * * revised loop components * * * * *
144 jaeri recommendations used for some heater rod material properties.
145 new vapor loss coefficients in vessel core
146 new radial loss coefficients in levels 4 - 10
147 akimotos nodding for combined and broken cold legs
148 vessel nodding:
149     four radial rings
150     two azimuthal zones
151     sixteen axial levels
152         three levels in lower plenum
153         seven levels in core
154         six levels in upper plenum
155 system nodding:
156     three intact loops lumped into one loop
157     cold leg between vessel and break is modeled without the expansion
158 *
159 *
160 *****
161 * namelist data *
162 *****
163 *
164 &inopts
165   nrs1v=1,iadded=10,nhtstr=24,newrfd=3, imfr=3,
166   iblaus=1,
167   &end
168 *
169 *           dstep           timet
170 *           4241           80.015229
171 *           stdyst           transi           ncomp           njun           ipak
172 *           0                 1                 43                17                1
173 *           epso             eps
174 *           1.0000e-04       1.0000e-04
175 *           oitmax           sitmax           isolut           ncontr
176 *           10                10                0                 0
177 *           ntsv             ntcb           ntcf             ntrp           ntcp
178 *           9                 8                 0                 3                1
179 *
180 *****

```

```

181 * component-number data *
182 *****
183 *
184 * iorder*          1          2          3          4          5
185 * iorder*          6          7          8          11         12
186 * iorder*          13         14         15         16         17
187 * iorder*          18         19         25         28s
188          999          998          997          996          995
189          994          993s
190          974          973s
191          918          917          916          915s
192          914          913          912          911          910
193          909          908          907s
194 784s
195 670 669e
196 *
197 *
198 *****
199 * material-properties data *
200 *****
201 *
202 * matb *           55           58           59           60e
203 * ptbln * r02      7r02           5e
204 *
205 * prptb(1,i)      prptb(2,i)      prptb(3,i)      prptb(4,i)      prptb(5,i)
206          3.0000e+02      8.3500e+03      4.4487e+02      1.2337e+01      1.0000e+00
207          5.0000e+02      8.3500e+03      4.9042e+02      1.5834e+01      1.0000e+00
208          7.0000e+02      8.3500e+03      5.3948e+02      1.9331e+01      1.0000e+00
209          9.0000e+02      8.3500e+03      5.8987e+02      2.2828e+01      1.0000e+00
210          1.1000e+03      8.3500e+03      6.3939e+02      2.6324e+01      1.0000e+00
211          1.3000e+03      8.3500e+03      6.8588e+02      2.9821e+01      1.0000e+00
212          2.0000e+03      8.3500e+03      6.8588e+02      2.9821e+01      1.0000e+00
213 e
214 *
215 * prptb(1,i)      prptb(2,i)      prptb(3,i)      prptb(4,i)      prptb(5,i)
216          3.0000e+02      3.8000e+03      8.4970e+02      3.5870e+01      1.0000e+00
217          5.0000e+02      3.8000e+03      9.6550e+02      2.0173e+01      1.0000e+00
218          7.0000e+02      3.8000e+03      1.0813e+03      1.2529e+01      1.0000e+00
219          9.0000e+02      3.8000e+03      1.1971e+03      8.9514e+00      1.0000e+00
220          1.1000e+03      3.8000e+03      1.3129e+03      7.1615e+00      1.0000e+00
221          1.3000e+03      3.8000e+03      1.4287e+03      6.1228e+00      1.0000e+00
222          2.0000e+03      3.8000e+03      1.4287e+03      6.1228e+00      1.0000e+00
223 e
224 *
225 * prptb(1,i)      prptb(2,i)      prptb(3,i)      prptb(4,i)      prptb(5,i)
226          3.0000e+02      2.8000e+03      9.8640e+02      1.6300e+00      1.0000e+00
227          6.0000e+02      2.8000e+03      1.1358e+03      1.4200e+00      1.0000e+00
228          9.0000e+02      2.8000e+03      1.2852e+03      1.2100e+00      1.0000e+00
229          1.3000e+03      2.8000e+03      1.4844e+03      9.3000e-01      1.0000e+00
230          2.0000e+03      2.8000e+03      1.4844e+03      9.3000e-01      1.0000e+00
231 e
232 *
233 * prptb(1,i)      prptb(2,i)      prptb(3,i)      prptb(4,i)      prptb(5,i)
234          3.0000e+02      8.4103e+03      4.4029e+02      1.4340e+01      8.4000e-01
235          6.0000e+02      8.2925e+03      5.0636e+02      1.9331e+01      8.4000e-01
236          9.0000e+02      8.1747e+03      5.7242e+02      2.4322e+01      8.4000e-01
237          1.2000e+03      8.0569e+03      6.3839e+02      2.9314e+01      8.4000e-01
238          2.0000e+03      8.0569e+03      6.3839e+02      2.9314e+01      8.4000e-01
239 e
240 *
241 *
242 *****
243 * control-parameter data *
244 *****
245 *
246 *
247 * signal variables
248 * idsv      isvn      ilcn      icn1      icn2
249          0
250 *
251 * control blocks
252 * idcb      icbn      icb1      icb2      icb3
253 *          cbgain      cbxmin      cbxmax      cbcon1      cbcon2
254 *
255          0
256 *
257 * trips
258 *          ntse          ntct          ntsf          ntcp          ntsd
259          0          0          0          3          0
260 *
261          0
262 *          ndmp
263          0
264 *          3
265 *          idmp()
266 *          1001          1002          1003
267 *
268 *****
269 * component data *
270 *****
271 *
272 end

```

```

273 *
274 *****
275 * time-step data *
276 *****
277 *
278 *      dtmin      dtmax      tend      rtwfp
279 * 1.0000e-06    5.0000e-03    1.0000e+02    0.0000e+00
280 *      edint      gfint      dmpint      sedint
281 * 1.0000e+01    1.0000e+00    1.0000e+01    1.0000e+01
282 *
283 *      dtmin      dtmax      tend      rtwfp
284 * 1.0000e-06    5.0000e-03    2.0000e+02    0.0000e+00
285 *      edint      gfint      dmpint      sedint
286 * 2.5000e+01    1.0000e+00    2.5000e+01    2.5000e+01
287 *
288 *      dtmin      dtmax      tend      rtwfp
289 * 1.0000e-06    1.0000e-02    4.0000e+02    0.0000e+00
290 *      edint      gfint      dmpint      sedint
291 * 5.0000e+01    1.0000e+00    5.0000e+01    5.0000e+01
292 *
293 *      dtmin      dtmax      tend      rtwfp
294 * 1.0000e-06    2.0000e-02    6.0000e+02    0.0000e+00
295 *      edint      gfint      dmpint      sedint
296 * 1.0000e+02    1.0000e+00    1.0000e+02    1.0000e+02
297 *
298 *      dtmin      dtmax      tend      rtwfp
299 *      endflag
300 * -1.0000e+00

```

## APPENDIX AA

### CODE-DATA COMPARISON FOR CCTF RUN 54 WITH RENODED CORE WITH NEWRFD=3

This appendix presents the calculation results for CCTF Run 54 with the core renoded from 7 axial levels to 17 axial levels, with the reflood option newrfd=3. The set of plots presented is the same as presented in the main body of the report for the 7-level core model. For reference purposes, the figure numbers for the two sets of calculations are listed below.

21-level core	7-level core	21-level core	7-level core
AA-1	5.3-13	AA-17	5.3-29
AA-2	5.3-14	AA-18	5.3-30
AA-3	5.3-15	AA-19	5.3-31
AA-4	5.3-16	AA-20	5.3-32
AA-5	5.3-17	AA-21	5.3-33
AA-6	5.3-18	AA-22	5.3-34
AA-7	5.3-19	AA-23	5.3-35
AA-8	5.3-20	AA-24	5.3-36
AA-9	5.3-21	AA-25	5.3-37
AA-10	5.3-22	AA-26	5.3-38
AA-11	5.3-23	AA-27	5.3-39
AA-12	5.3-24	AA-28	5.3-40
AA-13	5.3-25	AA-29	5.3-41
AA-14	5.3-26	AA-30	5.3-42
AA-15	5.3-27	AA-31	5.3-43
AA-16	5.3-28	AA-32	5.3-44



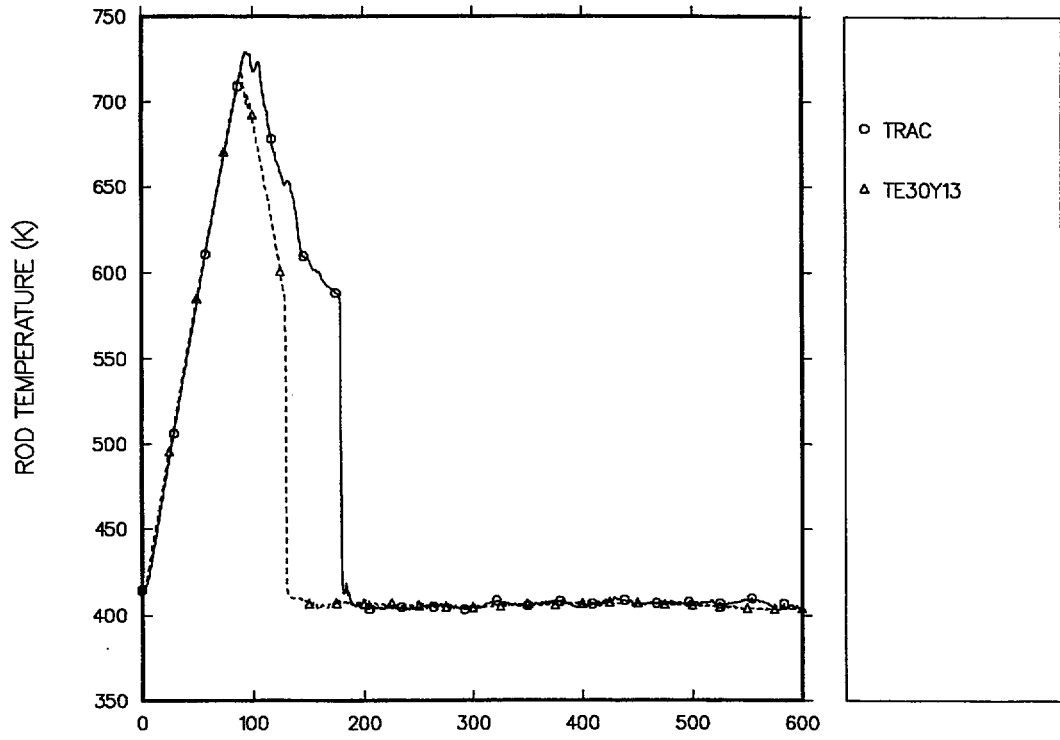


Fig. AA-1. Calculated and measured cladding temperatures for the hot rod at the 2.480-m elevation.

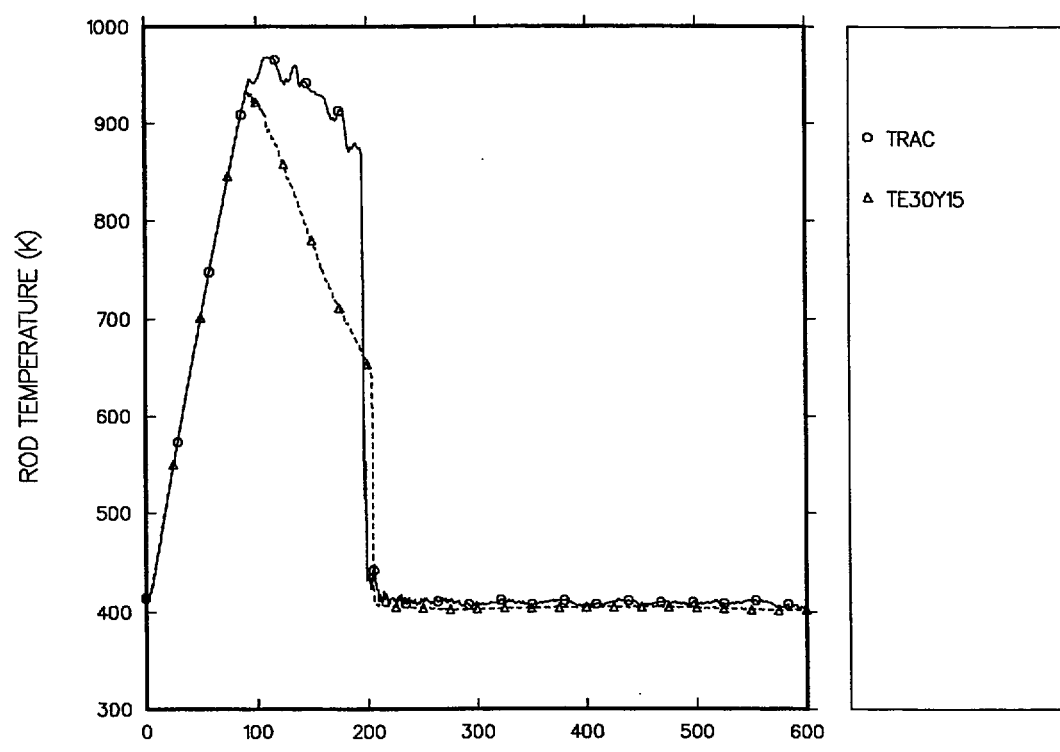


Fig. AA-2. Calculated and measured cladding temperatures for the hot rod at the 3.115-m elevation.

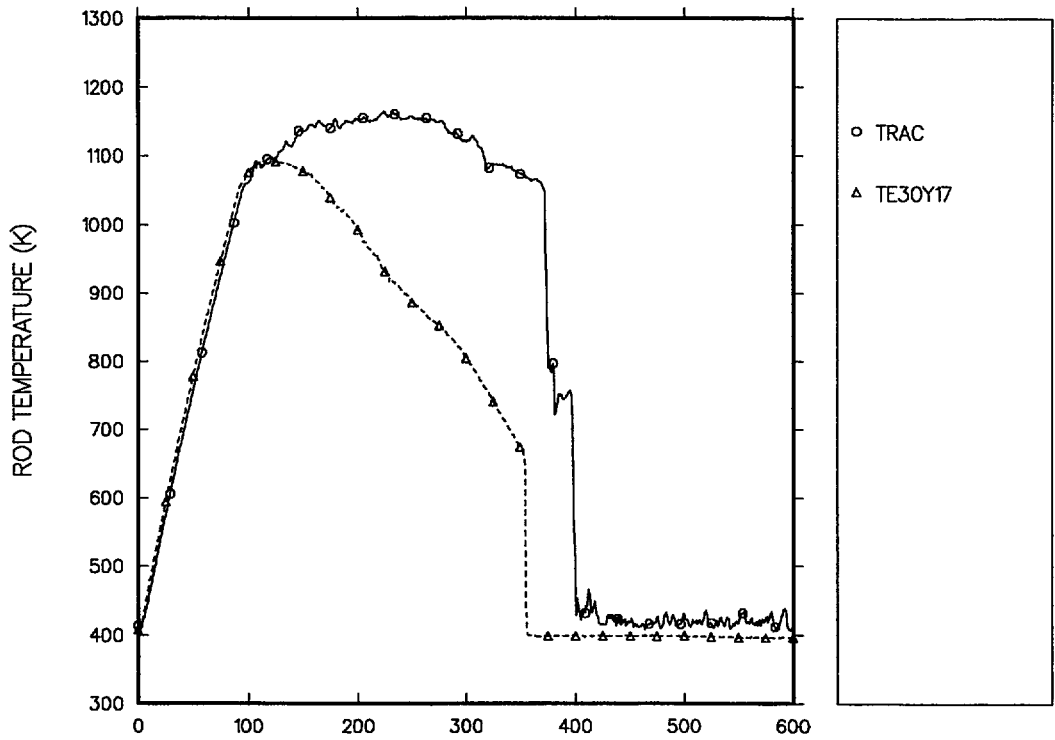


Fig. AA-3. Calculated and measured cladding temperatures for the hot rod at the 3.930-m (core midplane) elevation.

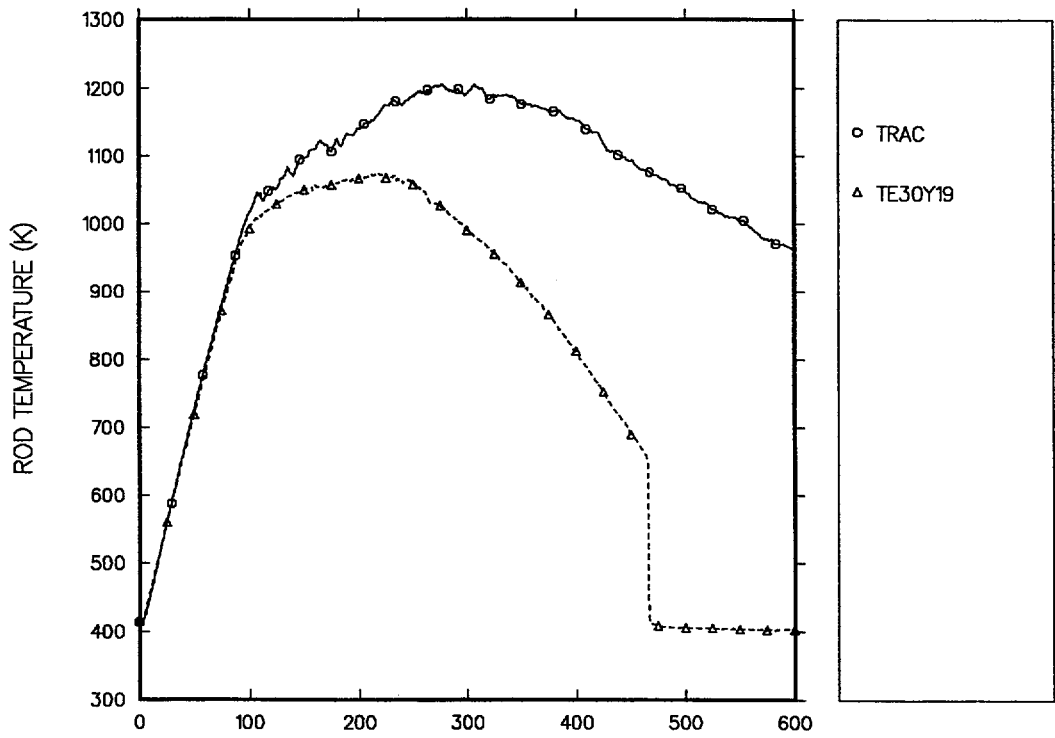


Fig. AA-4. Cladding temperatures for the hot rod at the 4.540-m elevation.

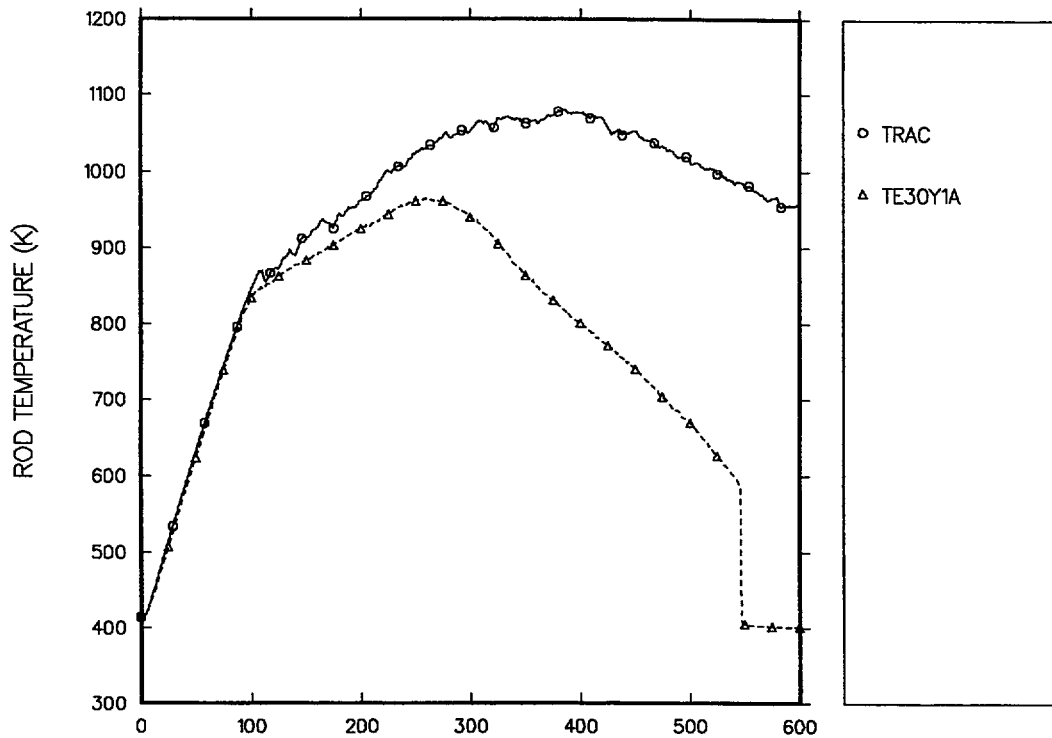


Fig. AA-5. Cladding temperatures for the hot rod at the 5.150-m elevation.

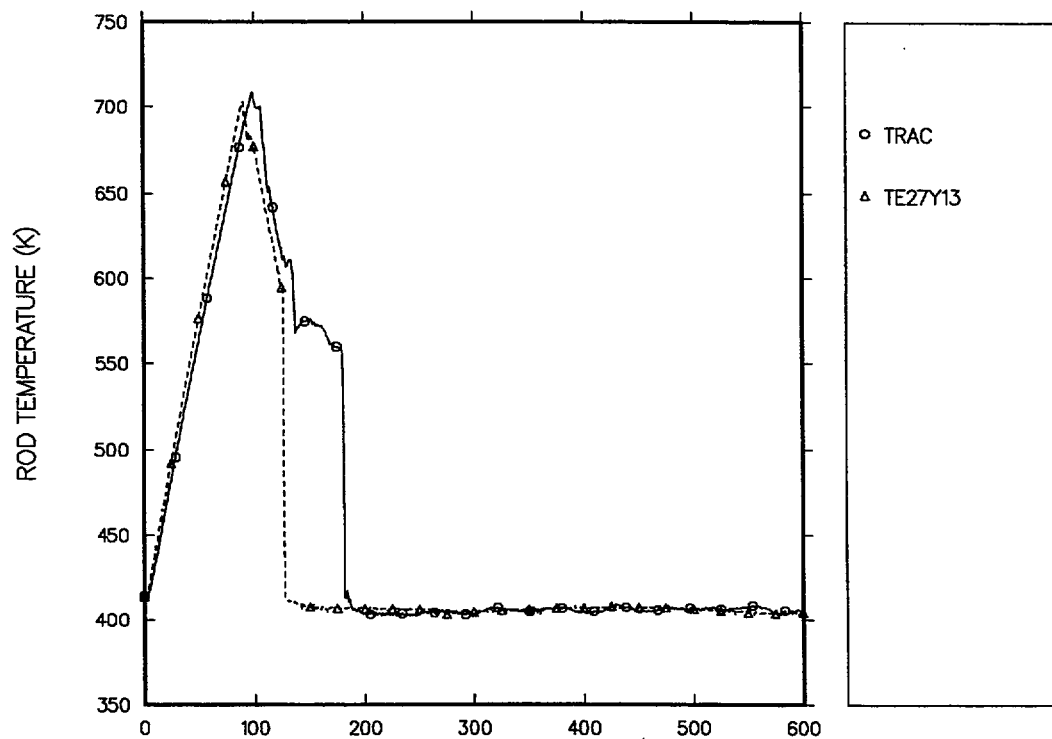


Fig. AA-6. Cladding temperatures for the intermediate-powered rod at the 2.480-m elevation.

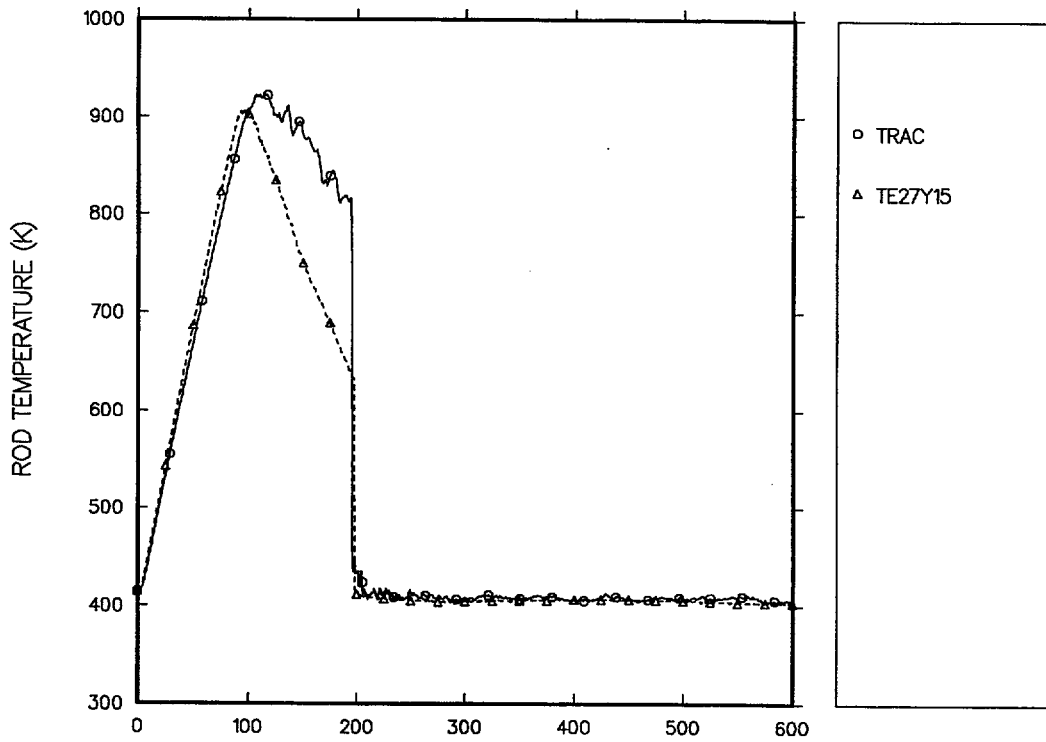


Fig. AA-7. Cladding temperatures for the intermediate-powered rod at the 3.115-m elevation.

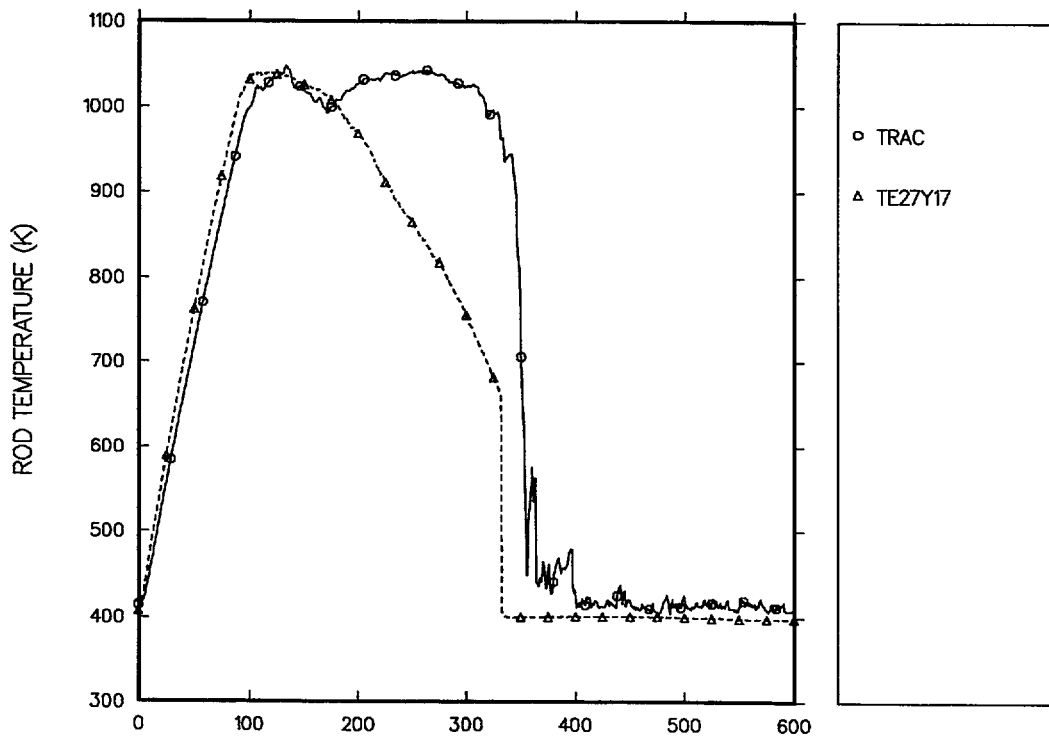


Fig. AA-8. Cladding temperatures for the intermediate-powered rod at the core midplane.

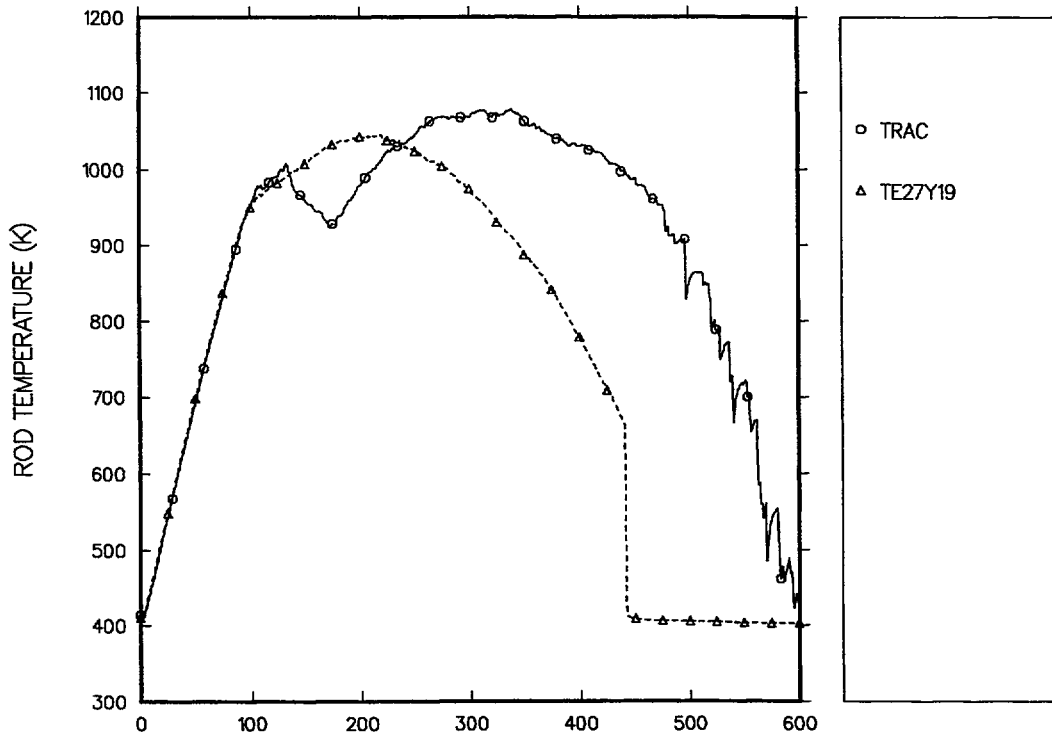


Fig. AA-9. Comparison of calculated and measured cladding temperatures for the intermediate-powered rod at the 4.540-m elevation.

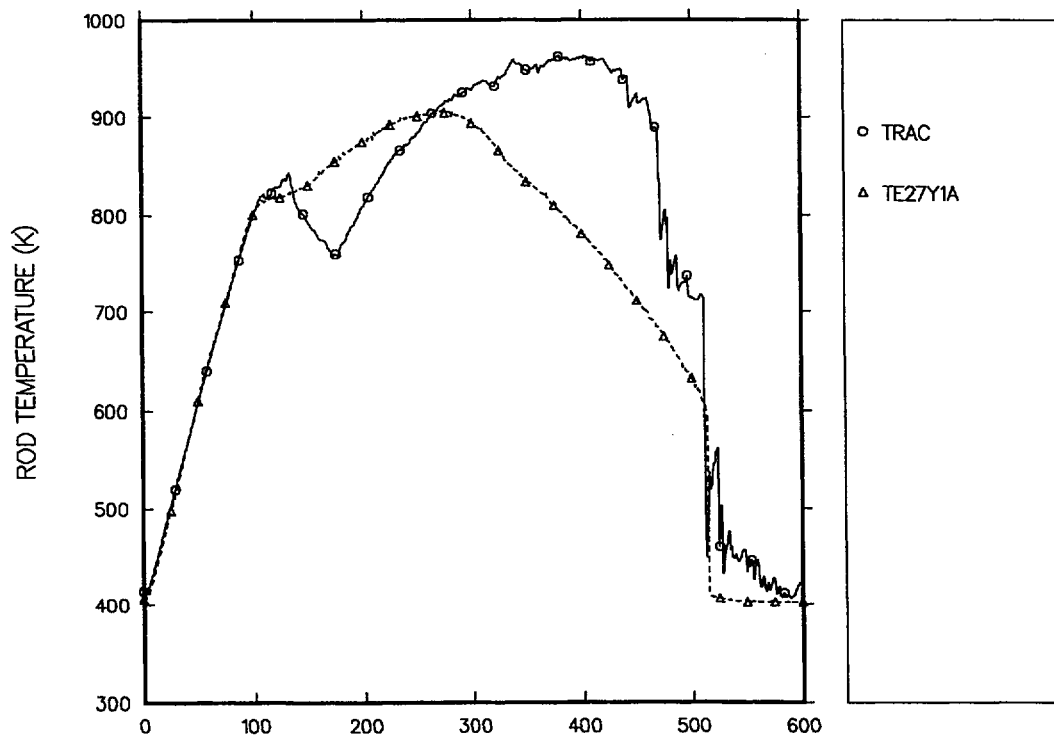


Fig. AA-10. Comparison of calculated and measured cladding temperatures for the intermediate-powered rod at the 5.150-m elevation.

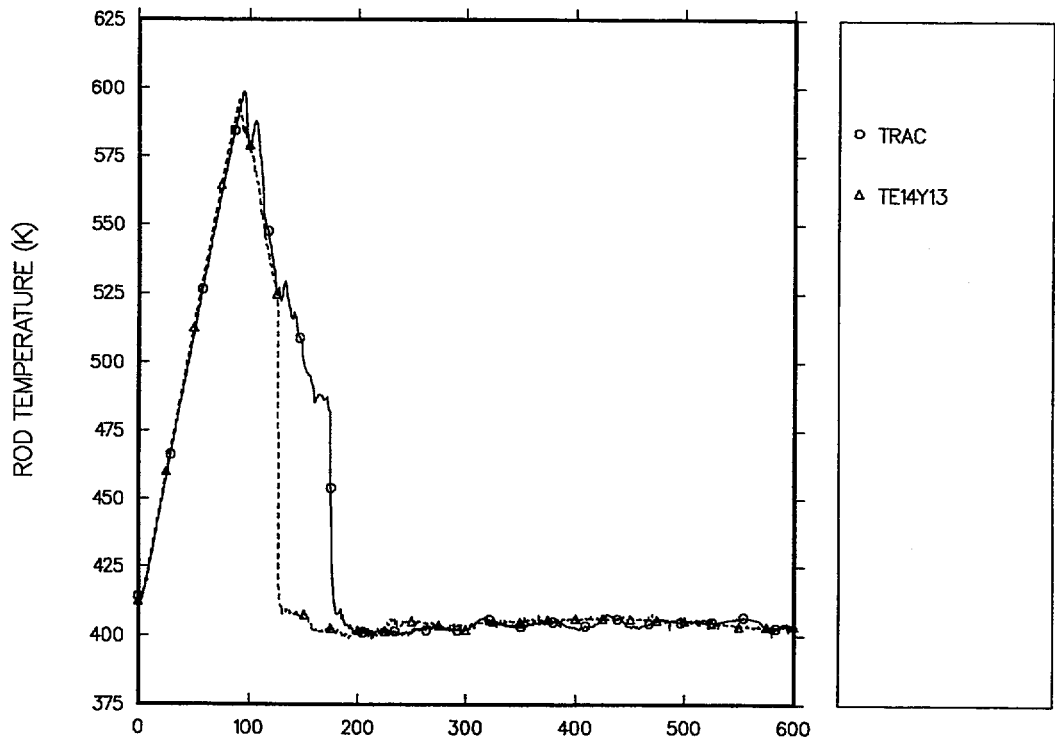


Fig. AA-11. Cladding temperatures for the low-powered rod at the 2.480-m elevation.

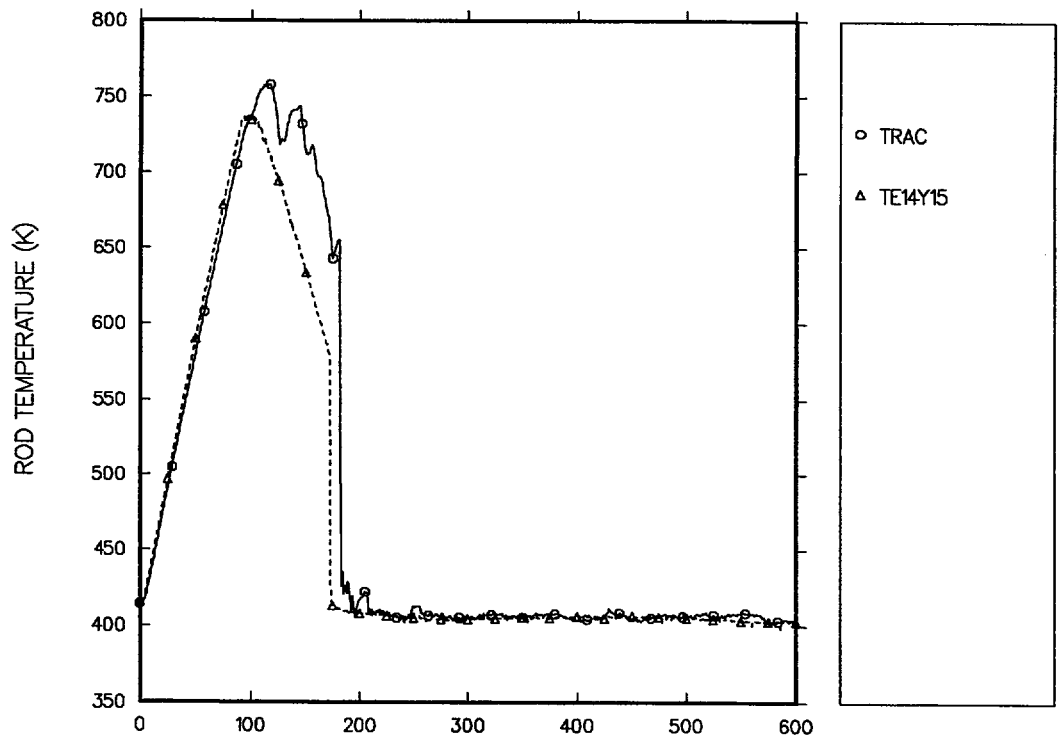


Fig. AA-12. Cladding temperatures for the low-powered rod at the 3.115-m elevation.

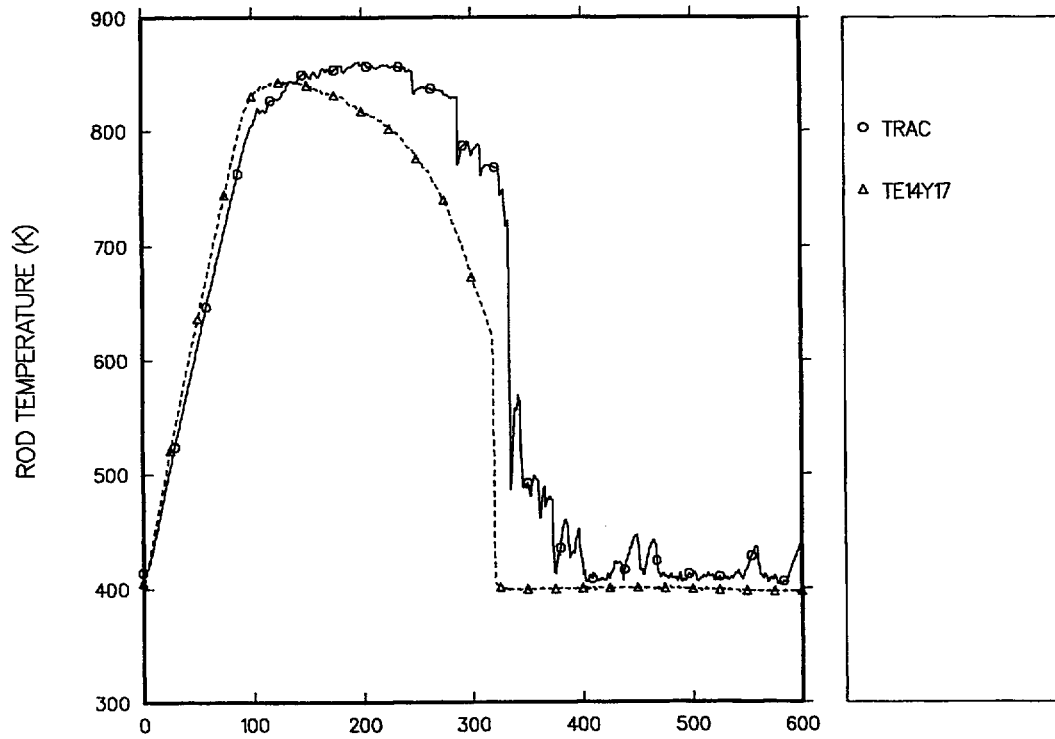


Fig. AA-13. Cladding temperatures for the low-powered rod at the core midplane.

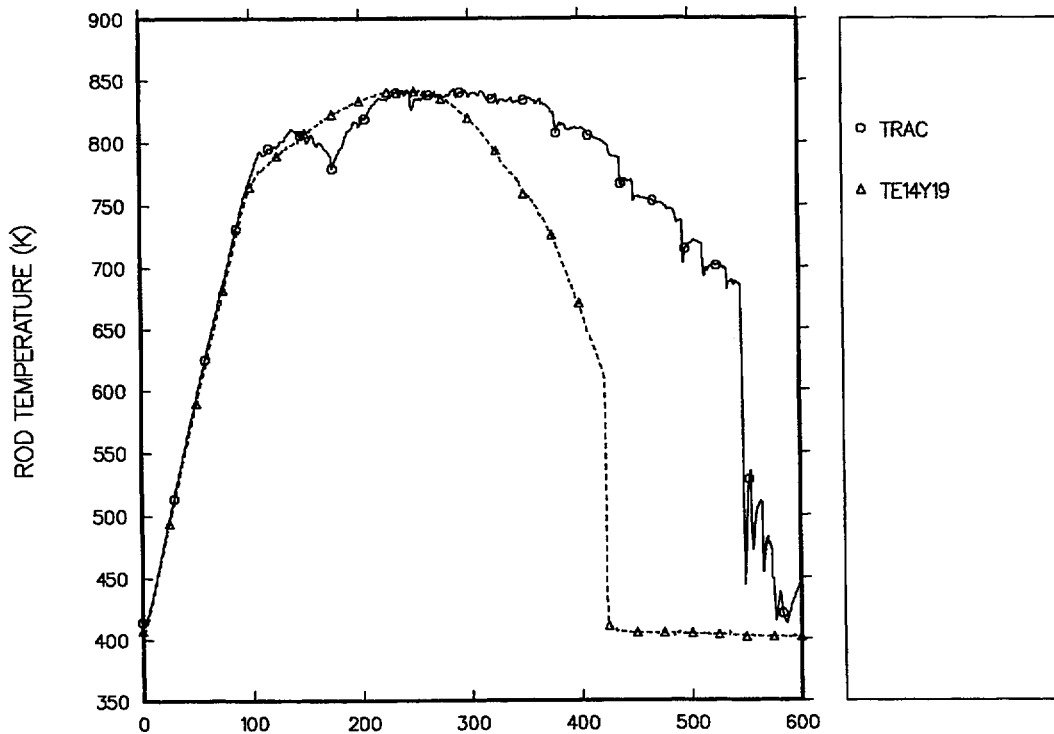


Fig. AA-14. Cladding temperatures for the low-powered rod at the 4.540-m elevation.

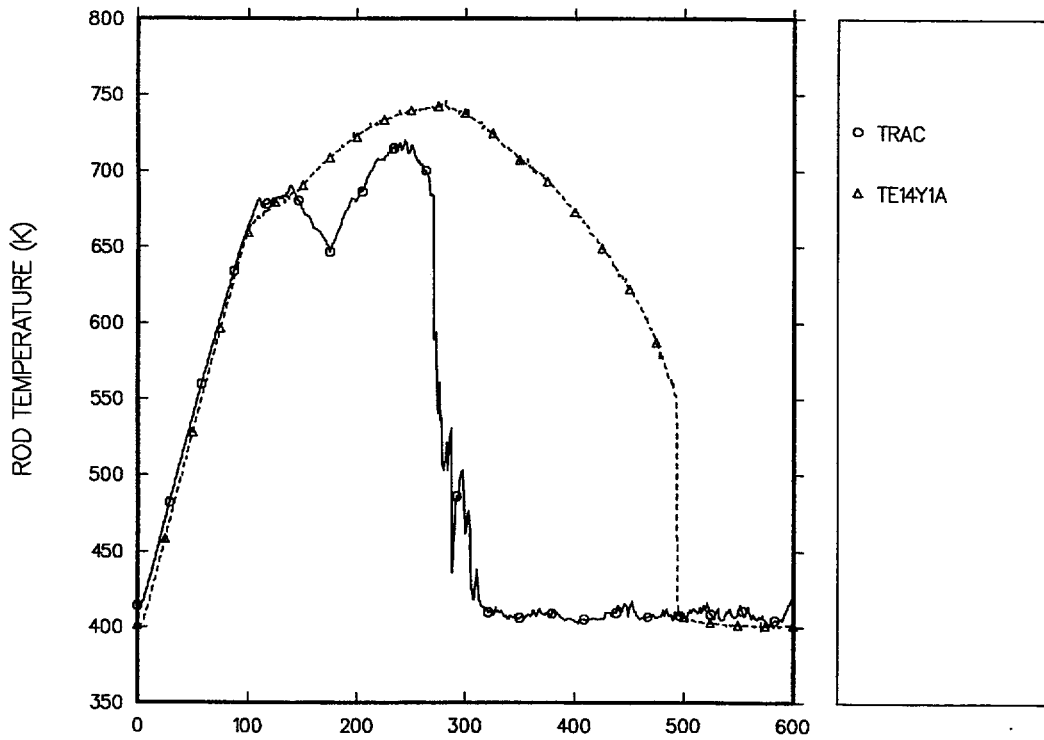


Fig. AA-15. Comparison of calculated and measured cladding temperatures for the low-powered rod at the 5.150-m elevation.

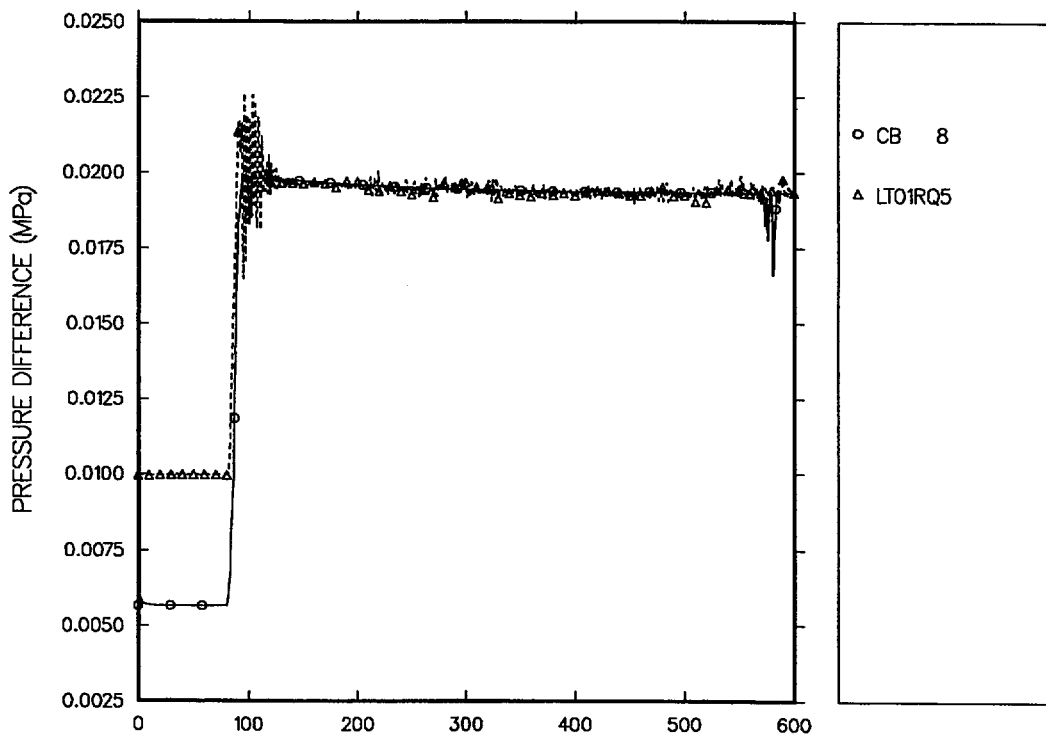


Fig. AA-16. Calculated and measured pressure vessel differential pressure: lower plenum.



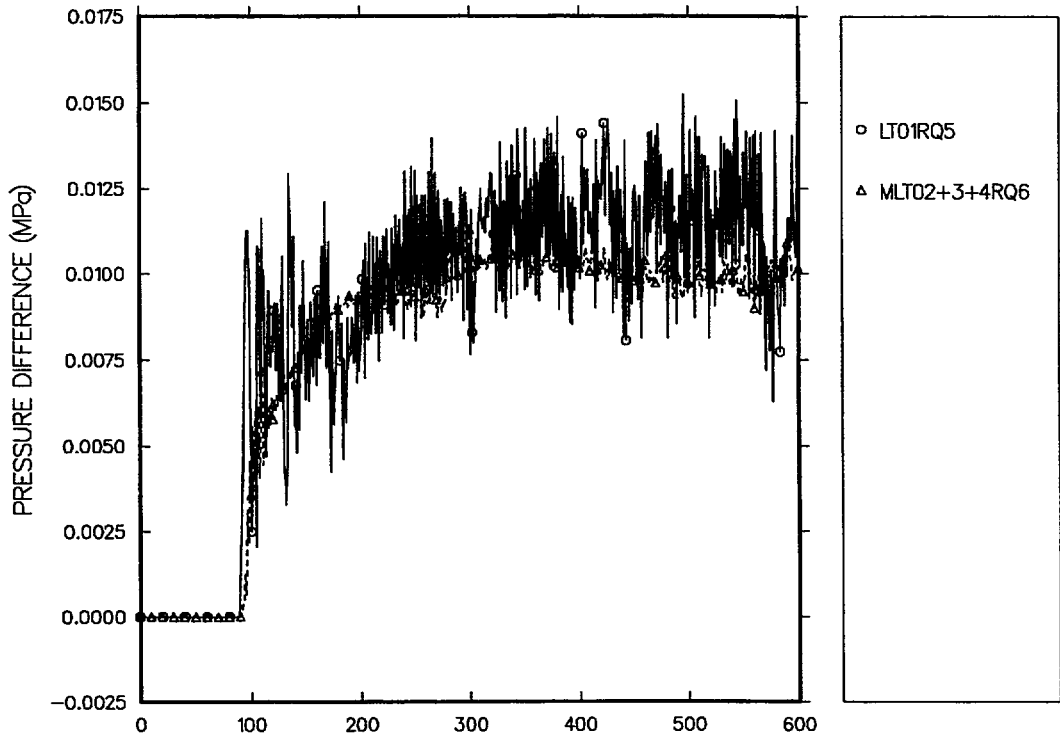


Fig. AA-17. Calculated and measured pressure vessel differential pressure: lower half of the core.

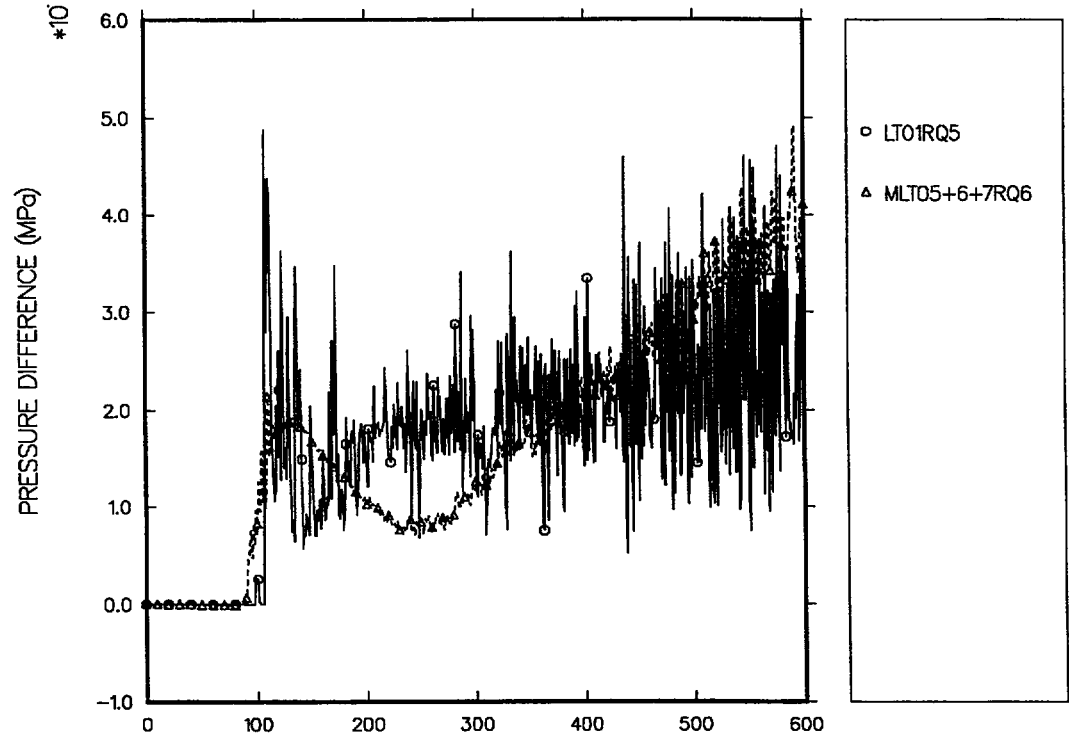


Fig. AA-18. Calculated and measured pressure vessel differential pressure: upper half of the core.

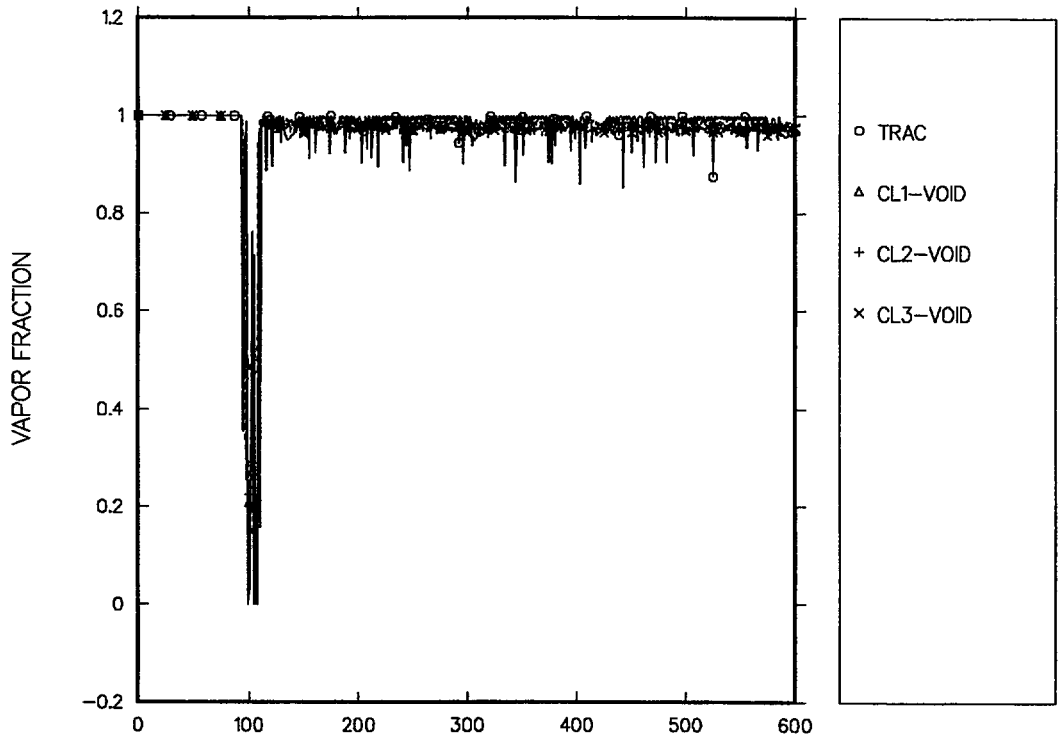


Fig. AA-19. Calculated and measured cold-leg, spool-piece void fraction.

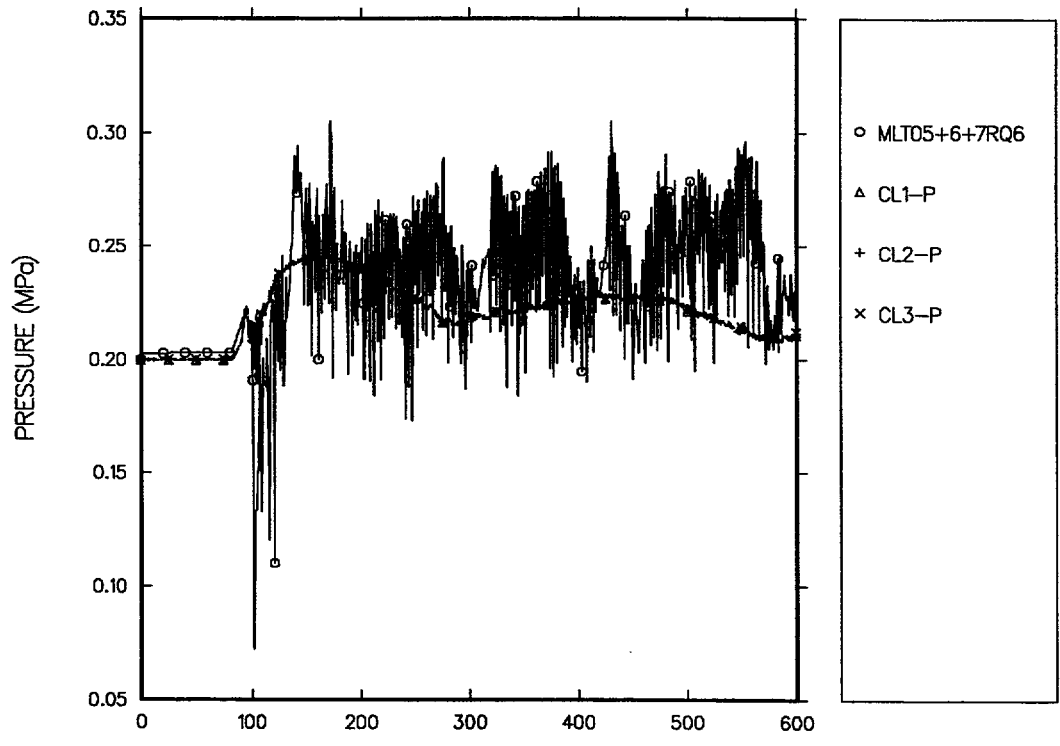


Fig. AA-20. Calculated and measured cold-leg, spool-piece pressure.

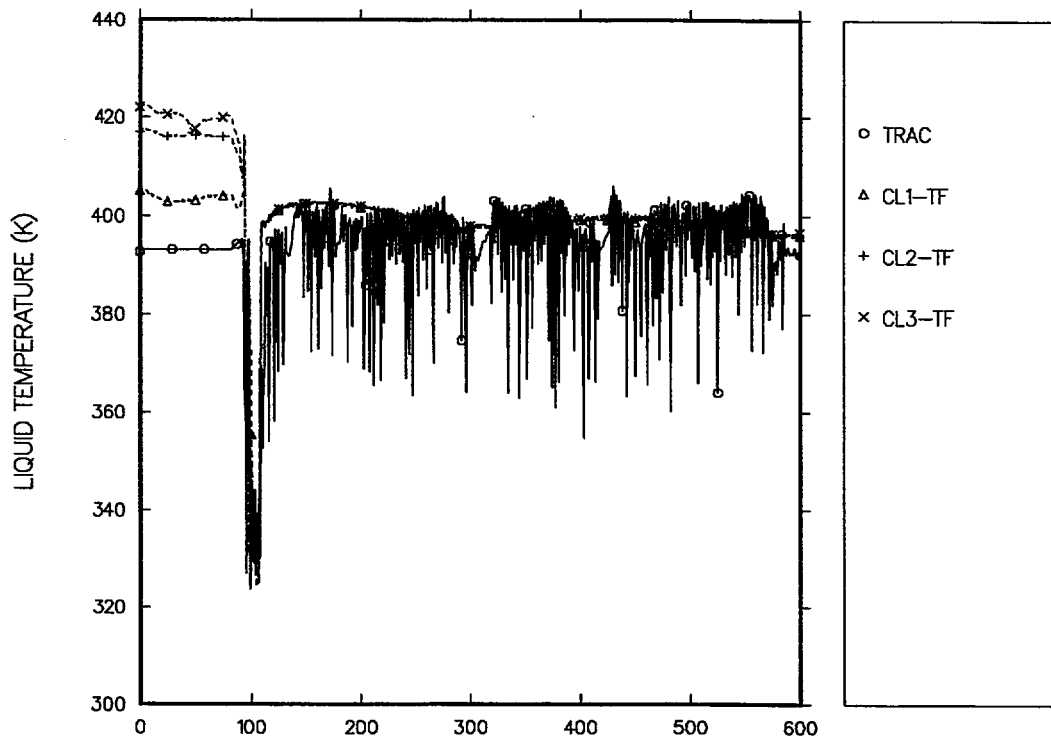


Fig. AA-21. Calculated and measured cold-leg, spool-piece fluid temperature.

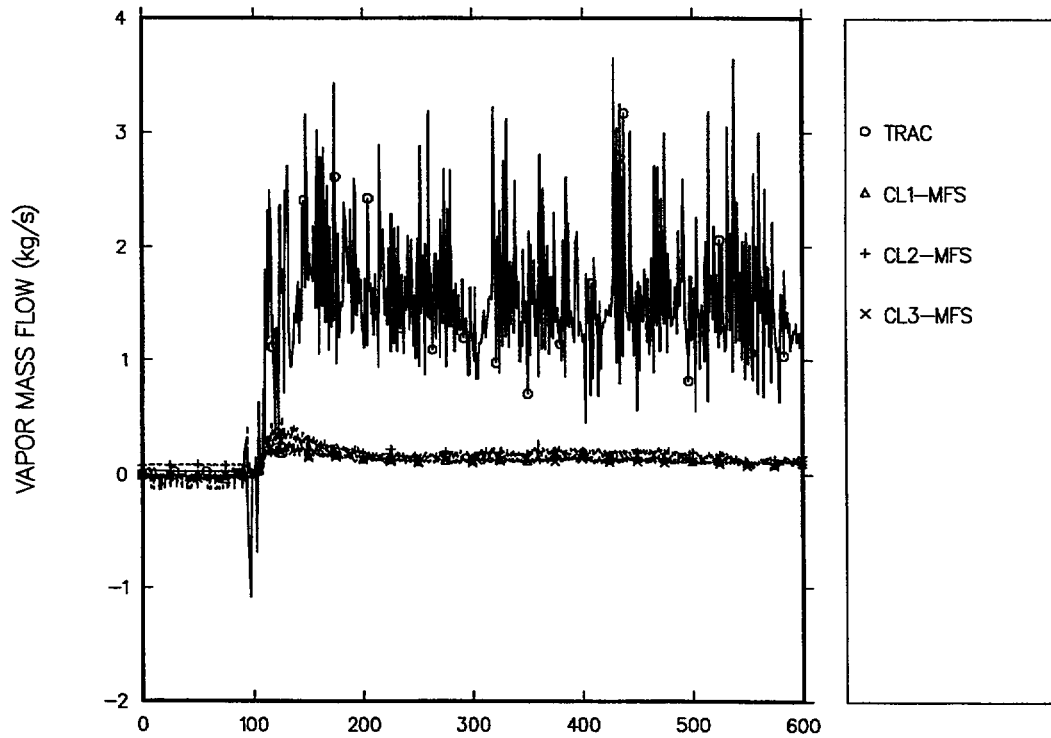


Fig. AA-22. Calculated and measured cold-leg, spool-piece steam mass flow rate.

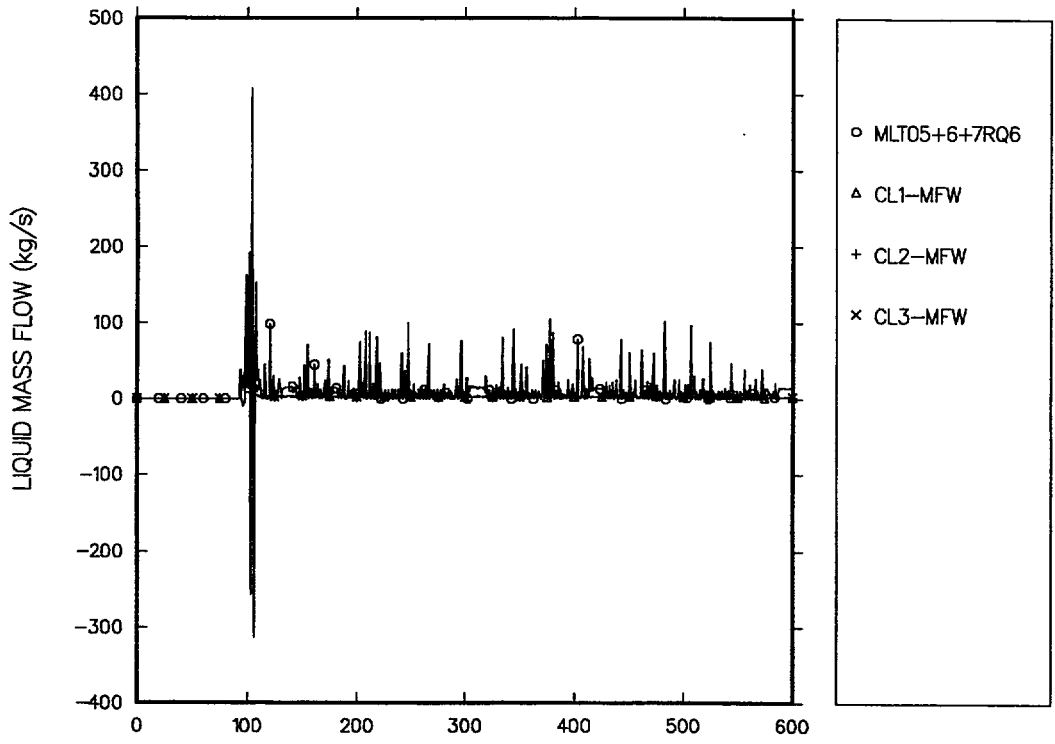


Fig. AA-23. Calculated and measured cold-leg, spool-piece liquid mass flow rate.

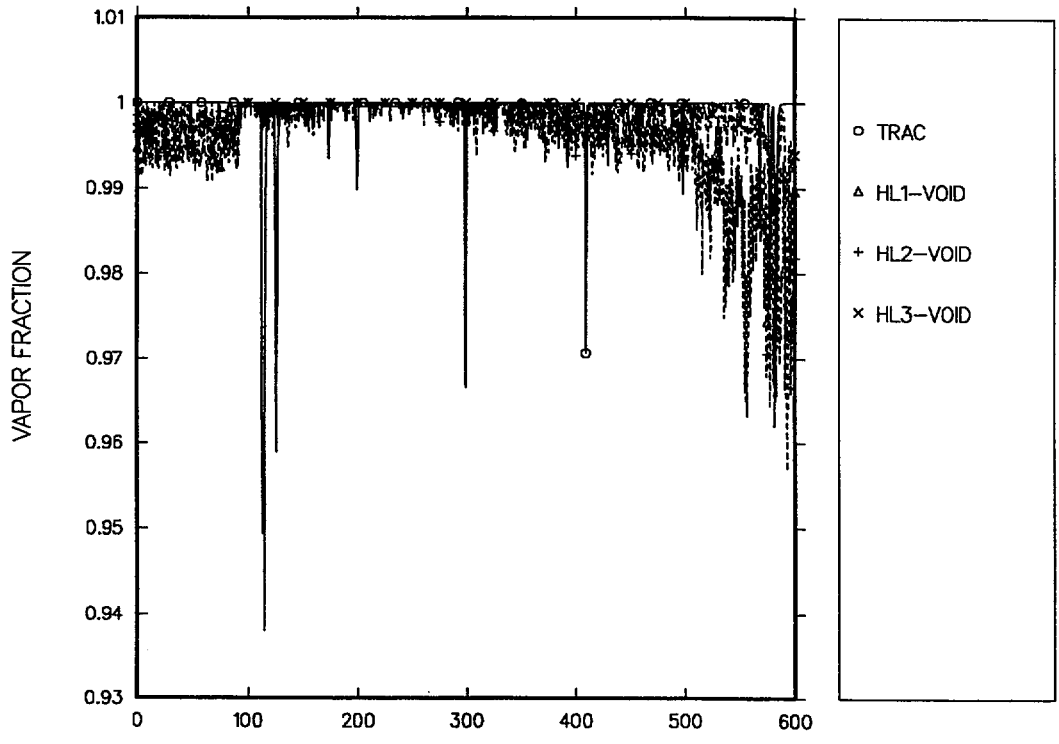


Fig. AA-24. Calculated and measured hot-leg, spool-piece void fraction.

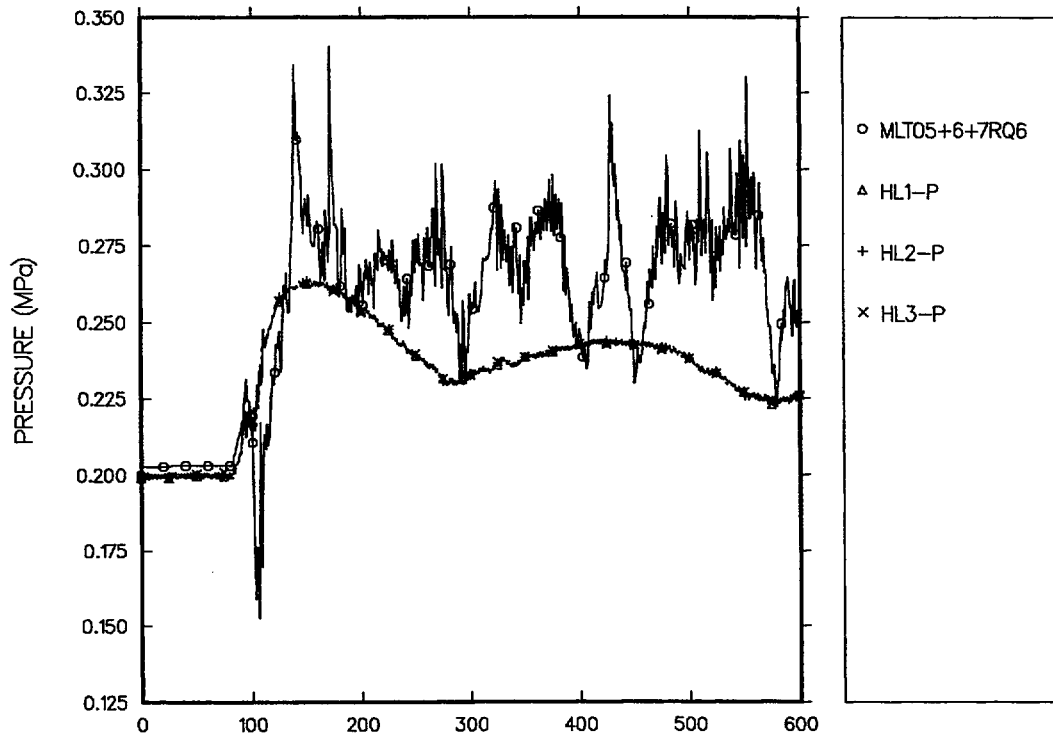


Fig. AA-25. Calculated and measured hot-leg, spool-piece pressure.

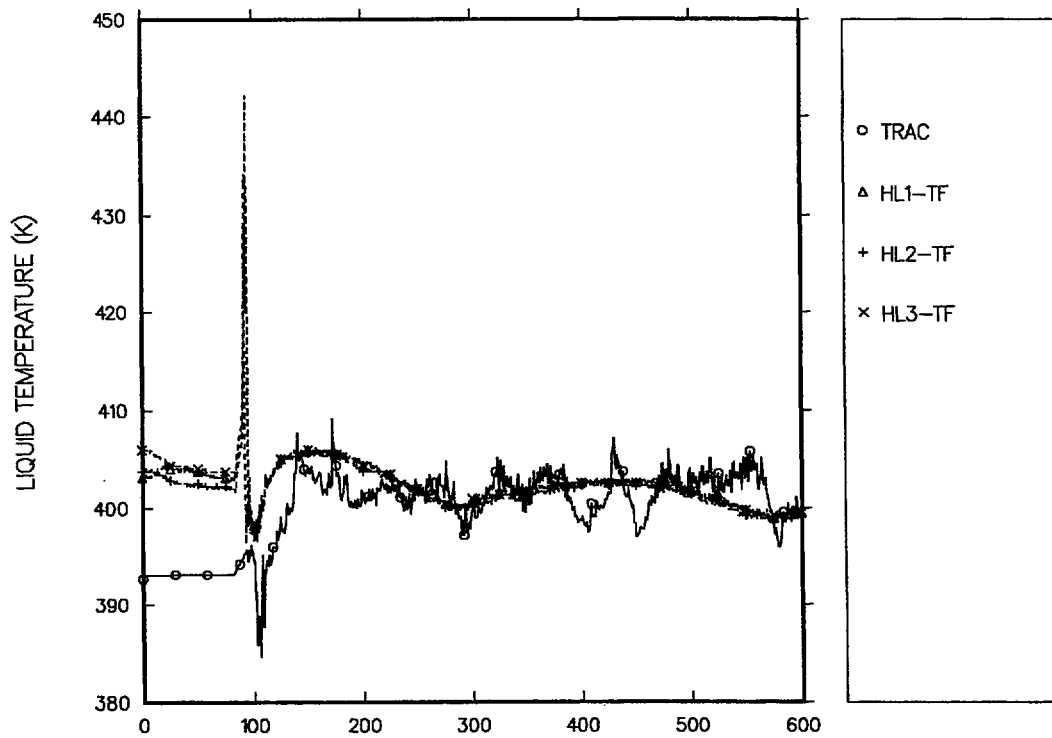


Fig. AA-26. Calculated and measured hot-leg, spool-piece fluid temperature.

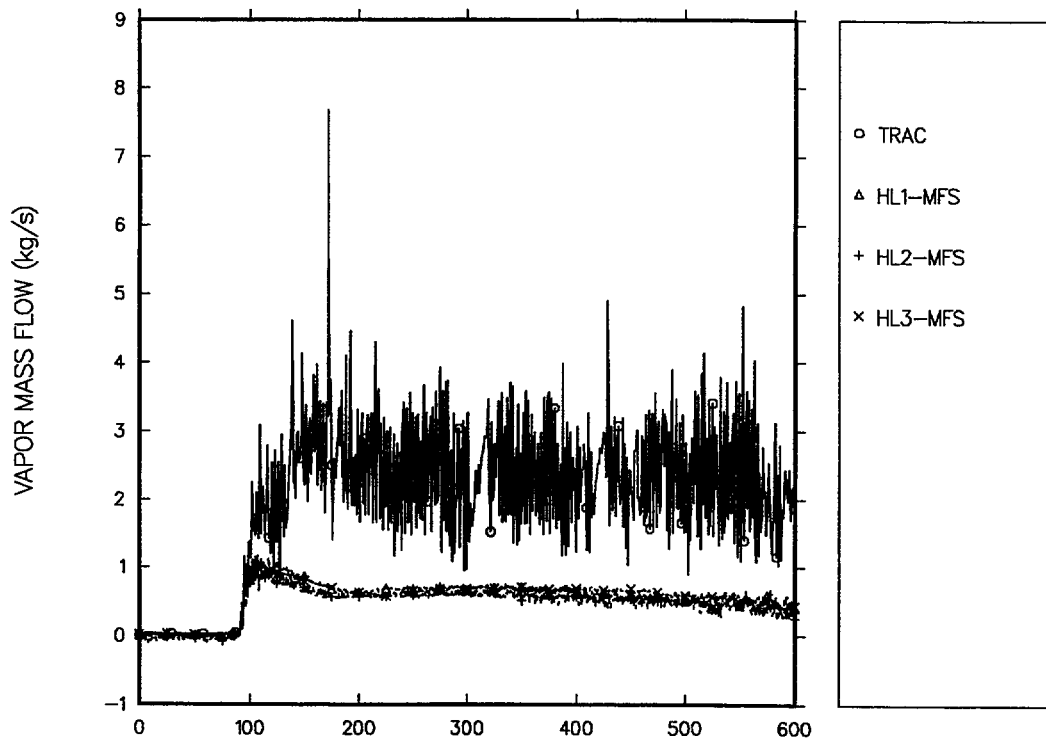


Fig. AA-27. Calculated and measured hot-leg, spool-piece, steam mass flow rate.

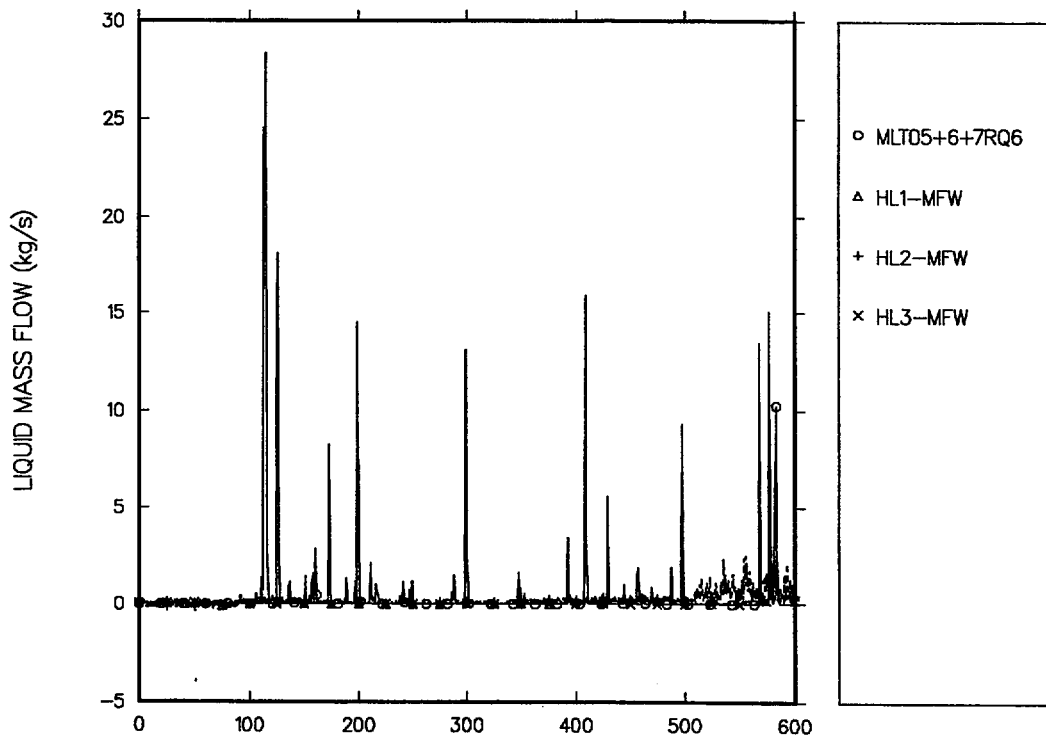


Fig. AA-28. Calculated and measured hot-leg, spool-piece, steam mass flow rate.

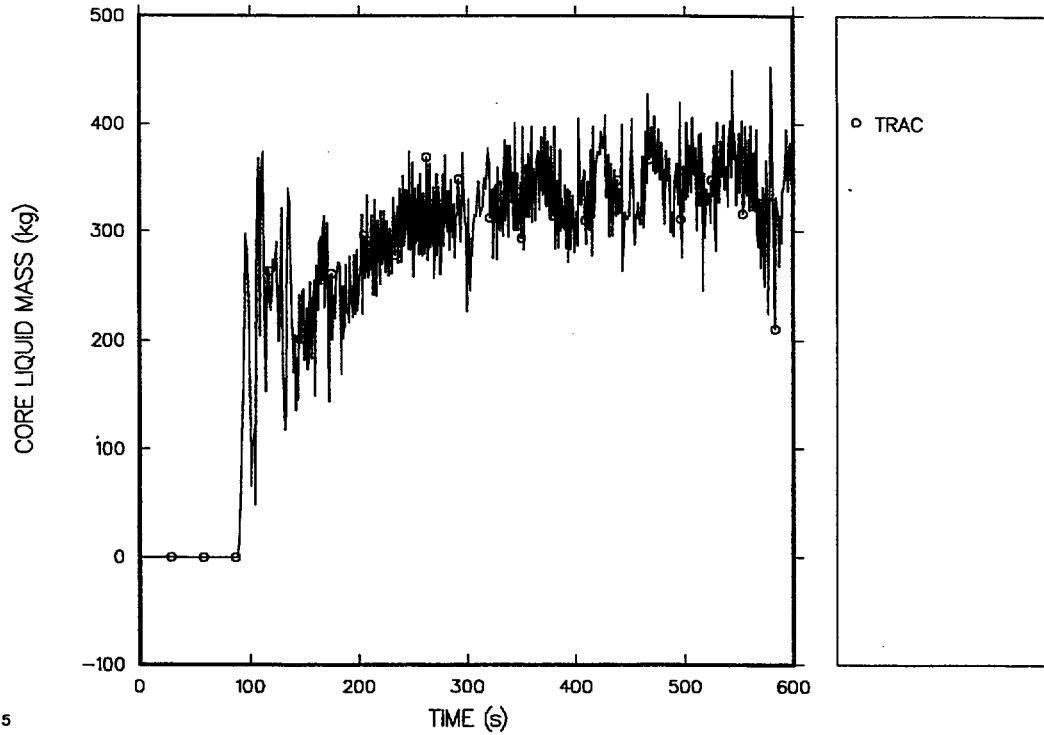


Fig. AA-29. Calculated core liquid mass.

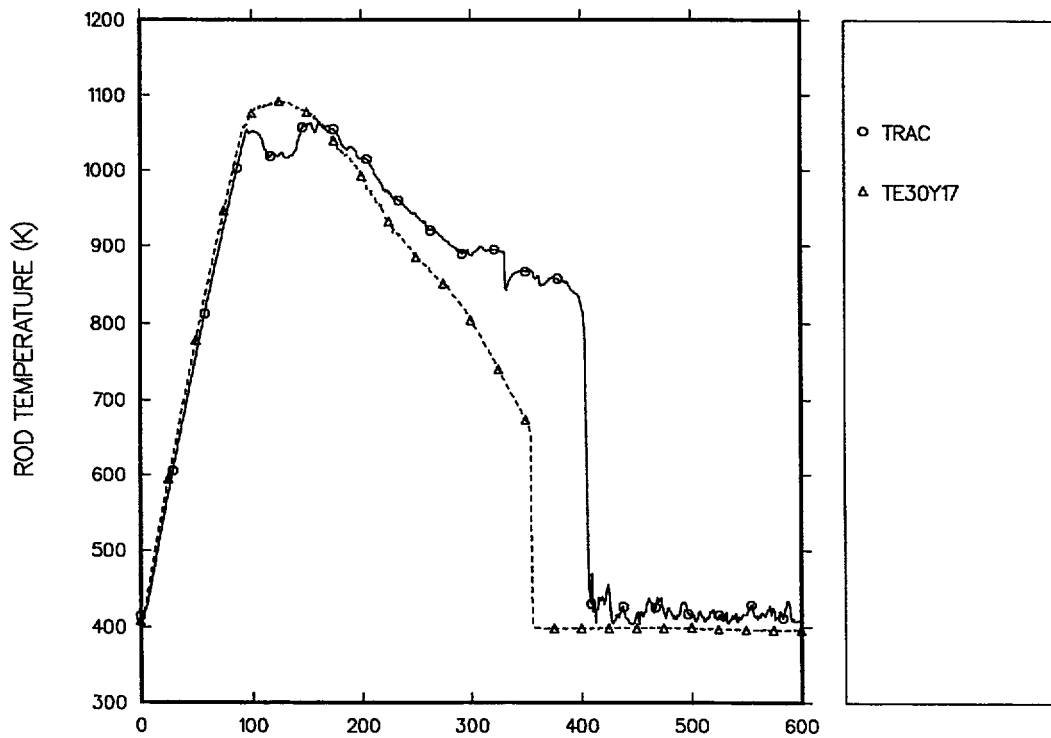


Fig. AA-30. Calculated and measured cladding temperatures for the hot rod at the 3.930-m (core midplane) elevation (with grid-spacer model).

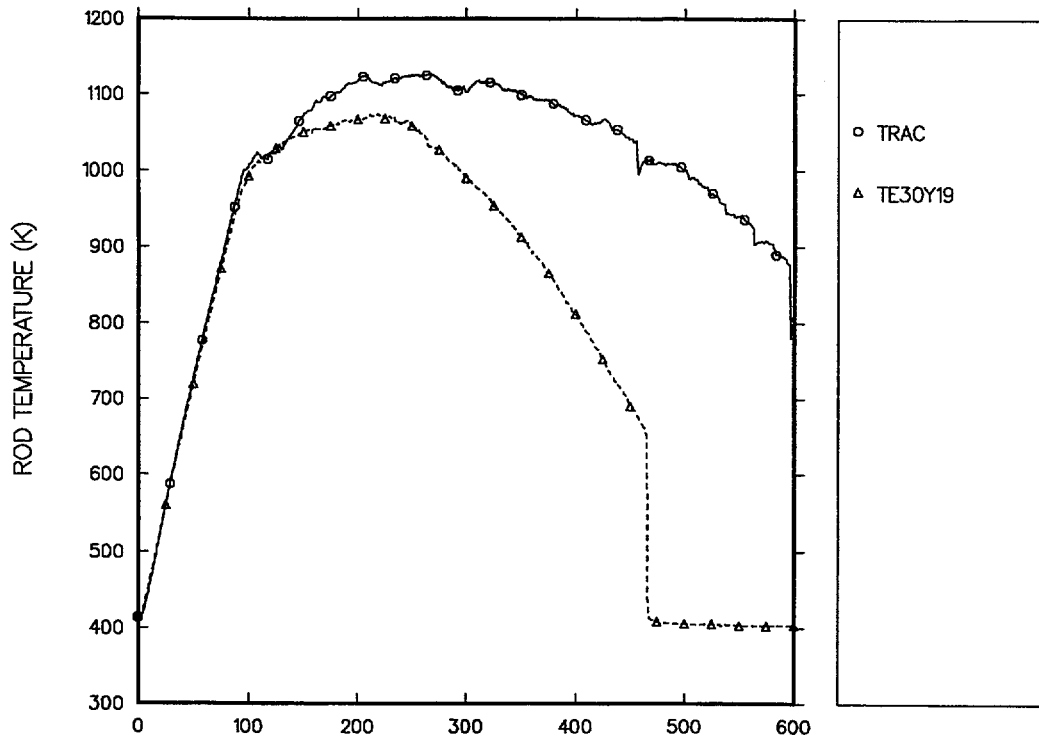


Fig. AA-31. Cladding temperatures for the hot rod at the 4.540-m elevation (with grid-spacer model).

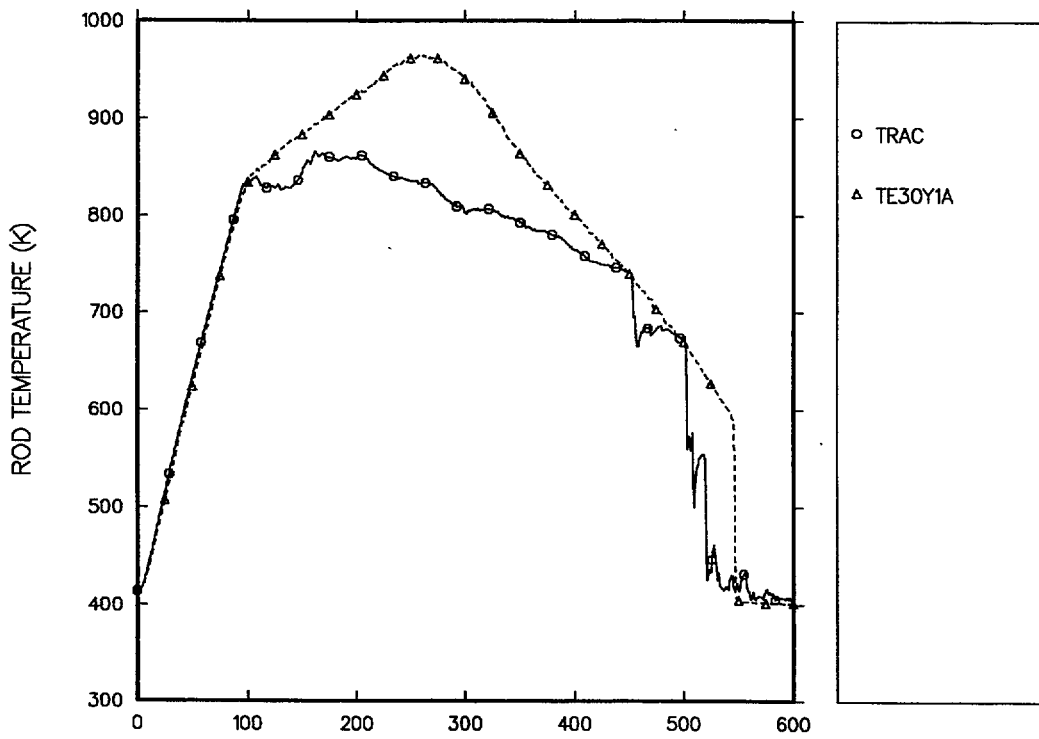


Fig. AA-32. Cladding temperatures for the hot rod at the 5.150-m elevation (with grid-spacer model).



## APPENDIX BB

### CODE-DATA COMPARISON FOR CCTF RUN 54 WITH RENODED CORE WITH NEWRFD=1

This appendix presents the calculation results for CCTF Run 54 with the core renoded from 7 axial levels to 17 axial levels, with the reflod option newrfd=1. The set of plots presented is the same as presented in Appendix AA for the renoded core with reflod option newrfd=3. For reference purposes, the figure numbers for the two sets of calculations are listed below.

newrfd=1	newrfd=3	newrfd=1	newrfd=3
BB-1	AA-1	BB-17	AA-17
BB-2	AA-2	BB-18	AA-18
BB-3	AA-3	BB-19	AA-19
BB-4	AA-4	BB-20	AA-20
BB-5	AA-5	BB-21	AA-21
BB-6	AA-6	BB-22	AA-22
BB-7	AA-7	BB-23	AA-23
BB-8	AA-8	BB-24	AA-24
BB-9	AA-9	BB-25	AA-25
BB-10	AA-10	BB-26	AA-26
BB-11	AA-11	BB-27	AA-27
BB-12	AA-12	BB-28	AA-28
BB-13	AA-13	BB-29	AA-29
BB-14	AA-14	BB-30	AA-30
BB-15	AA-15	BB-31	AA-31
BB-16	AA-16	BB-32	AA-32

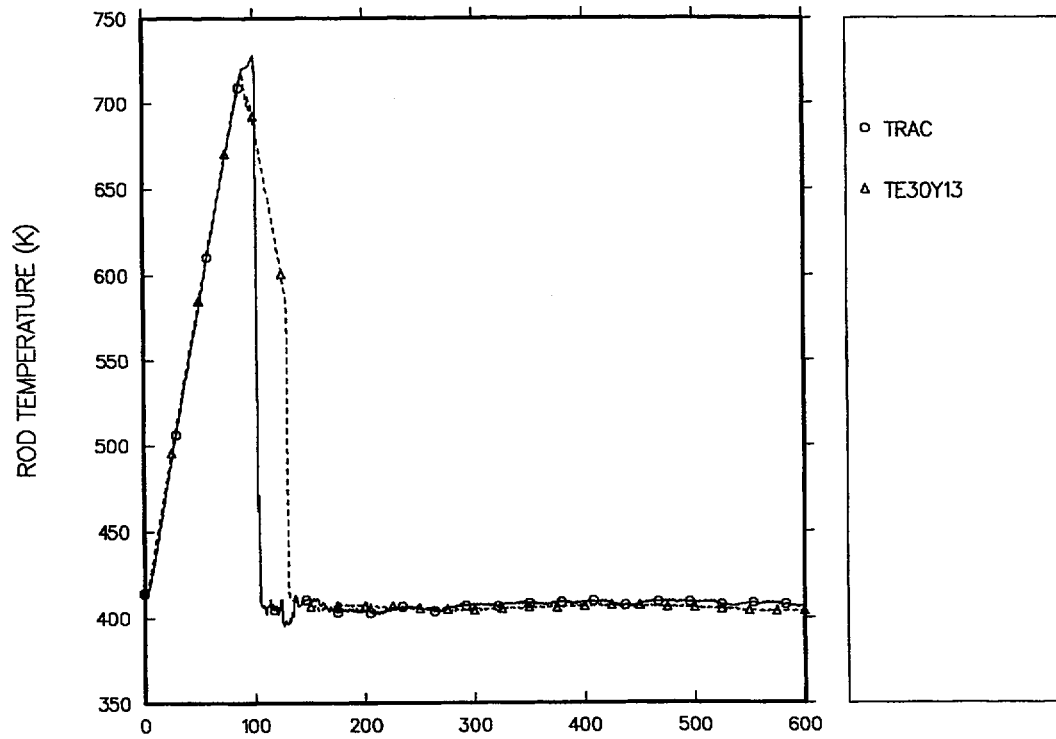


Fig. BB-1. Calculated and measured cladding temperatures for the hot rod at the 2.480-m elevation.

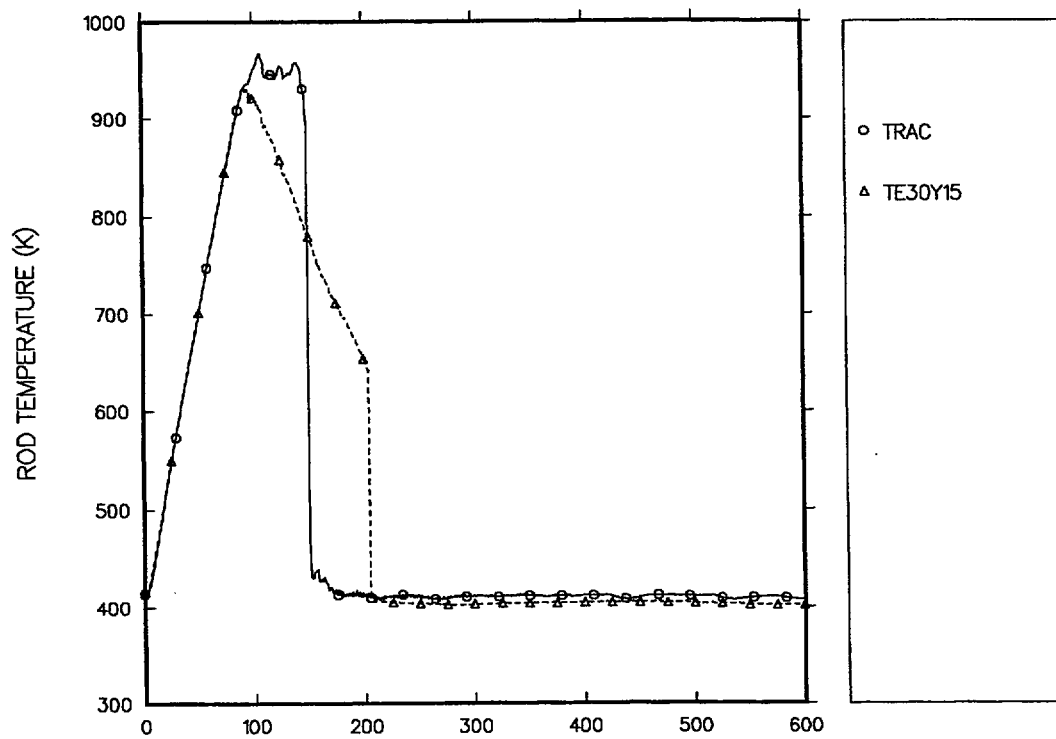


Fig. BB-2. Calculated and measured cladding temperatures for the hot rod at the 3.115-m elevation.

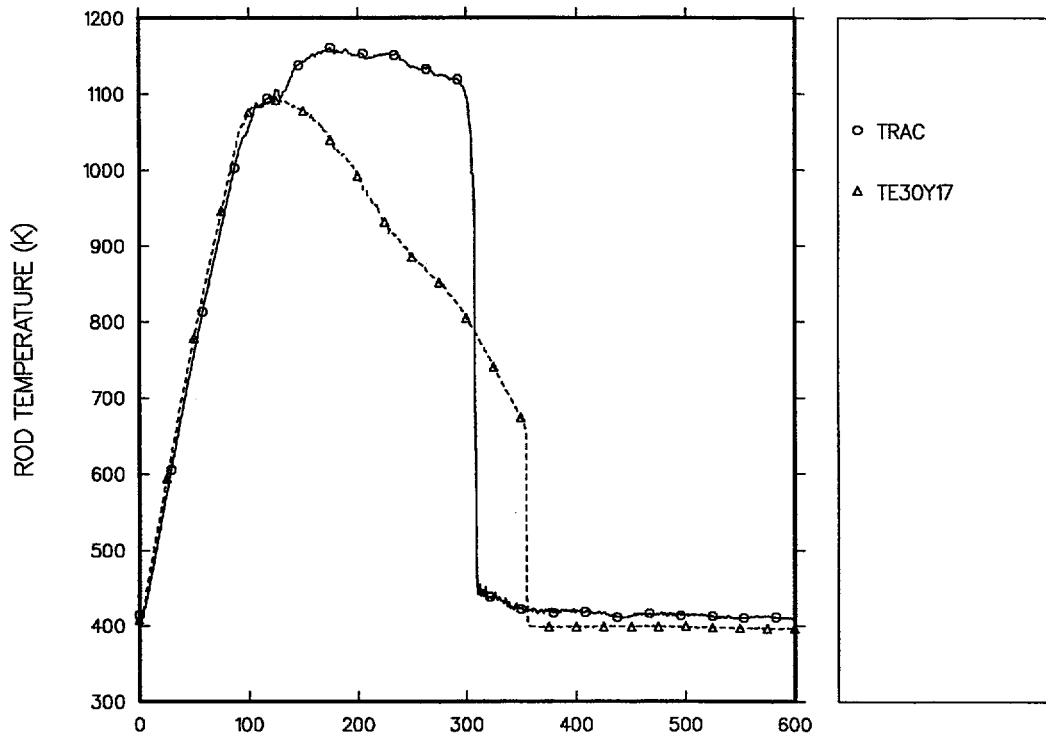


Fig. BB-3. Calculated and measured cladding temperatures for the hot rod at the 3.930-m (core midplane) elevation.

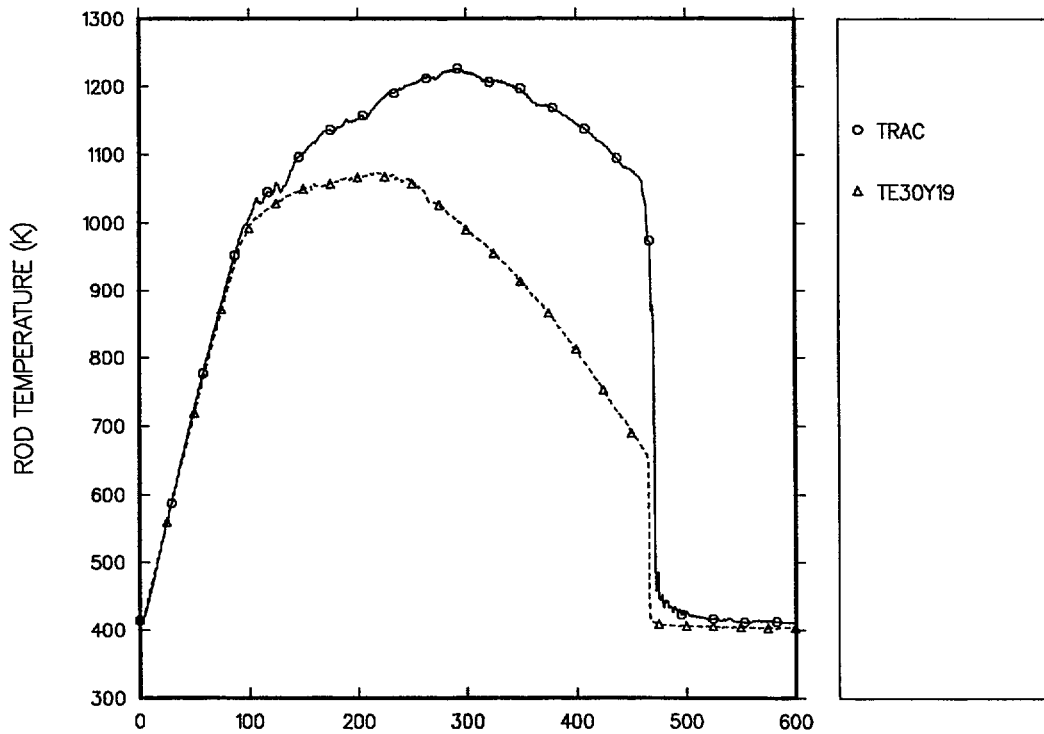


Fig. BB-4. Cladding temperatures for the hot rod at the 4.540-m elevation.

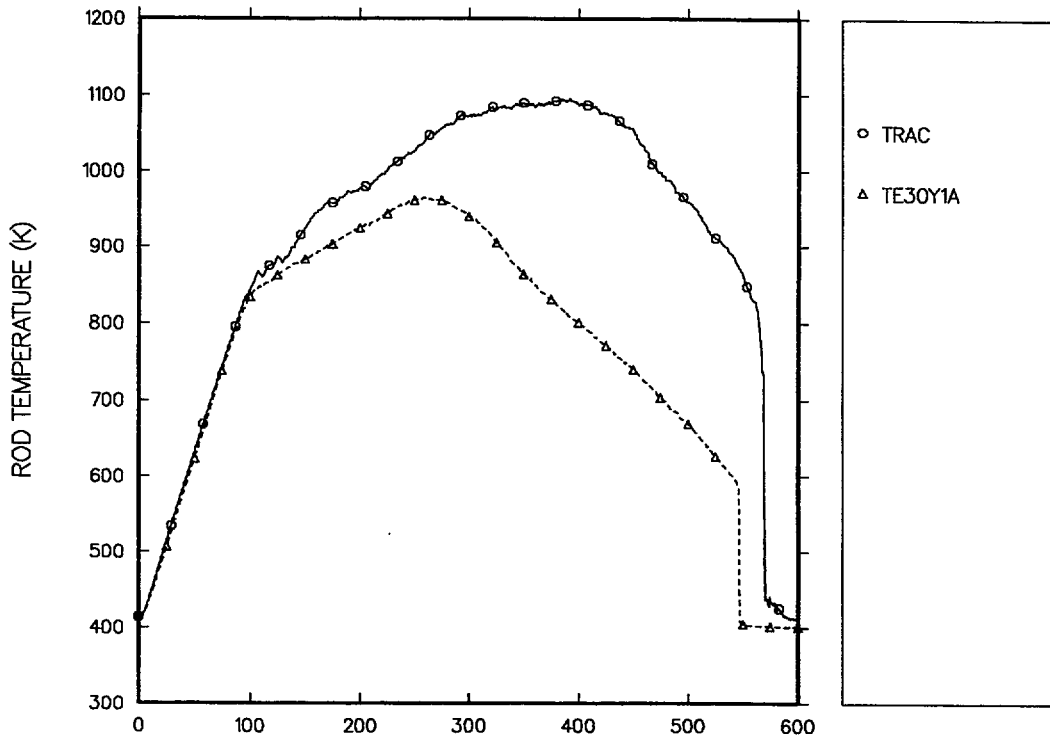


Fig. BB-5. Cladding temperatures for the hot rod at the 5.150-m elevation.

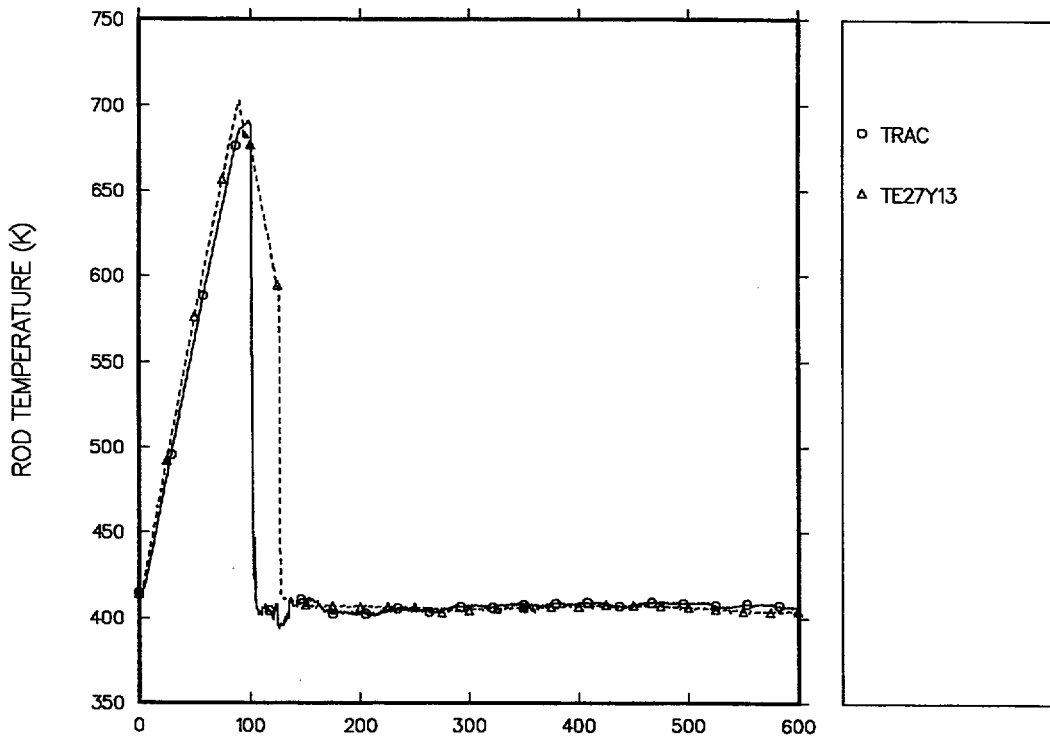


Fig. BB-6. Cladding temperatures for the intermediate-powered rod at the 2.480-m elevation.

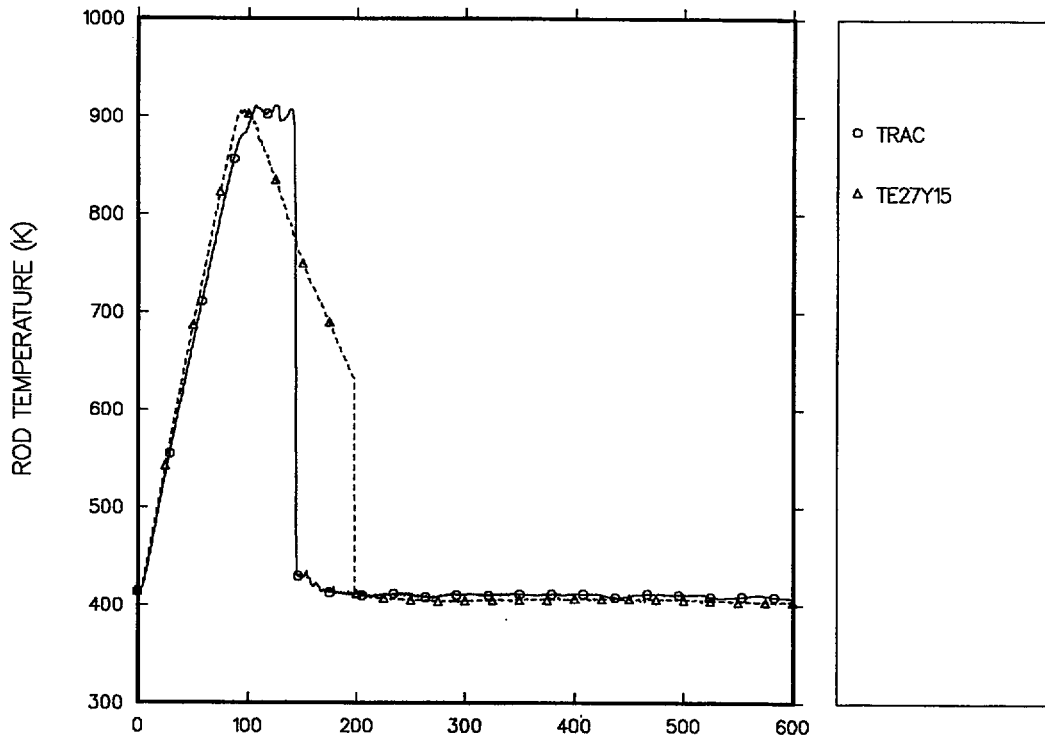


Fig. BB-7. Cladding temperatures for the intermediate-powered rod at the 3.115-m elevation.

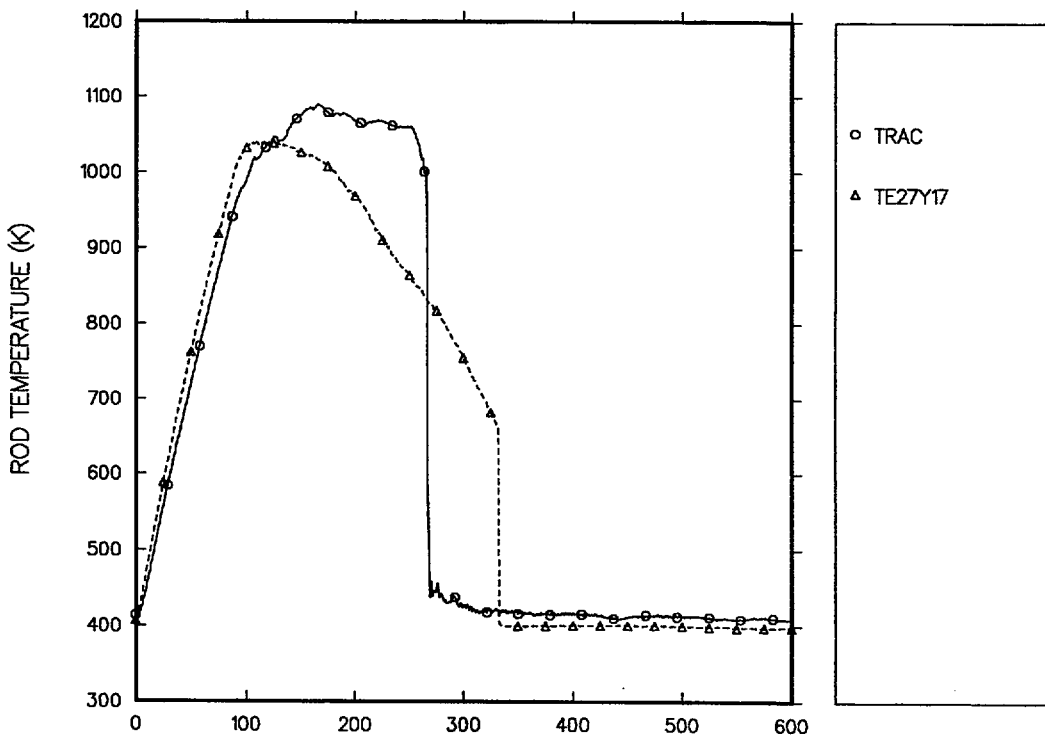


Fig. BB-8. Cladding temperatures for the intermediate-powered rod at the core midplane.

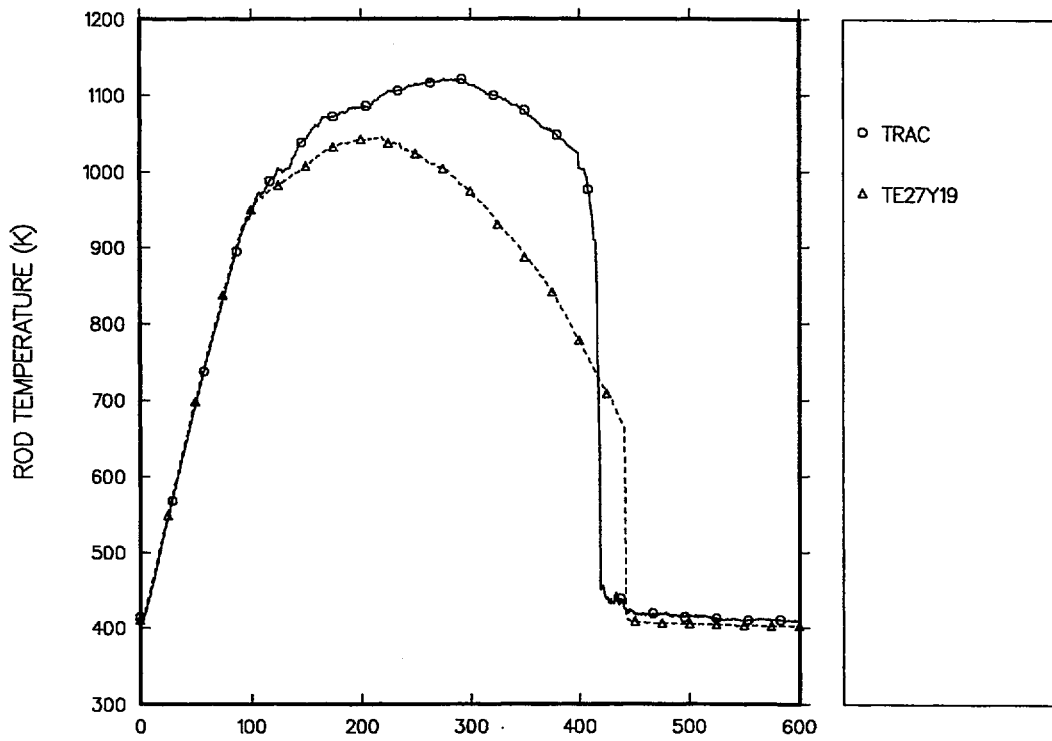


Fig. BB-9. Comparison of calculated and measured cladding temperatures for the intermediate-powered rod at the 4.540-m elevation.

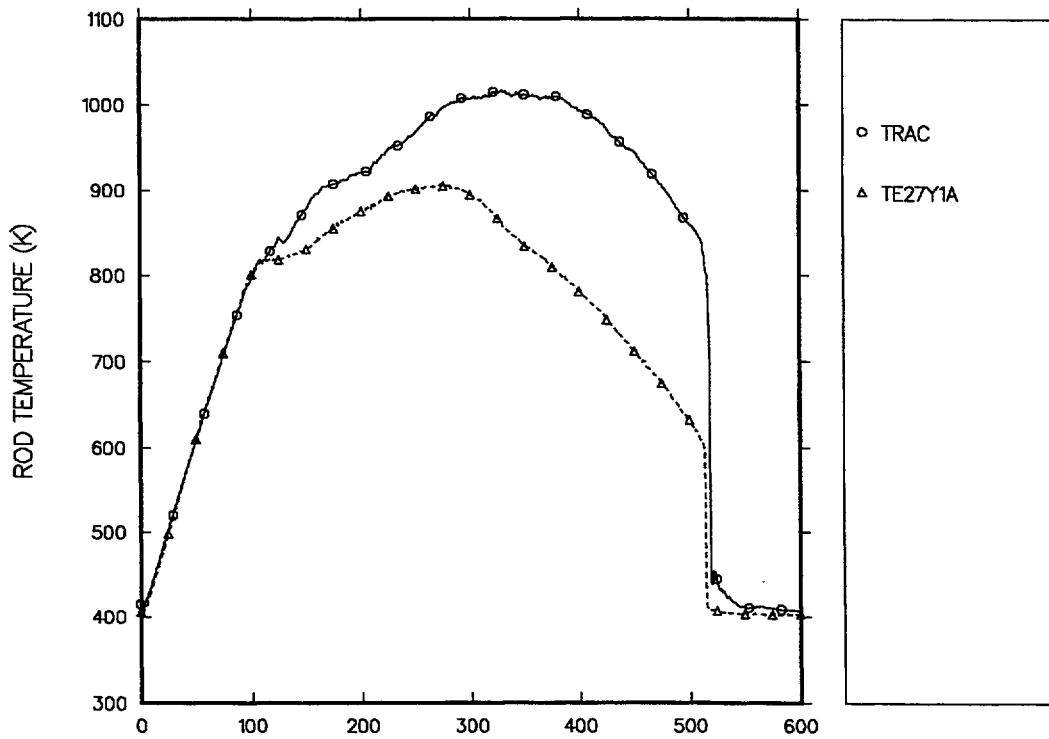


Fig. BB-10. Comparison of calculated and measured cladding temperatures for the intermediate-powered rod at the 5.150-m elevation.

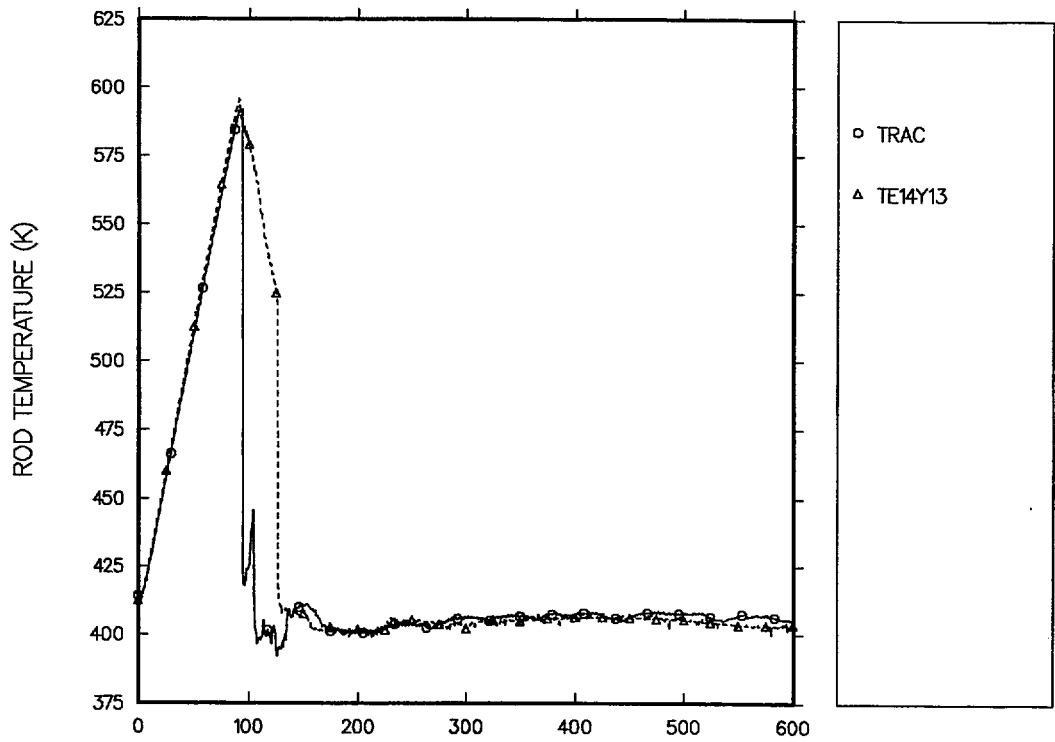


Fig. BB-11. Cladding temperatures for the low-powered rod at the 2.480-m elevation.

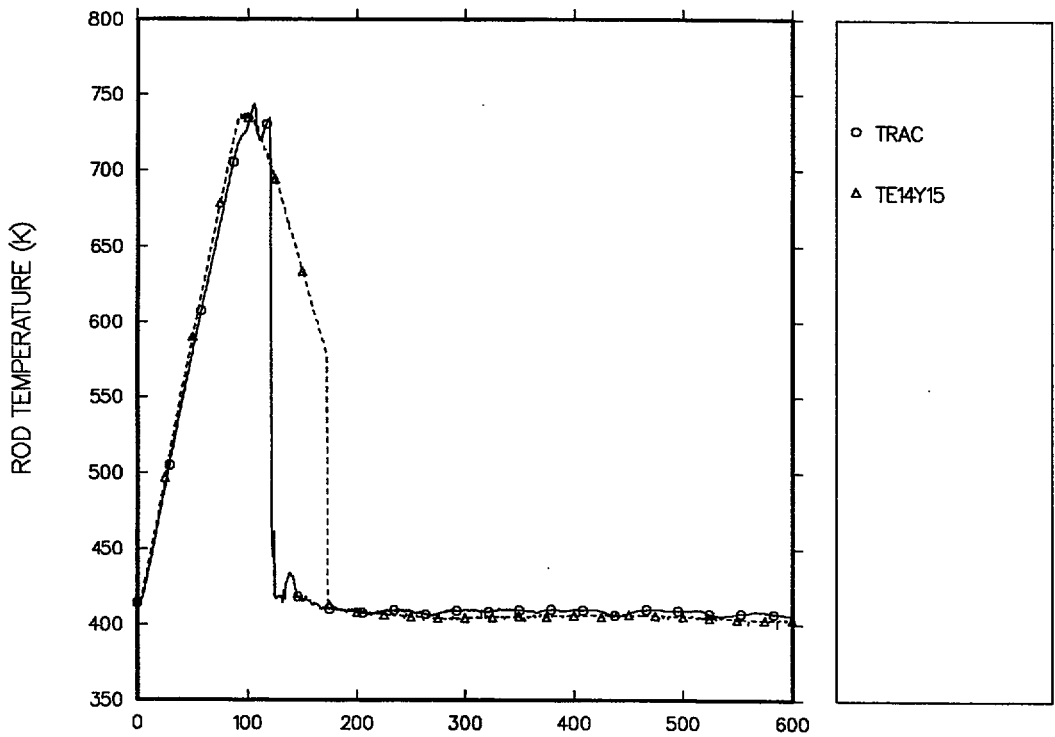


Fig. BB-12. Cladding temperatures for the low-powered rod at the 3.115-m elevation.

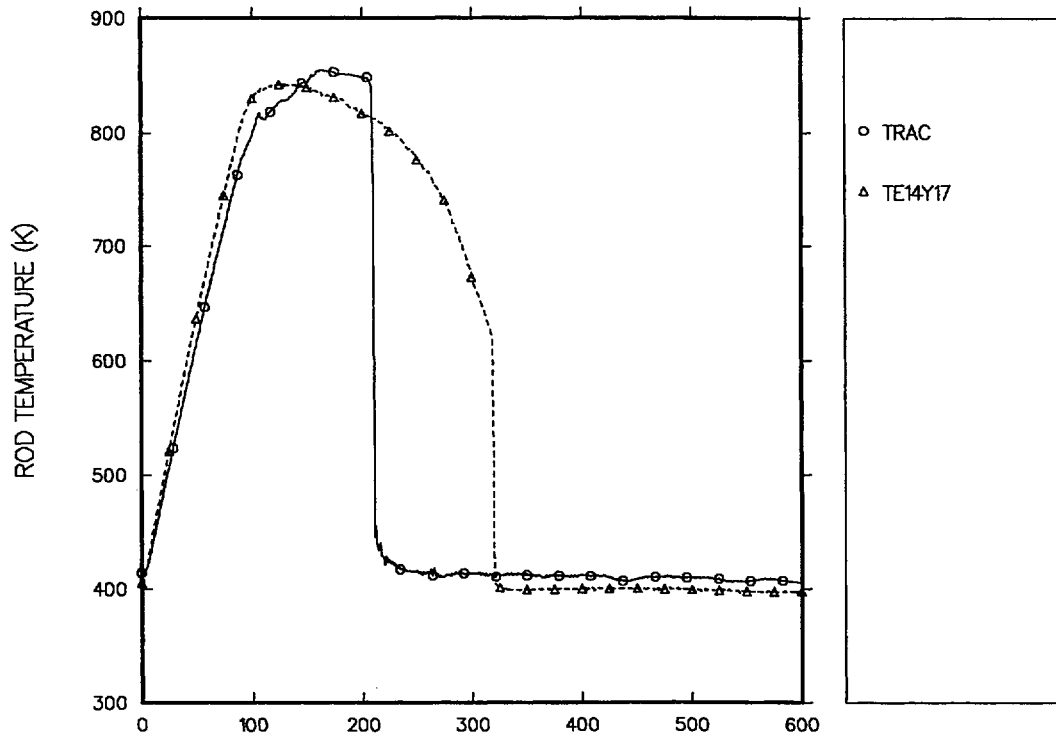


Fig. BB-13. Cladding temperatures for the low-powered rod at the core midplane.

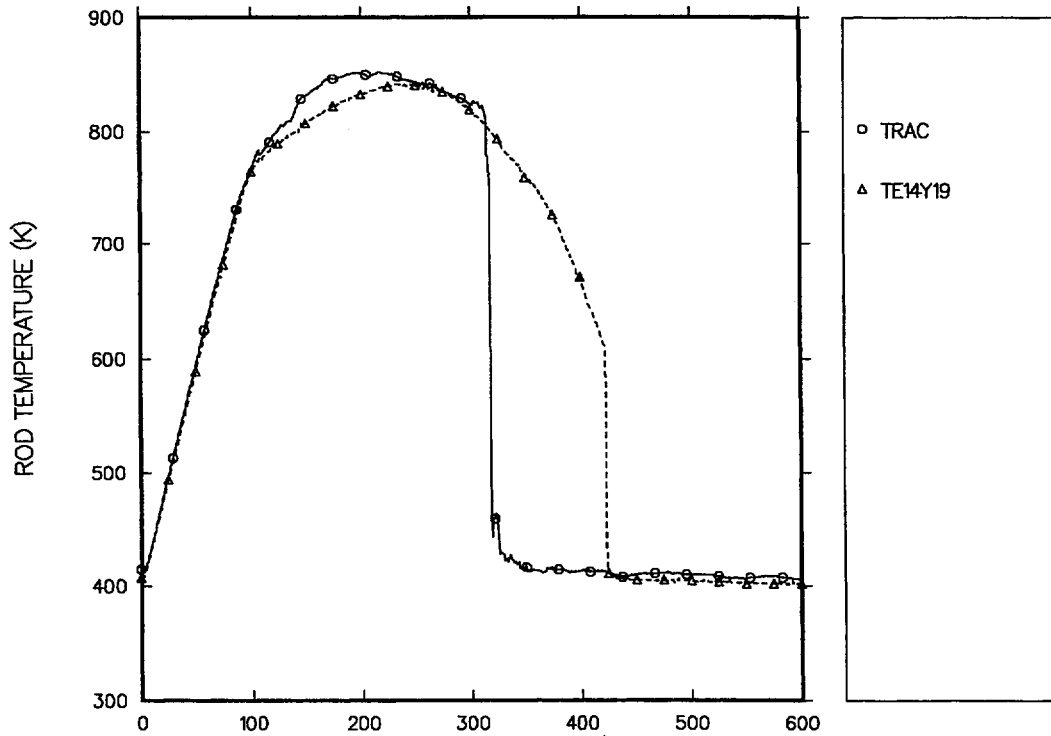


Fig. BB-14. Cladding temperatures for the low-powered rod at the 4.540-m elevation.



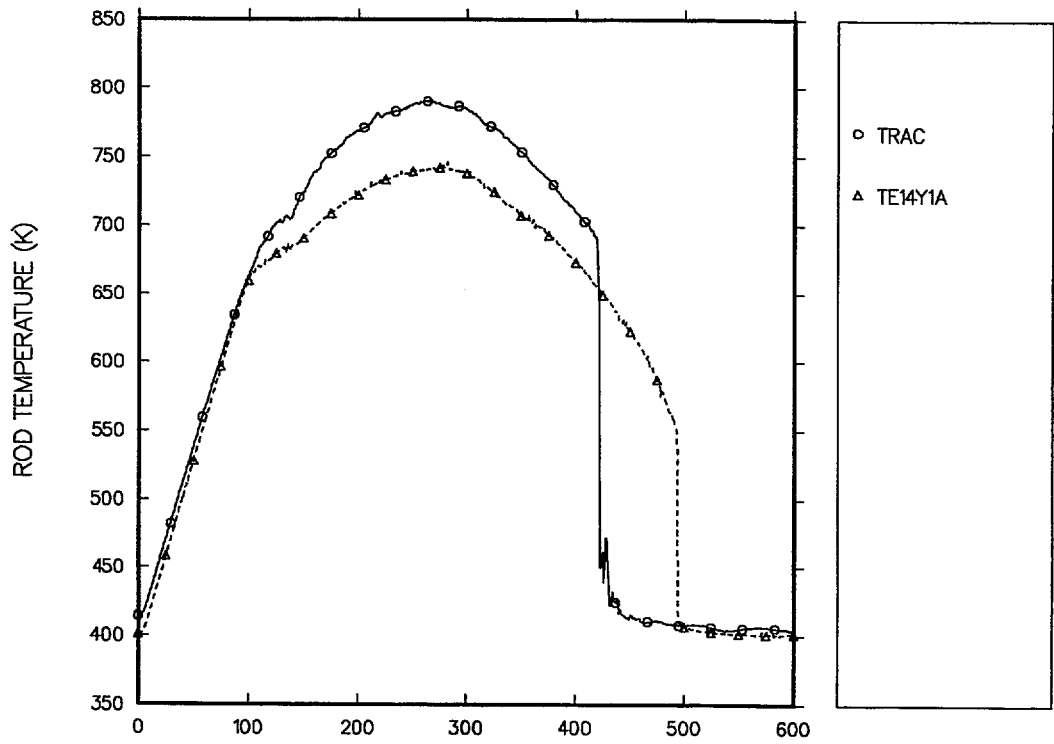


Fig. BB-15. Comparison of calculated and measured cladding temperatures for the low-powered rod at the 5.150-m elevation.

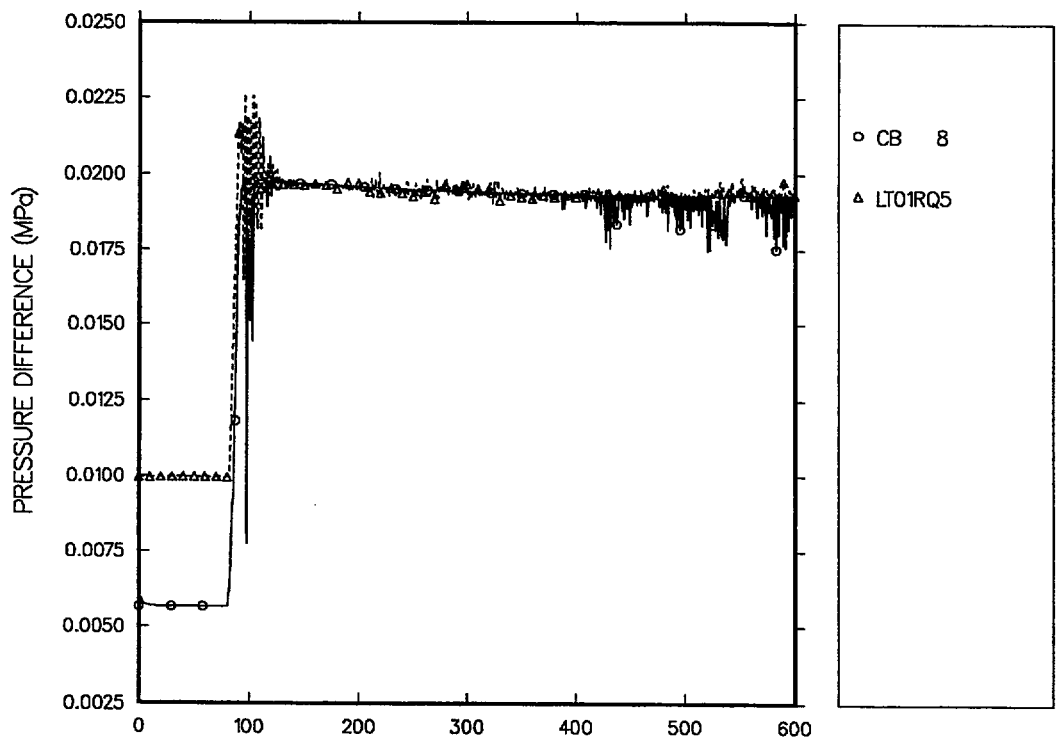


Fig. BB-16. Calculated and measured pressure vessel differential pressure: lower plenum.

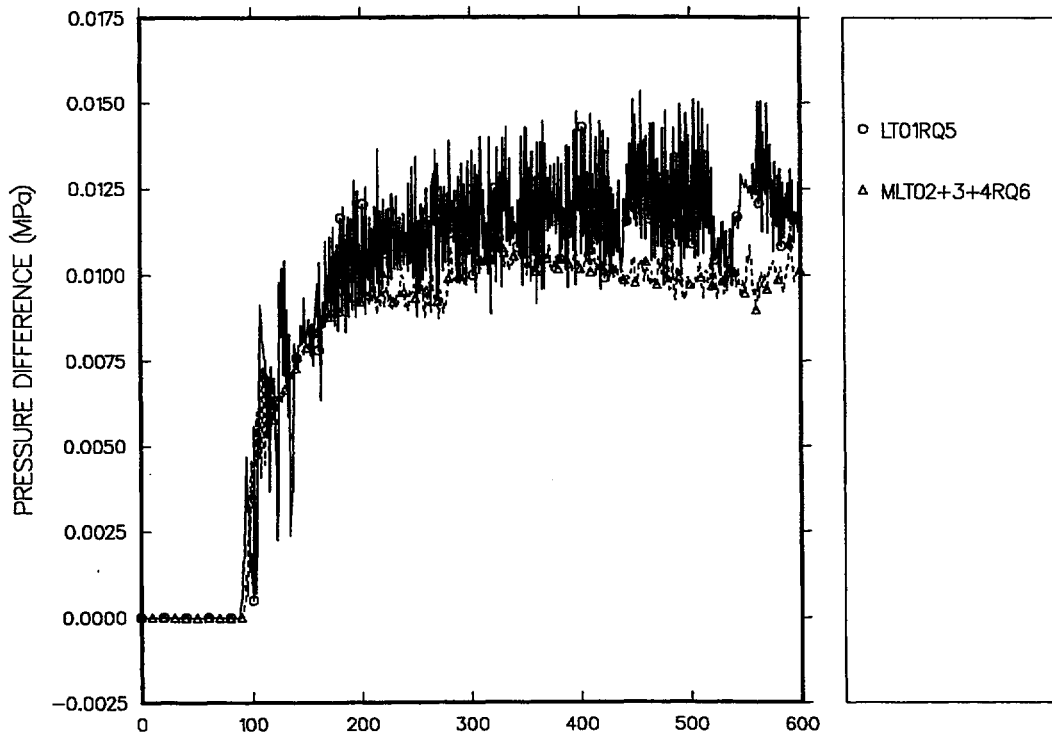


Fig. BB-17. Calculated and measured pressure vessel differential pressure: lower half of the core.

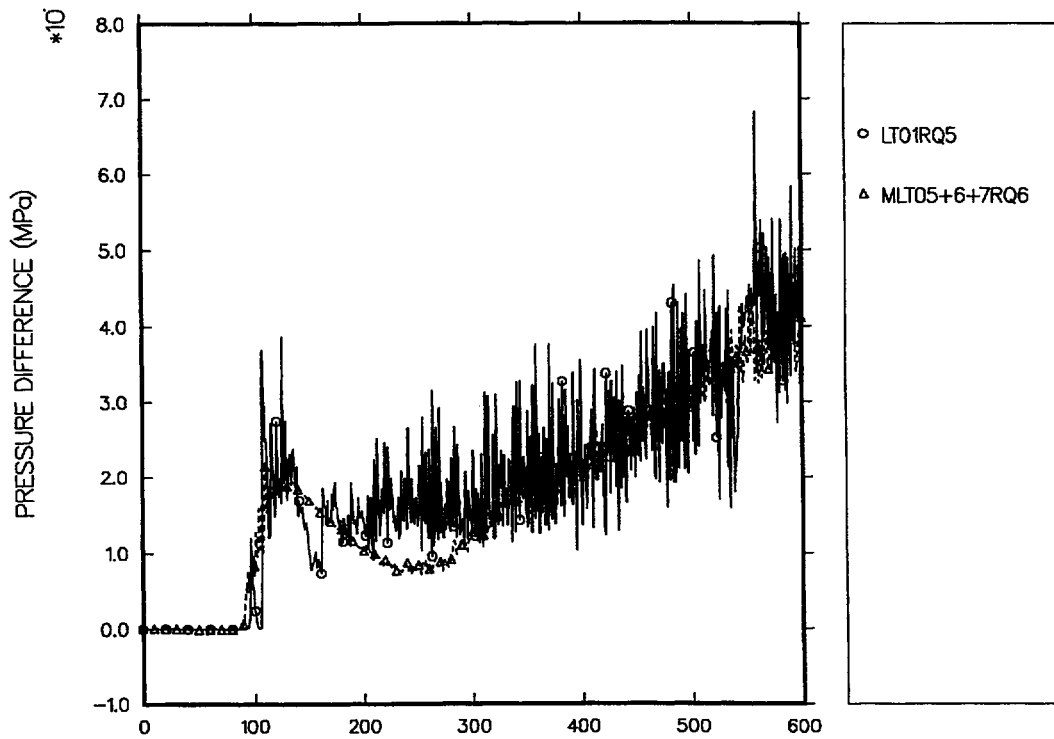


Fig. BB-18. Calculated and measured pressure vessel differential pressure: upper half of the core.

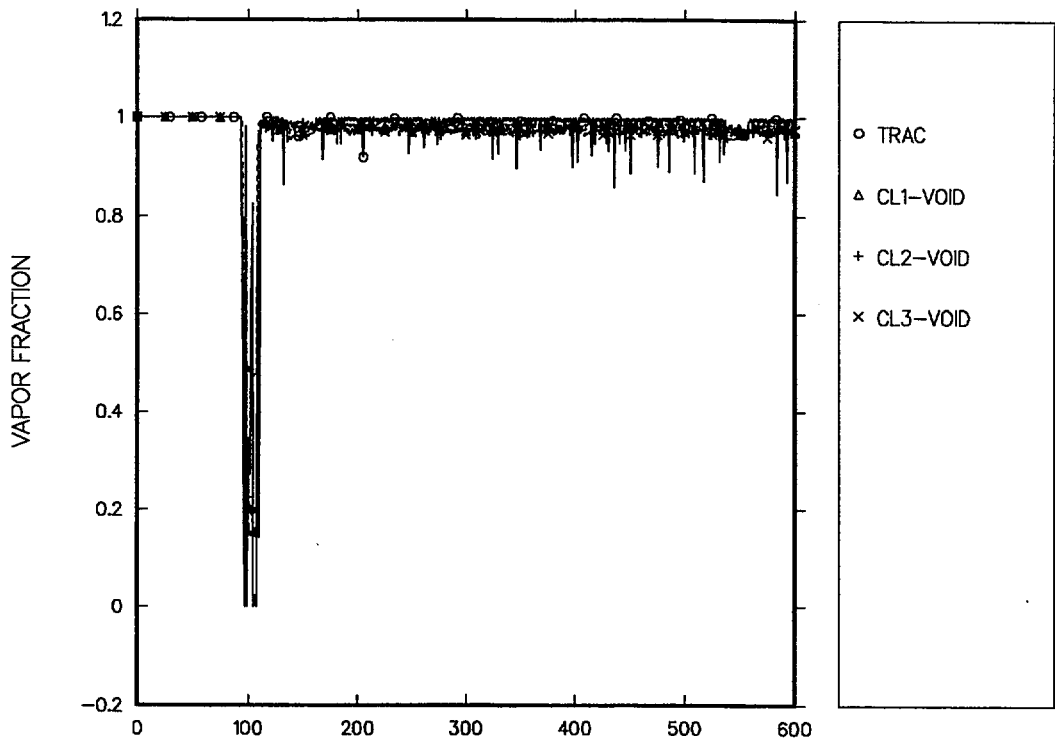


Fig. BB-19. Calculated and measured cold-leg, spool-piece void fraction.

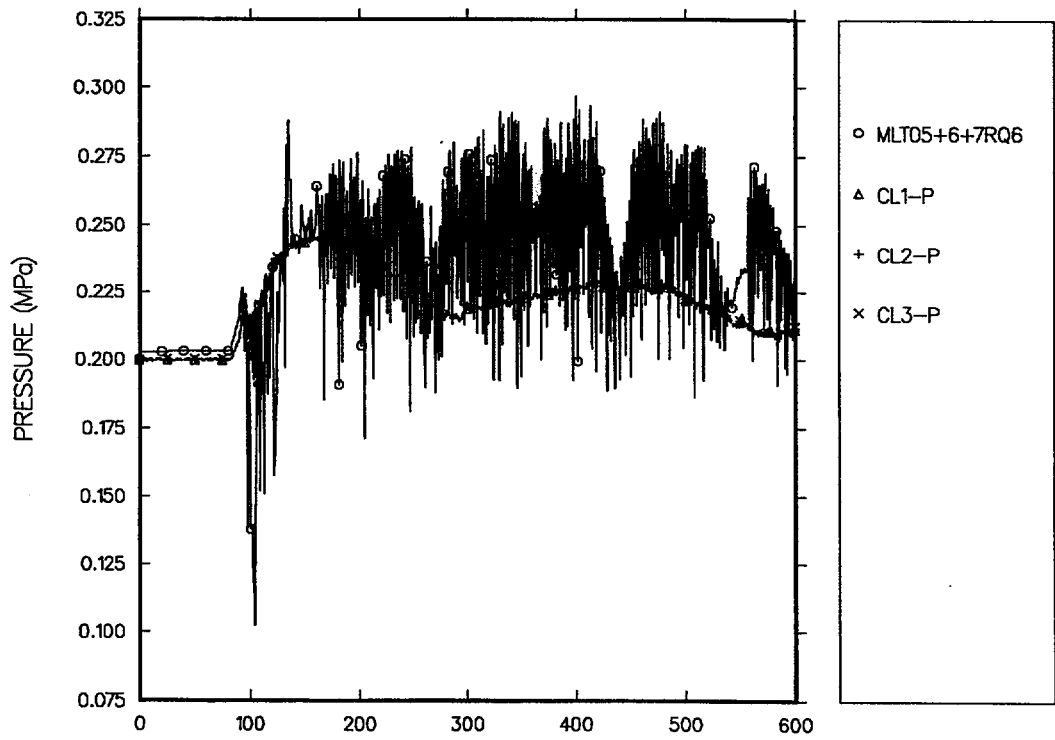


Fig. BB-20. Calculated and measured cold-leg, spool-piece pressure.

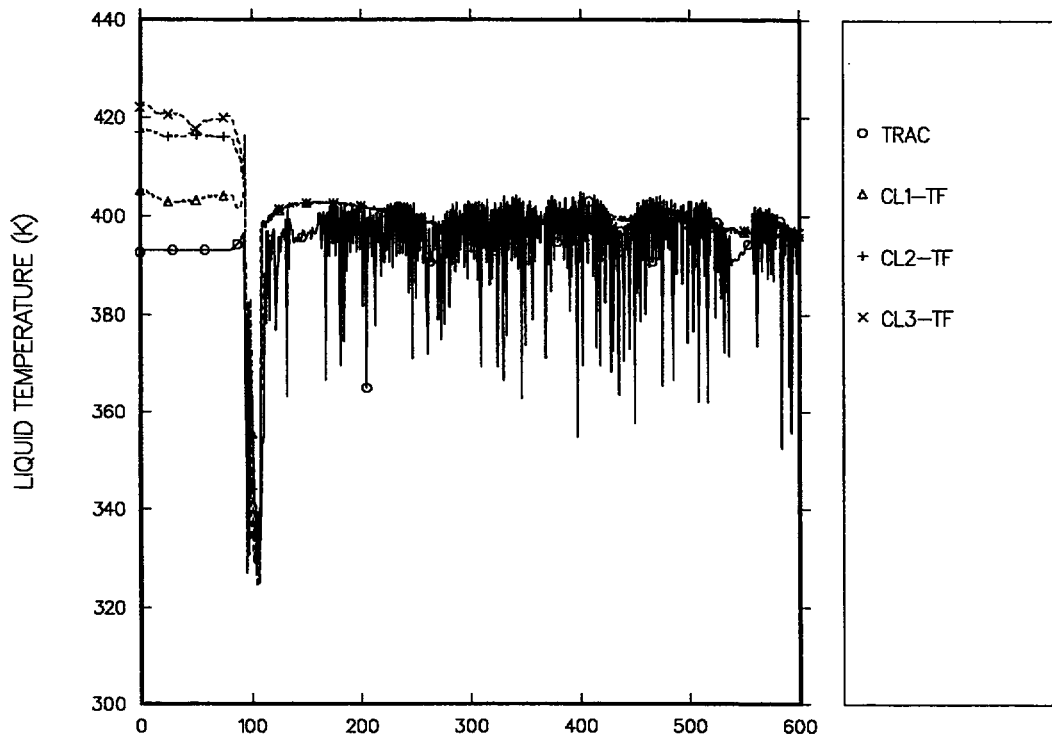


Fig. BB-21. Calculated and measured cold-leg, spool-piece fluid temperature.

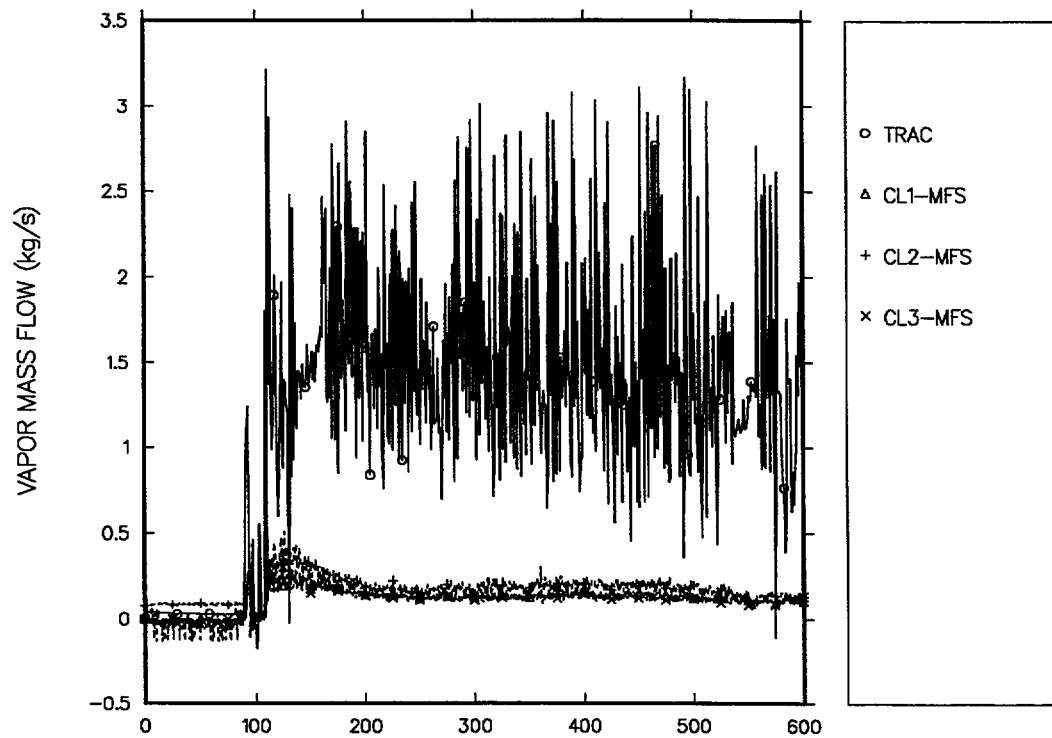


Fig. BB-22. Calculated and measured cold-leg, spool-piece, steam mass flow rate.

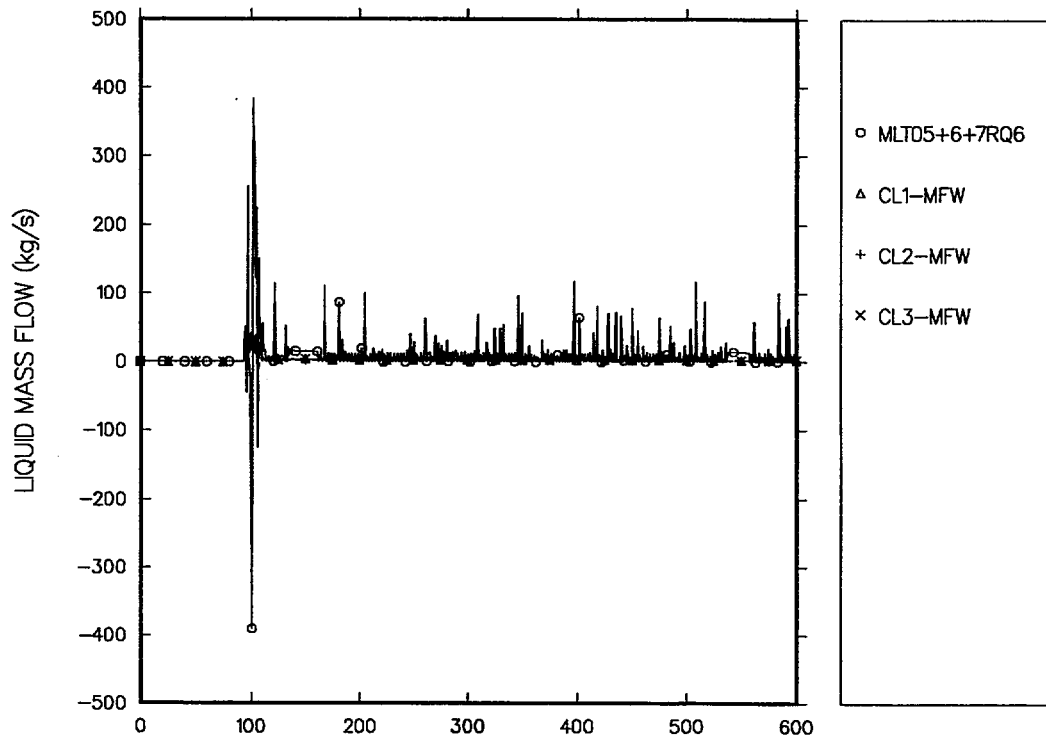


Fig. BB-23. Calculated and measured cold-leg, spool-piece, liquid mass flow rate.

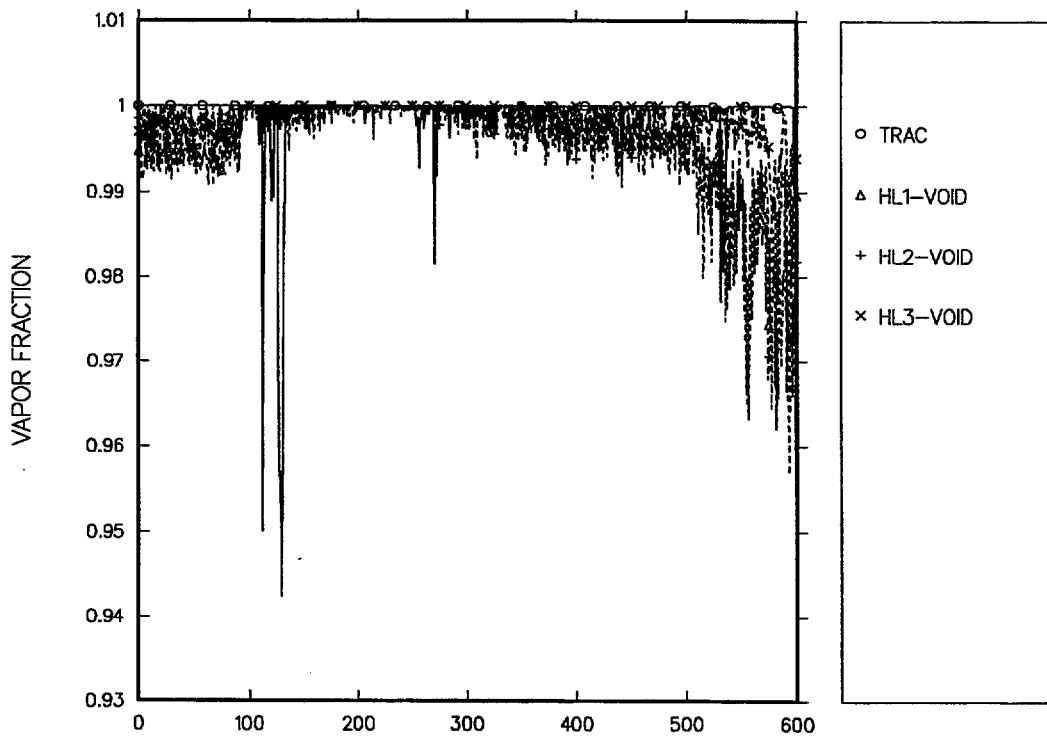


Fig. BB-24. Calculated and measured hot-leg, spool-piece void fraction.

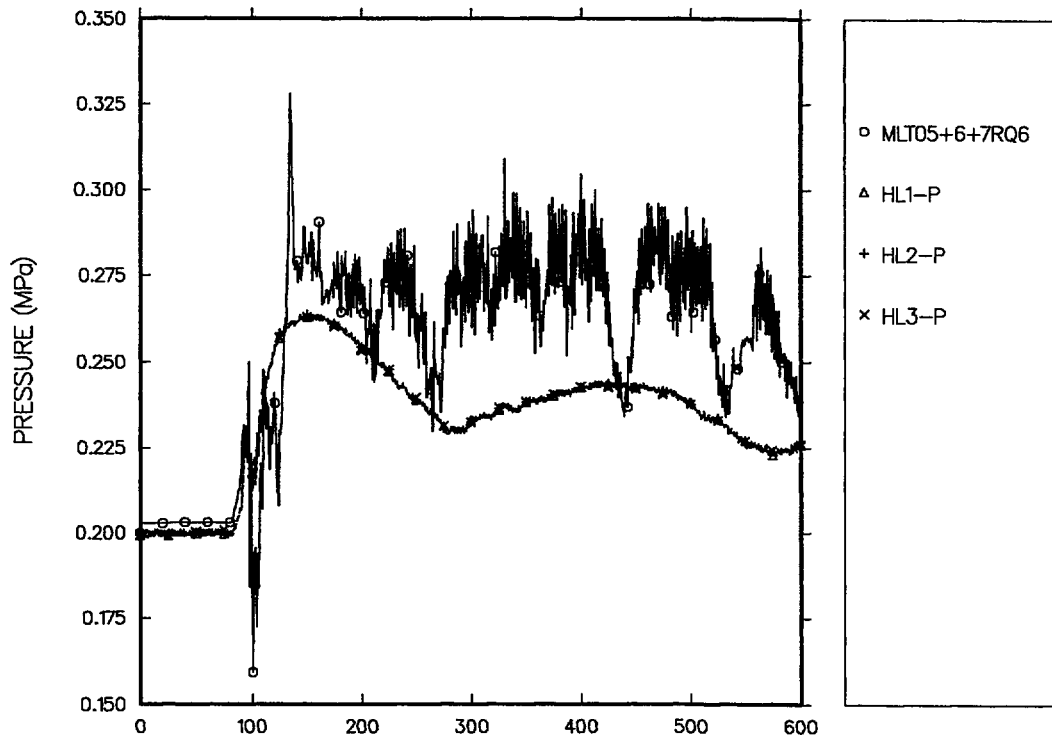


Fig. BB-25. Calculated and measured hot-leg, spool-piece pressure.

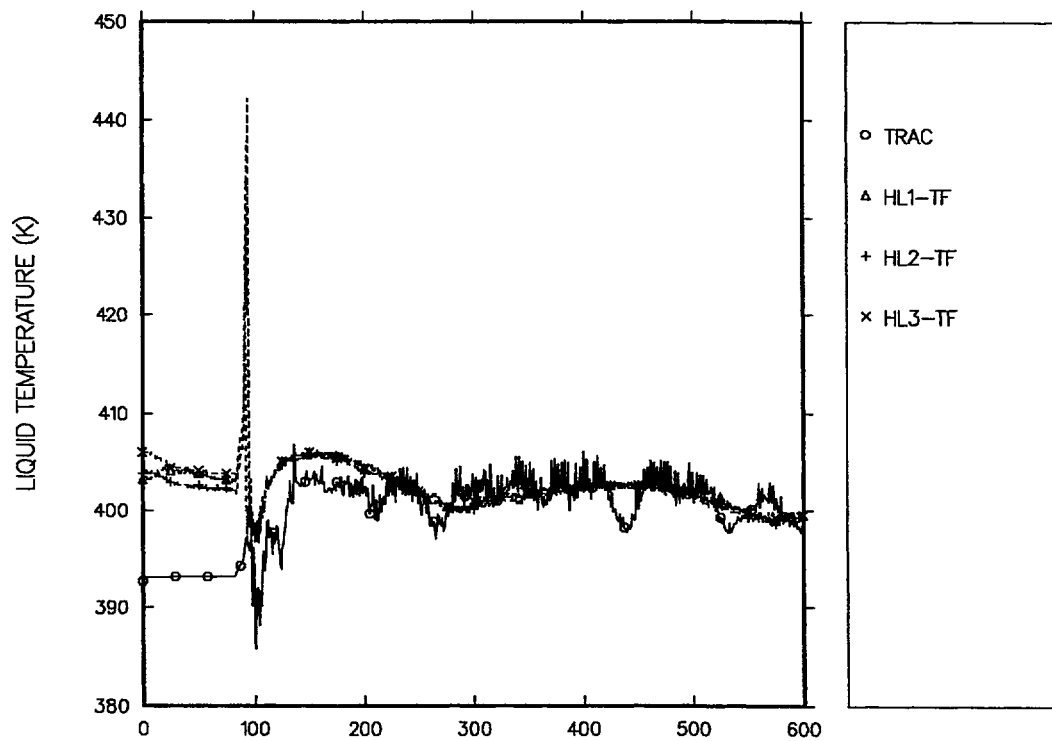


Fig. BB-26. Calculated and measured hot-leg, spool-piece fluid temperature.

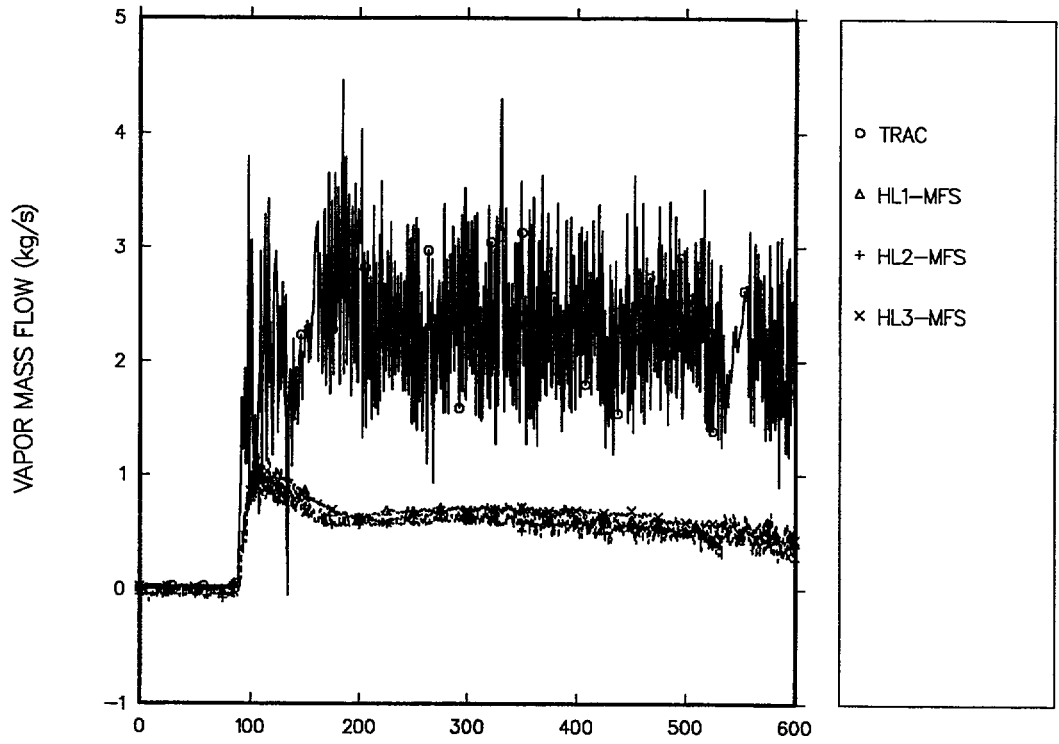


Fig. BB-27. Calculated and measured hot-leg, spool-piece, steam mass flow rate.

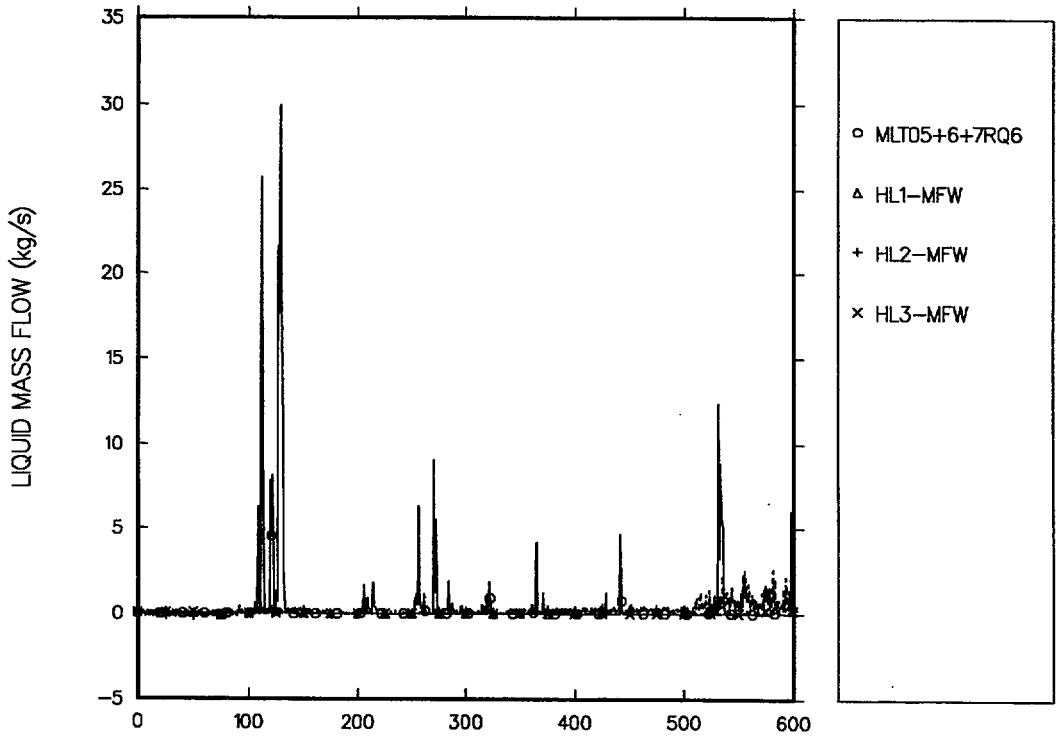


Fig. BB-28. Calculated and measured hot-leg, spool-piece, steam mass flow rate.

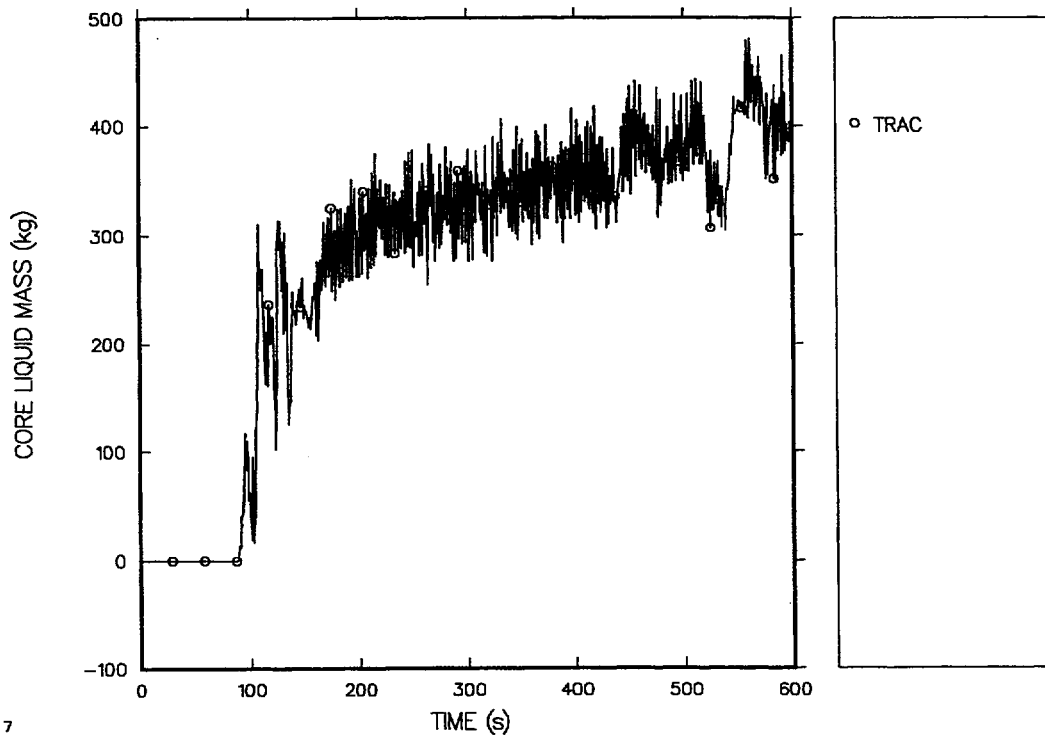


Fig. BB-29. Calculated core liquid mass.

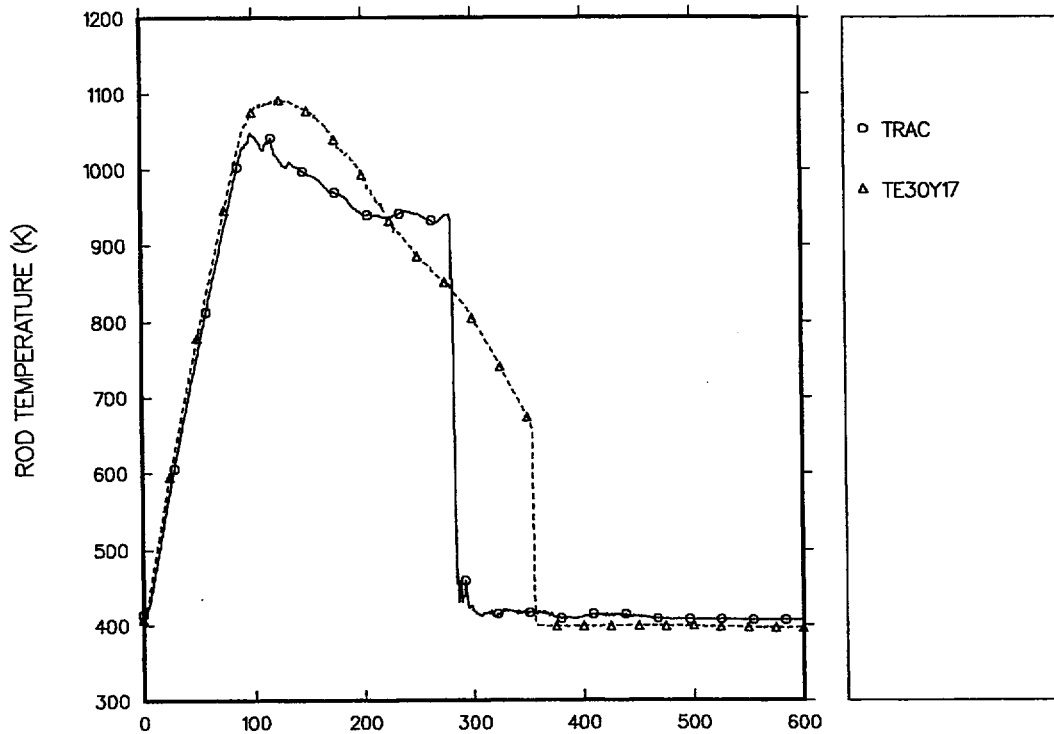


Fig. BB-30. Calculated and measured cladding temperatures for the hot rod at the 3.930-m (core midplane) elevation (with grid-spacer model).



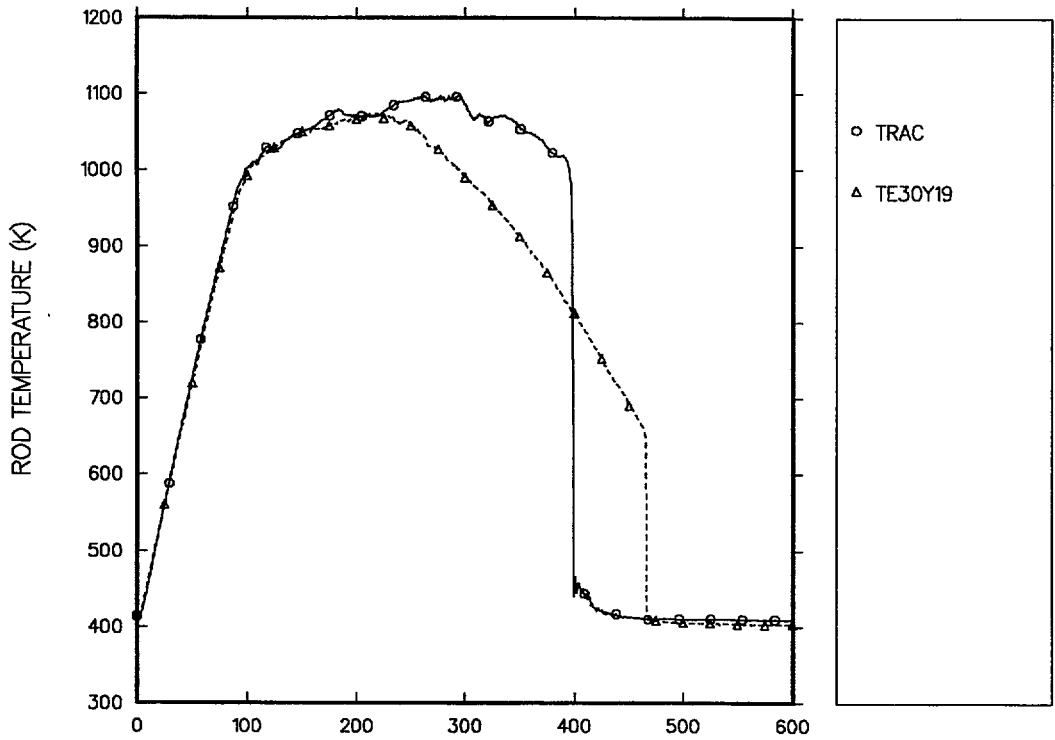


Fig. BB-31. Cladding temperatures for the hot rod at the 4.540-m elevation (with grid-spacer model).

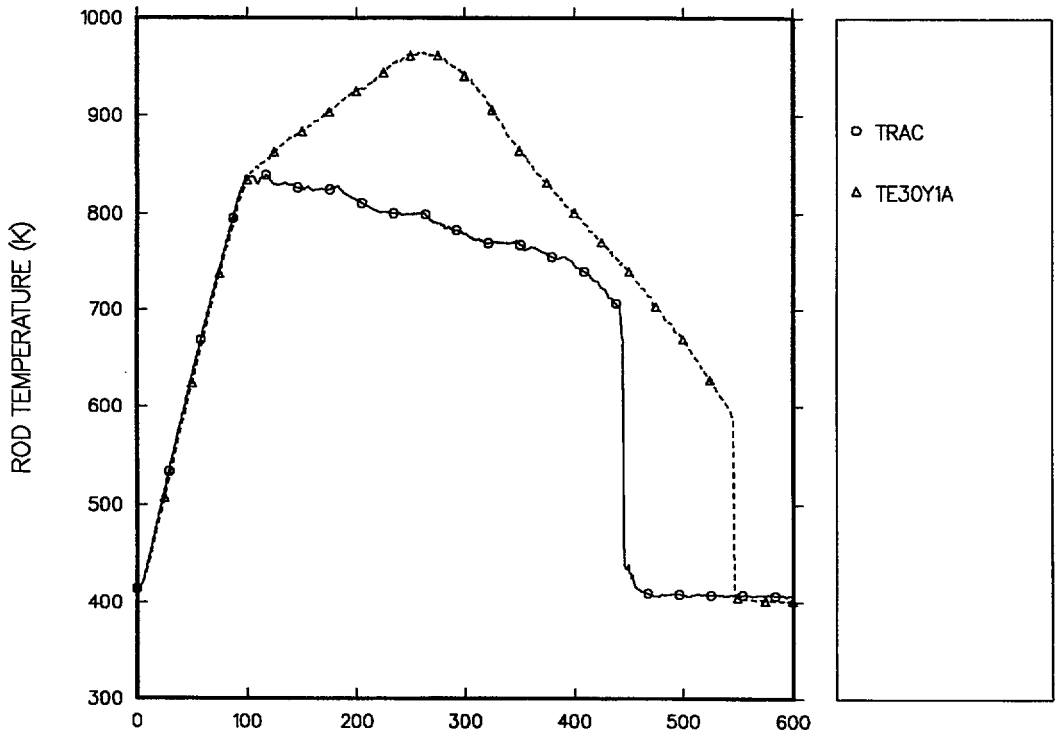


Fig. BB-32. Cladding temperatures for the hot rod at the 5.150-m elevation (with grid-spacer model).

## APPENDIX CC

### CODE-DATA COMPARISON FOR SCTF RUN 719 WITH NEWRFD=1

The calculation results for the reflood option newrfd=1 are presented in this appendix. The set of plots presented are the same as presented in the main body of the report for the reflood option newrfd=3. Previous TRAC-PF1/MOD2 developmental assessment calculations used the TRAC grid-spacer model. We have run SCTF Run 719 calculations both with and without the grid-spacer model. We have determined that the grid-spacer model should not be used because it results in excessive and nonphysical heat-transfer processes in the upper portions of the core. Therefore, the base-case assessment results for SCTF Run 719 do not use the TRAC grid-spacer model. For reference purposes, the figure numbers for the two reflood options are listed below.

newrfd = 1	newrfd = 3
CC-1	5.4-15
CC-2	5.4-16
CC-3	5.4-17
CC-4	5.4-18
CC-5	5.4-19
CC-6	5.4-20
CC-7	5.4-21
CC-8	5.4-22
CC-9	5.4-23
CC-10	5.4-24
CC-11	5.4-25
CC-12	5.4-26
CC-13	5.4-27
CC-14	5.4-28
CC-15	5.4-29
CC-16	5.4-30
CC-17	5.4-31
CC-18	5.4-32

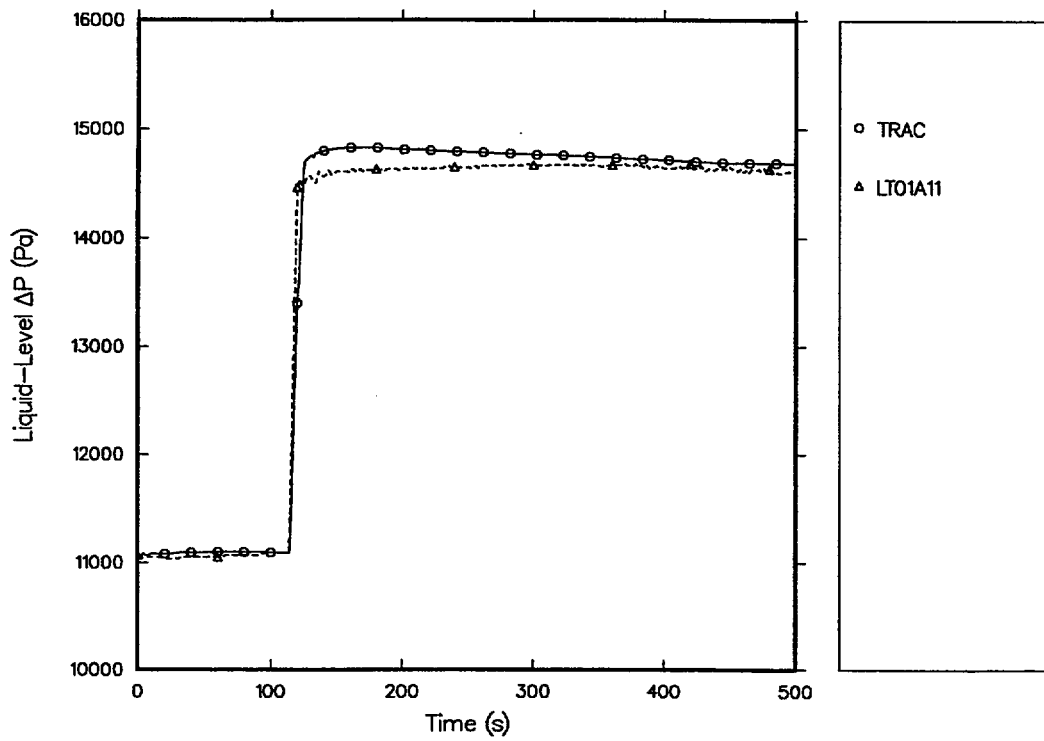


Fig. CC-1. Lower-plenum liquid level.

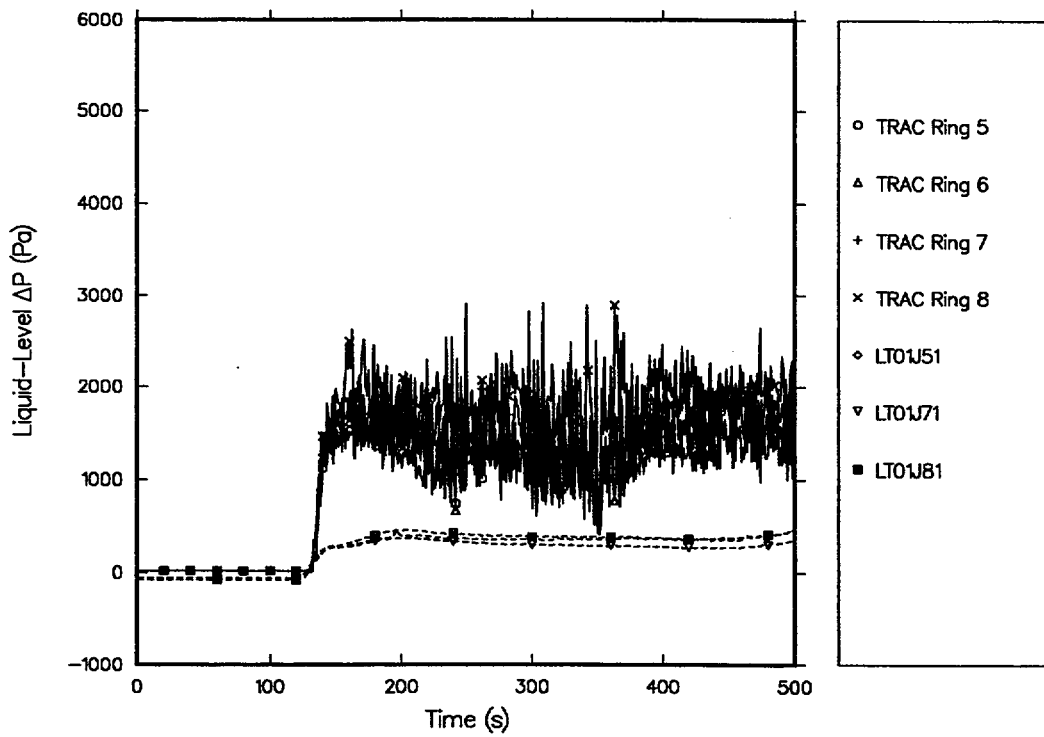


Fig. CC-2. Measured and calculate upper-plenum liquid levels above bundles 5 and 8.

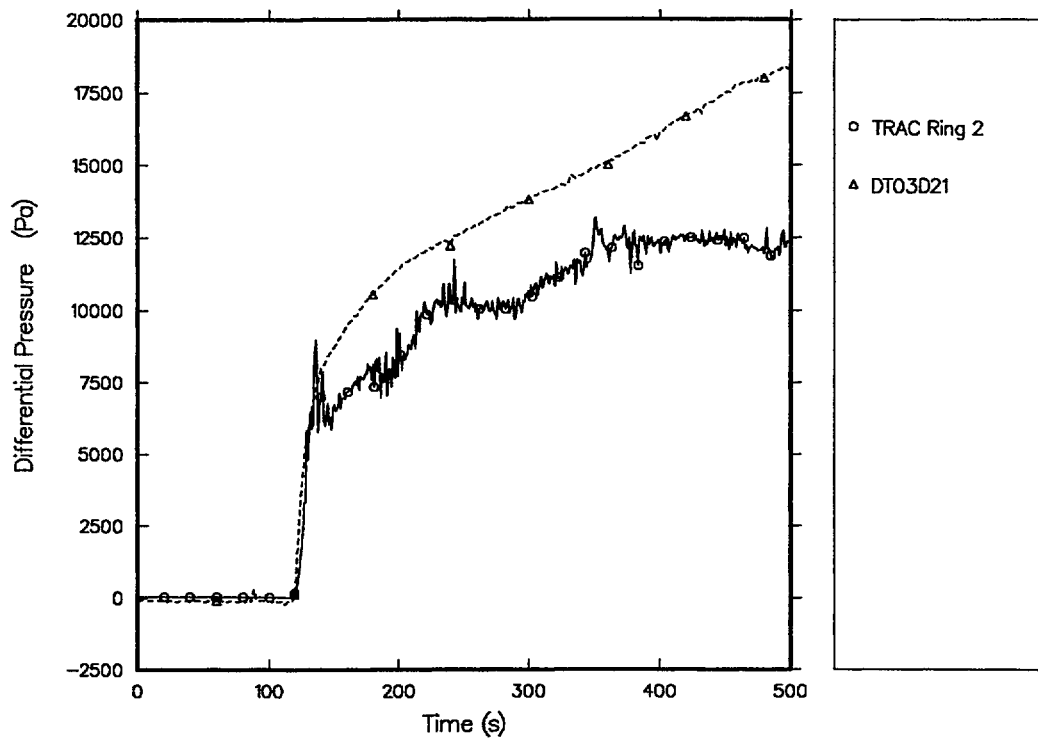


Fig. CC-3. Calculated and measured core full-height level in bundle 2.

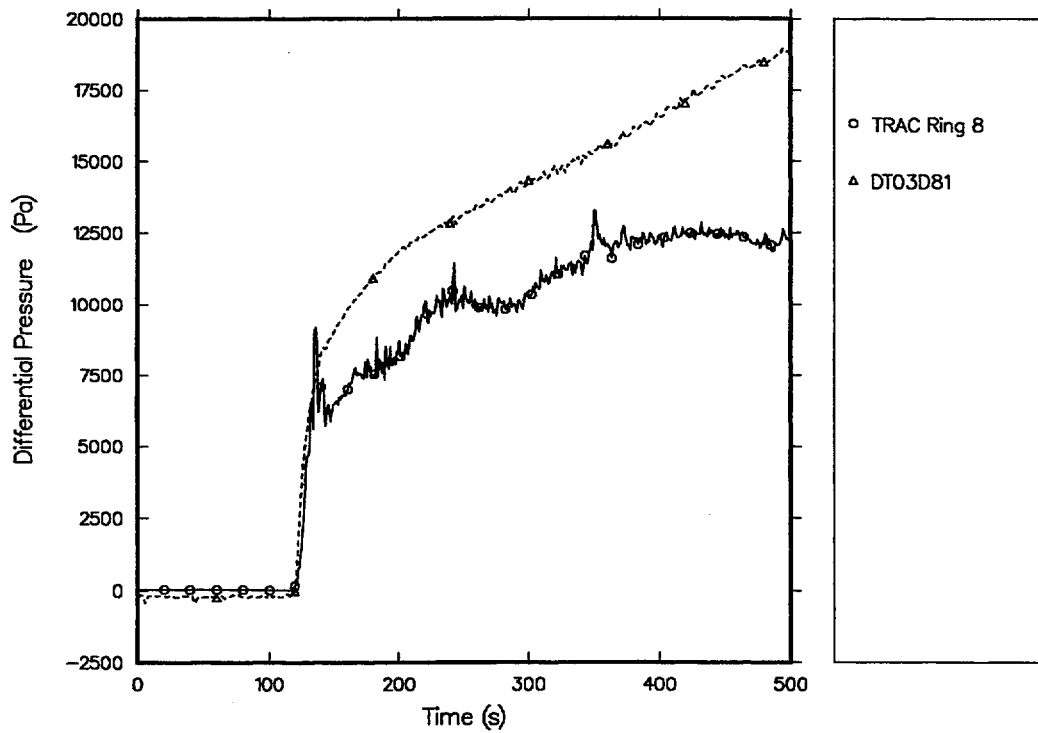


Fig. CC-4. Calculated and measured core full-height level in bundle 8.

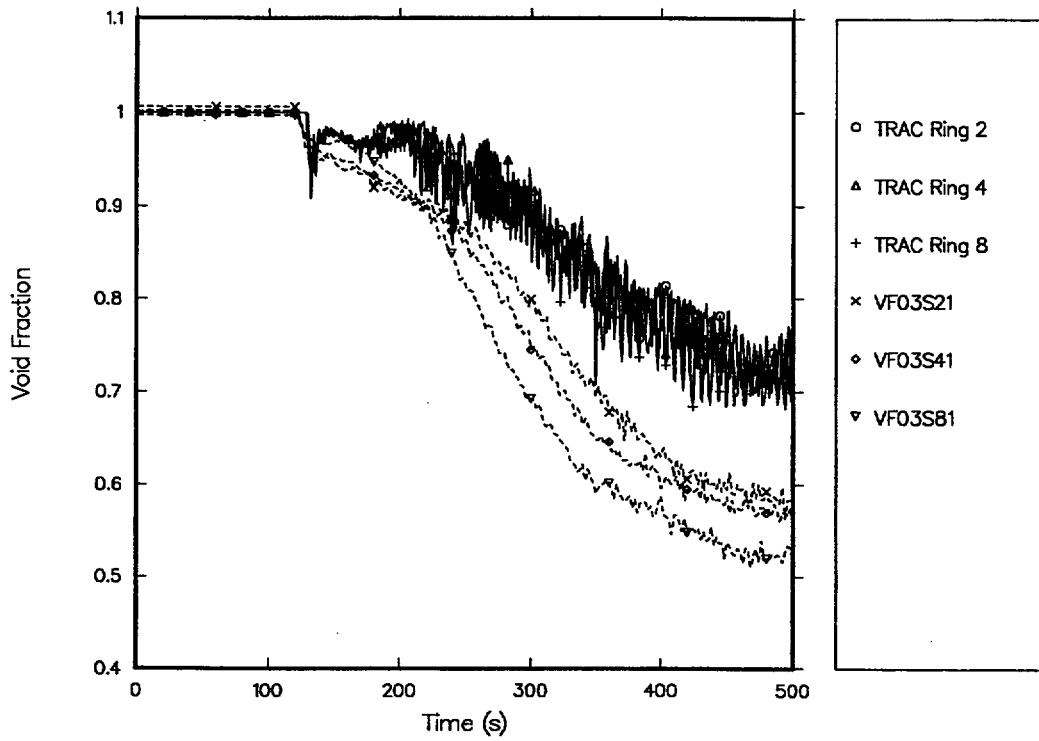


Fig. CC-5. Void fractions in bundles 2, 4, 6, and 8 at the 1.905-m level.

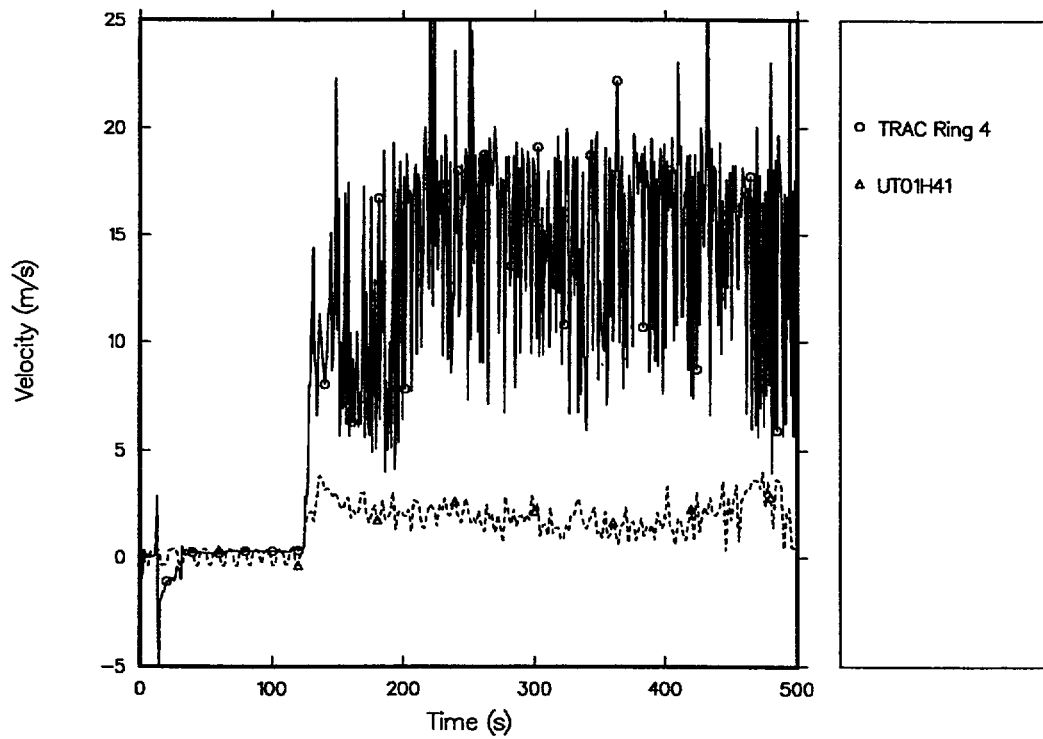


Fig. CC-6. Calculated and measured bundle 4 tie-plate vapor flows.

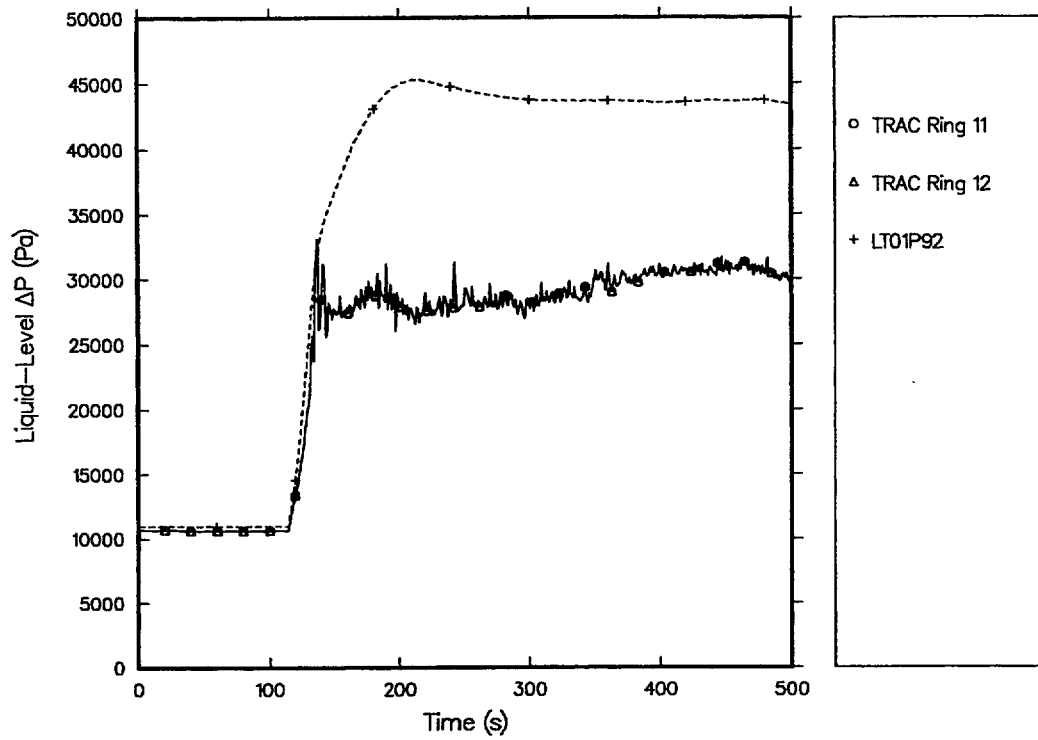


Fig. CC-7. Calculated and measured downcomer liquid level.

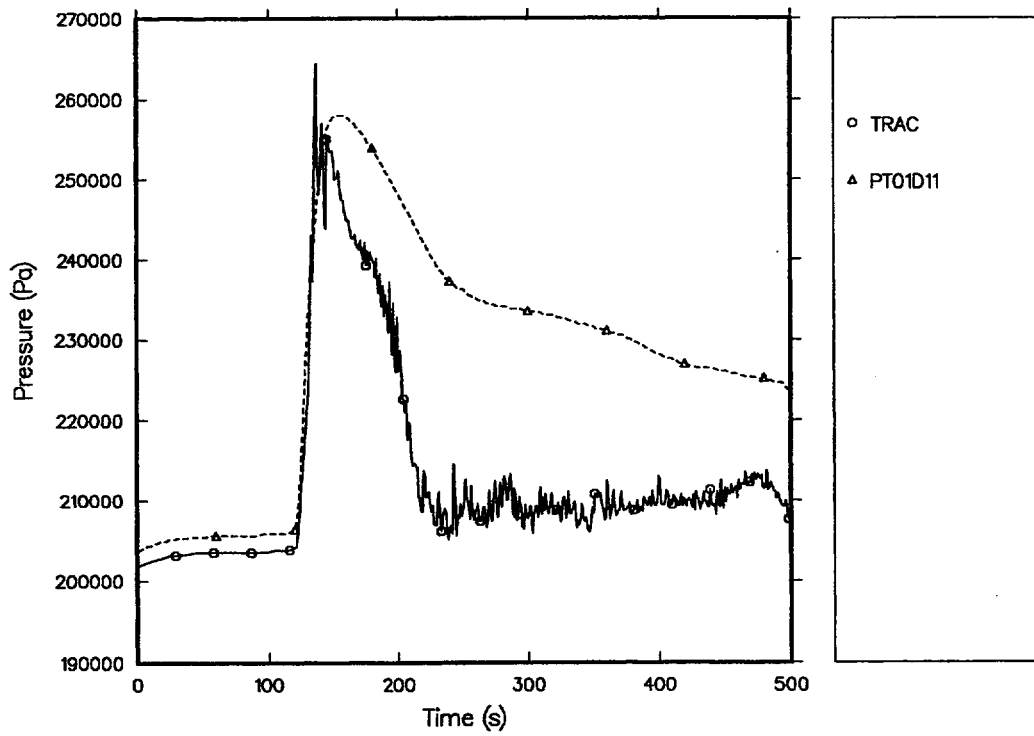


Fig. CC-8. Calculated and measured core average pressure.

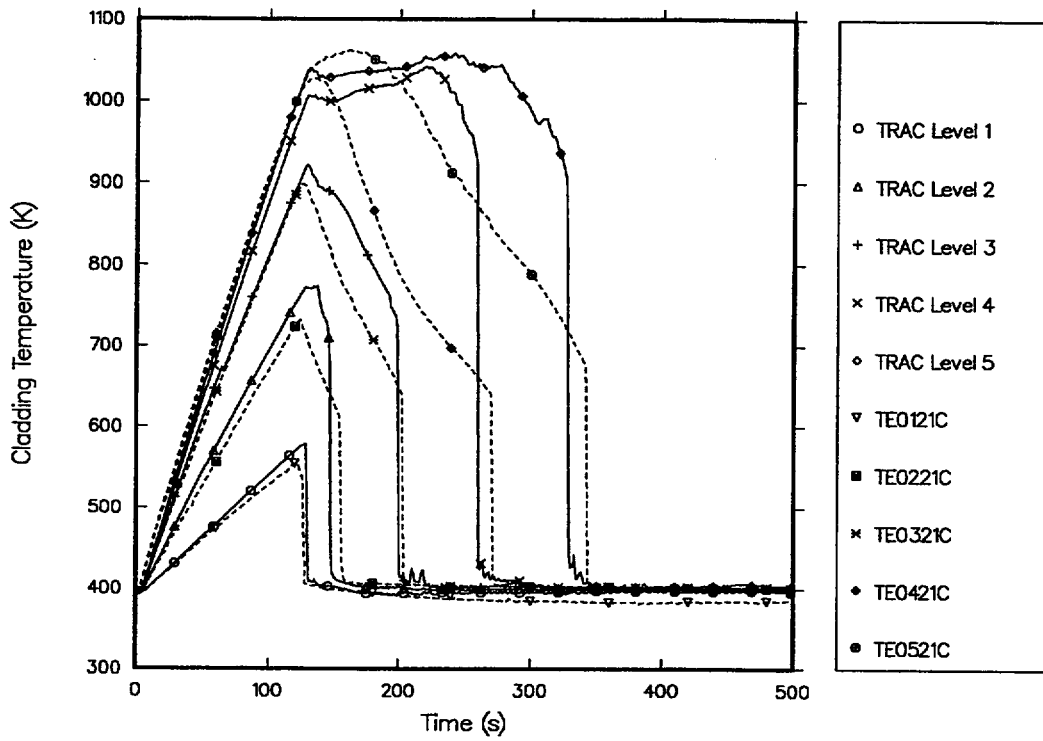


Fig. CC-9. Calculated and measured core-lower-half cladding temperature of bundle 2.

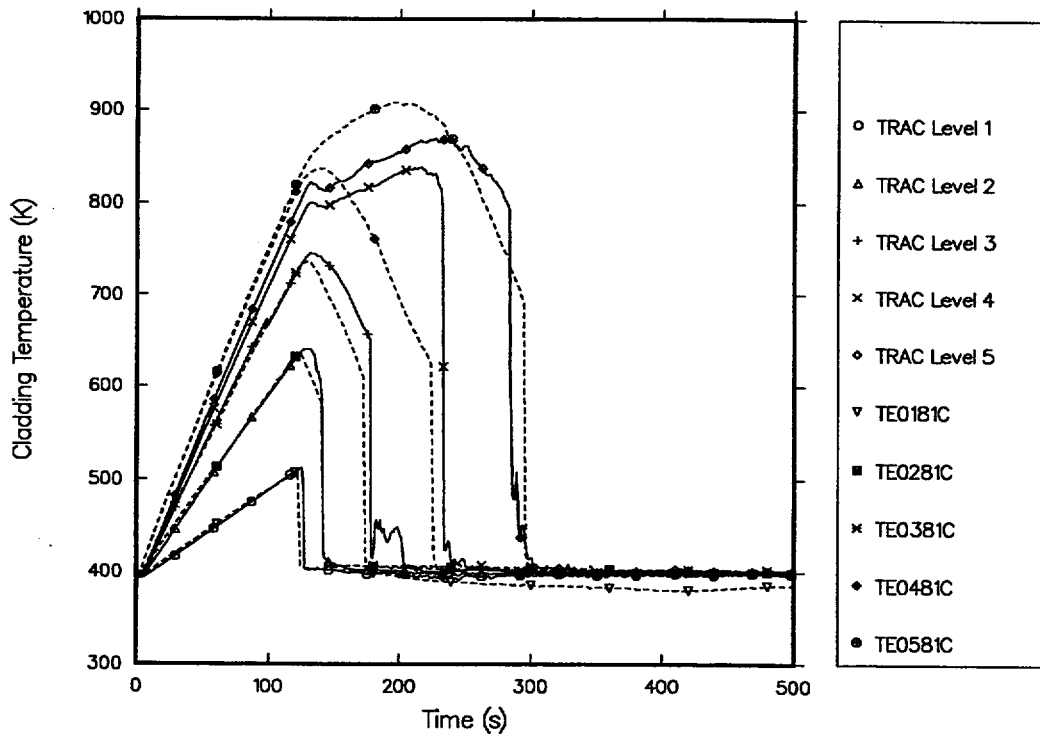


Fig. CC-10. Calculated and measured core-lower-half cladding temperature of bundle 8.

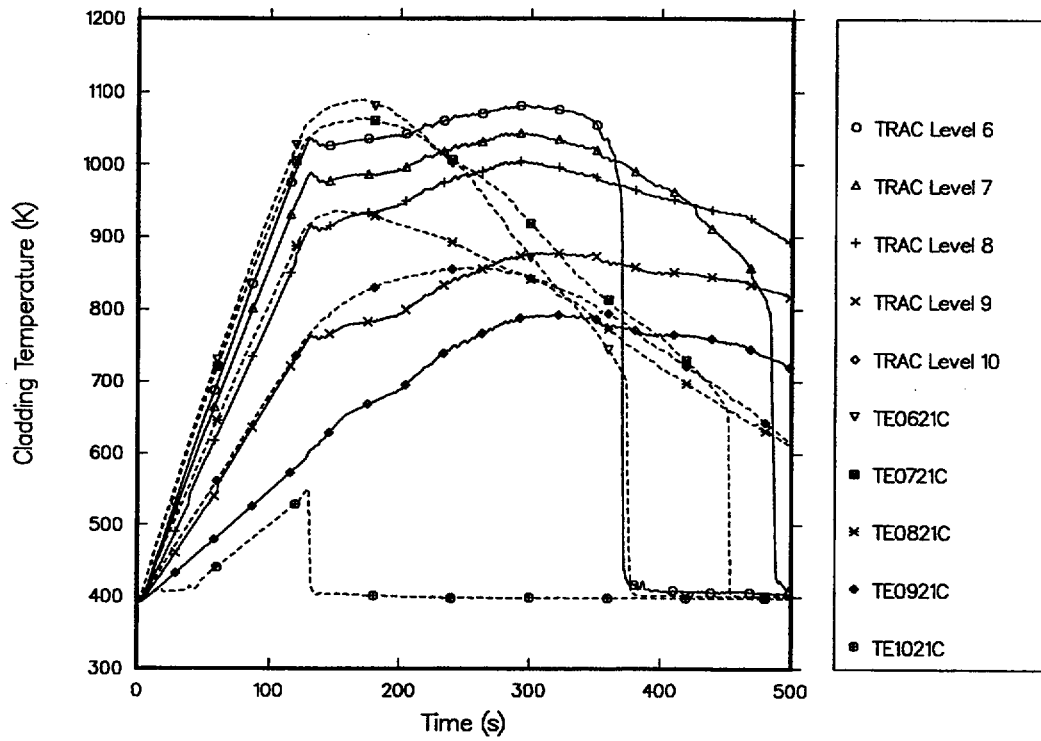


Fig. CC-11. Calculated and measured core-upper-half cladding temperature of bundle 2.

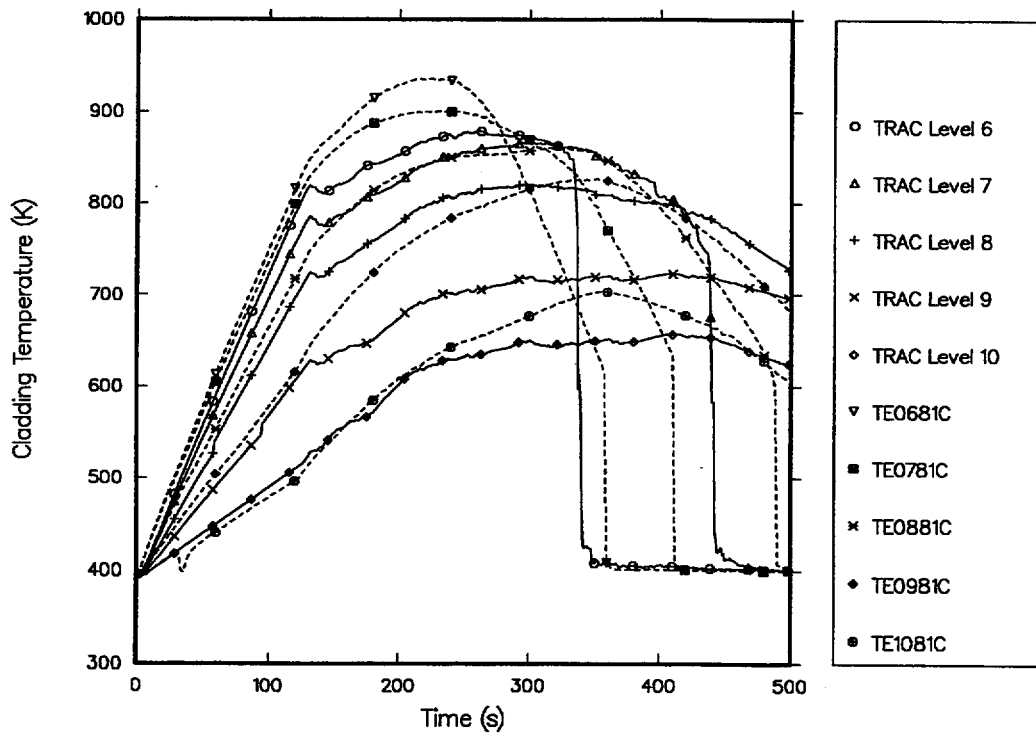


Fig. CC-12. Calculated and measured core-upper-half cladding temperature of bundle 8.



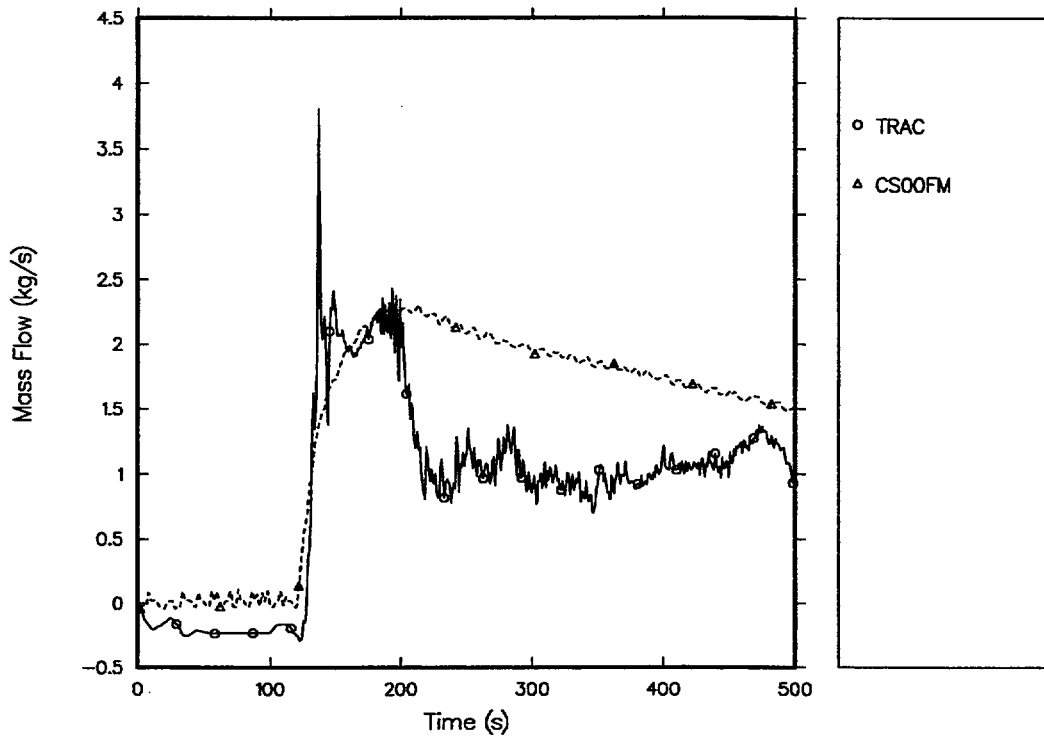


Fig. CC-13. Calculated and measured pressure-vessel-side broken cold-leg mass flow rate.

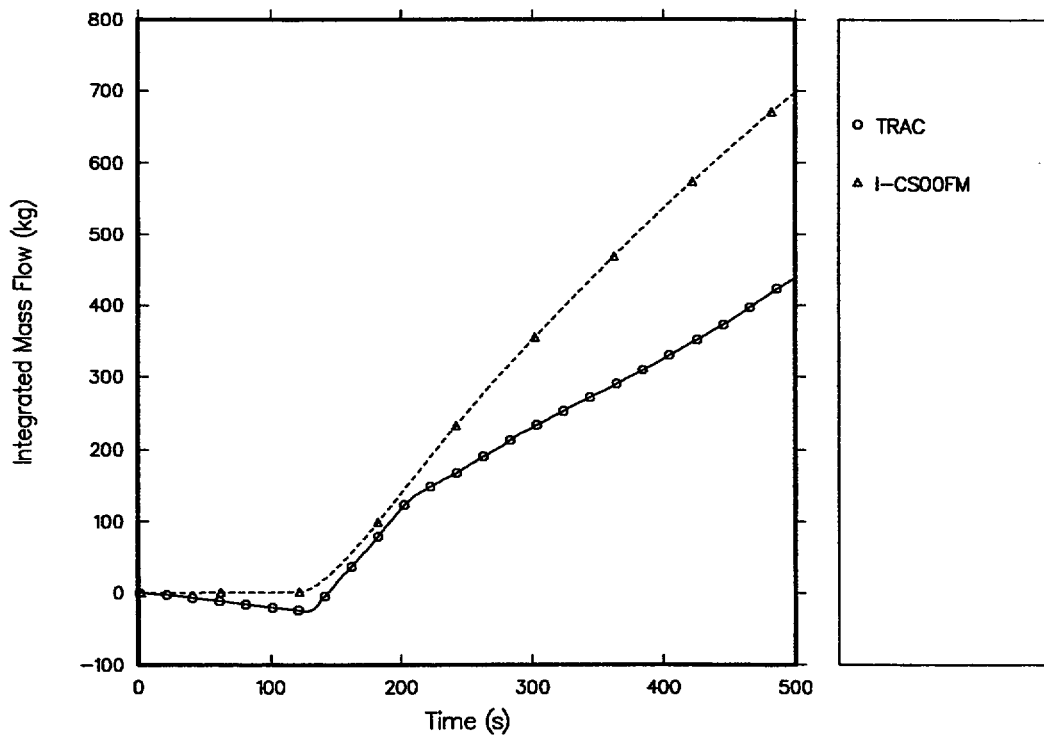


Fig. CC-14. Calculated and measured pressure-vessel-side broken cold-leg integrated mass flow.

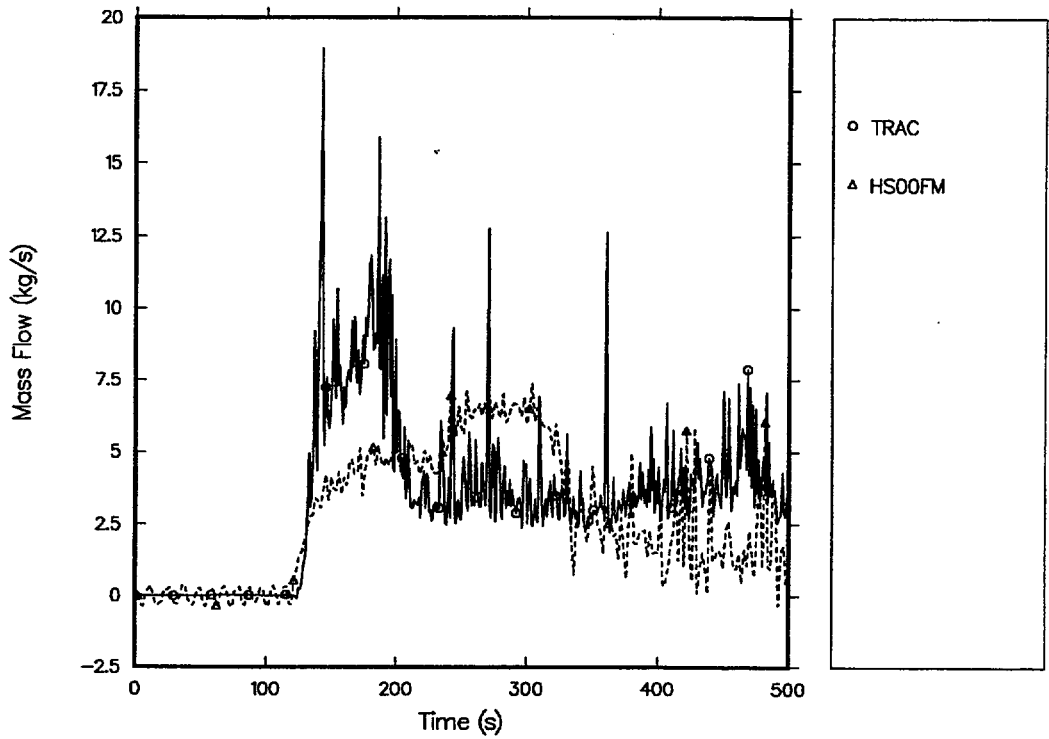


Fig. CC-15. Calculated and measured hot-leg mass flow rate.

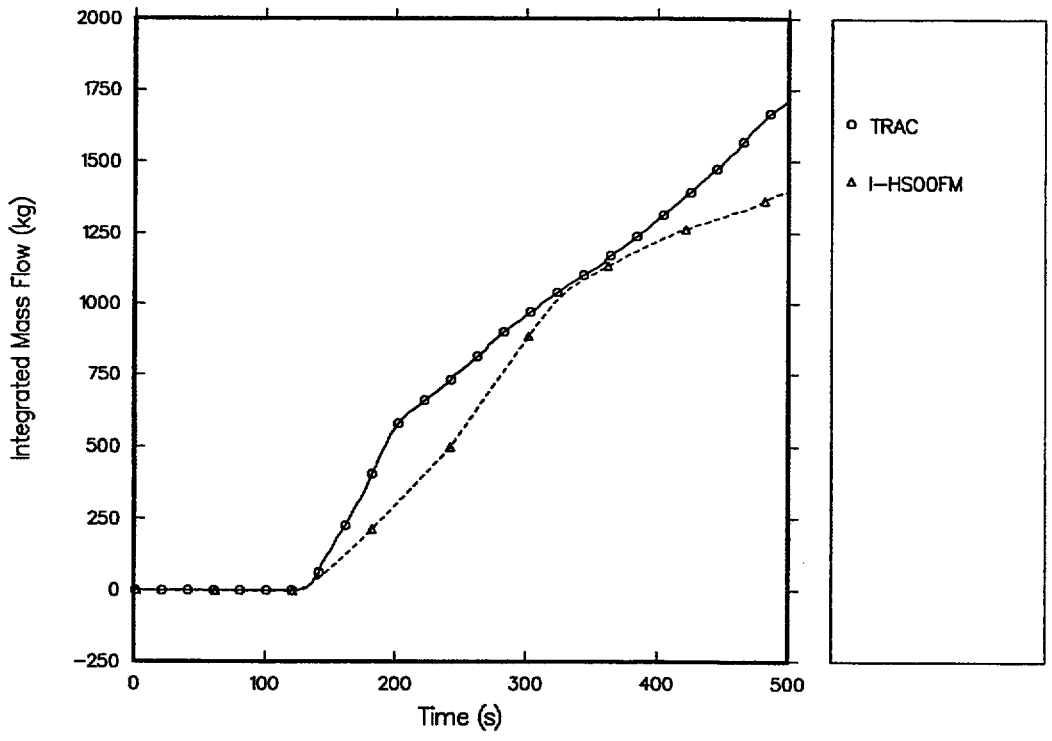


Fig. CC-16. Calculated and measured hot-leg integrated mass flow.

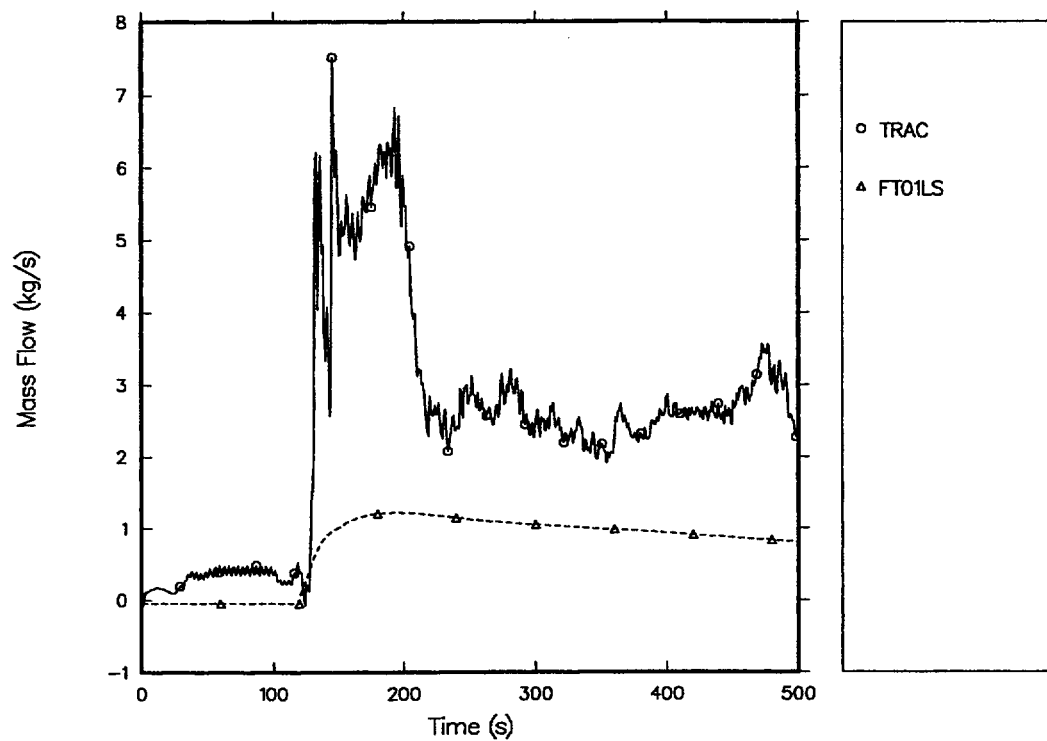


Fig. CC-17. Calculated and measured S/W-separator-side broken cold-leg mass flow rate.

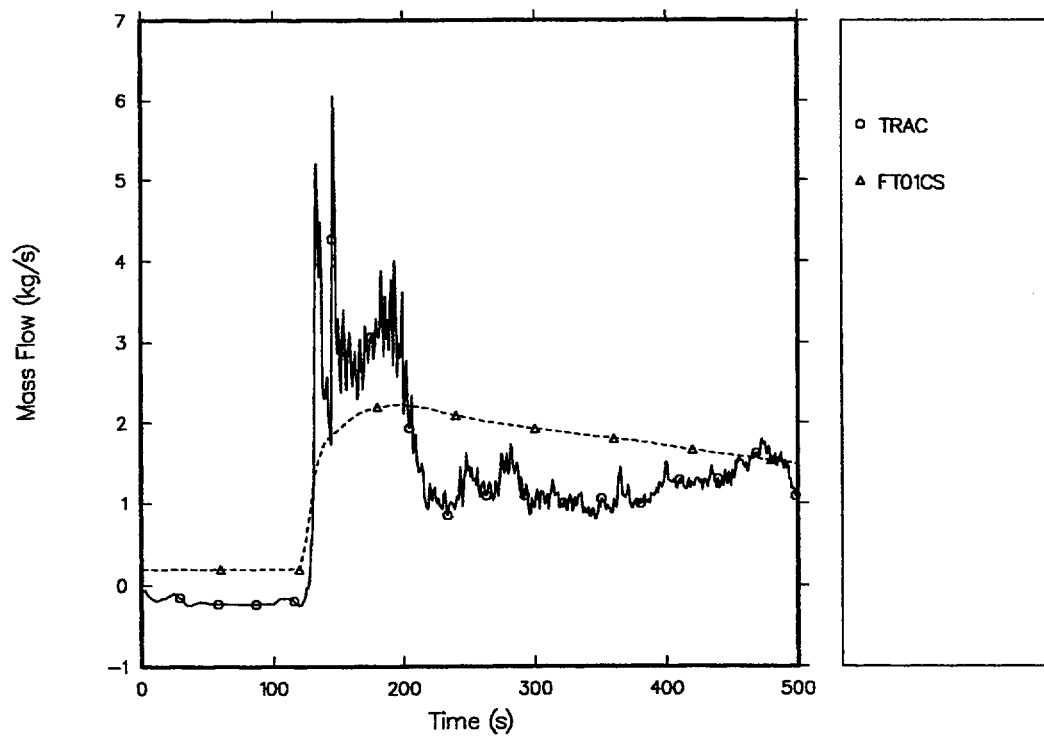


Fig. CC-18. Calculated and measured intact cold-leg mass flow rate.

## APPENDIX DD

### CODE-DATA COMPARISON FOR SCTF RUN 719 WITH NEWRFD=3, WITH GRID SPACERS MODELED

The calculation results for the reflood option newrfd=3 with grid spacers modeled are presented in this appendix. The set of plots presented are the same as presented in the main body of the report for the reflood option newrfd=3 without grid spacers.

newrfd = 3 with grid spacers modeled	newrfd = 3 without grid spacers modeled
DD-1	5.4-15
DD-2	5.4-16
DD-3	5.4-17
DD-4	5.4-18
DD-5	5.4-19
DD-6	5.4-20
DD-7	5.4-21
DD-8	5.4-22
DD-9	5.4-23
DD-10	5.4-24
DD-11	5.4-25
DD-12	5.4-26
DD-13	5.4-27
DD-14	5.4-28
DD-15	5.4-29
DD-16	5.4-30
DD-17	5.4-31
DD-18	5.4-32

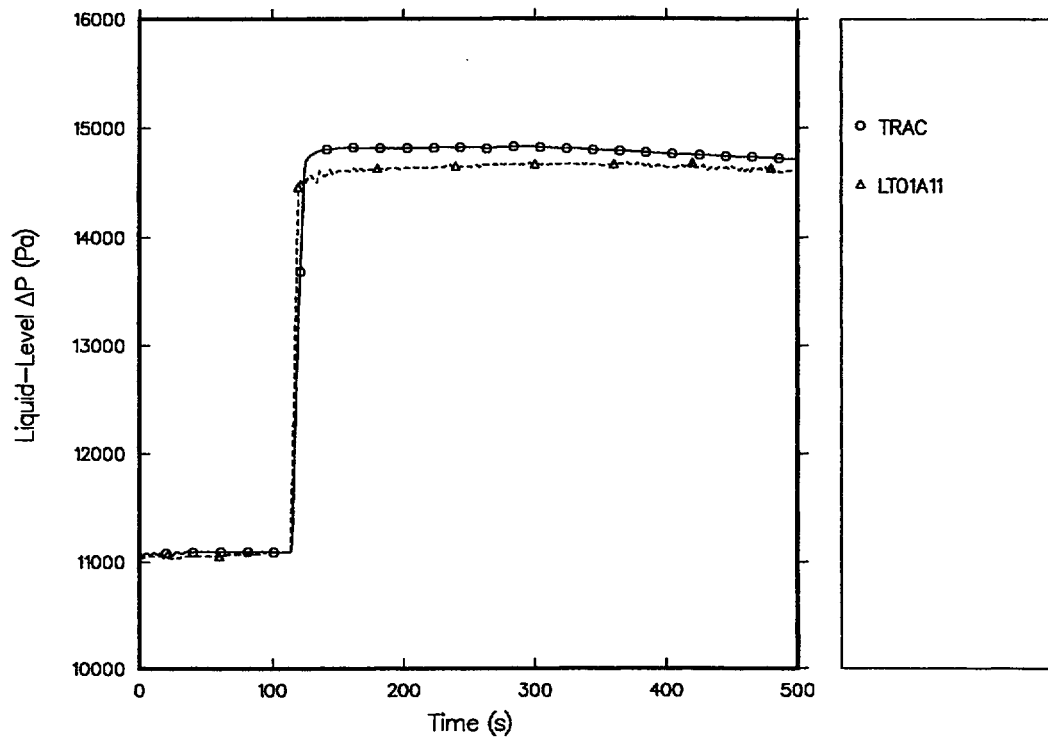


Fig. DD-1. Lower-plenum liquid level.

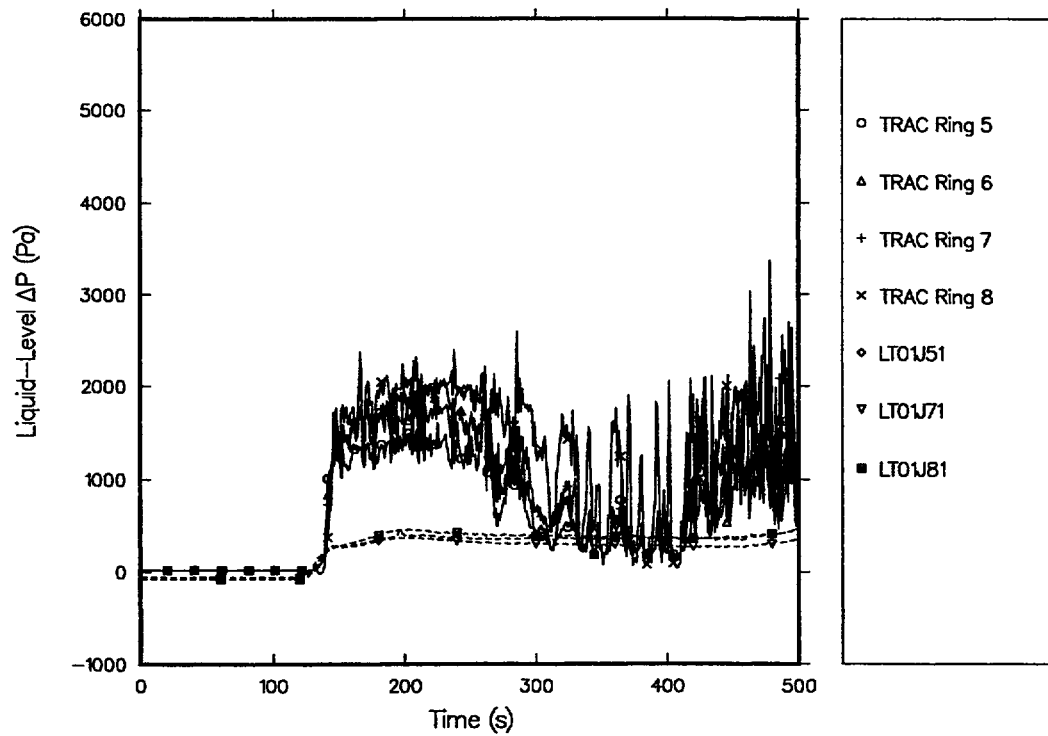


Fig. DD-2. Measured and calculate upper-plenum liquid levels above bundles 5 and 8.

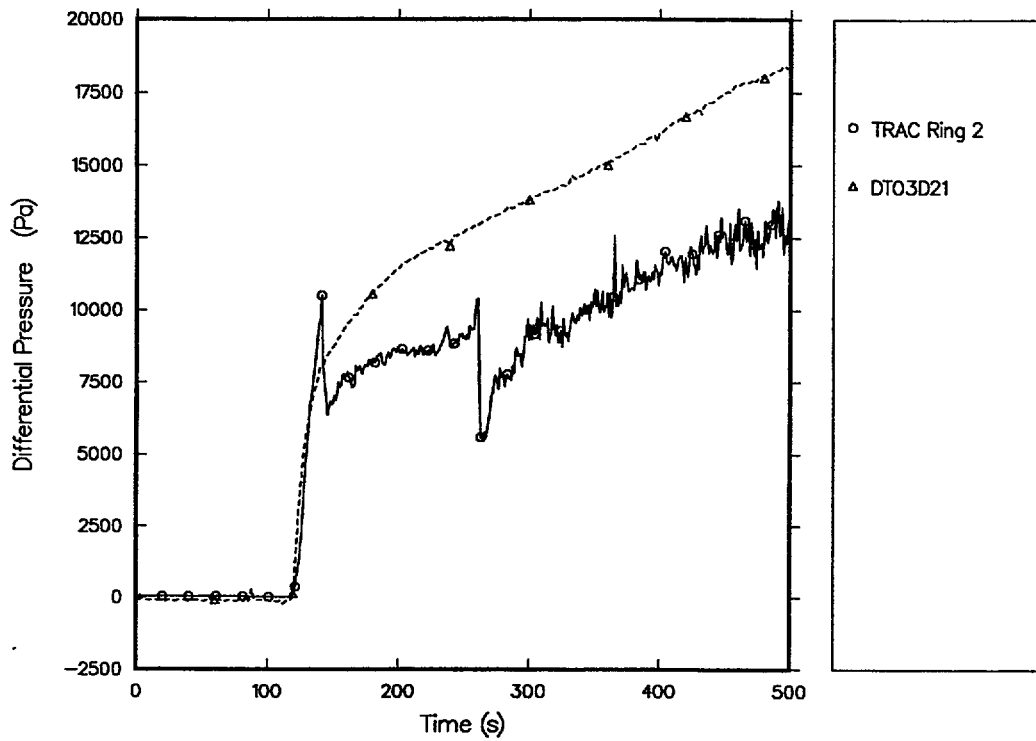


Fig. DD-3. Calculated and measured core full-height level in bundle 2.

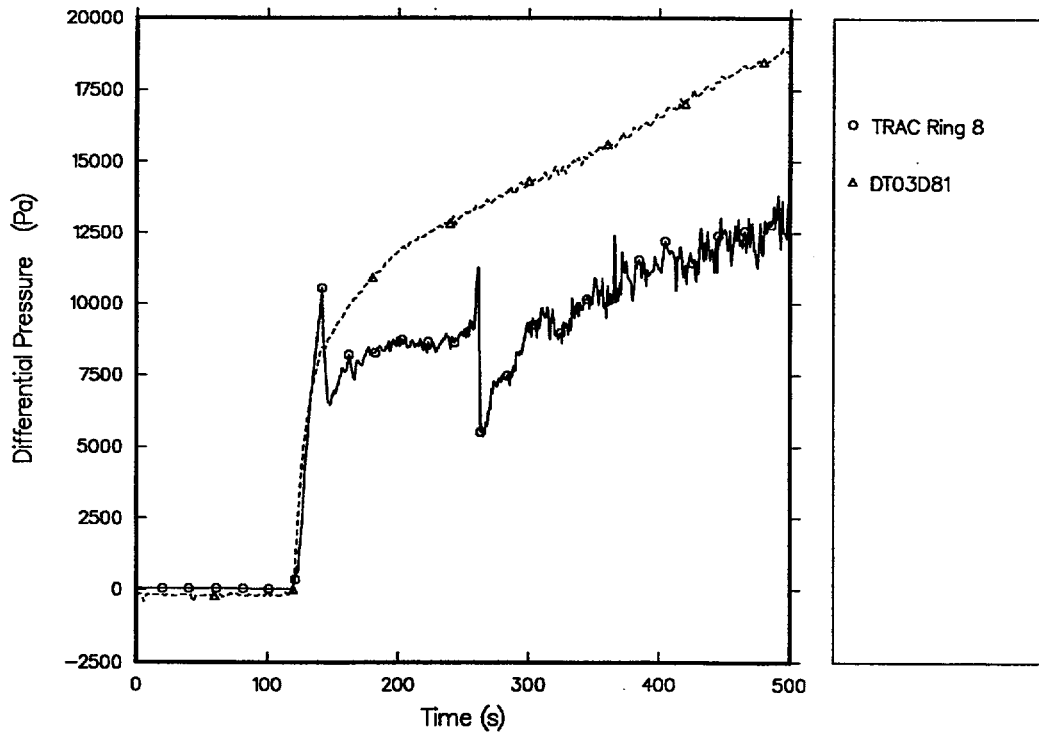


Fig. DD-4. Calculated and measured core full-height level in bundle 8.

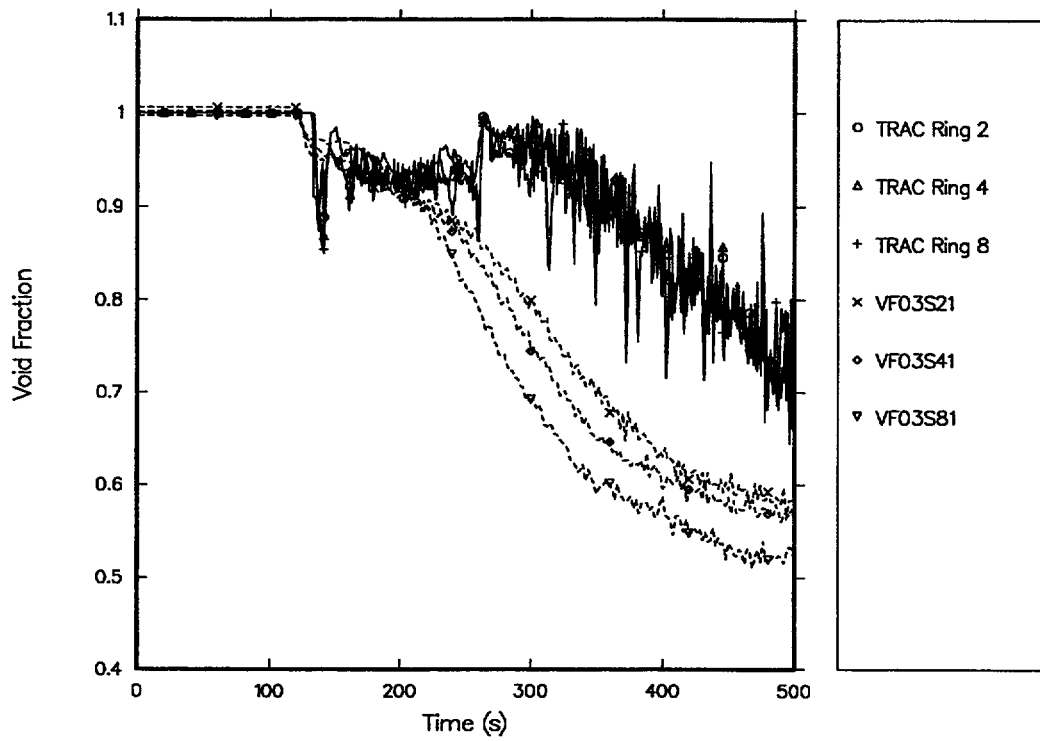


Fig. DD-5. Void fractions in bundles 2, 4, 6, and 8 at the 1.905-m level.

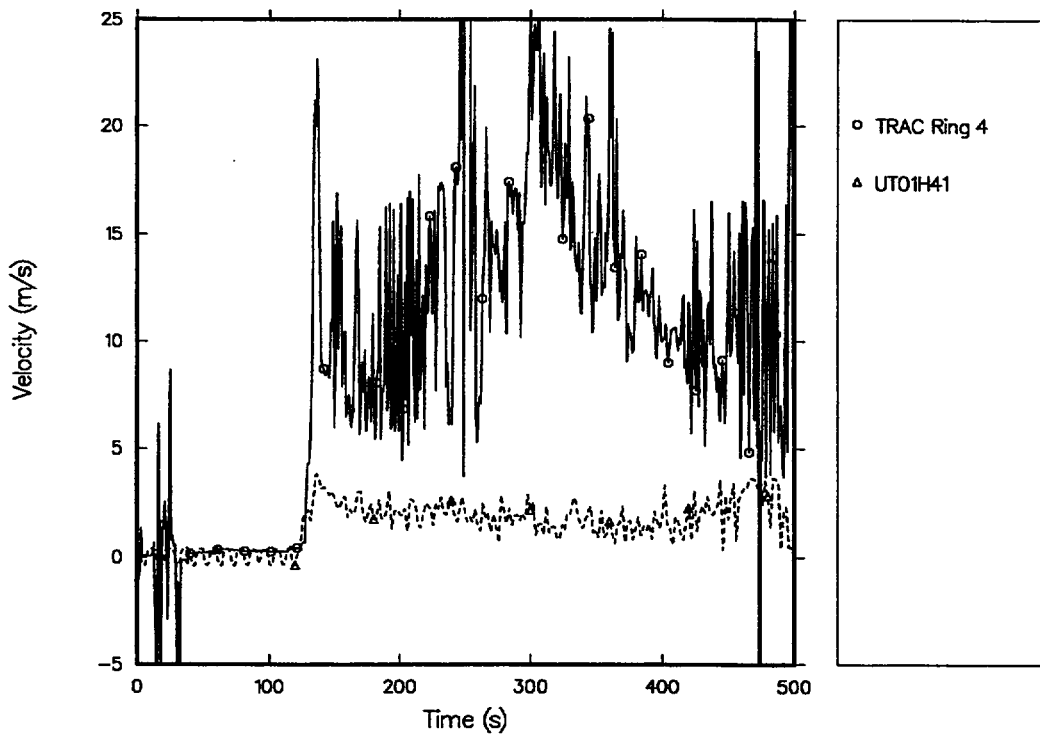


Fig. DD-6. Calculated and measured bundle 4 tie-plate vapor flows.

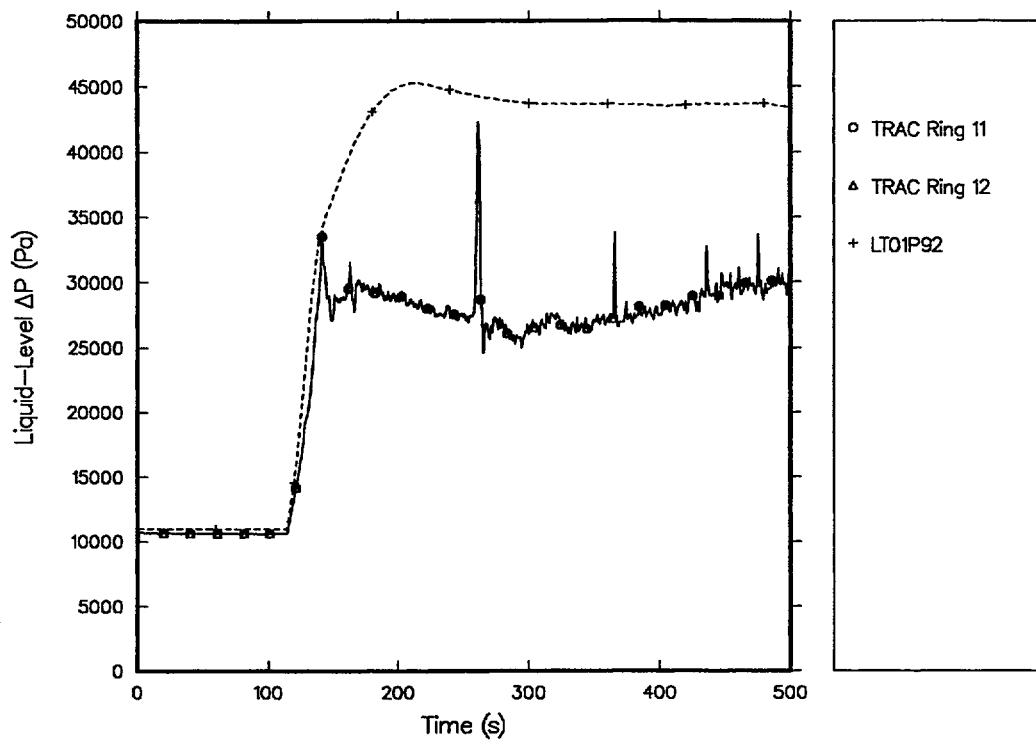


Fig. DD-7. Calculated and measured downcomer liquid level.

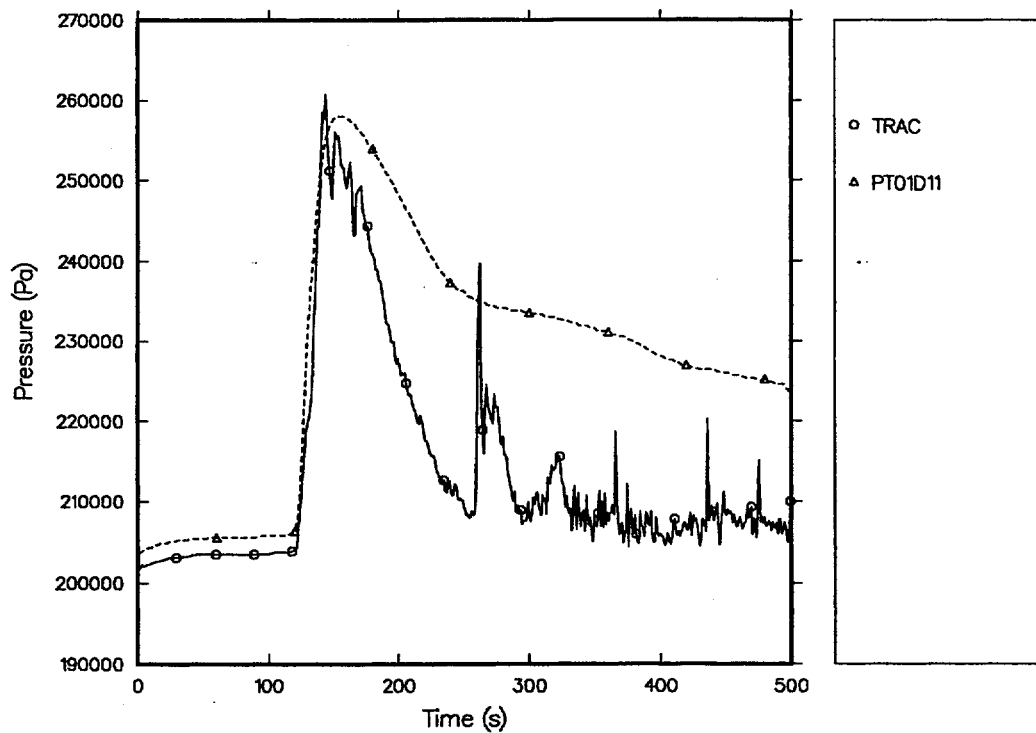


Fig. DD-8. Calculated and measured core average pressure.



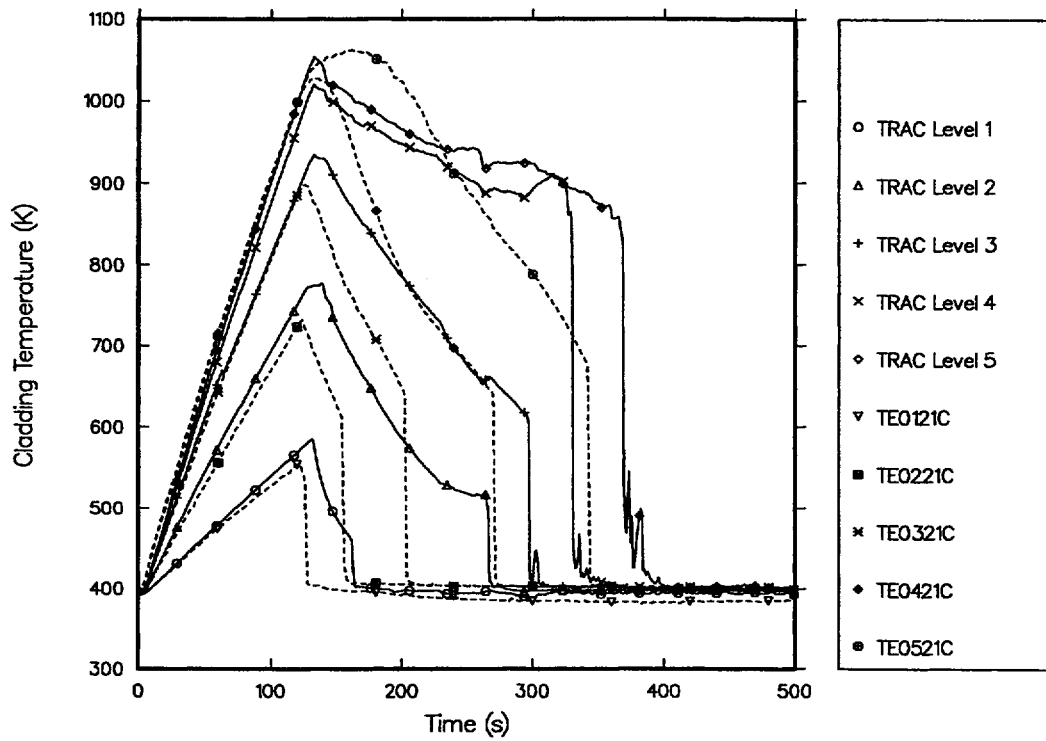


Fig. DD-9. Calculated and measured core-lower-half cladding temperature of bundle 2.

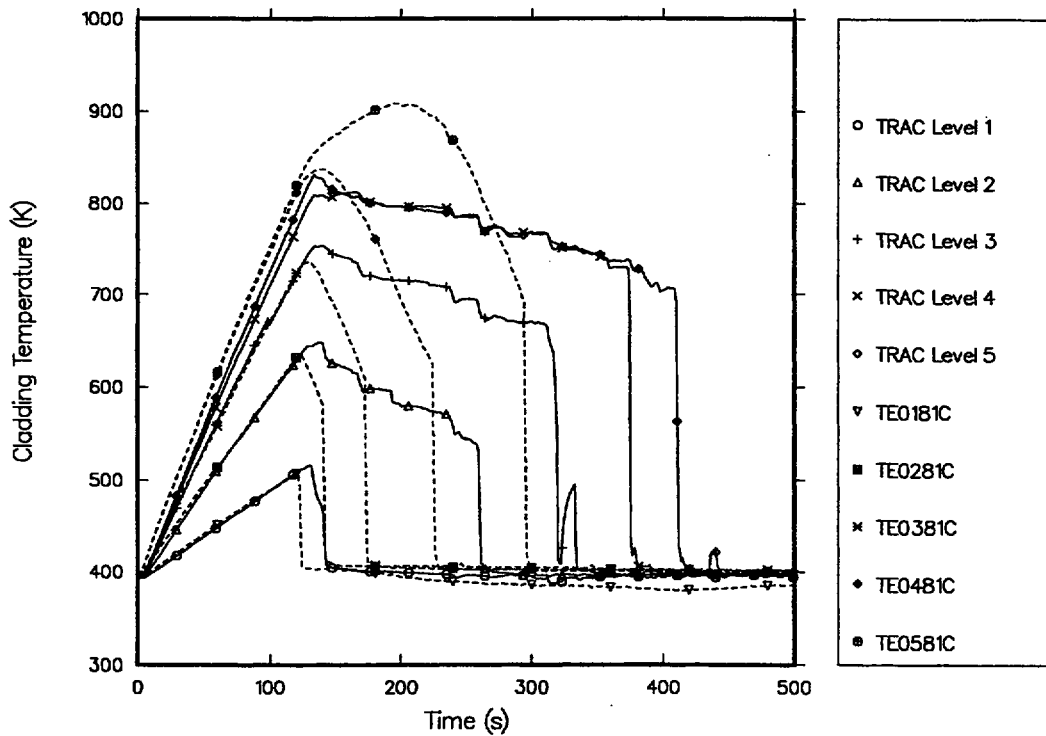


Fig. DD-10. Calculated and measured core-lower-half cladding temperature of bundle 8.

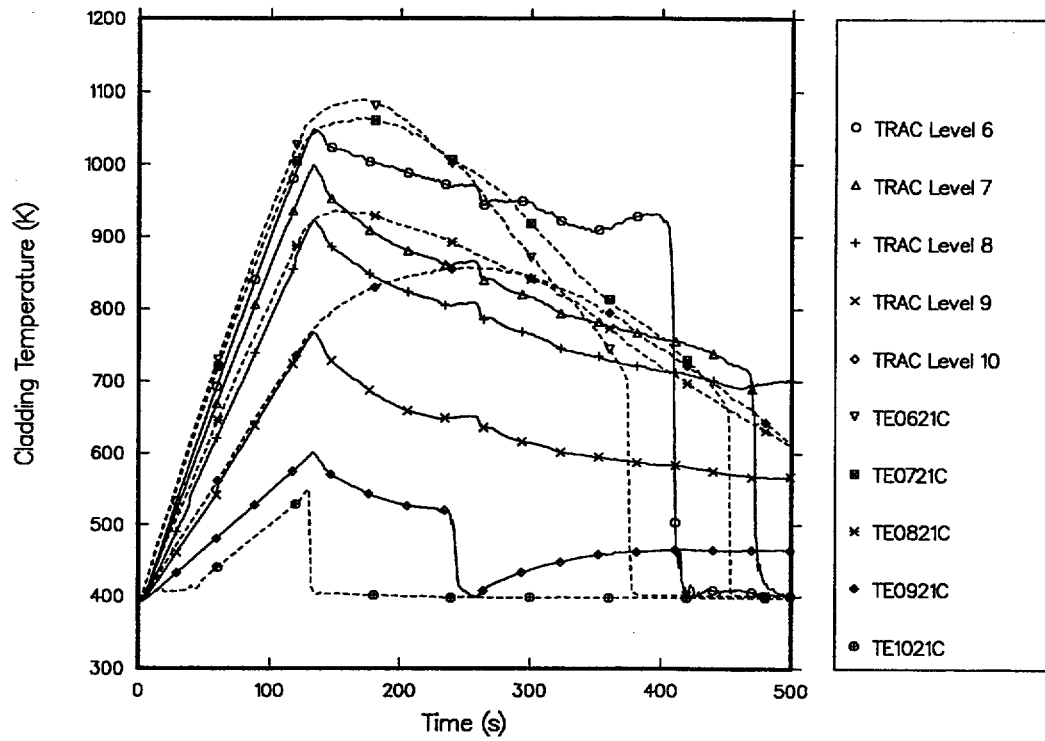


Fig. DD-11. Calculated and measured core-upper-half cladding temperature of bundle 2.

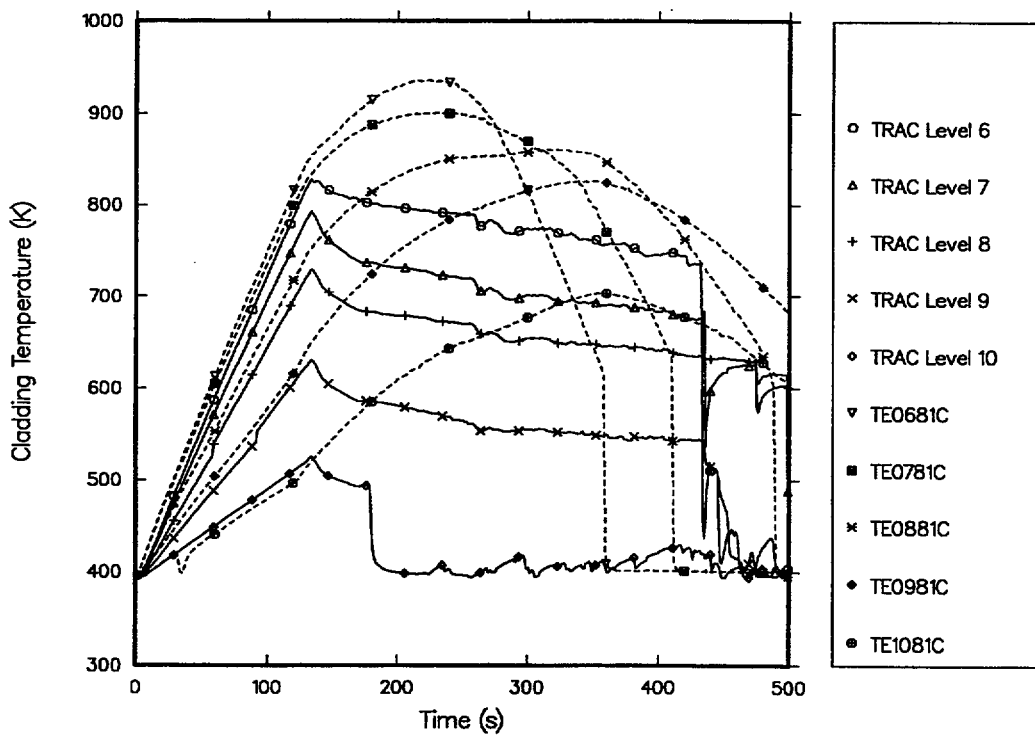


Fig. DD-12. Calculated and measured core-upper-half cladding temperature of bundle 8.

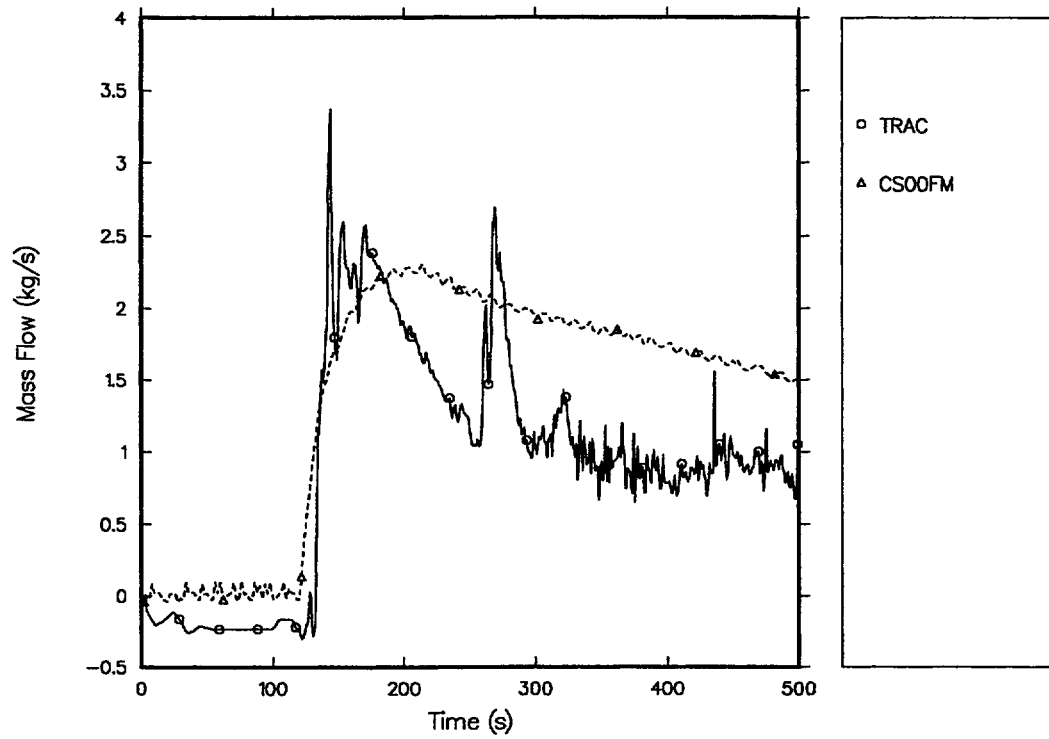


Fig. DD-13. Calculated and measured pressure-vessel-side broken cold-leg mass flow rate.

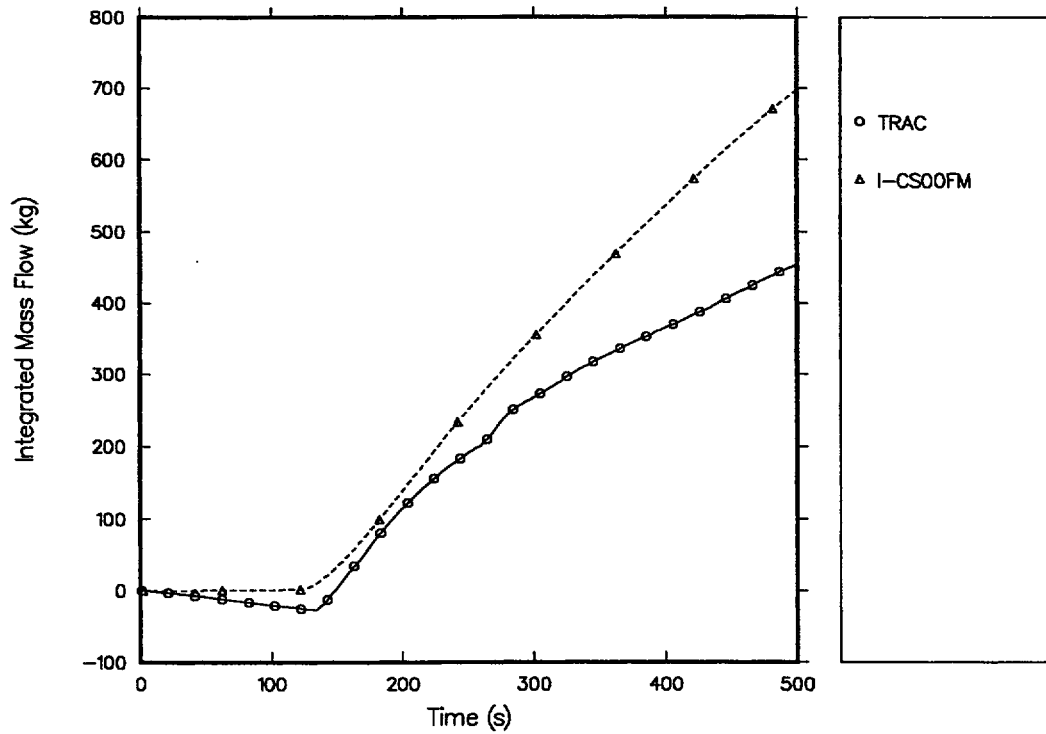


Fig. DD-14. Calculated and measured pressure-vessel-side broken cold-leg integrated mass flow.

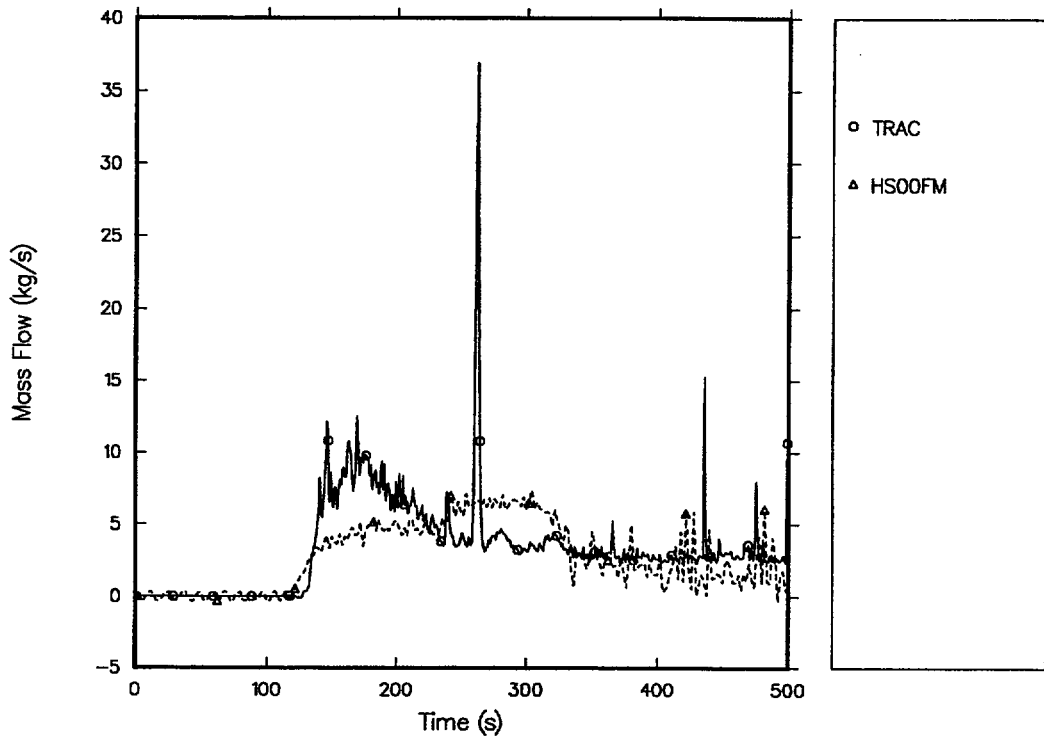


Fig. DD-15. Calculated and measured hot-leg mass flow rate.

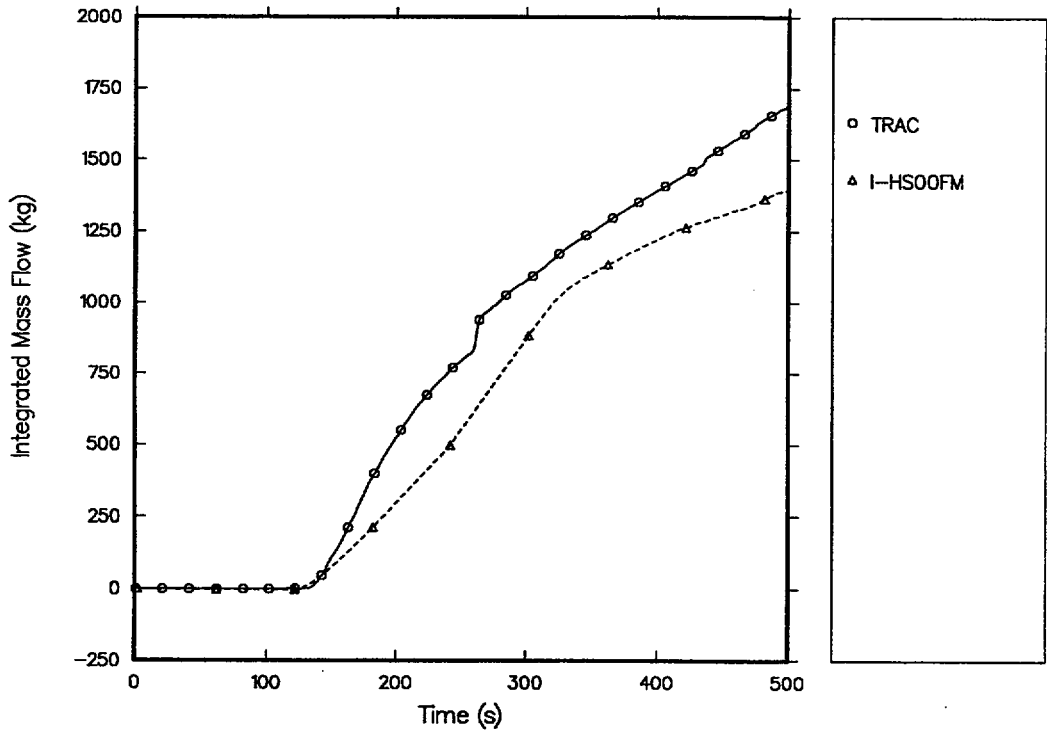


Fig. DD-16. Calculated and measured hot-leg integrated mass flow.

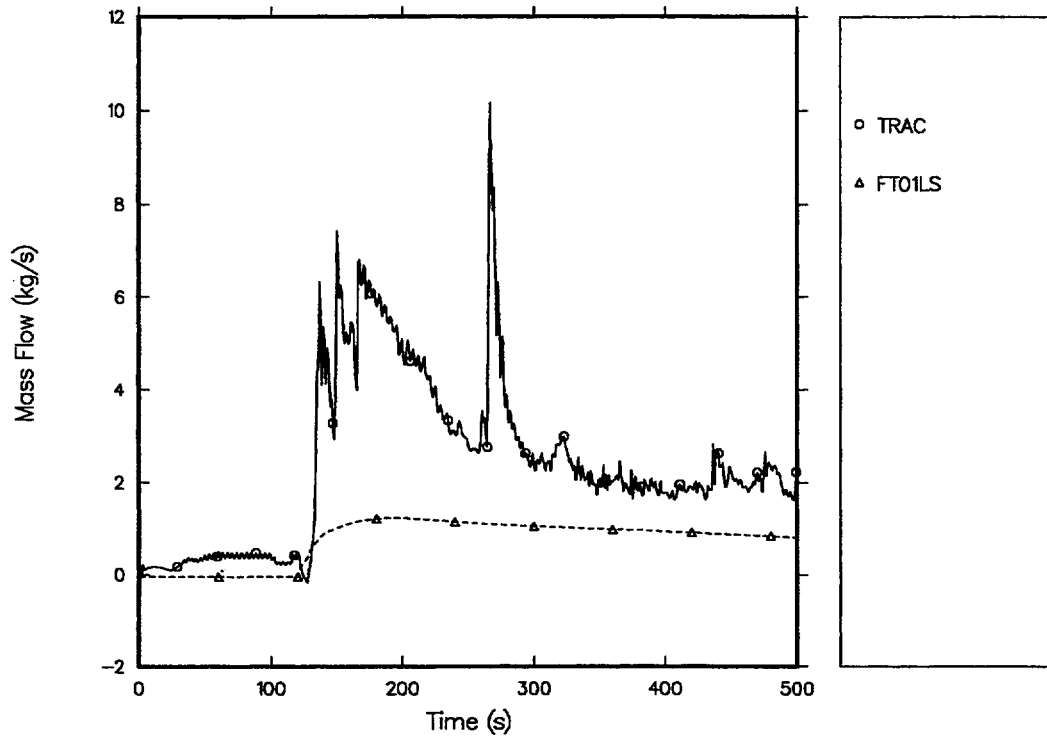


Fig. DD-17. Calculated and measured S/W-separator-side broken cold-leg mass flow rate.

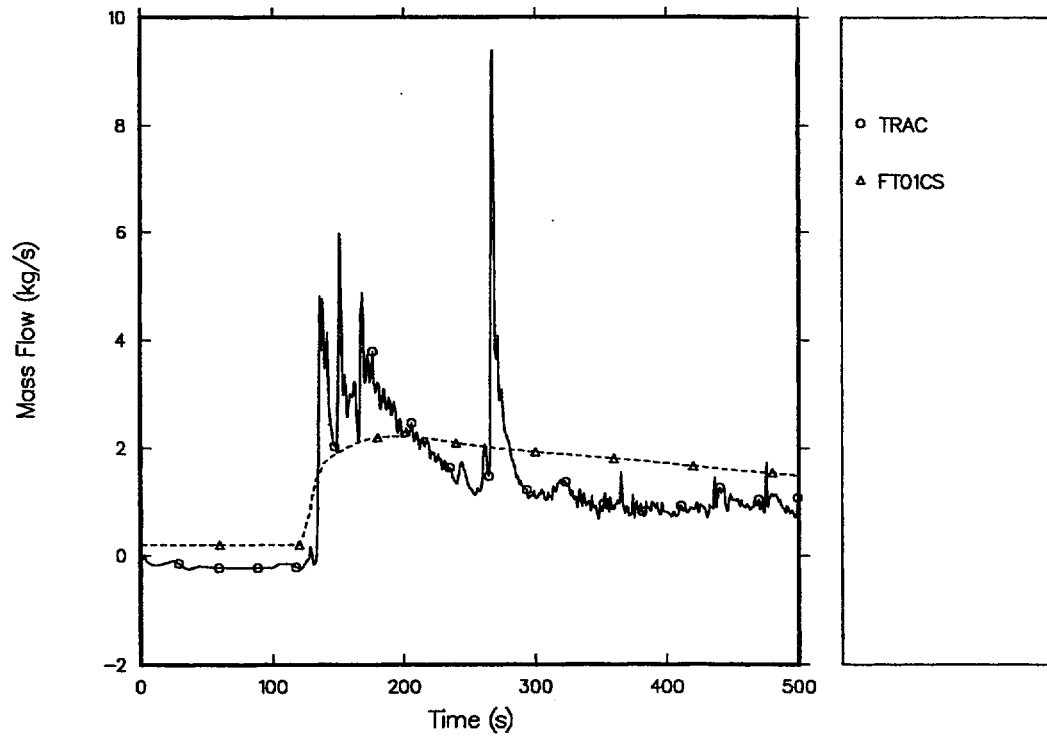


Fig. DD-18. Calculated and measured intact cold-leg mass flow rate.

## APPENDIX EE

### CODE-DATA COMPARISON FOR SCTF RUN 719 WITH NEWRFD=1, WITH GRID SPACERS MODELED

The calculation results for the reflood option newrfd=1 with grid spacers modeled are presented in this appendix. The set of plots presented are the same as presented in the Appendix V of the report for the reflood option newrfd=1 without grid spacers.

newrfd = 1 with grid spacers modeled	newrfd = 1 without grid spacers modeled
EE-1	DD-1
EE -2	DD -2
EE -3	DD -3
EE -4	DD -4
EE -5	DD -5
EE -6	DD -6
EE-7	DD -7
EE-8	DD -8
EE-9	DD -9
EE-10	DD -10
EE-11	DD -11
EE-12	DD -12
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EE-14	DD -14
EE-15	DD -15
EE-16	DD -16
EE-17	DD -17
EE-18	DD -18

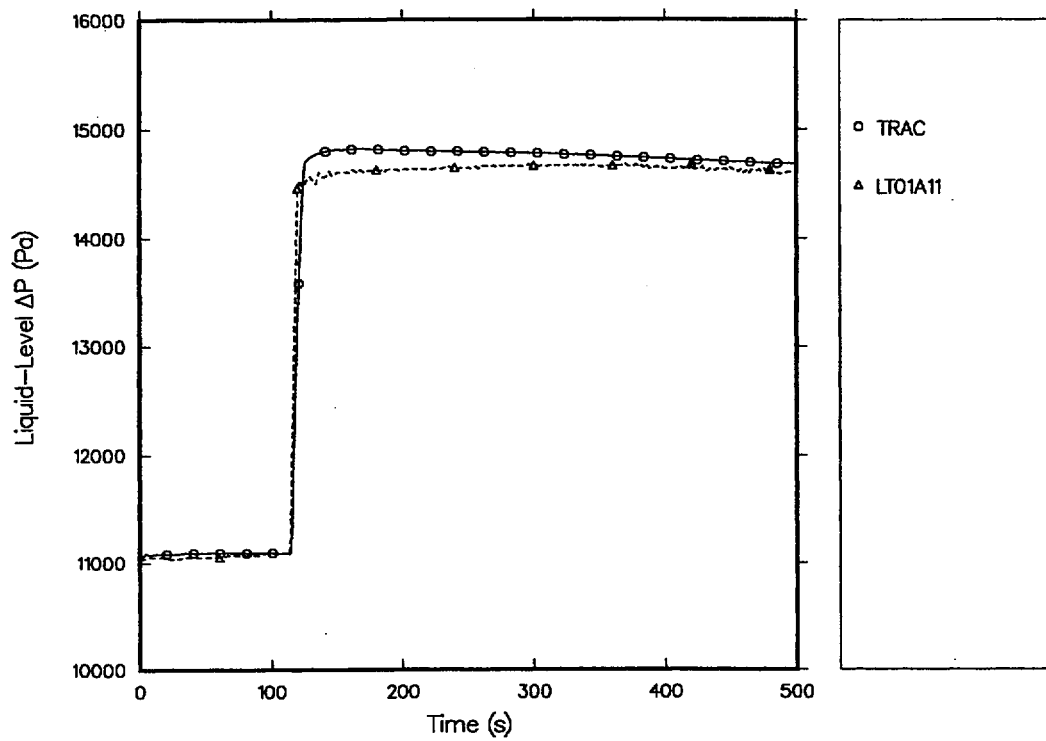


Fig. EE-1. Lower-plenum liquid level.

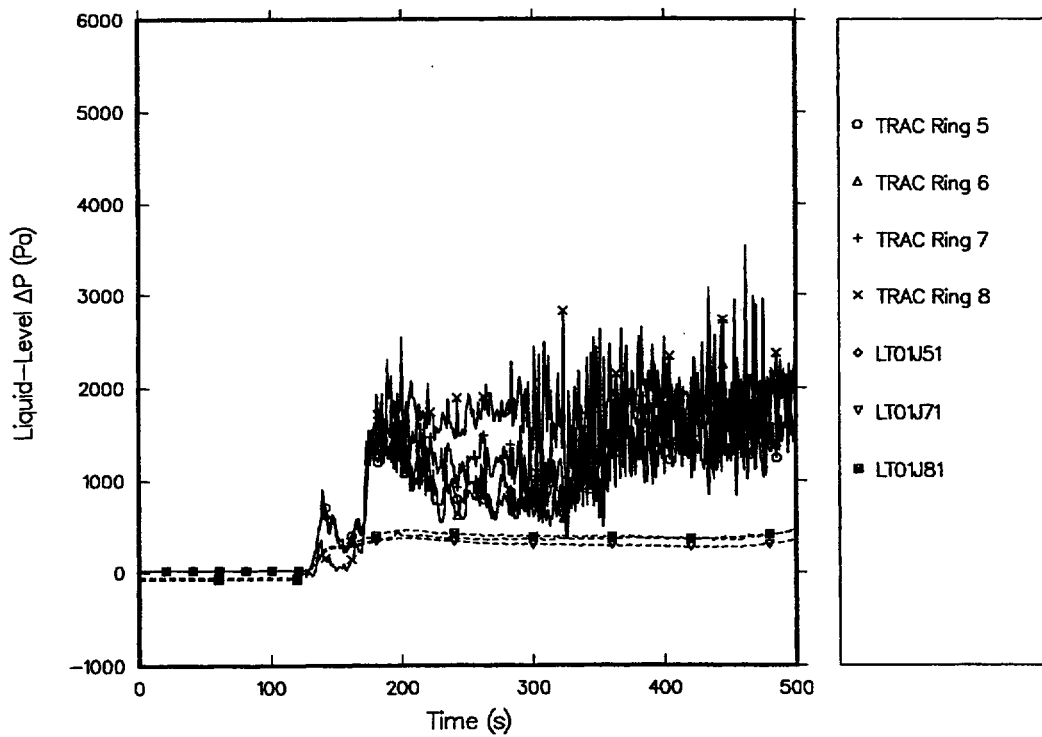


Fig. EE-2. Measured and calculate upper-plenum liquid levels above bundles 5 and 8.

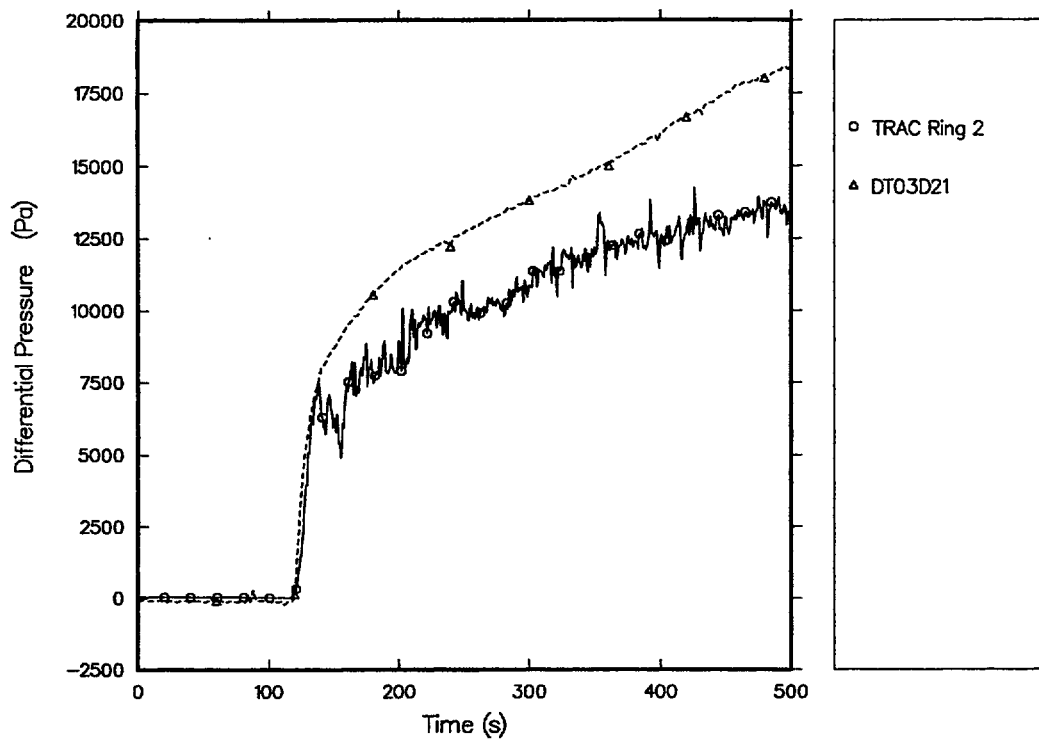


Fig. EE-3. Calculated and measured core full-height level in bundle 2.

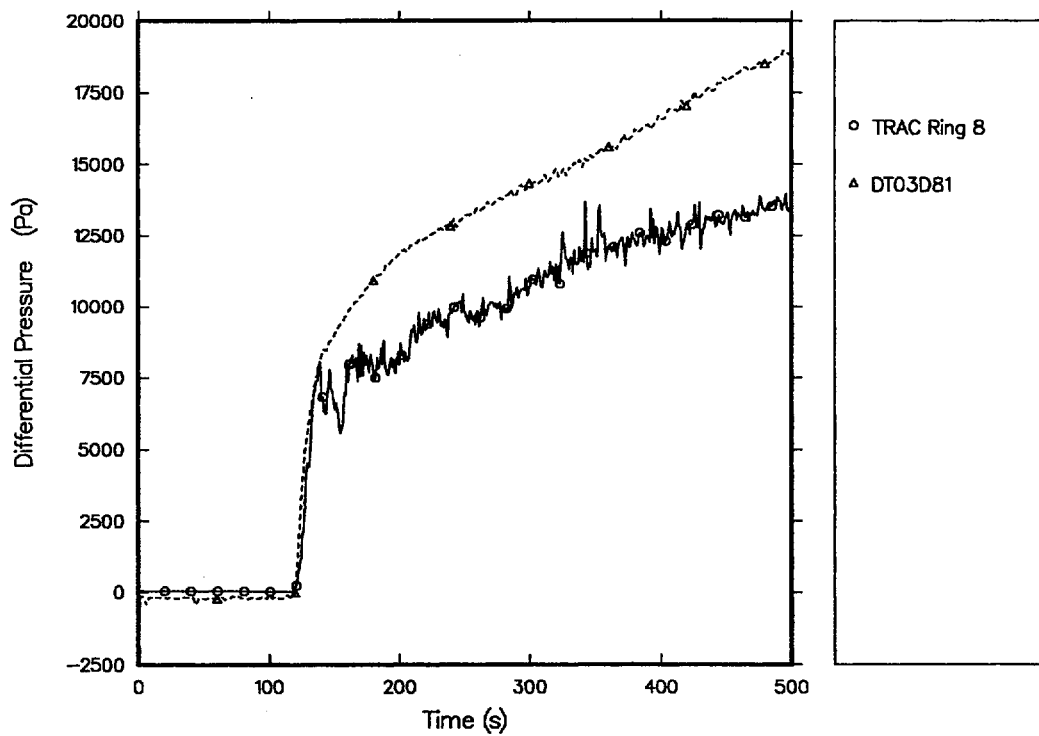


Fig. EE-4. Calculated and measured core full-height level in bundle 8.



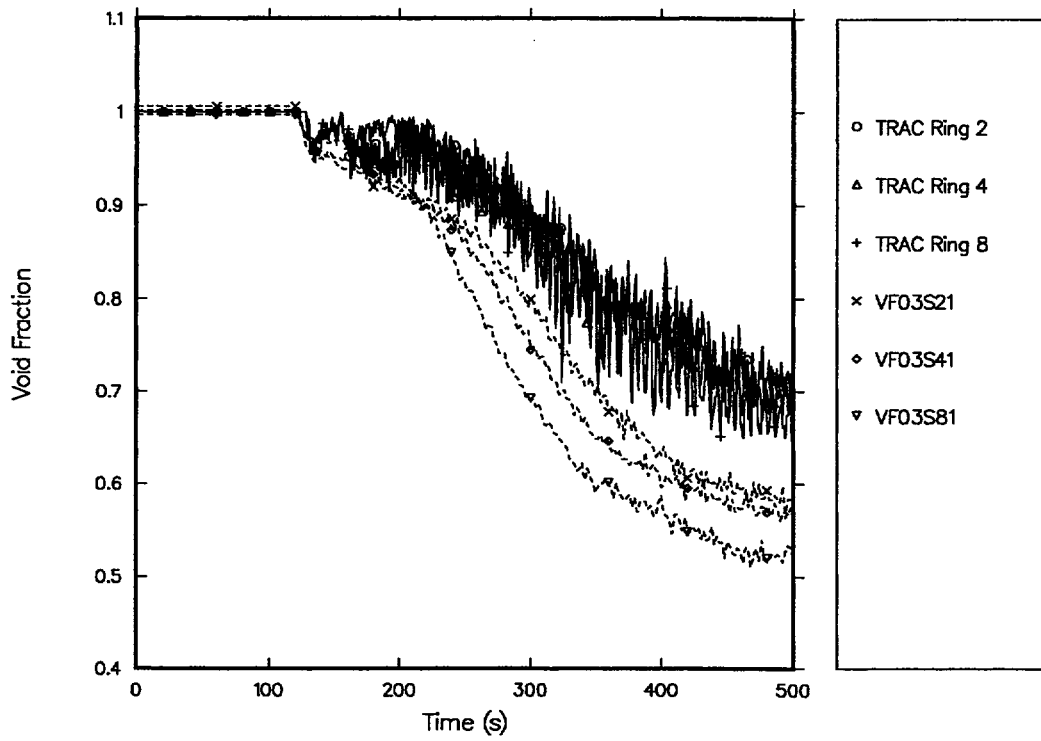


Fig. EE-5. Void fractions in bundles 2, 4, 6, and 8 at the 1.905-m level.

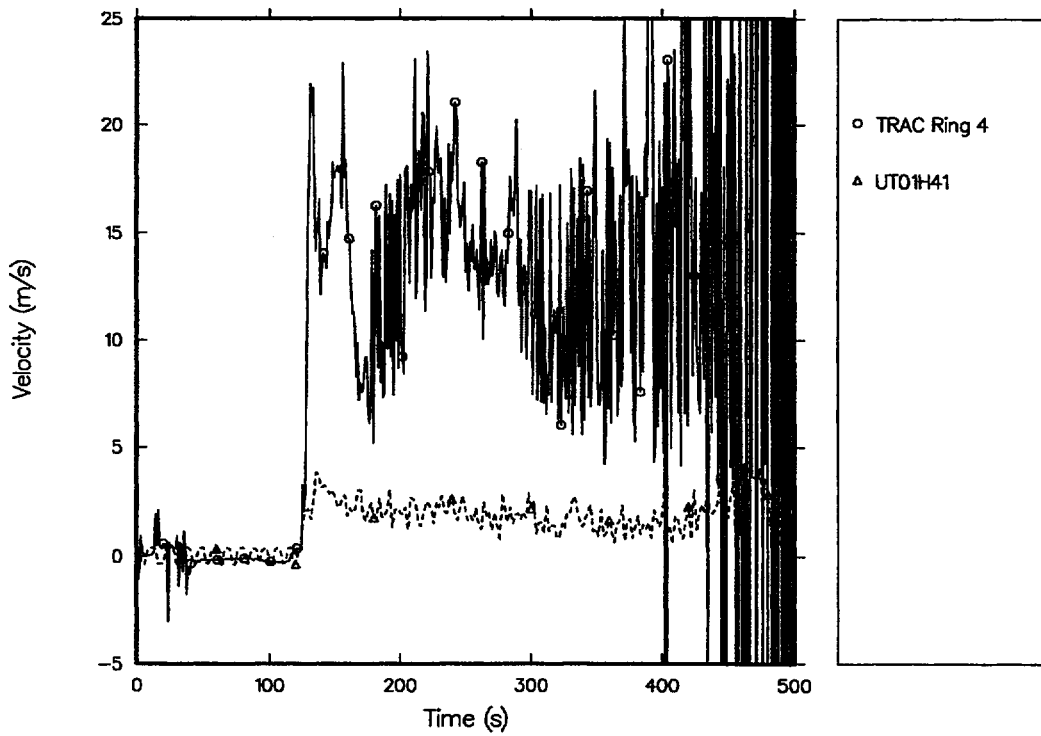


Fig. EE-6. Calculated and measured bundle 4 tie-plate vapor flows.

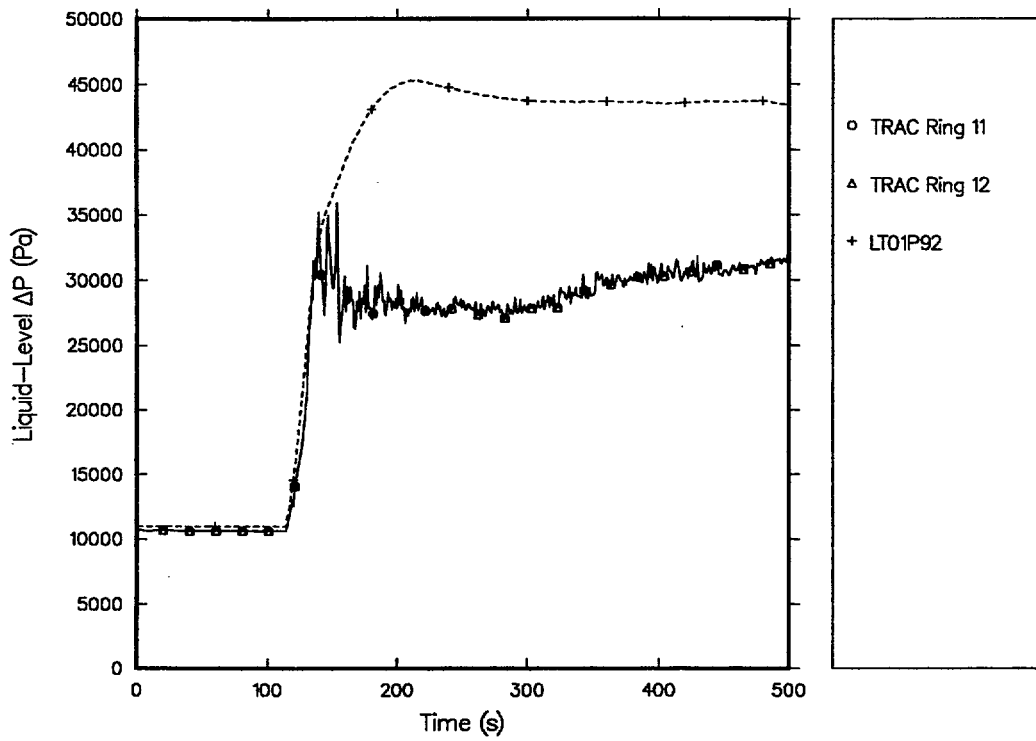


Fig. EE-7. Calculated and measured downcomer liquid level.

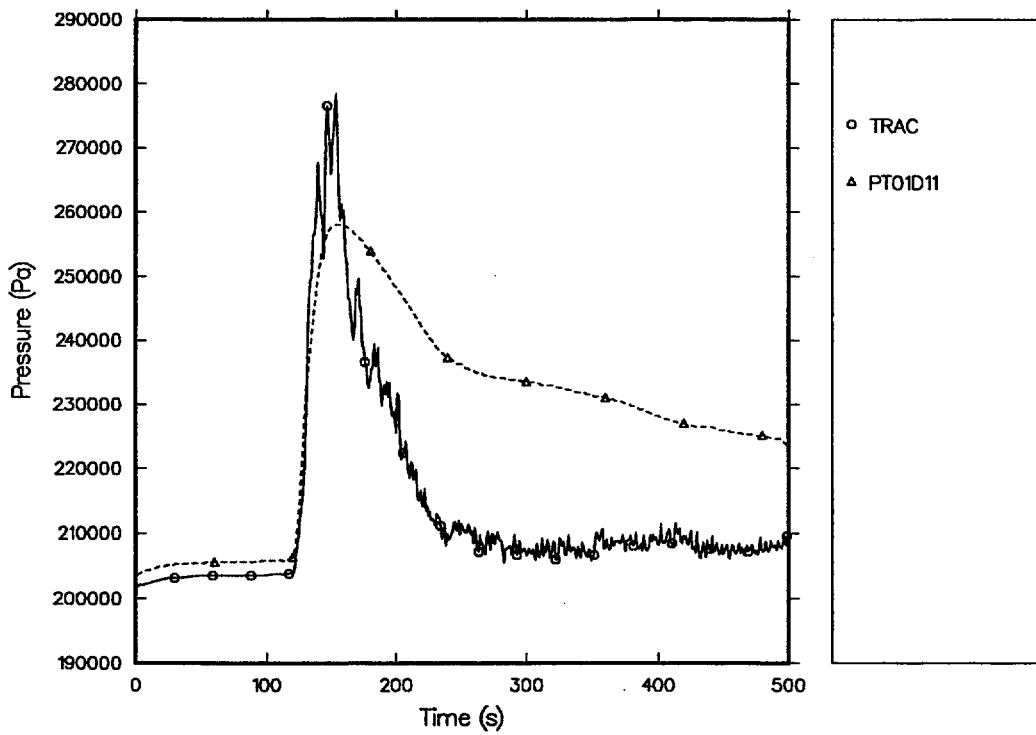


Fig. EE-8. Calculated and measured core average pressure.

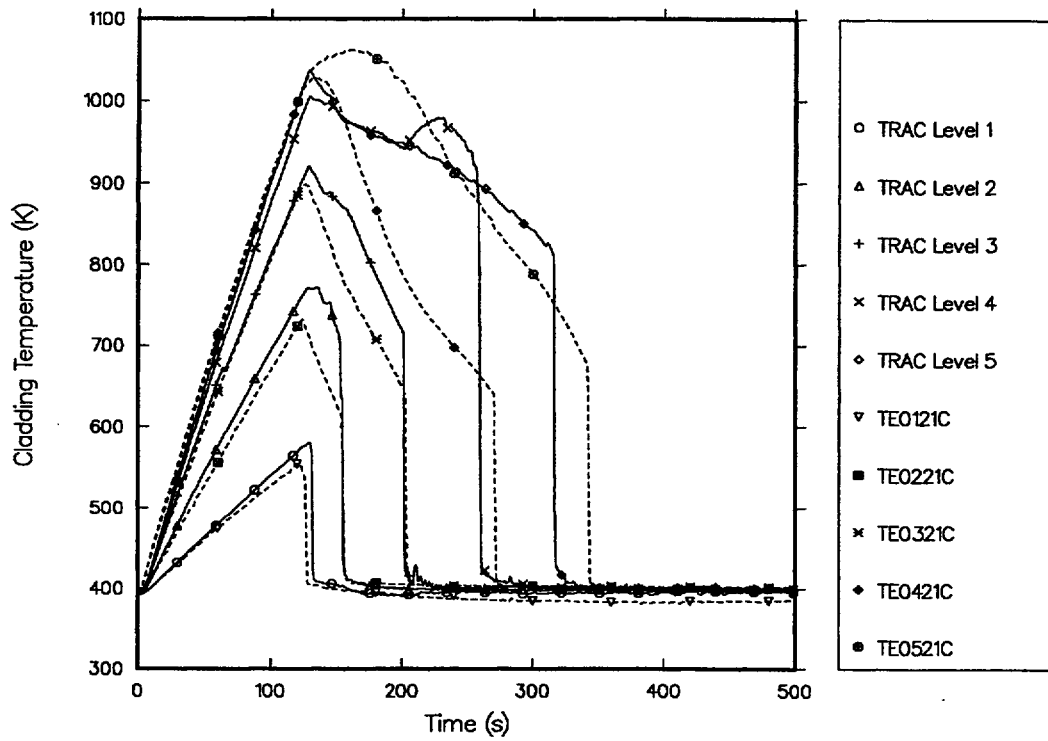


Fig. EE-9. Calculated and measured core-lower-half cladding temperature of bundle 2.

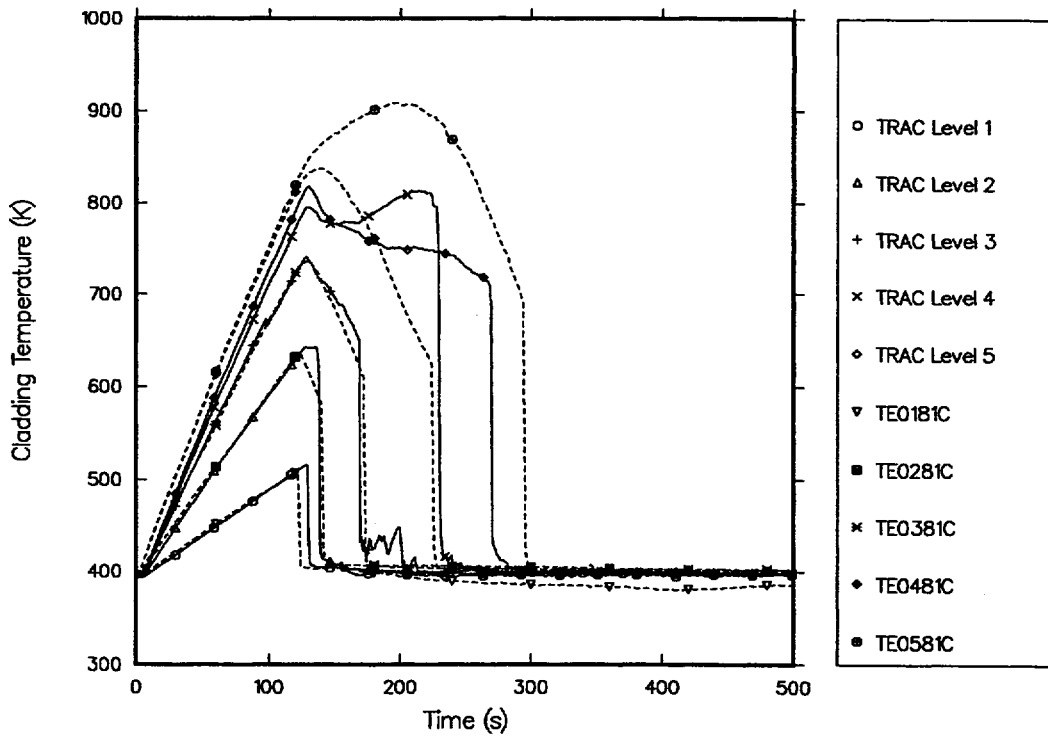


Fig. EE-10. Calculated and measured core-lower-half cladding temperature of bundle 8.

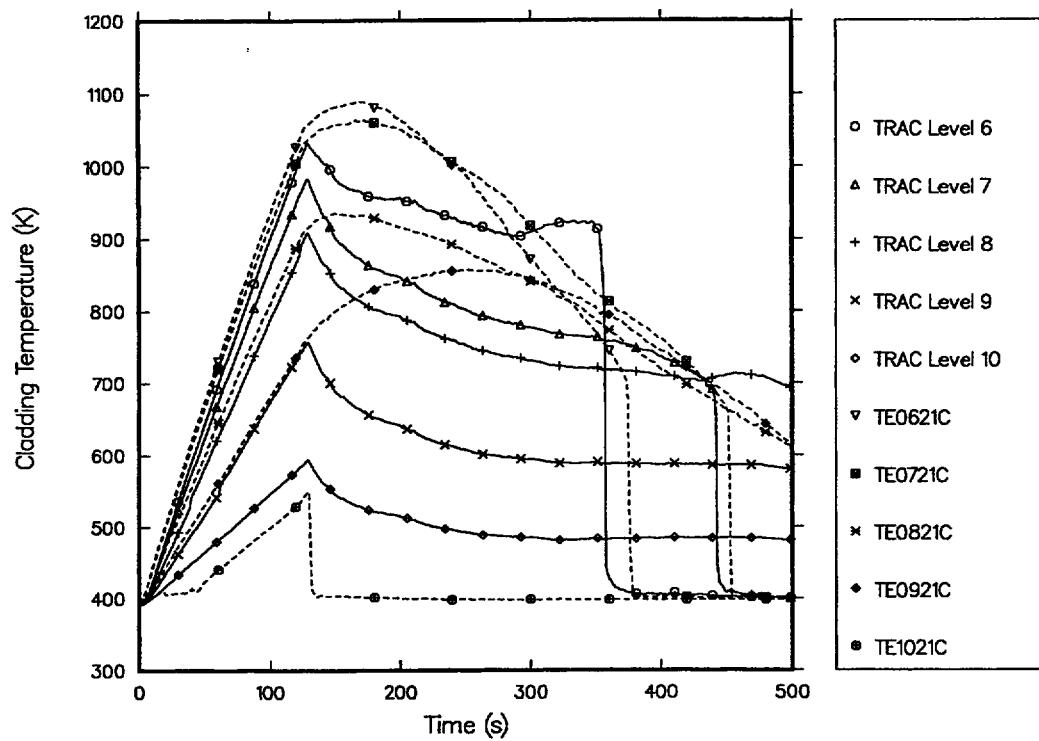


Fig. EE-11. Calculated and measured core-upper-half cladding temperature of bundle 2.

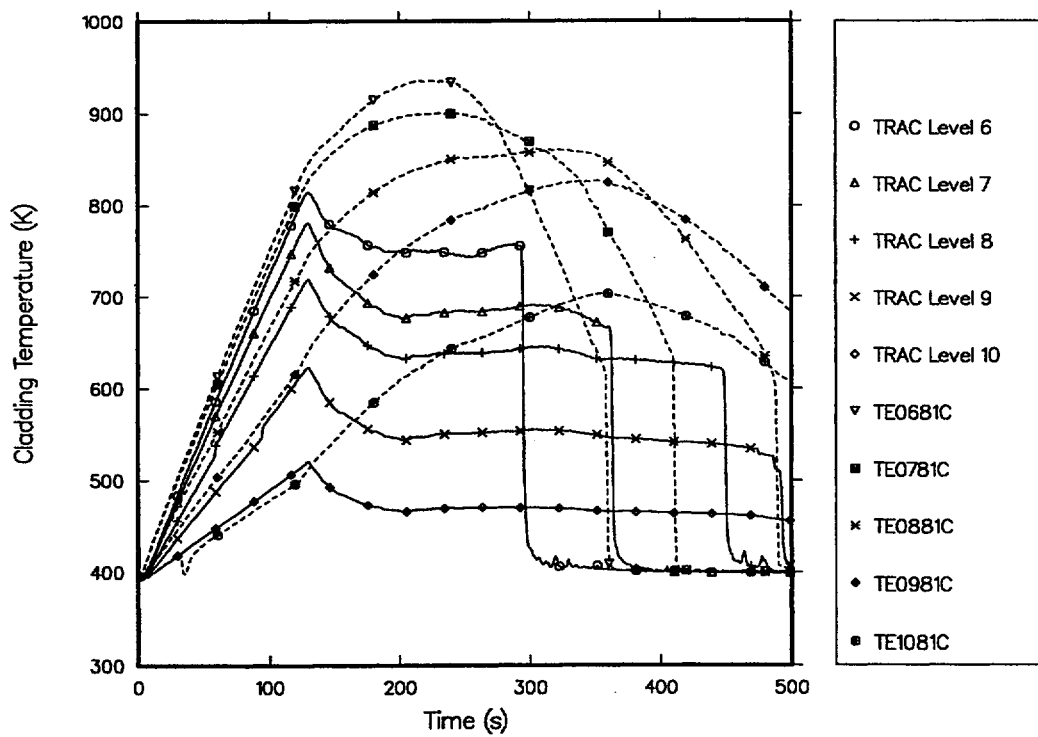


Fig. EE-12. Calculated and measured core-upper-half cladding temperature of bundle 8.

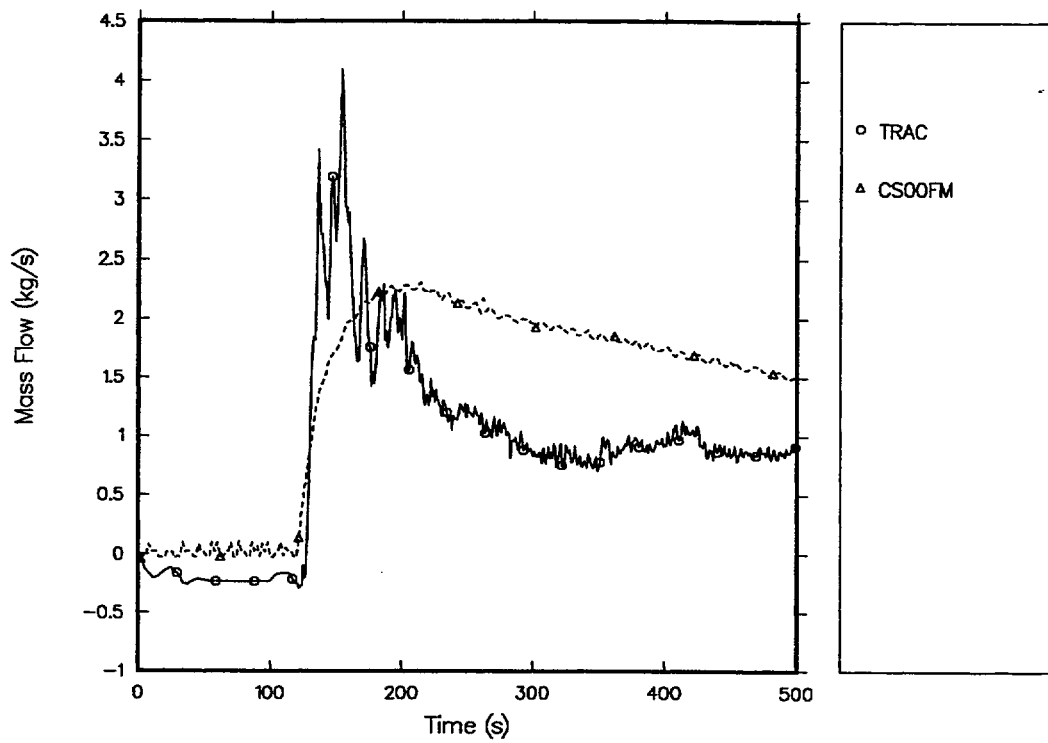


Fig. EE-13. Calculated and measured pressure-vessel-side broken cold-leg mass flow rate.

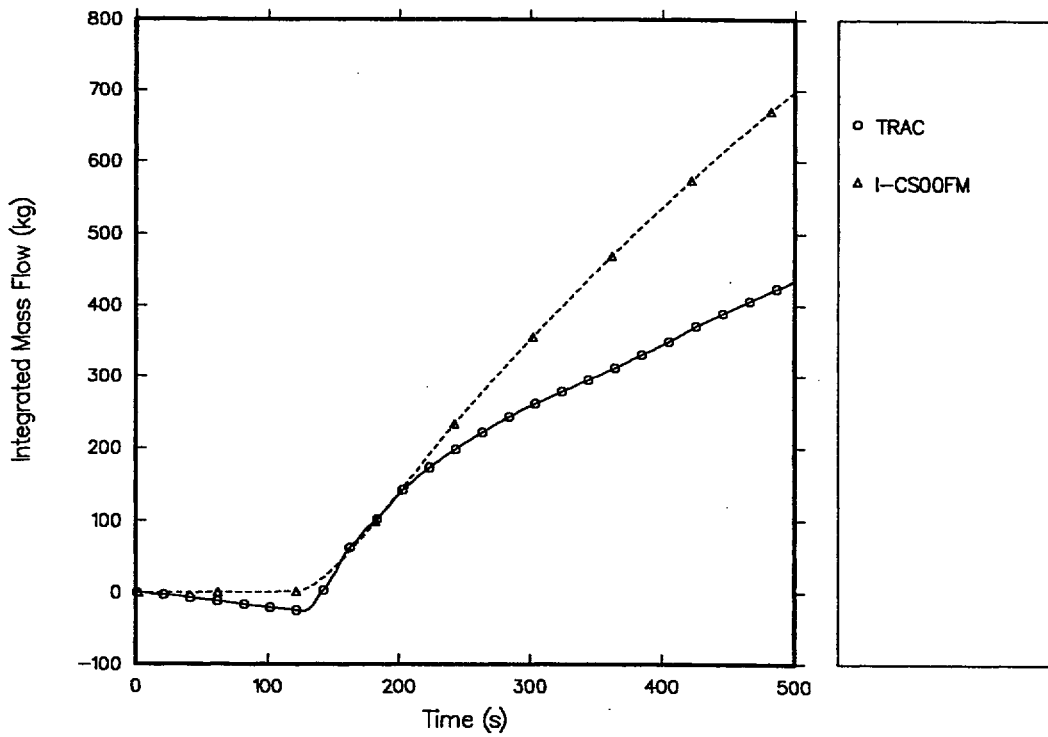


Fig. EE-14. Calculated and measured pressure-vessel-side broken cold-leg integrated mass flow.

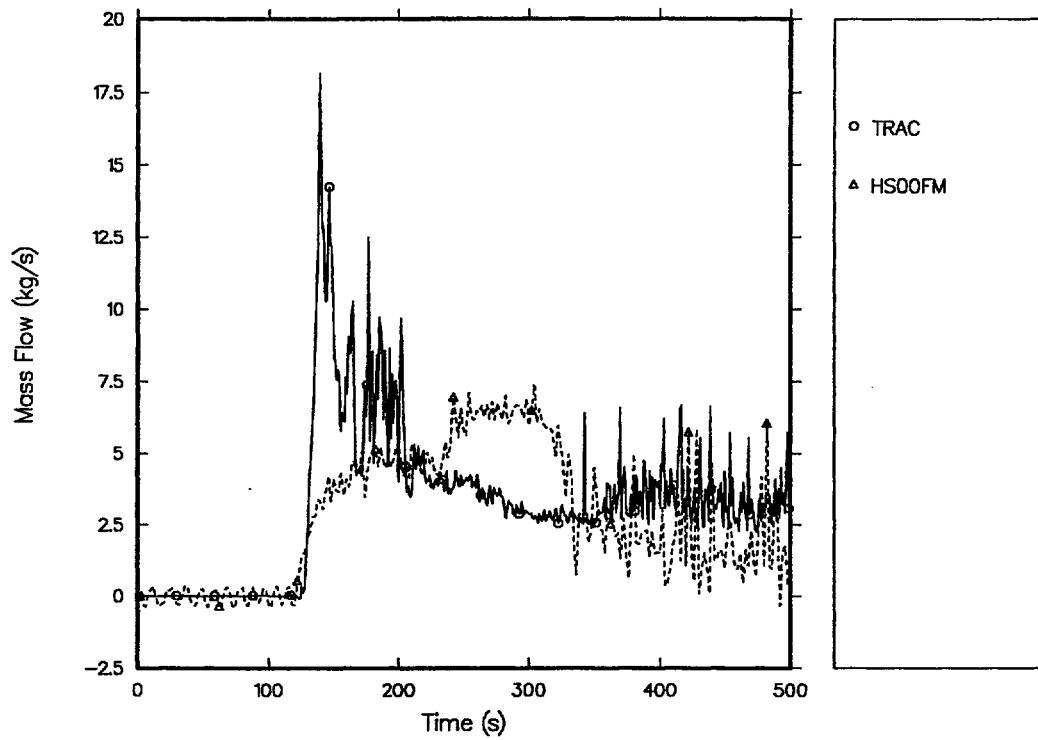


Fig. EE-15. Calculated and measured hot-leg mass flow rate.

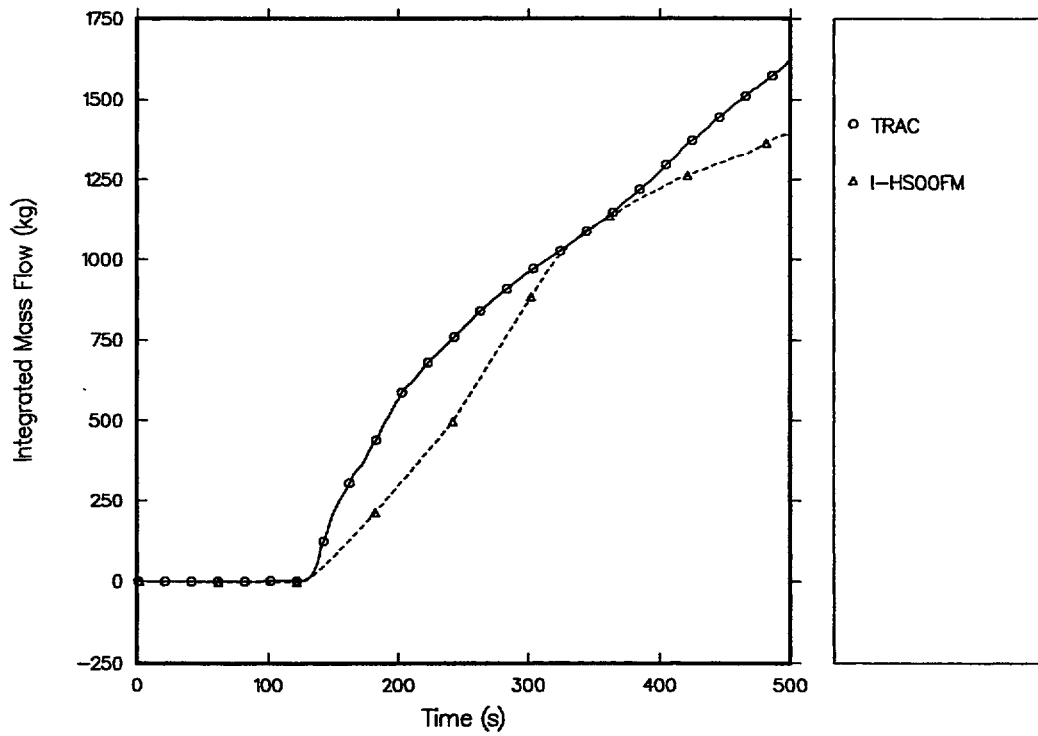


Fig. EE-16. Calculated and measured hot-leg integrated mass flow.

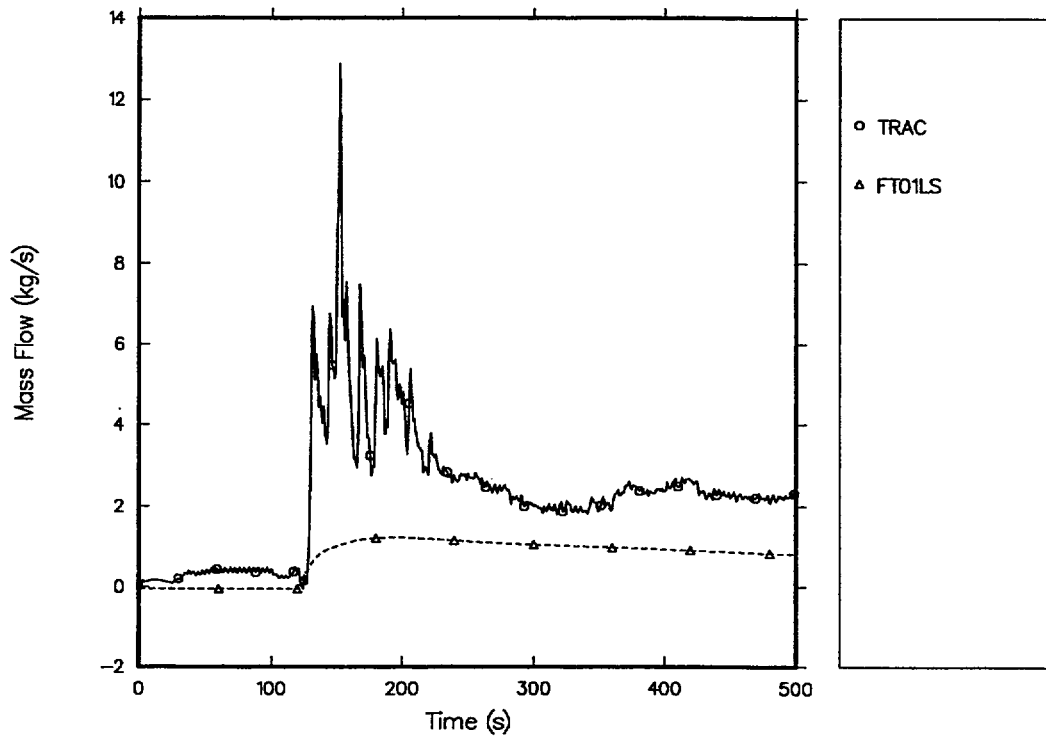


Fig. EE-17. Calculated and measured S/W-separator-side broken cold-leg mass flow rate.

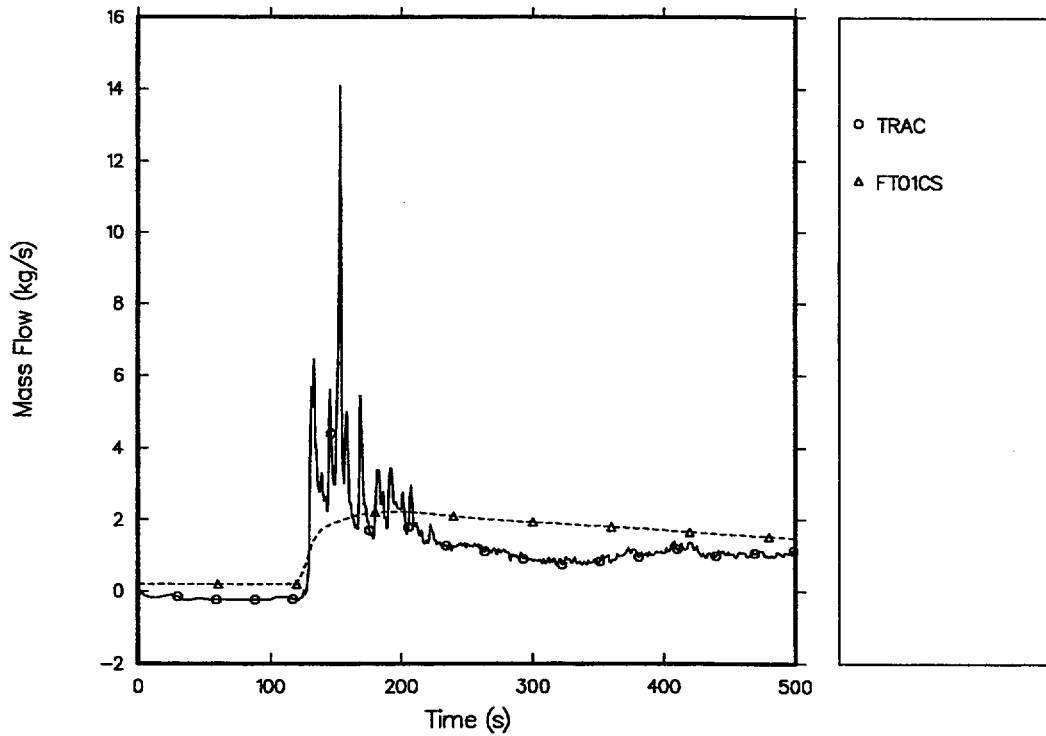


Fig. EE-18. Calculated and measured intact cold-leg mass flow rate.

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10. SUPPLEMENTARY NOTES

F. Odar, NRC Project Manager

11. ABSTRACT (200 words or less)

Los Alamos National Laboratory has developed the Transient Reactor Analysis Code (TRAC) to provide advanced, best-estimate simulations of real and postulated transients in pressurized water reactors (PWRs). The modernized TRAC-M/F77, Version 5.5, is the latest release version. TRAC-M/F77 (1) is more portable and maintainable than Version 5.4; (2) retains TRAC's essential features, a one- and/or three-dimensional, two-fluid treatment for the thermal hydraulics; (3) has other necessary modeling capabilities to model a reactor system, and (4) has a newly enhanced reflood model. The Developmental Assessment Manual describes the assessment calculations that were compared with analytical calculations and experimental data. The comparisons were performed to determine the accuracy and the applicability of TRAC-M/F77. Based on these assessments against analytical solutions, separate-effects tests, and integral tests, we believe that TRAC-M/F77 is suitable for analyzing PWRs during a loss-of-coolant accident and operational transients. The developmental assessment calculations demonstrate that TRAC-M/F77 is applicable to a wide range of test facilities and is accurate in terms of predicting major trends.

12. KEY WORDS/DESCRIPTORS (List words or phrases that will assist researchers in locating the report.)

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13. AVAILABILITY STATEMENT

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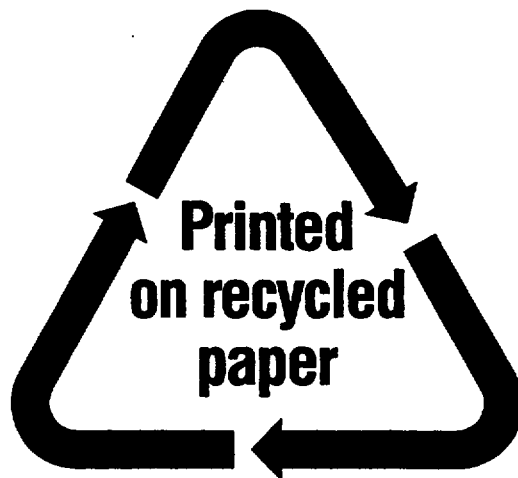
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