

APPENDIX L

CODE-DATA COMPARISON FOR FLECHT-SEASET TEST 31504 WITH NEWRFD=1

The calculation results for the reflood option newrfd=1, without and with grid spacers modeled, are presented in this appendix. The same set of plots that are presented in the main body of the report for the reflood option newrfd=3 are 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
L-1	4.8-7	L-26	4.8-32
L-2	4.8-8	L-27	4.8-33
L-3	4.8-9	L-28	4.8-34
L-4	4.8-10	L-29	4.8-35
L-5	4.8-11	L-30	4.8-36
L-6	4.8-12	L-31	4.8-37
L-7	4.8-13	L-32	4.8-38
L-8	4.8-14	L-33	4.8-39
L-9	4.8-15	L-34	4.8-40
L-10	4.8-16	L-35	4.8-41
L-11	4.8-17	L-36	4.8-42
L-12	4.8-18	L-37	4.8-43
L-13	4.8-19	L-38	4.8-44
L-14	4.8-20	L-39	4.8-45
L-15	4.8-21	L-40	4.8-46
L-16	4.8-22	L-41	4.8-47
L-17	4.8-23	L-42	4.8-48
L-18	4.8-24	L-43	4.8-49
L-19	4.8-25	L-44	4.8-50
L-20	4.8-26	L-45	4.8-51
L-21	4.8-27	L-46	4.8-52
L-22	4.8-28	L-47	4.9.53
L-23	4.8-29	L-48	4.8-54
L-24	4.8-30	L-49	4.8-55
L-25	4.8-31	L-50	4.8-56

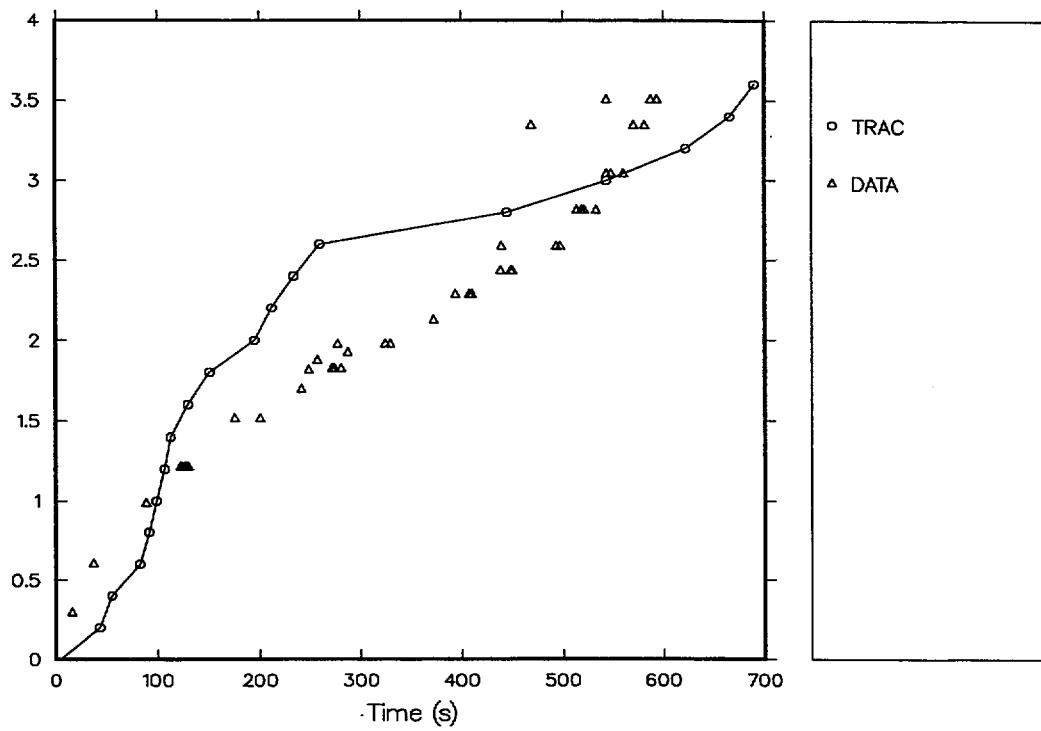


Fig. L-1. Comparison of predicted and measured cladding quench times.

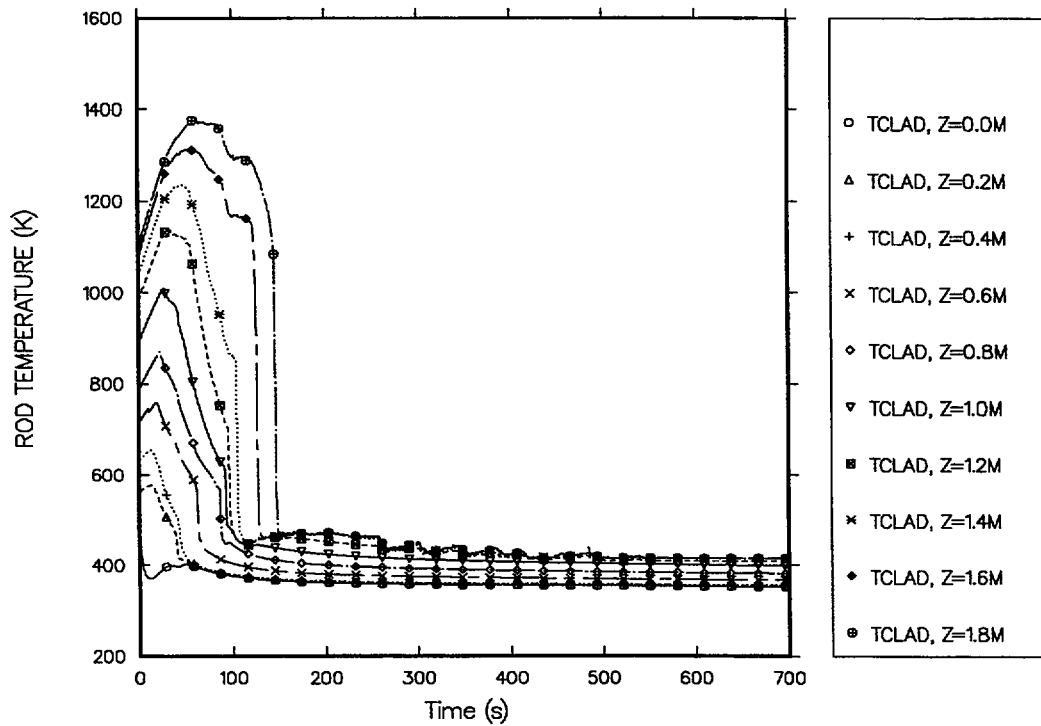


Fig. L-2. Predicted cladding temperature responses in lower half of core.

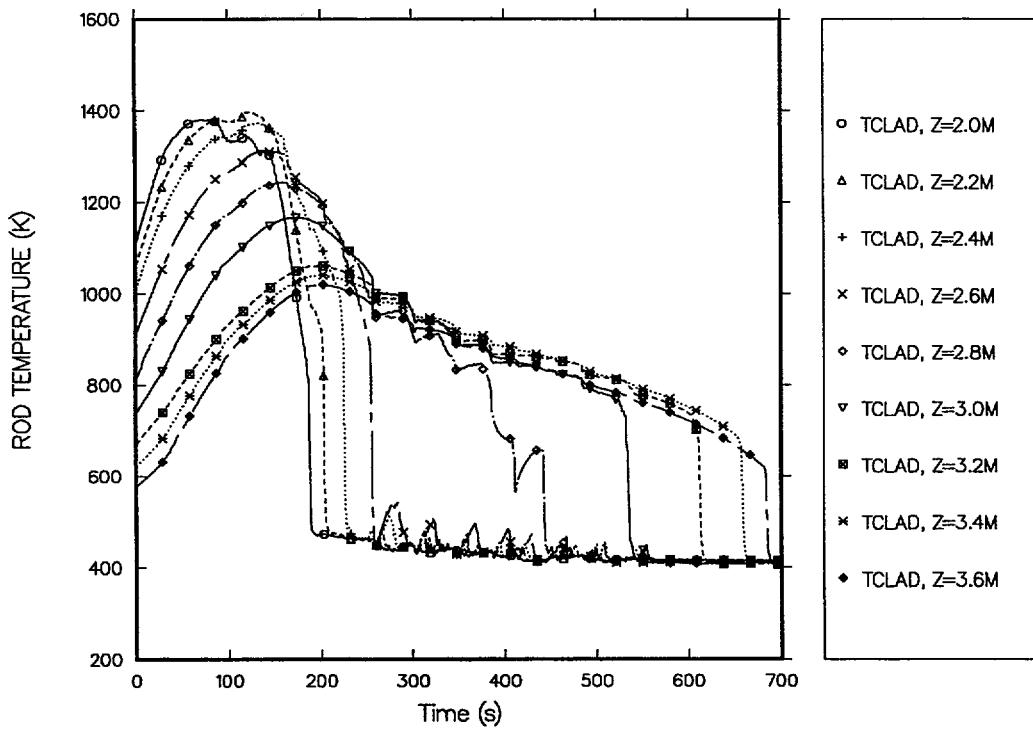


Fig. L-3. Predicted cladding temperature responses in upper half of core.

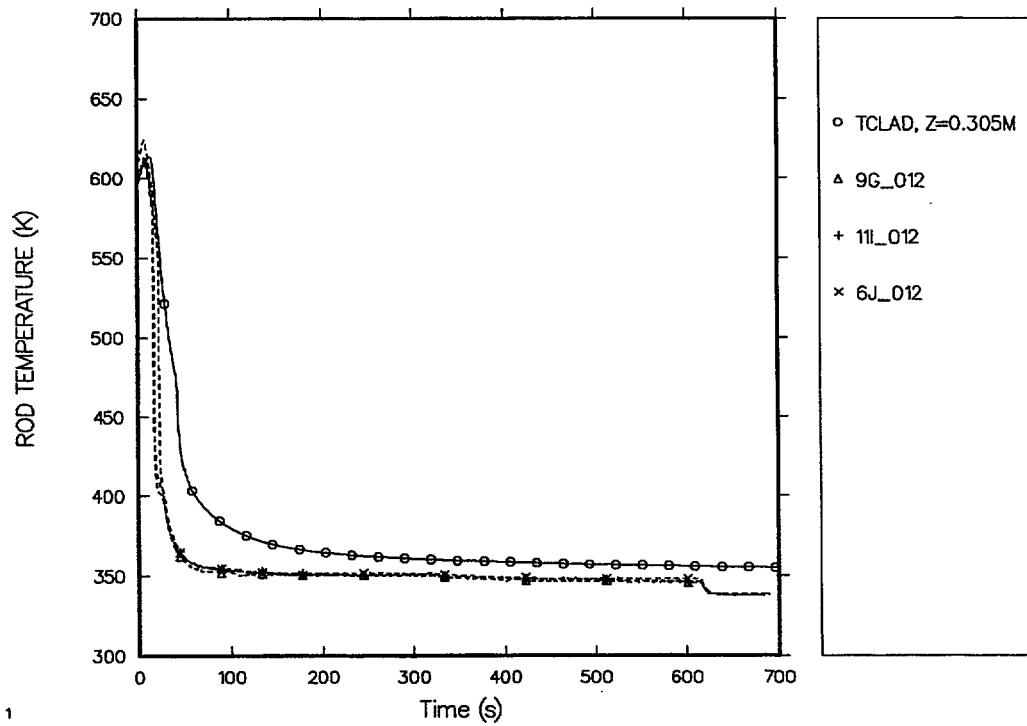


Fig. L-4. Comparison of predicted and measured heater-rod cladding temperatures at 0.3048-m elevation.

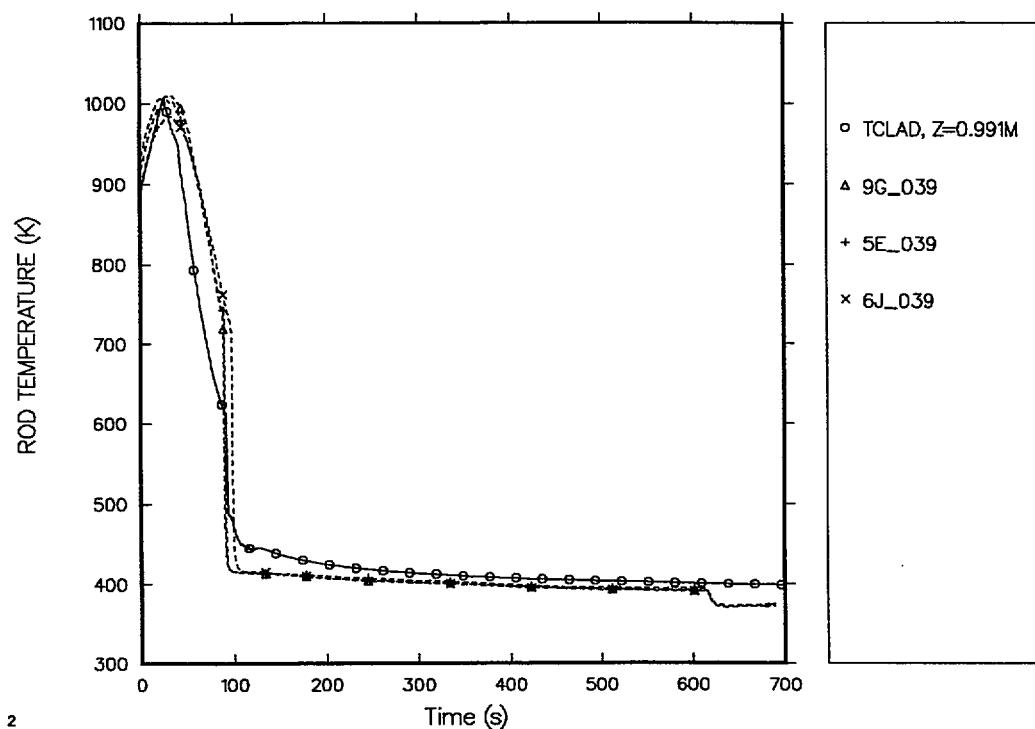


Fig. L-5. Comparison of predicted and measured heater-rod cladding temperatures at 0.9906-m elevation.

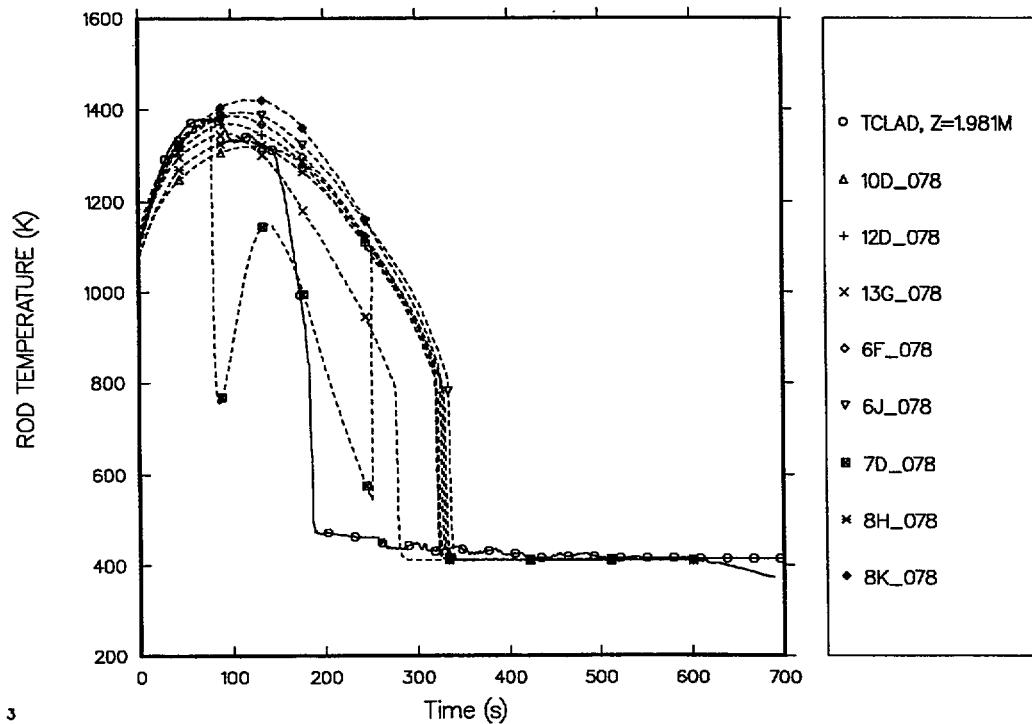


Fig. L-6. Comparison of predicted and measured heater-rod cladding temperatures at 1.9812-m elevation.

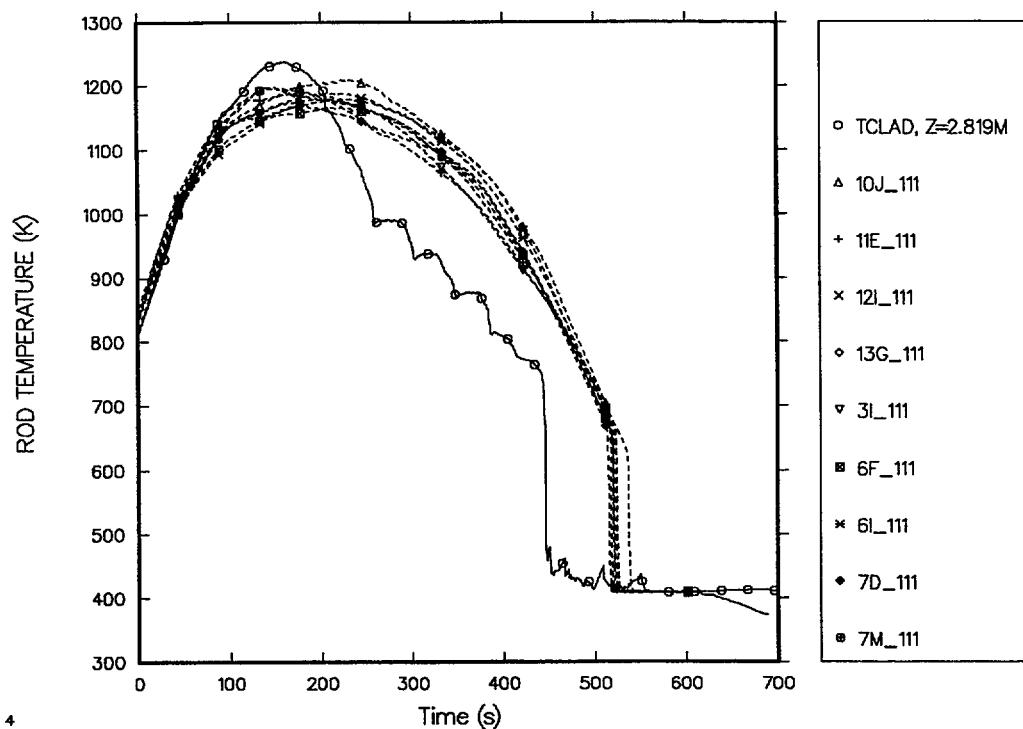


Fig. L-7. Comparison of predicted and measured heater-rod cladding temperatures at 2.8194-m elevation.

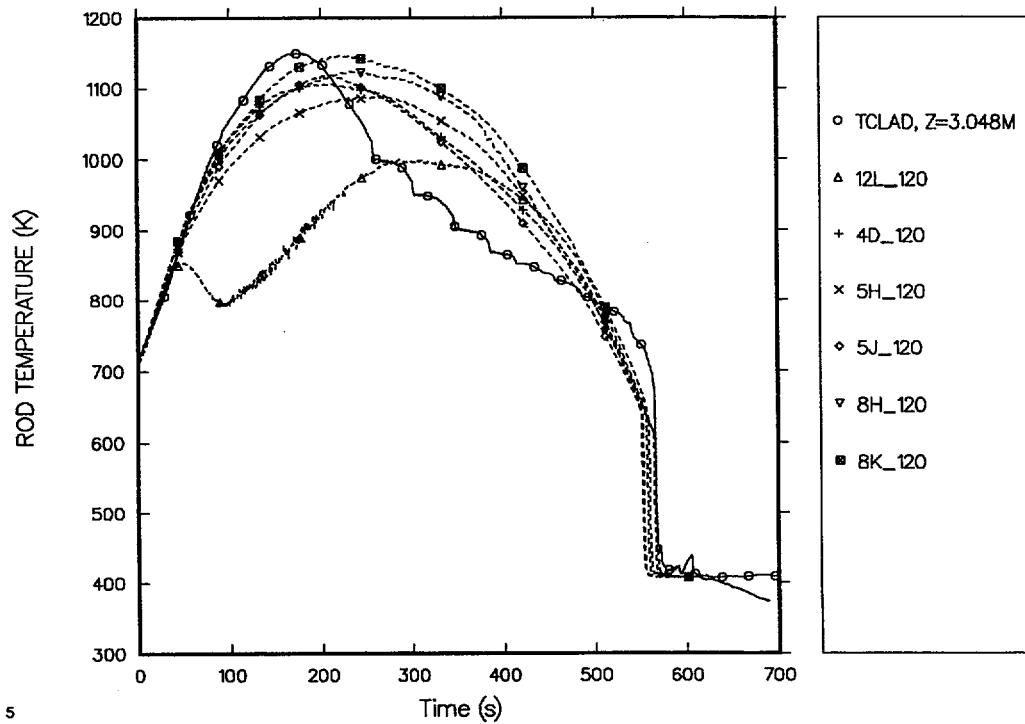


Fig. L-8. Comparison of predicted and measured heater-rod cladding temperatures at 3.0480-m elevation.

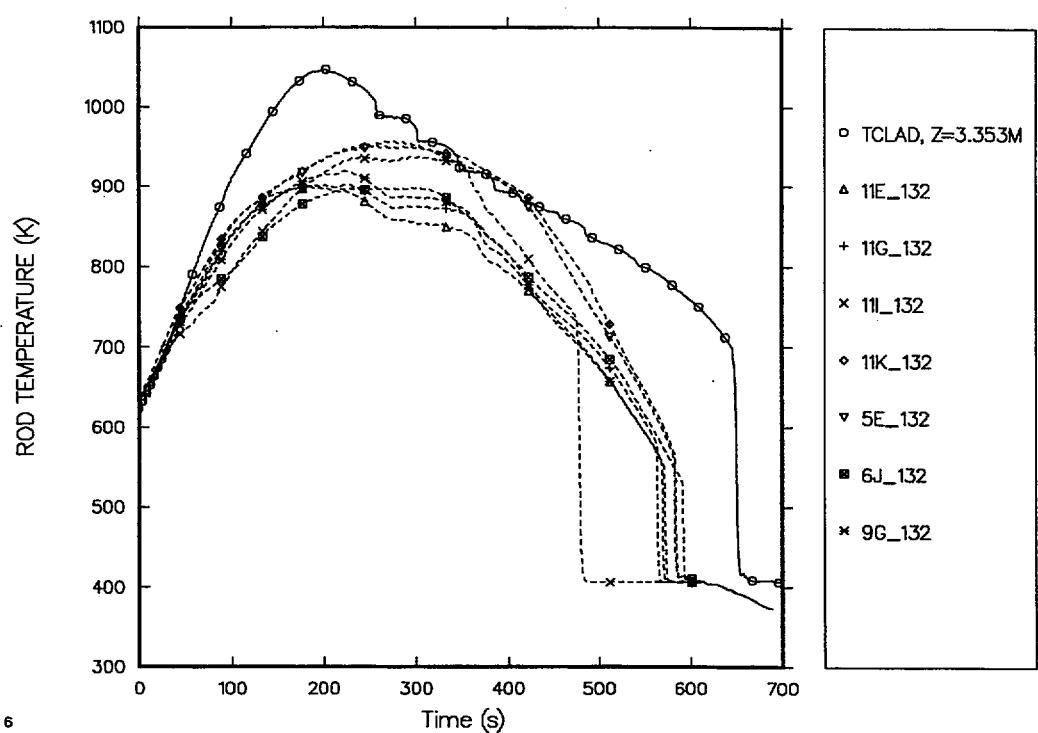


Fig. L-9. Comparison of predicted and measured heater-rod cladding temperatures at 3.3528-m elevation.

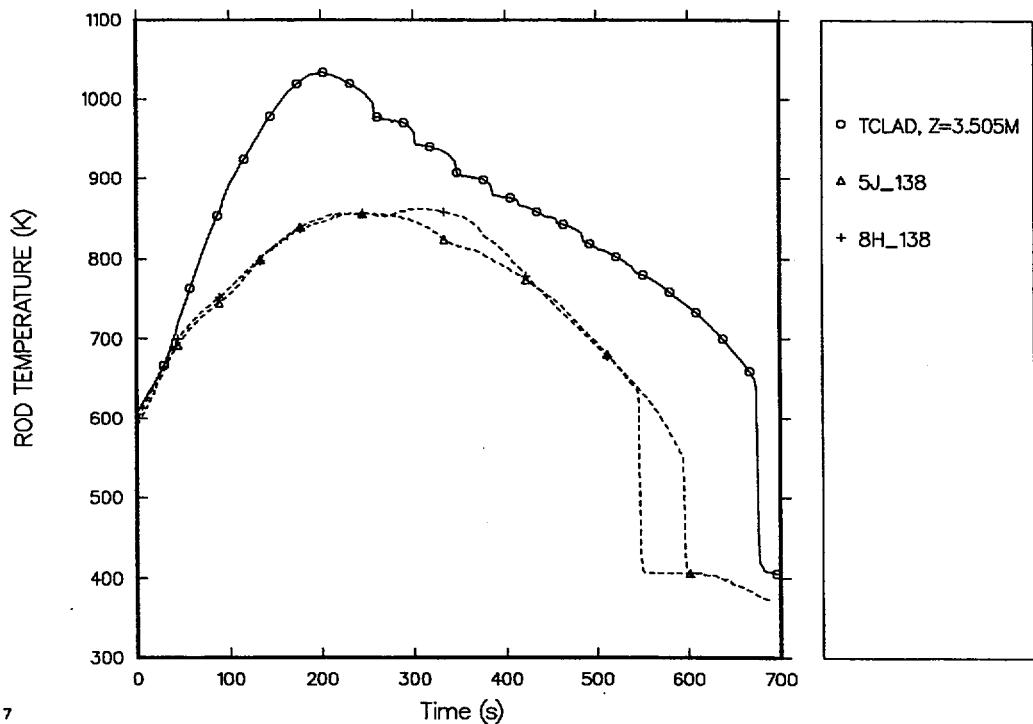
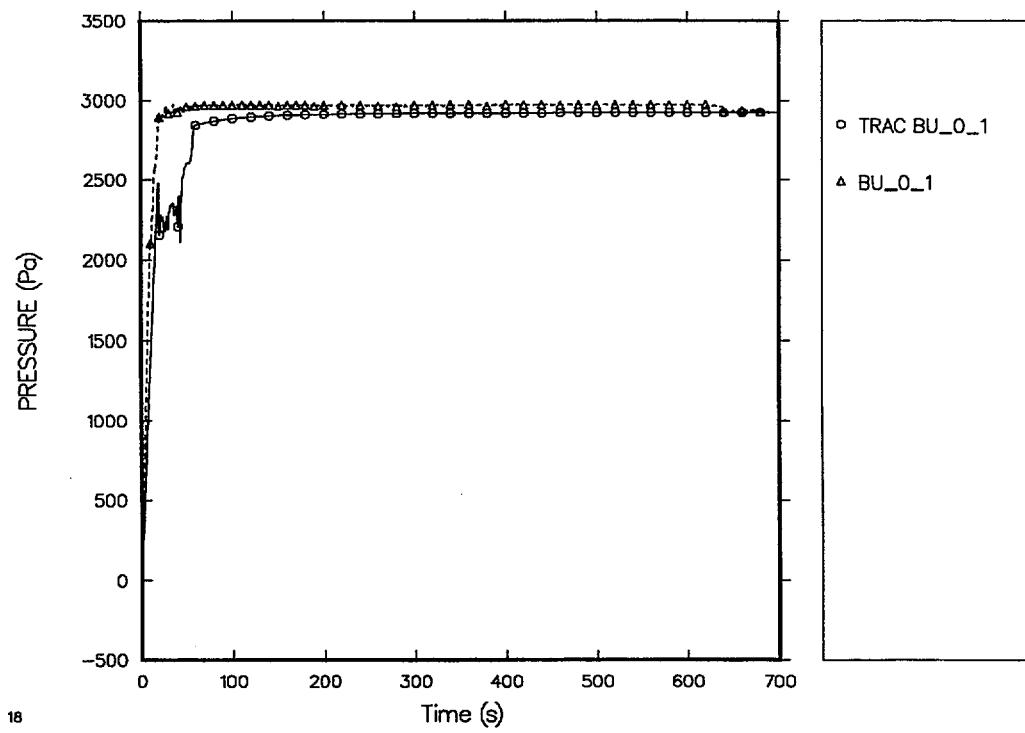
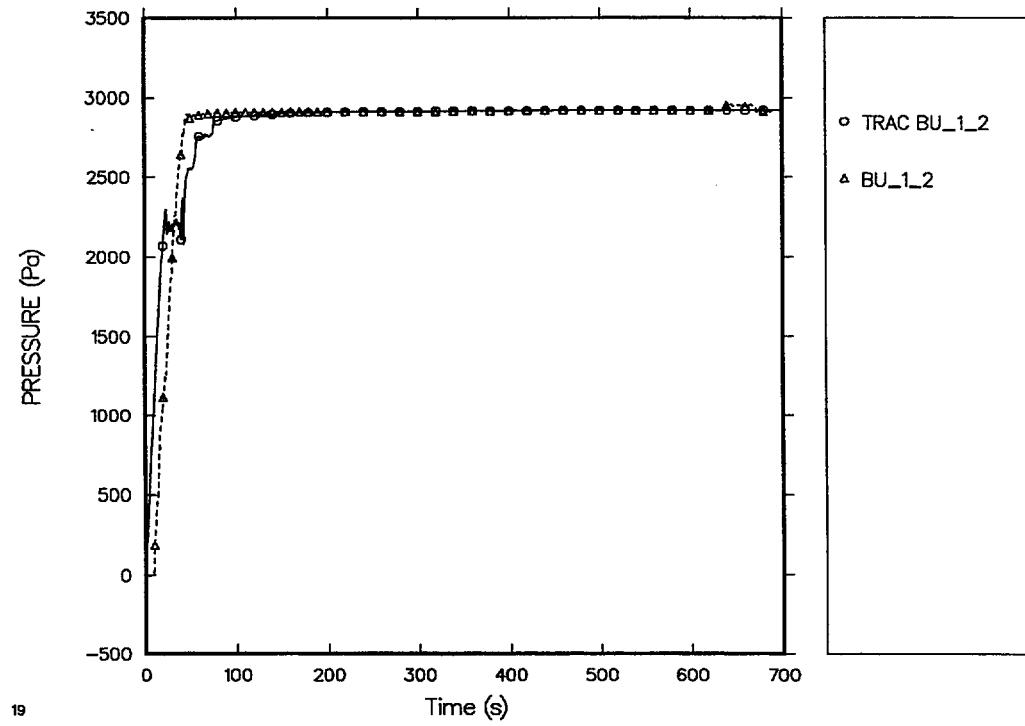


Fig. L-10. Comparison of predicted and measured heater-rod cladding temperatures at 3.5052-m elevation.



18

Fig. L-11. Comparison of predicted and measured differential pressures (0-1 ft).



19

Fig. L-12. Comparison of predicted and measured differential pressures (1-2 ft).

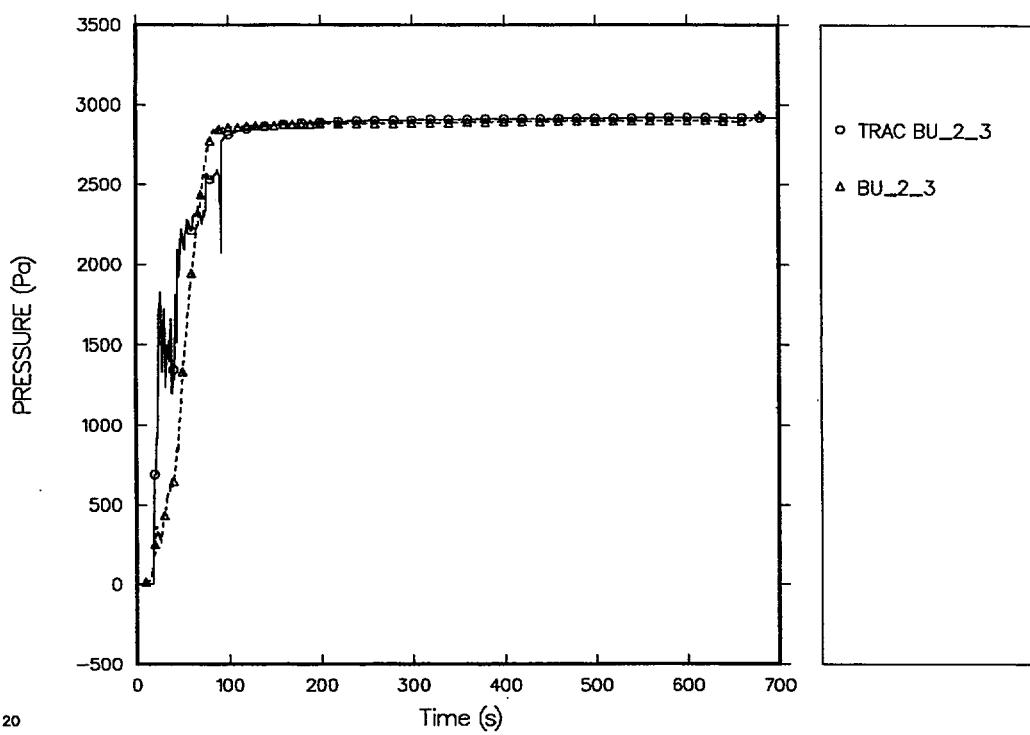


Fig. L-13. Comparison of predicted and measured differential pressures (2-3 ft).

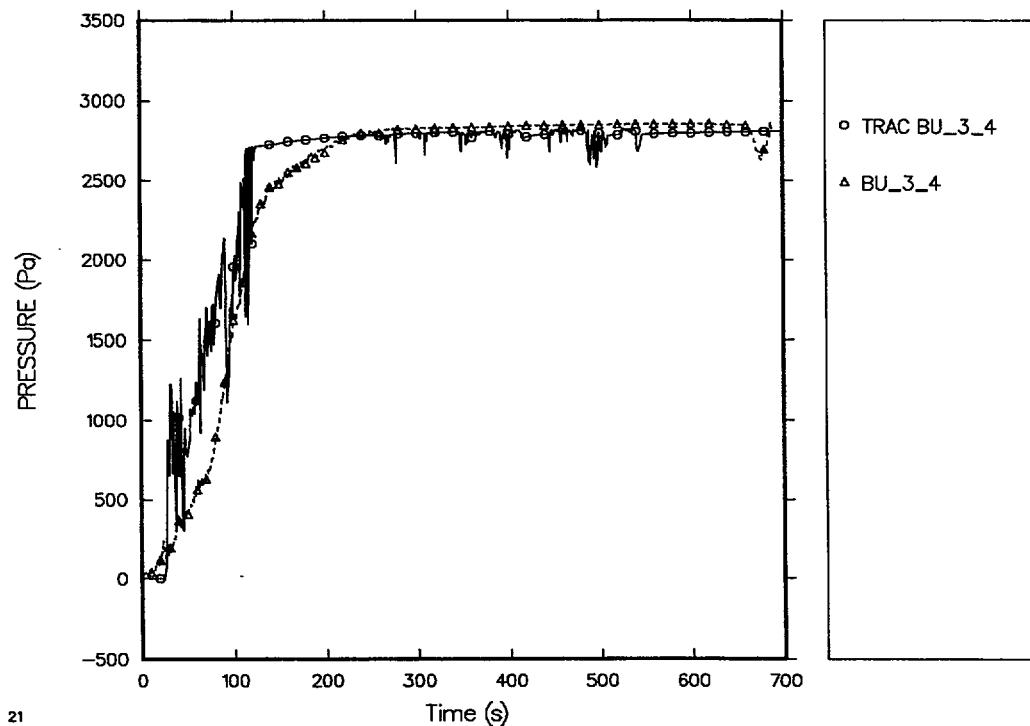
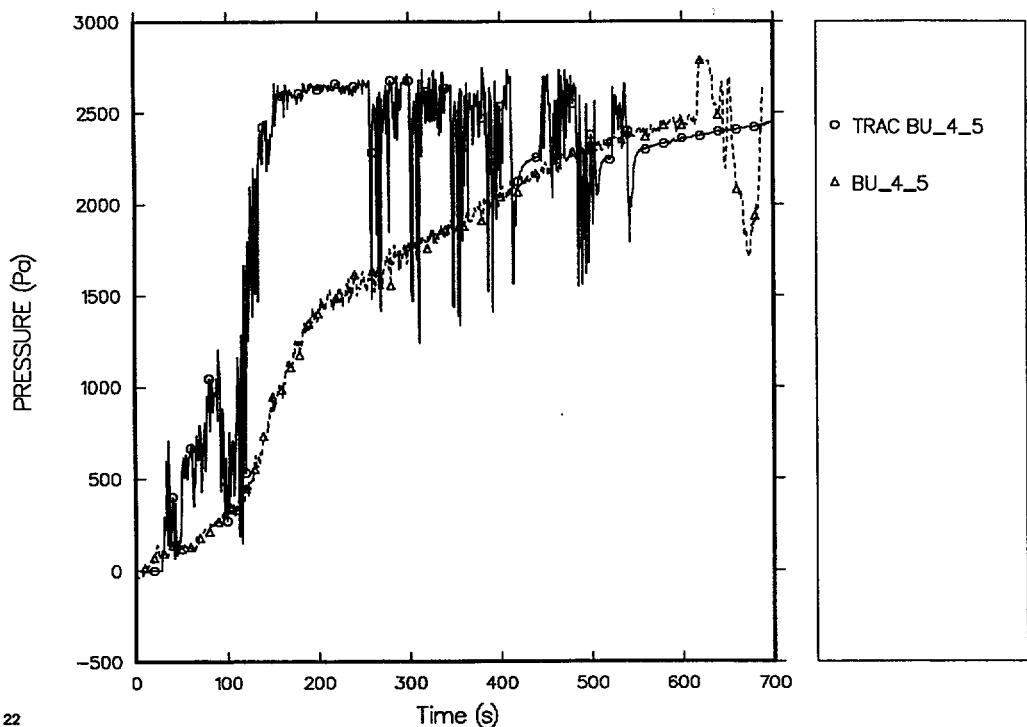
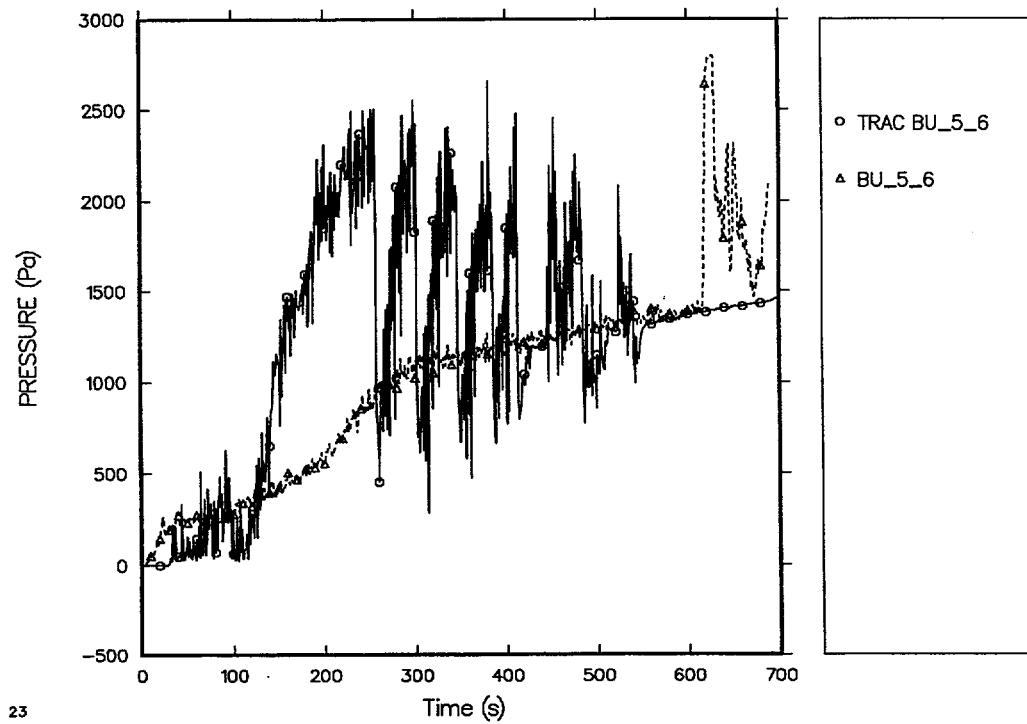


Fig. L-14. Comparison of predicted and measured differential pressures (3-4 ft).



22

Fig. L-15. Comparison of predicted and measured differential pressures (4-5 ft).



23

Fig. L-16. Comparison of predicted and measured differential pressures (5-6 ft).

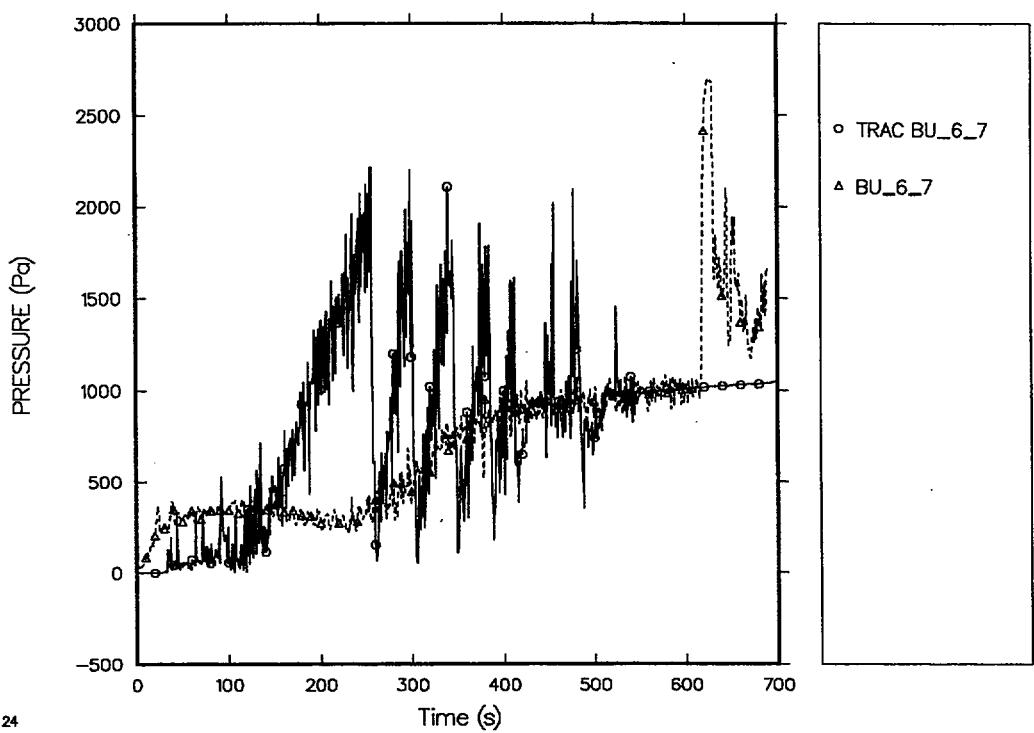


Fig. L-17. Comparison of predicted and measured differential pressures (6-7 ft).

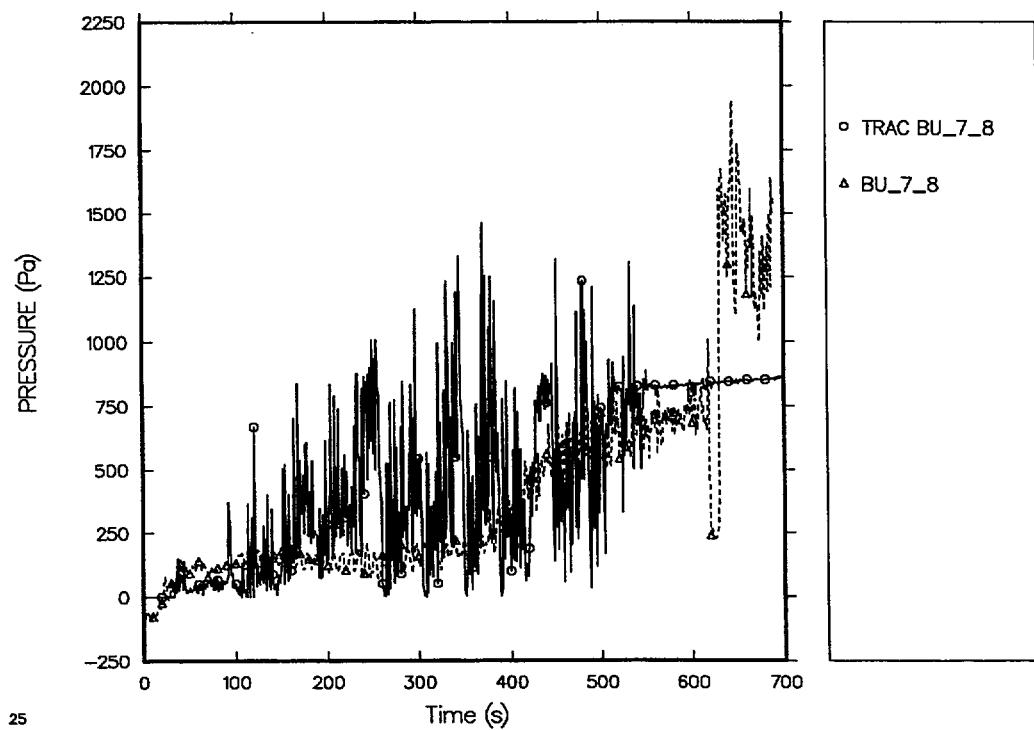
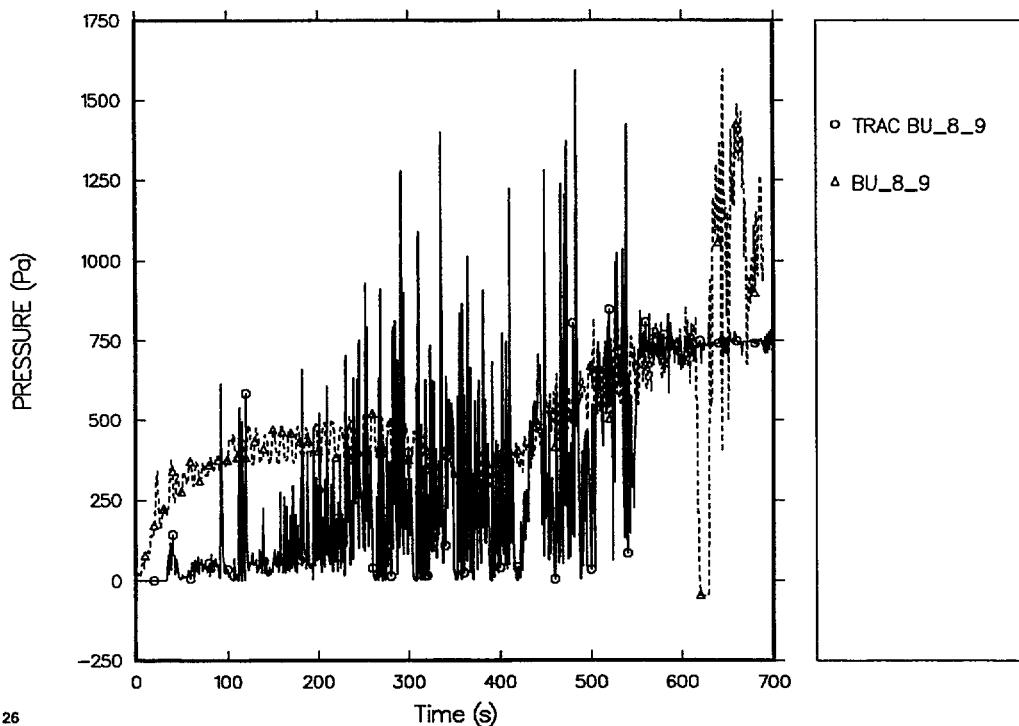
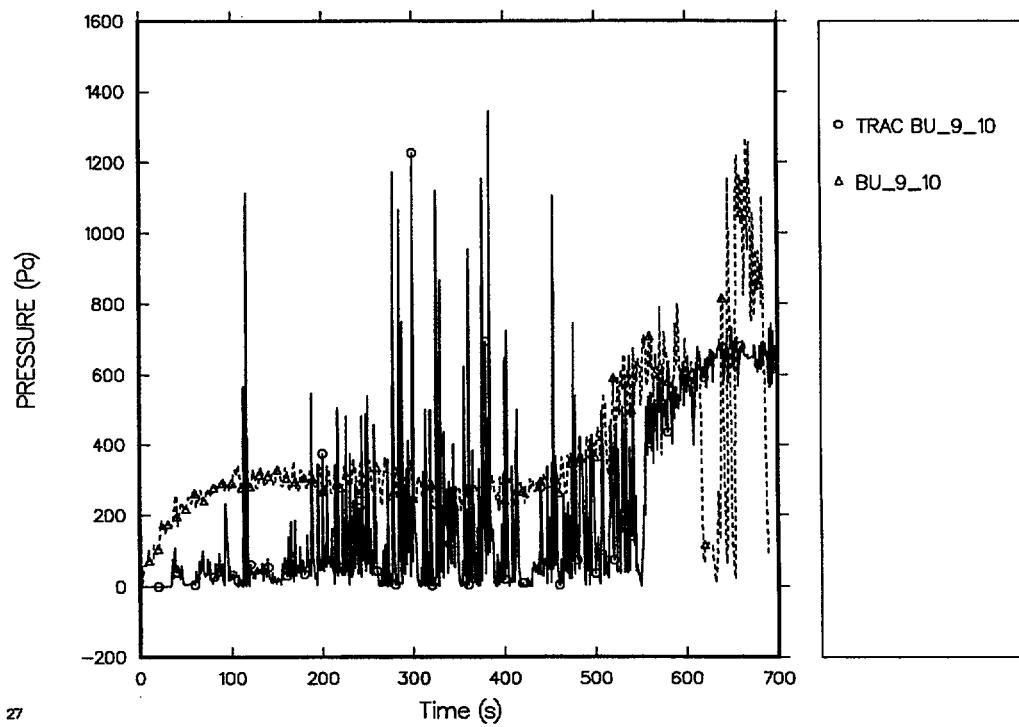


Fig. L-18. Comparison of predicted and measured differential pressures (7-8 ft).



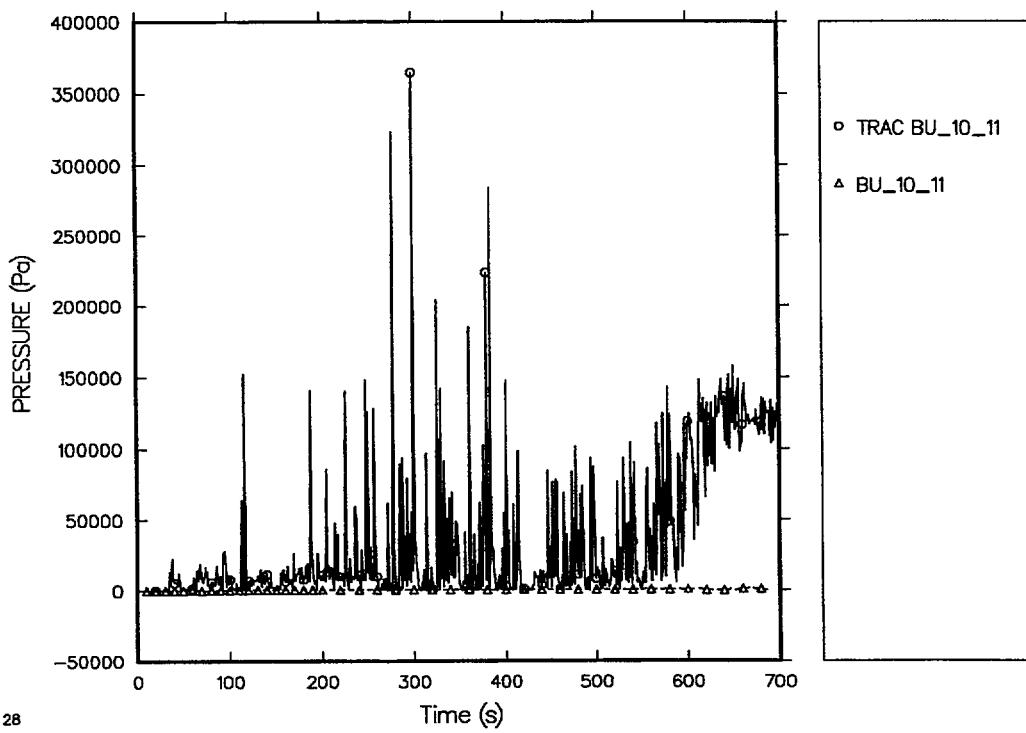
26

Fig. L-19. Comparison of predicted and measured differential pressures (8–9 ft).



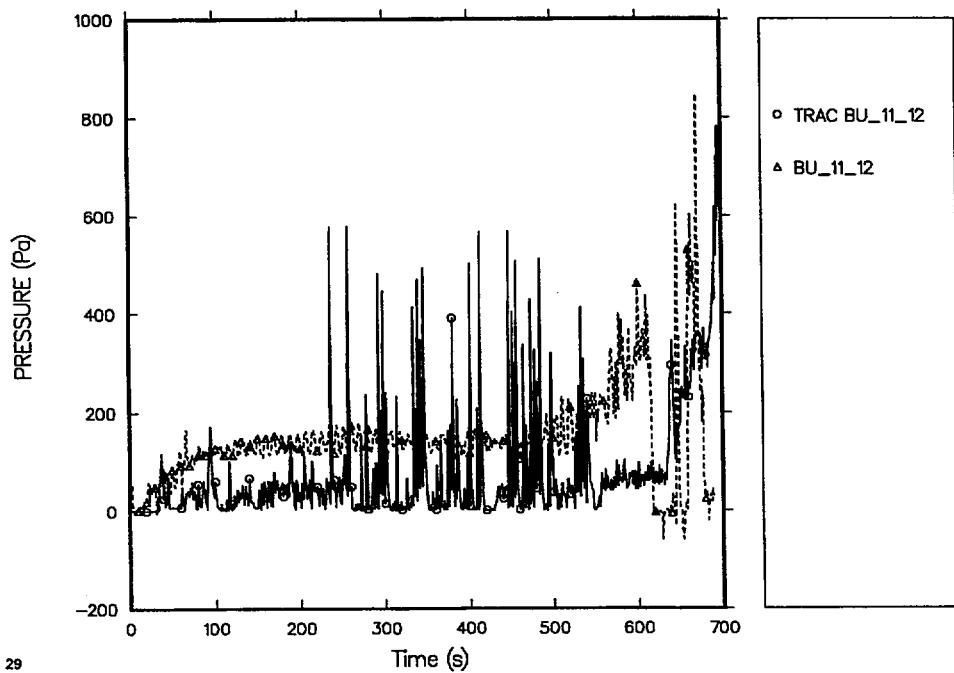
27

Fig. L-20. Comparison of predicted and measured differential pressures (9–10 ft).



28

Fig. L-21. Comparison of predicted and measured differential pressures (10–11 ft).



29

Fig. L-22. Comparison of predicted and measured differential pressures (11–12 ft).

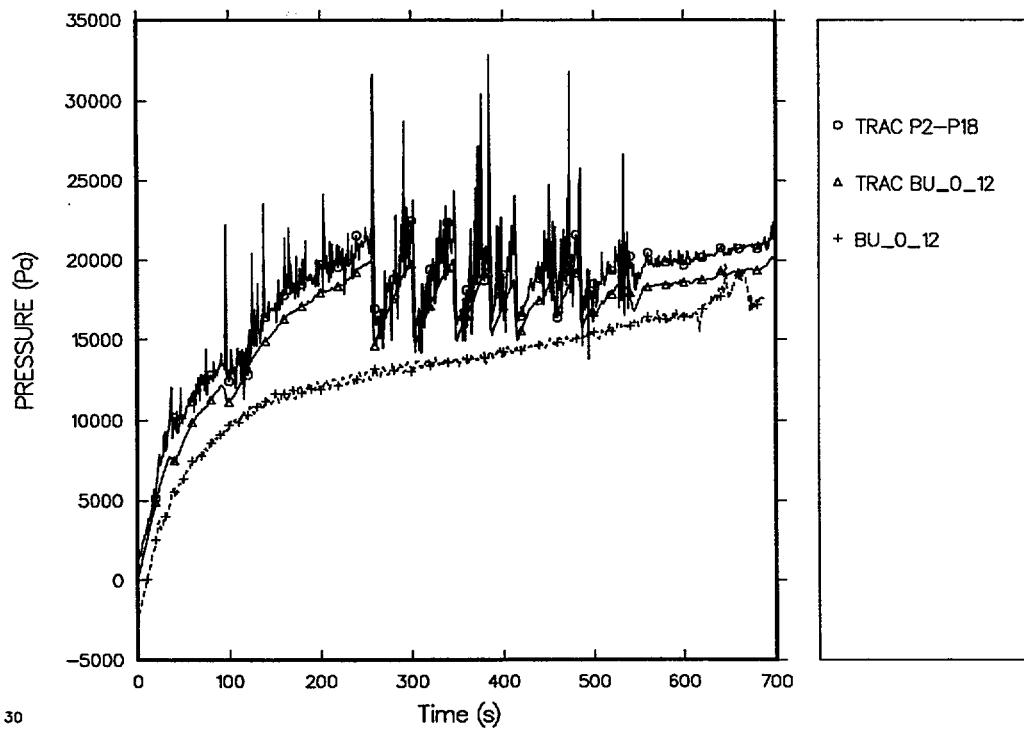


Fig. L-23. Comparison of predicted and measured total core differential pressures (0–12 ft).

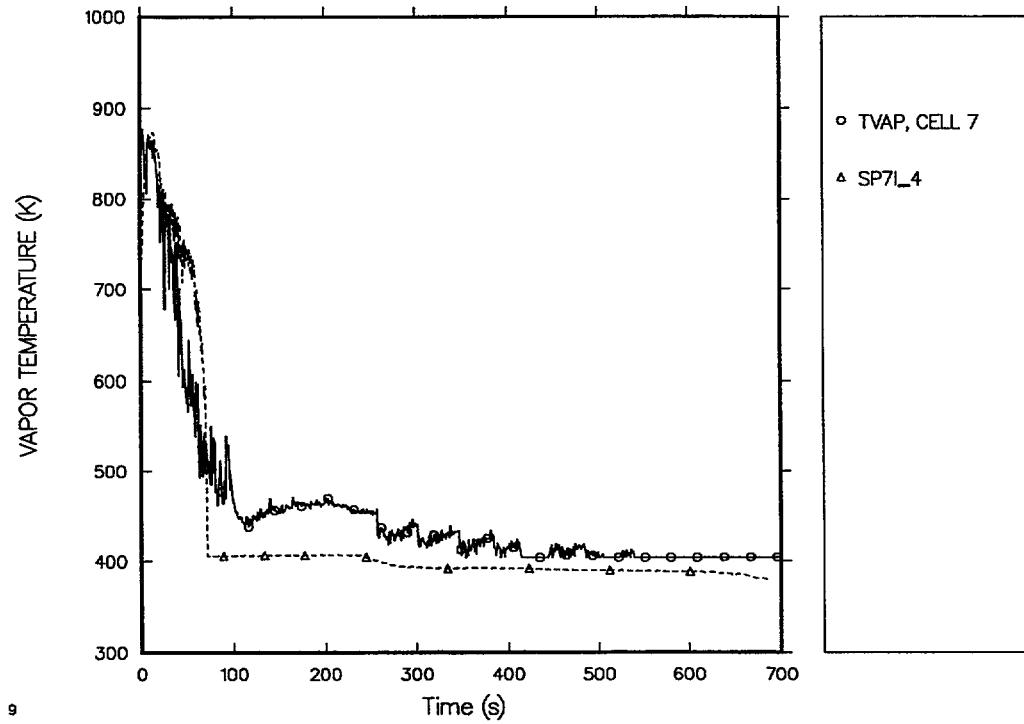


Fig. L-24. Comparison of predicted and measured vapor temperatures in cell 7.

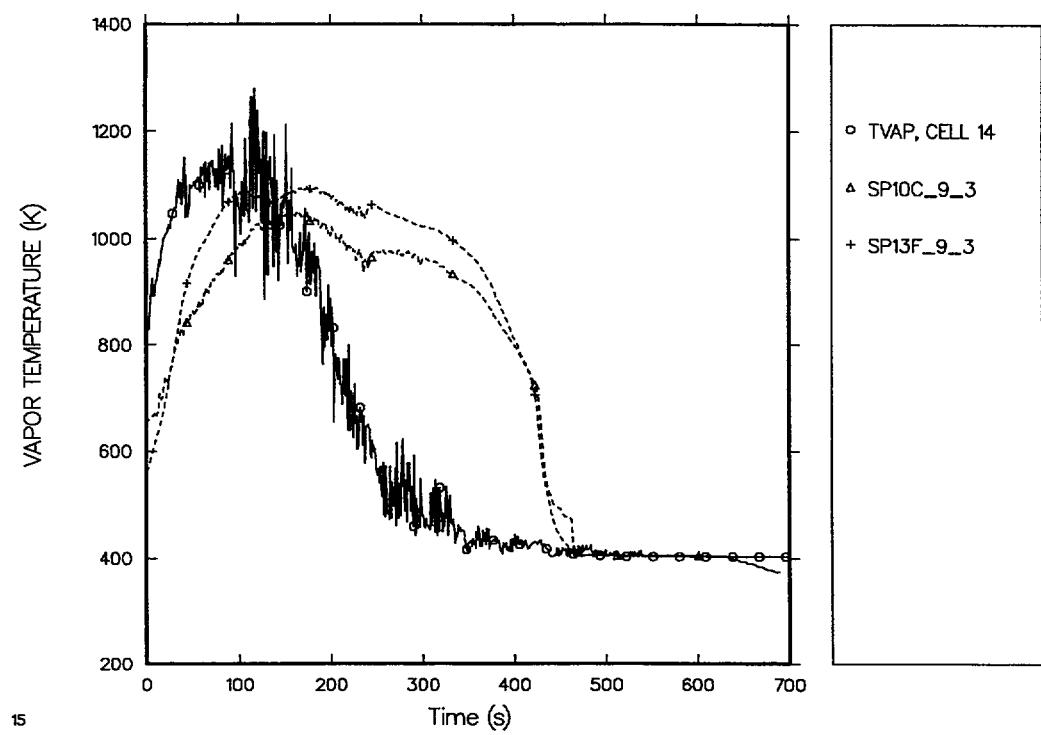


Fig. L-25. Comparison of predicted and measured vapor temperatures in cell 14.

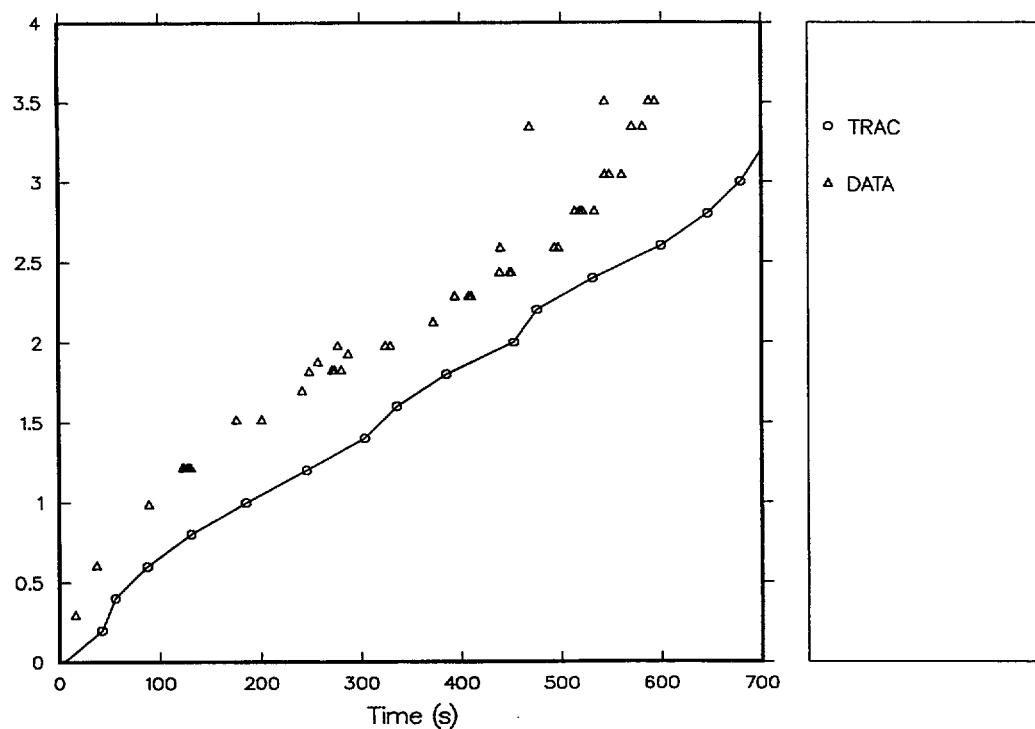


Fig. L-26. Comparison of predicted and measured cladding quench times (with grid-spacer model).

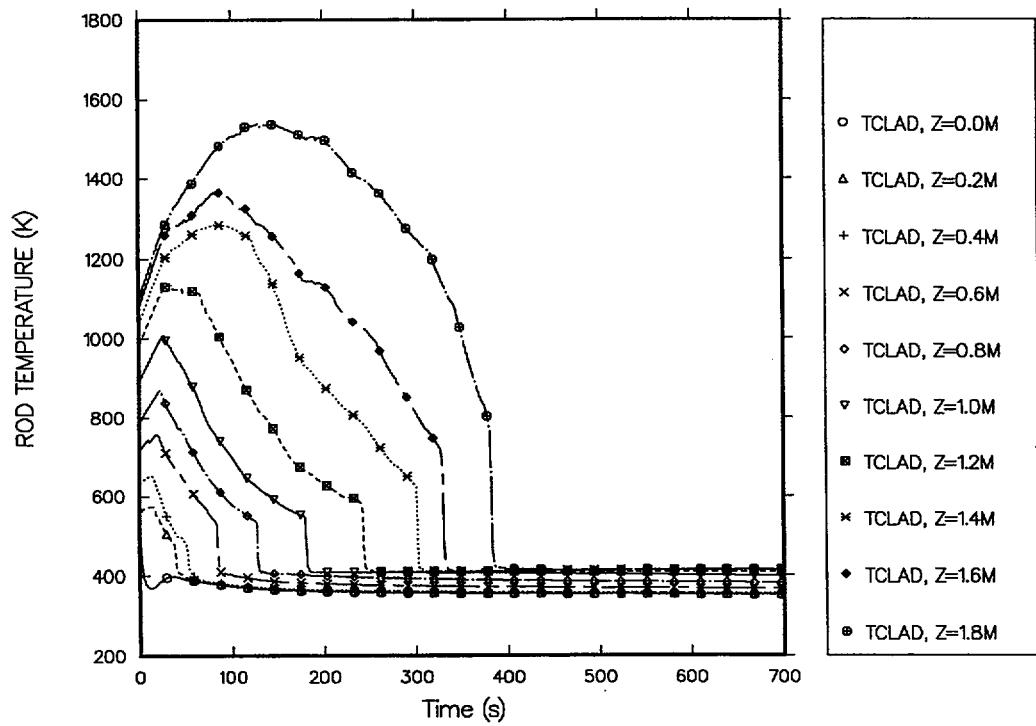


Fig. L-27. Predicted cladding temperature responses in lower half of core (with grid-spacer model).

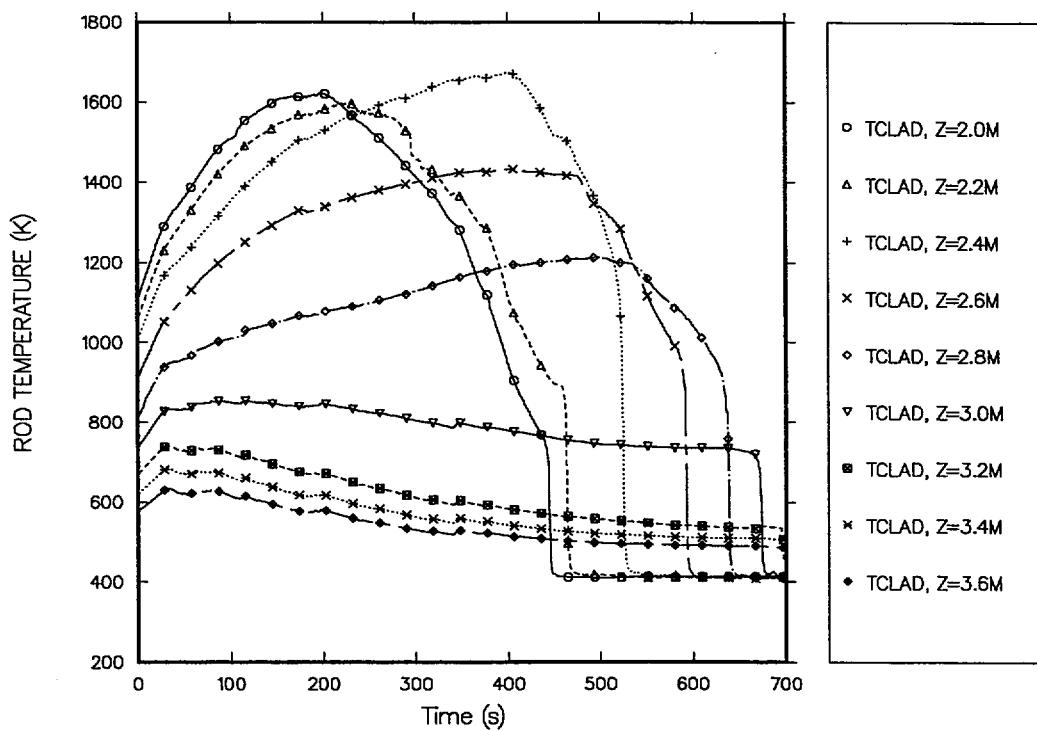


Fig. L-28. Predicted cladding temperature responses in upper half of core (with grid-spacer model).

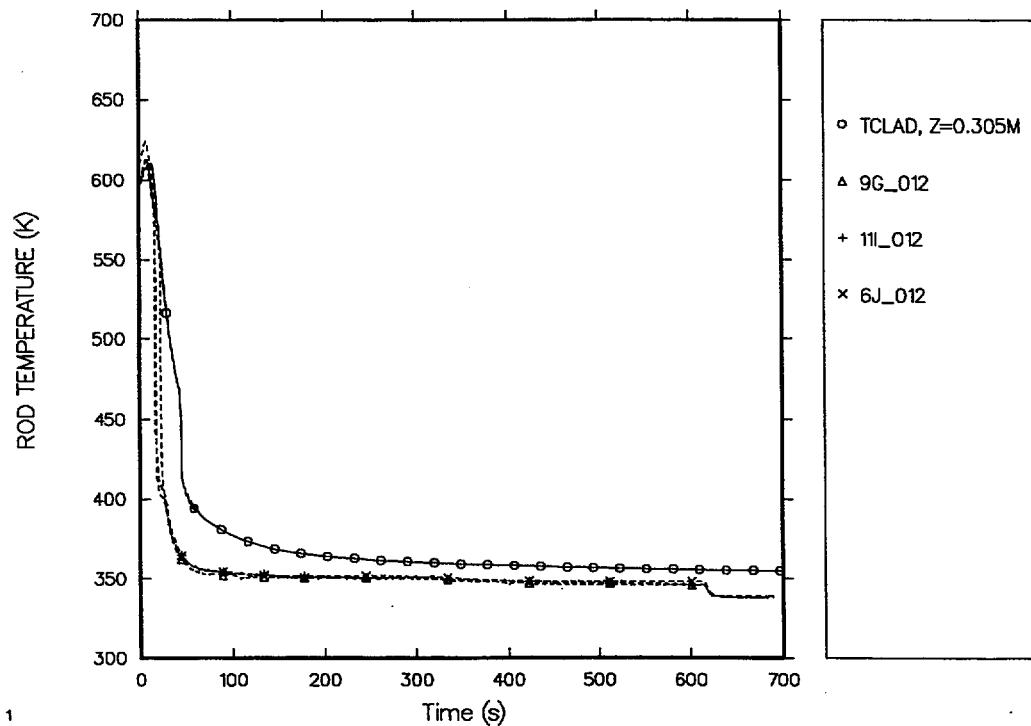


Fig. L-29. Comparison of predicted and measured heater-rod cladding temperatures at 0.3048-m elevation (with grid-spacer model).

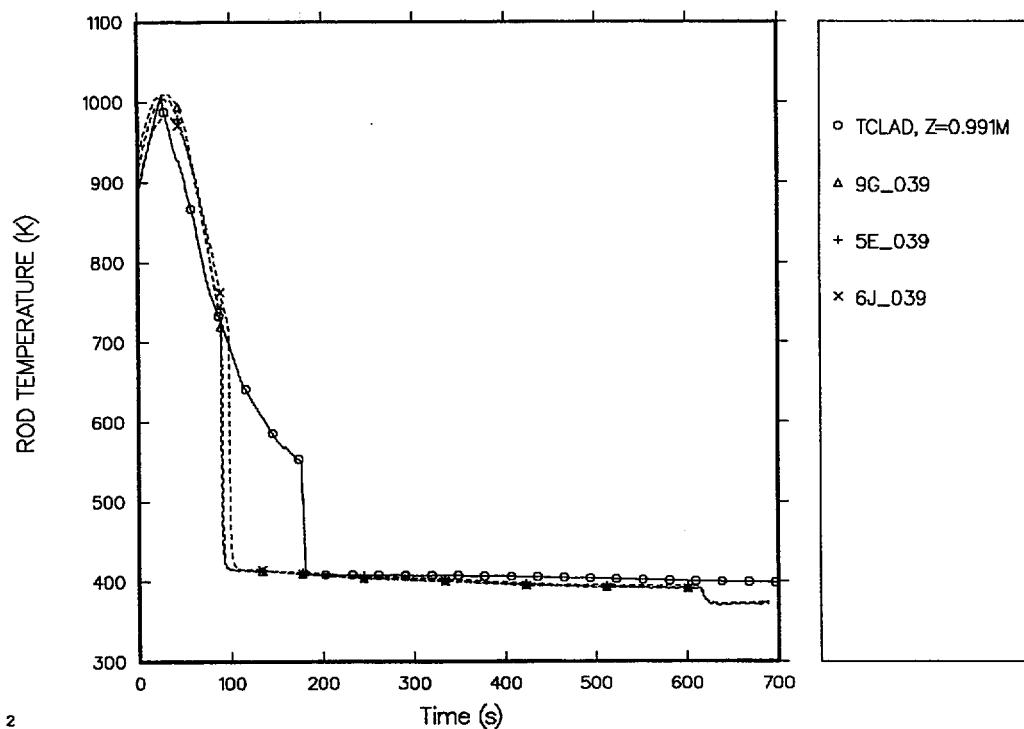


Fig. L-30. Comparison of predicted and measured heater-rod cladding temperatures at 0.9906-m elevation (with grid-spacer model).

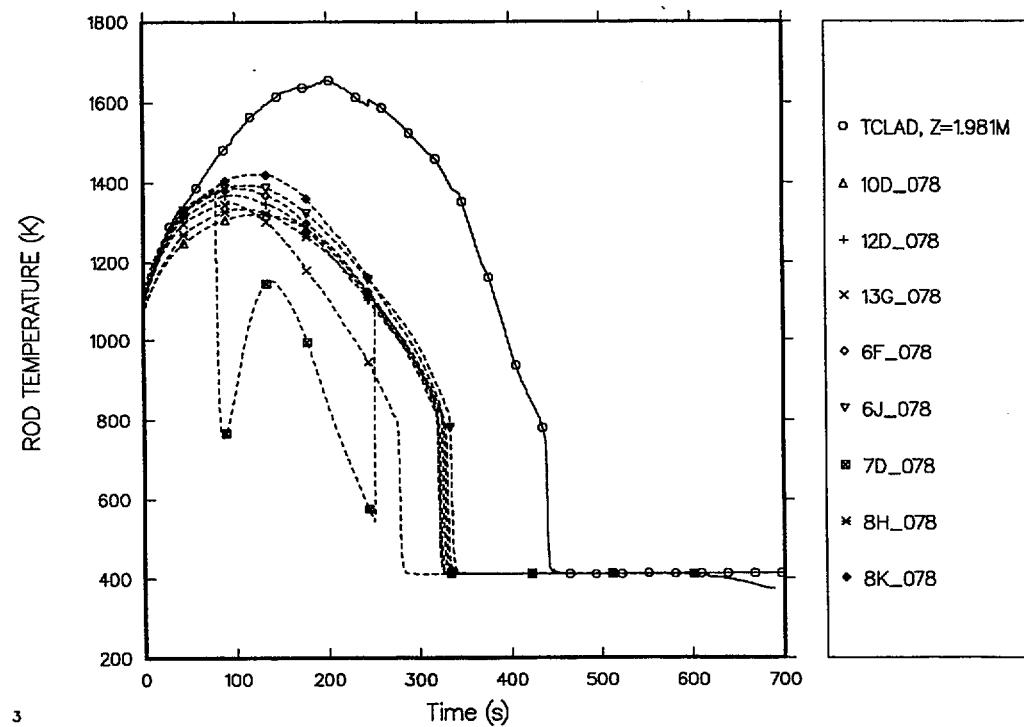


Fig. L-31. Comparison of predicted and measured heater-rod cladding temperatures at 1.9812-m elevation (with grid-spacer model).

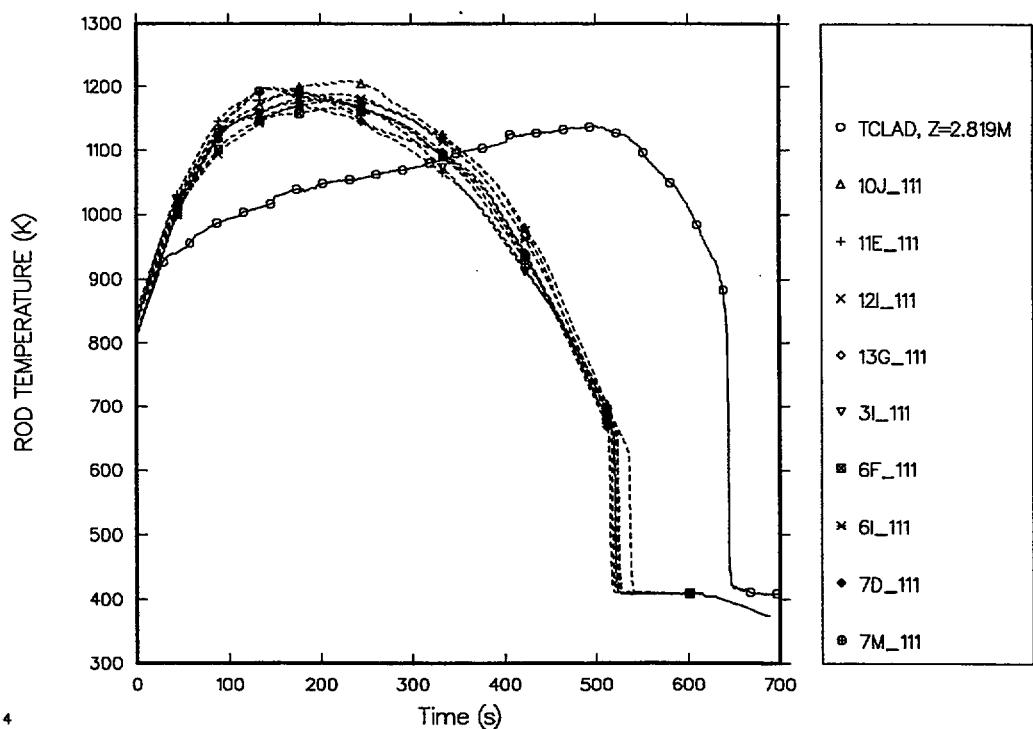


Fig. L-32. Comparison of predicted and measured heater-rod cladding temperatures at 2.8194-m elevation (with grid-spacer model).

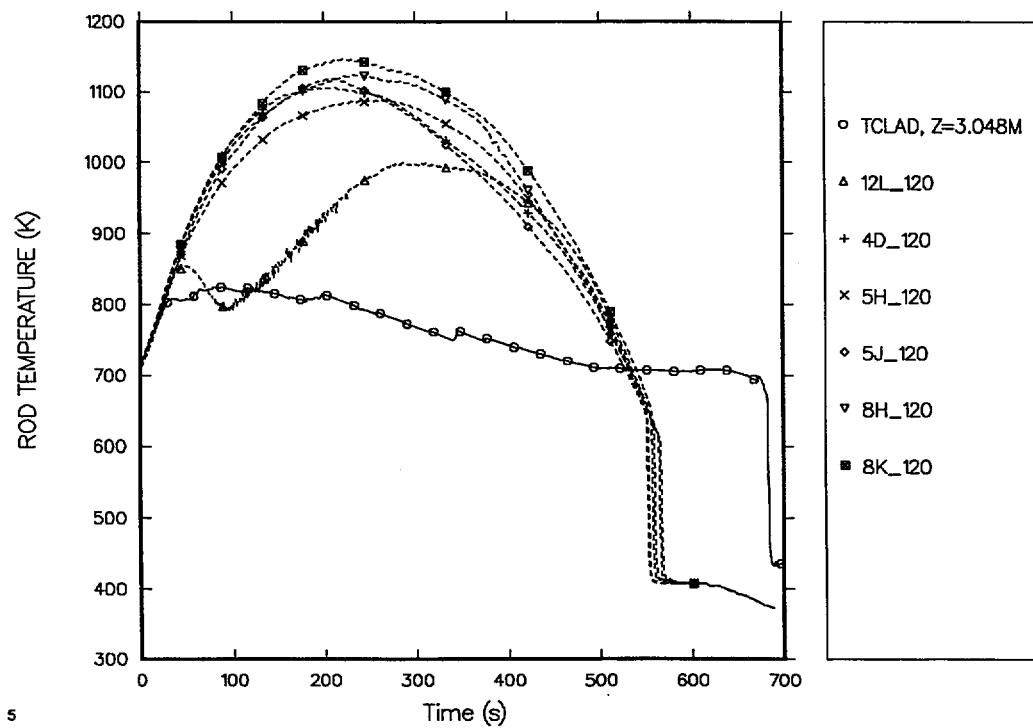


Fig. L-33. Comparison of predicted and measured heater-rod cladding temperatures at 3.0480-m elevation (with grid-spacer model).

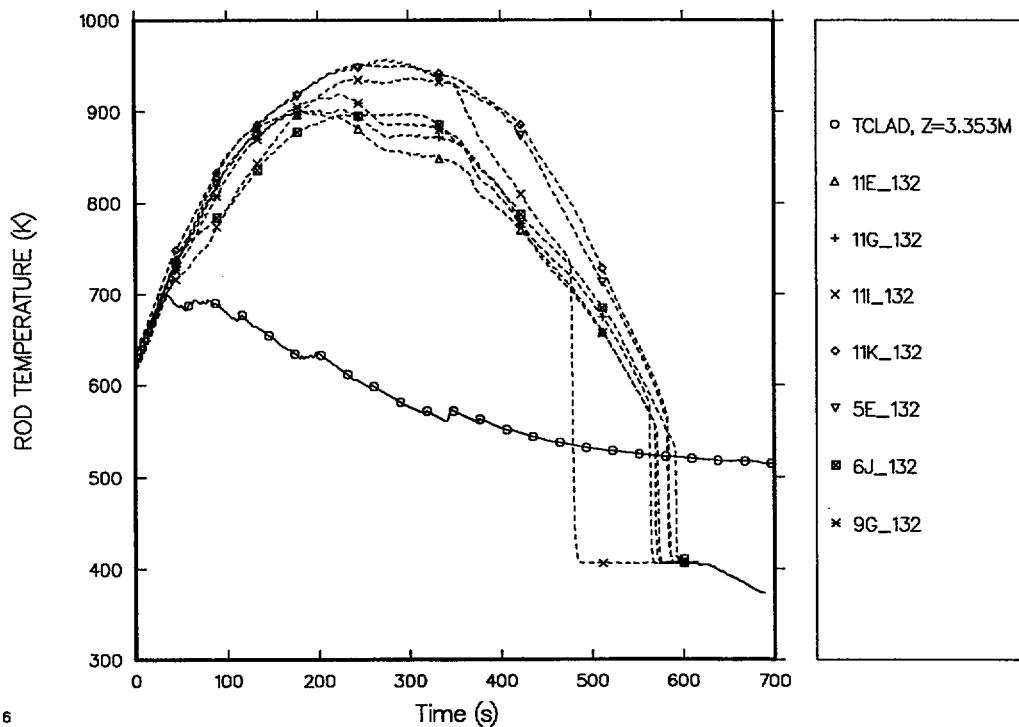


Fig. 49-34. Comparison of predicted and measured heater-rod cladding temperatures at 3.3528-m elevation (with grid-spacer model).

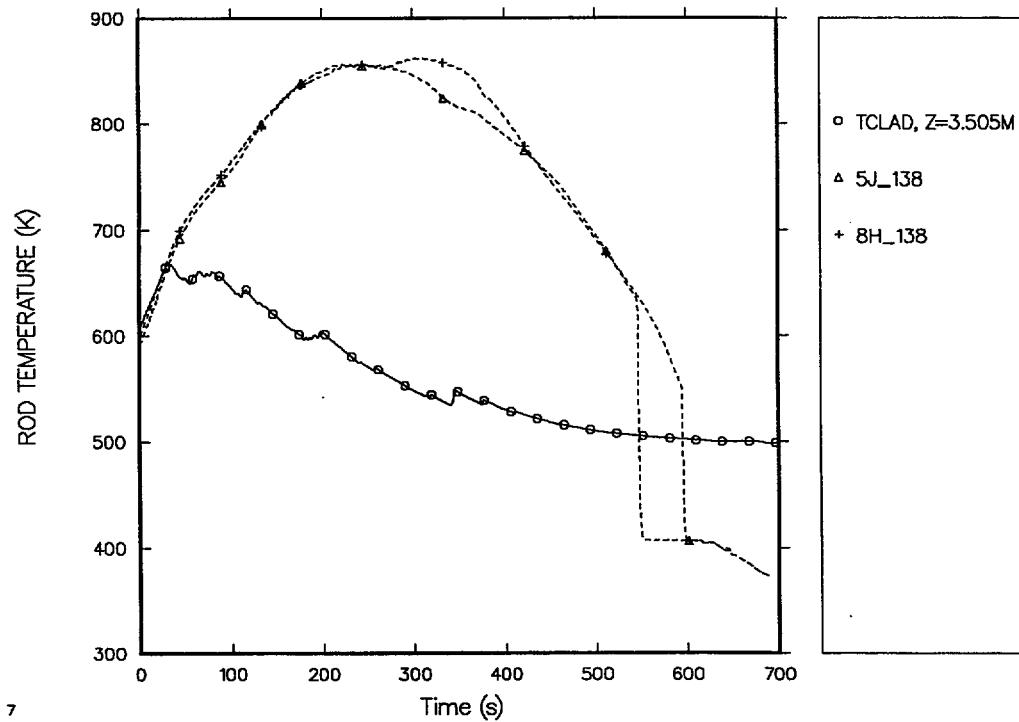


Fig. L-35. Comparison of predicted and measured heater-rod cladding temperatures at 3.5052-m elevation (with grid-spacer model).

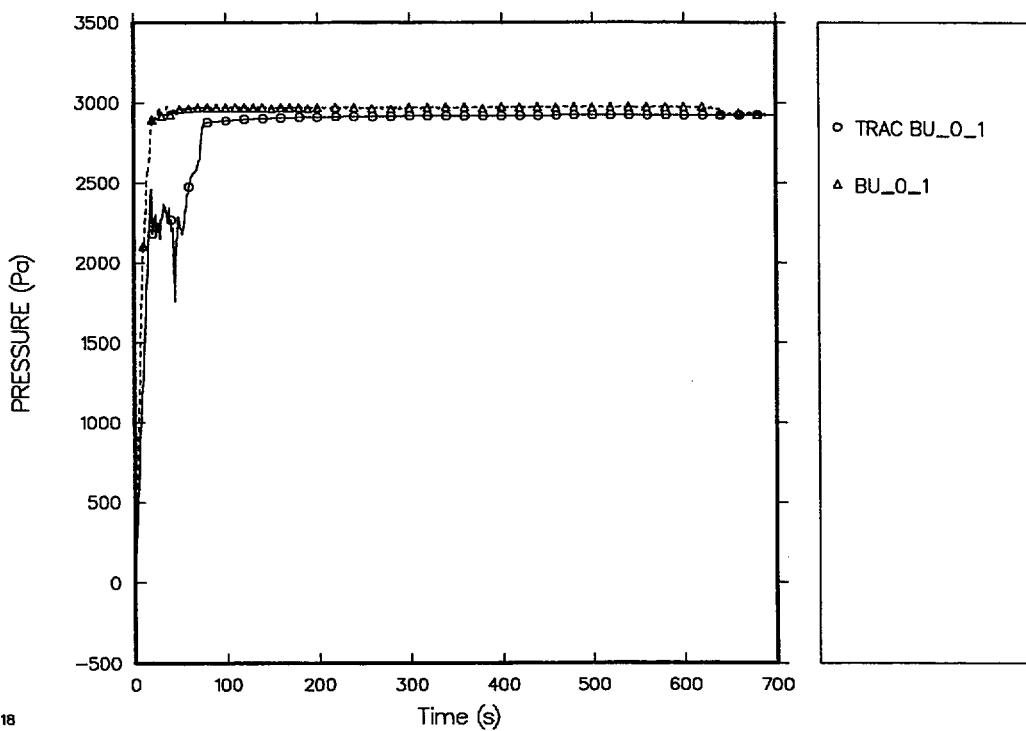


Fig. L-36. Comparison of predicted and measured differential pressures (0-1 ft, with grid-spacer model).

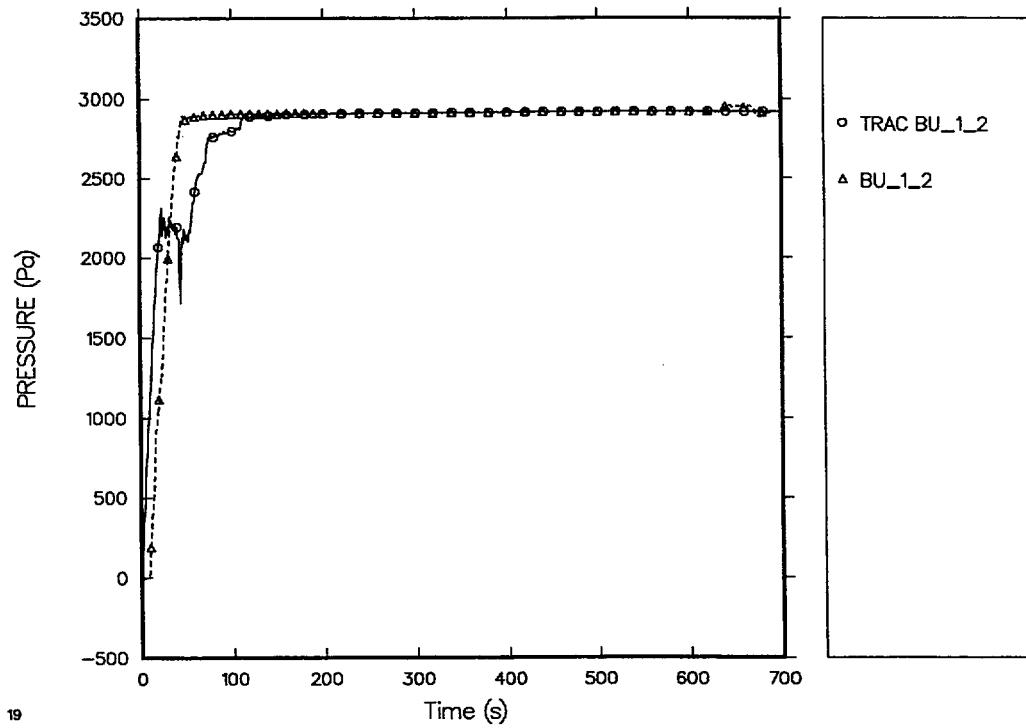


Fig. L-37. Comparison of predicted and measured differential pressures (1-2 ft, with grid-spacer model).

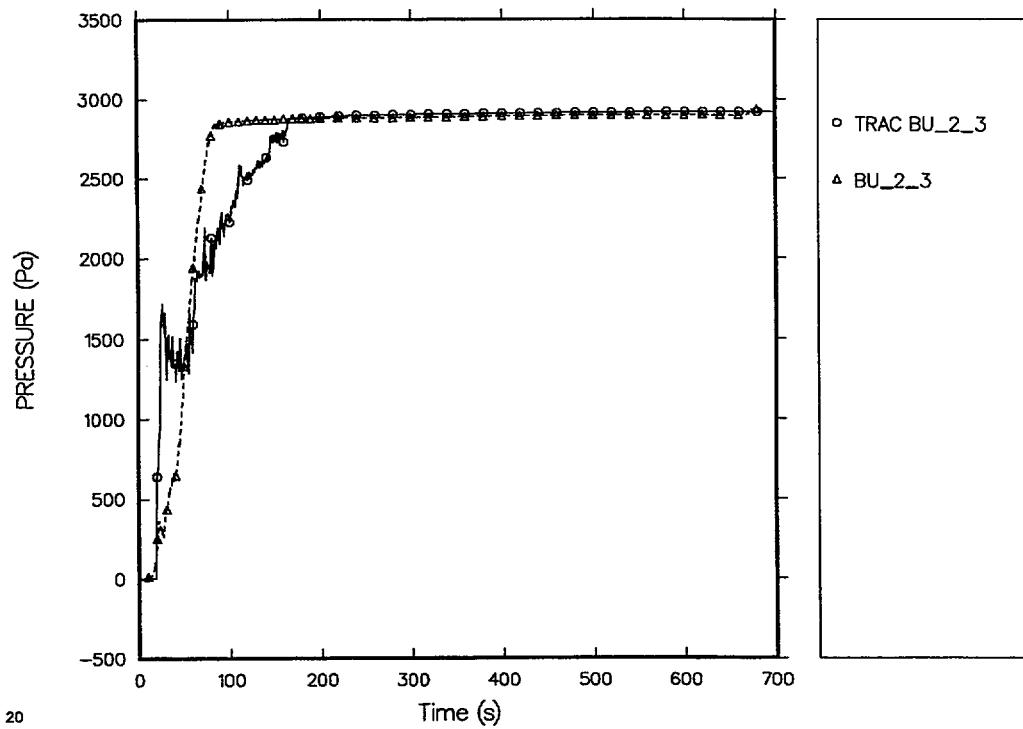


Fig. L-38. Comparison of predicted and measured differential pressures (2-3 ft, with grid-spacer model).

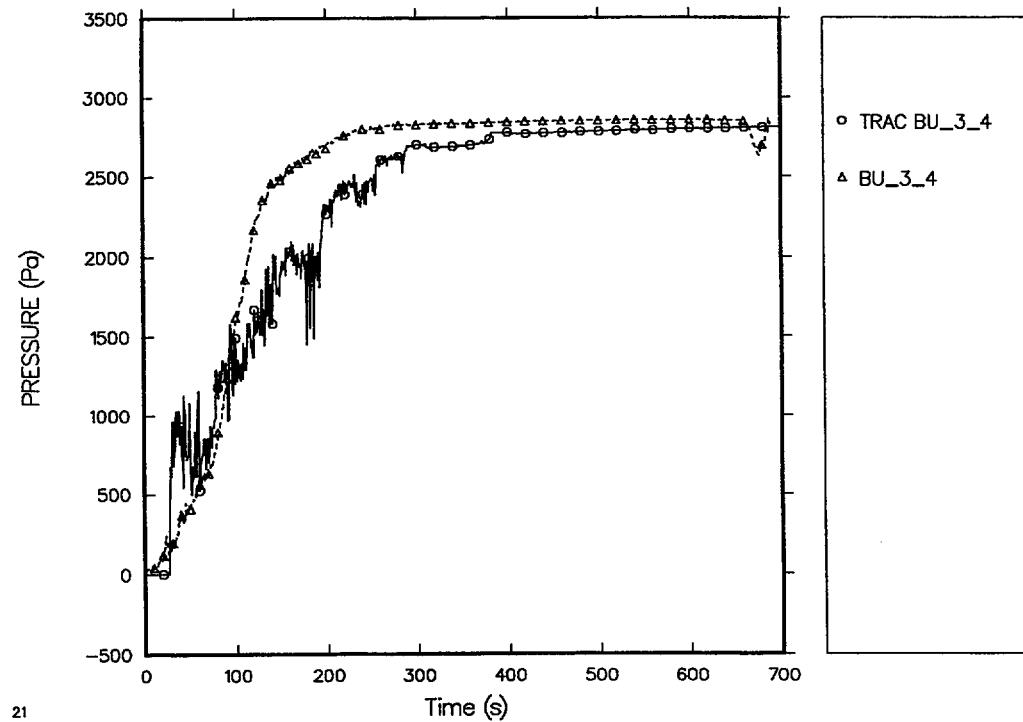
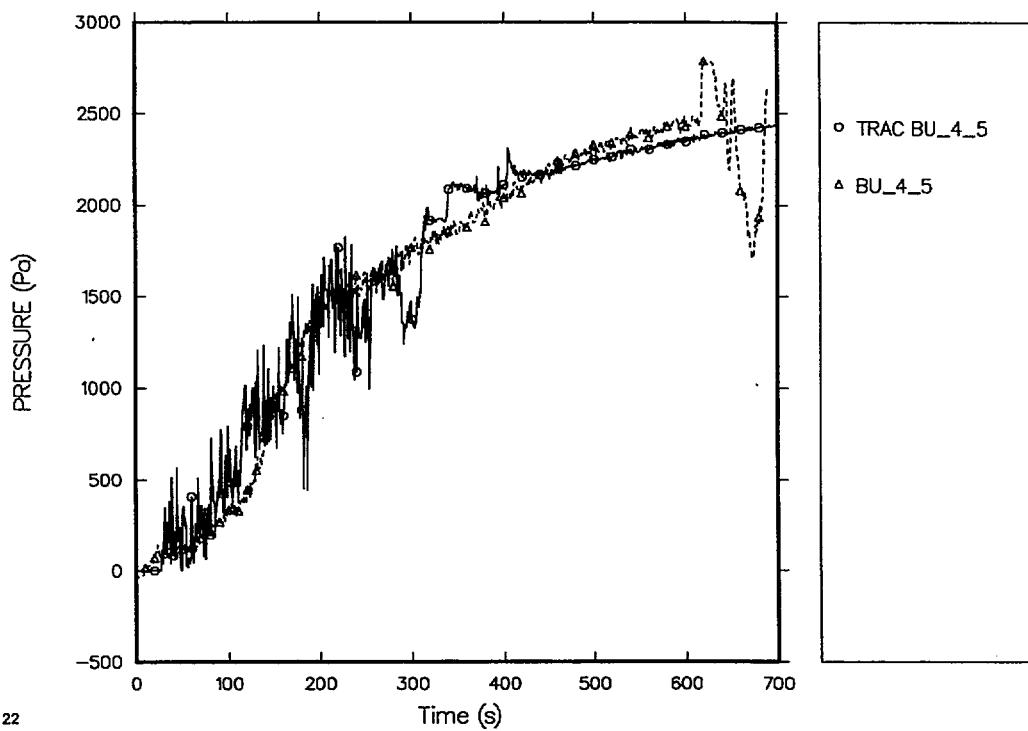
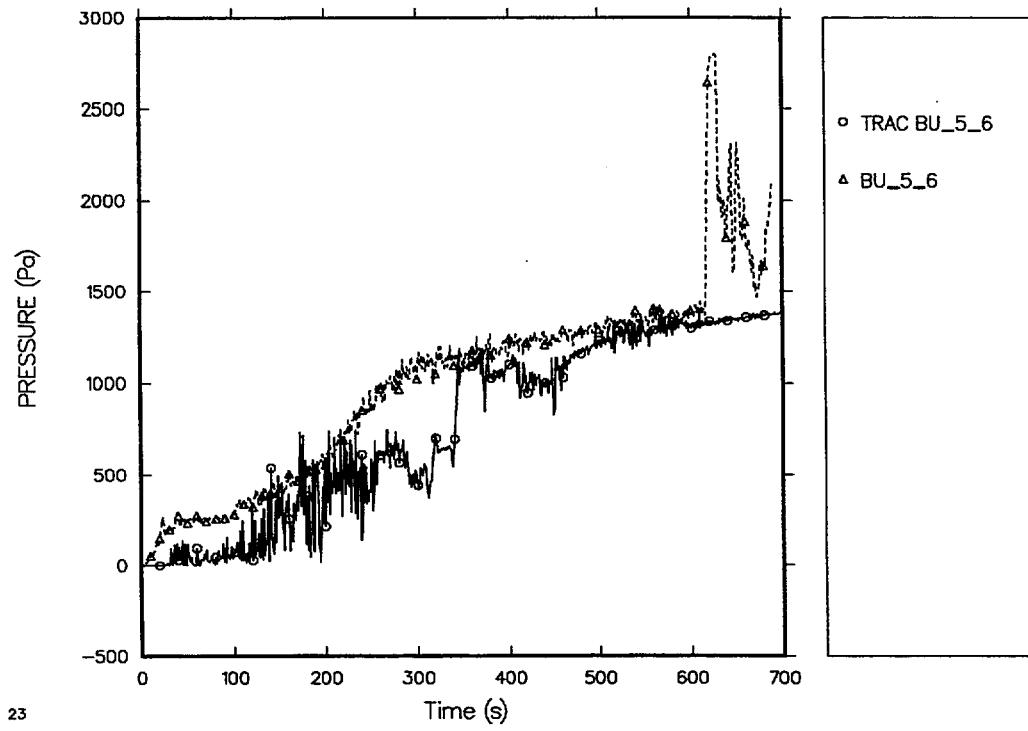


Fig. L-39. Comparison of predicted and measured differential pressures (3-4 ft, with grid-spacer model).



22

Fig. L-40. Comparison of predicted and measured differential pressures (4-5 ft, with grid-spacer model).



23

Fig. L-41. Comparison of predicted and measured differential pressures (5-6 ft, with grid-spacer model).

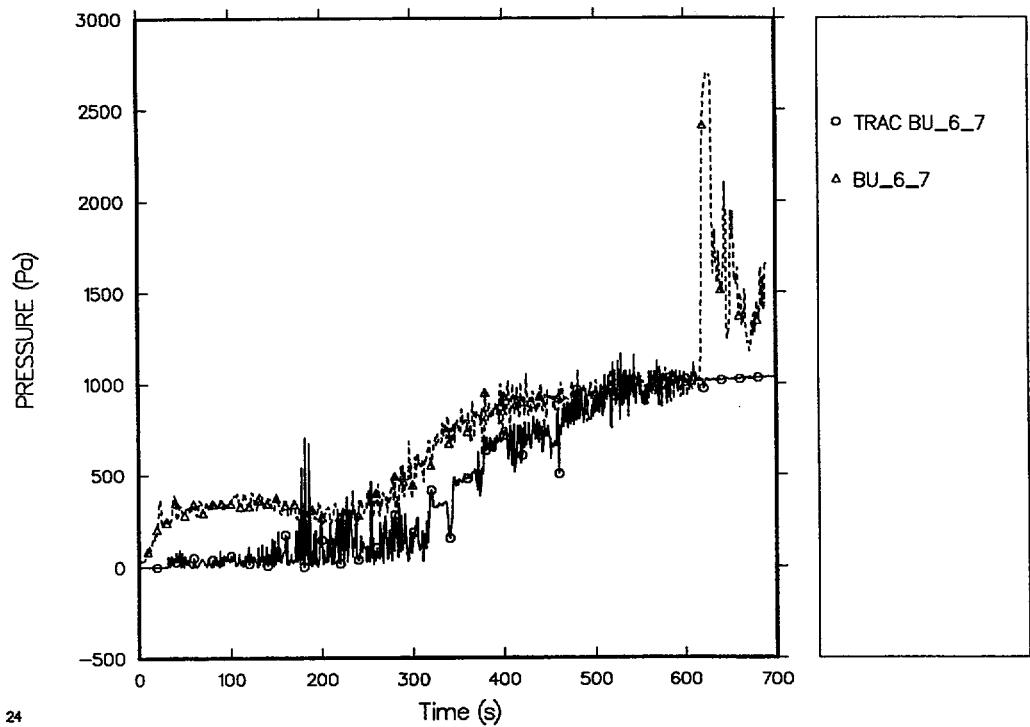


Fig. L-42. Comparison of predicted and measured differential pressures (6-7 ft, with grid-spacer model).

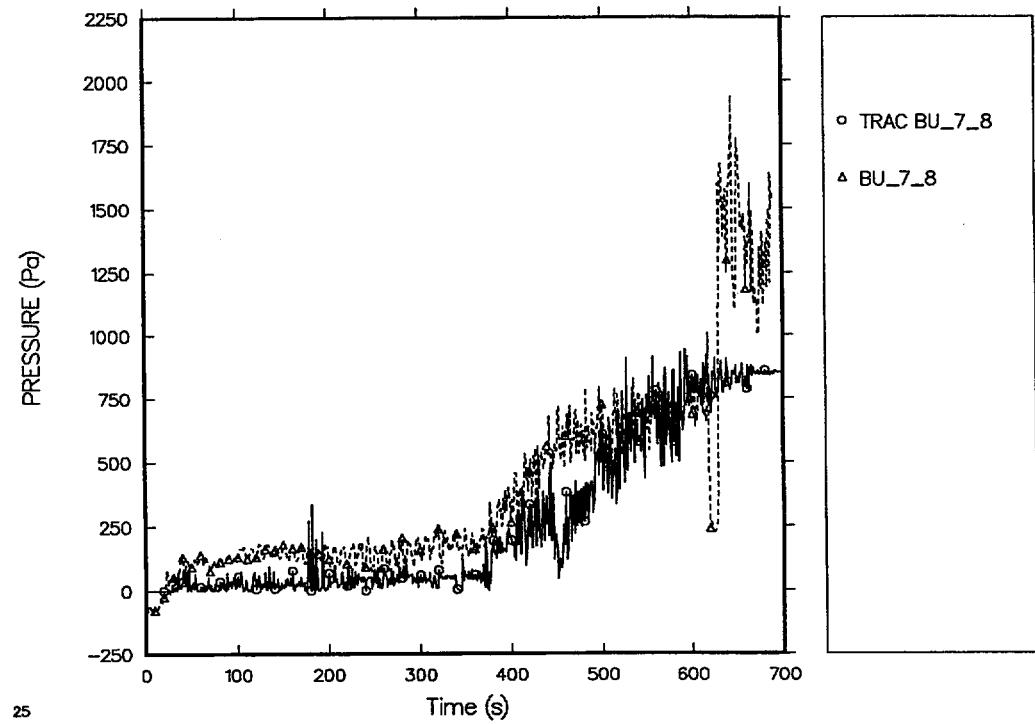


Fig. L-43. Comparison of predicted and measured differential pressures (7-8 ft, with grid-spacer model).

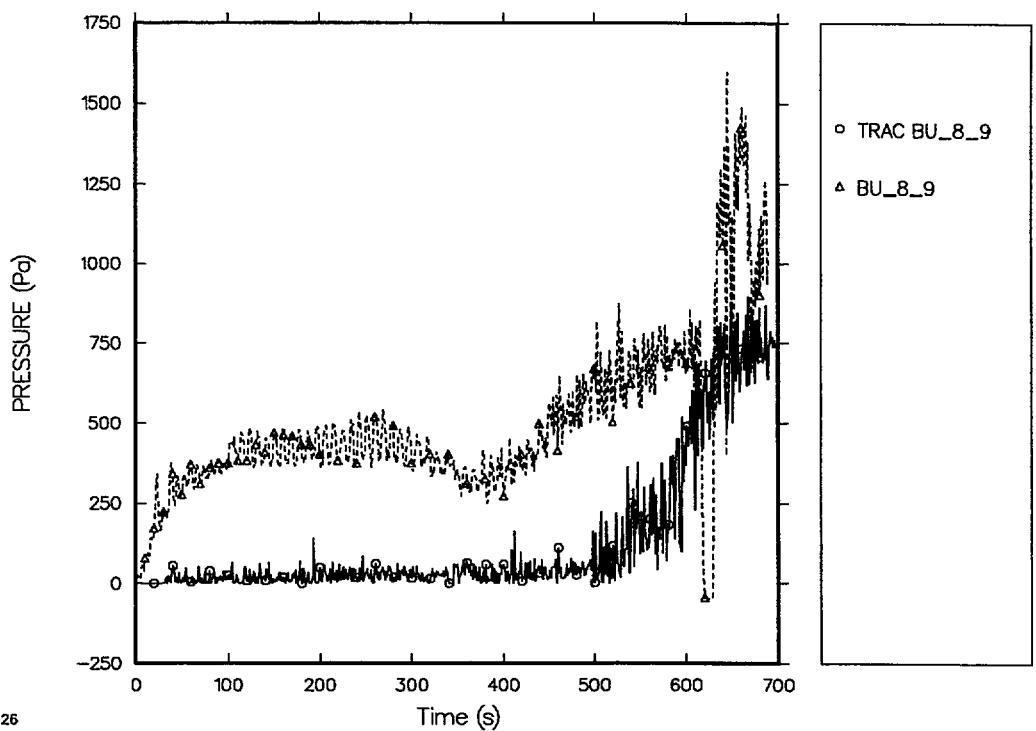


Fig. L-44. Comparison of predicted and measured differential pressures (8-9ft, with grid-spacer model).

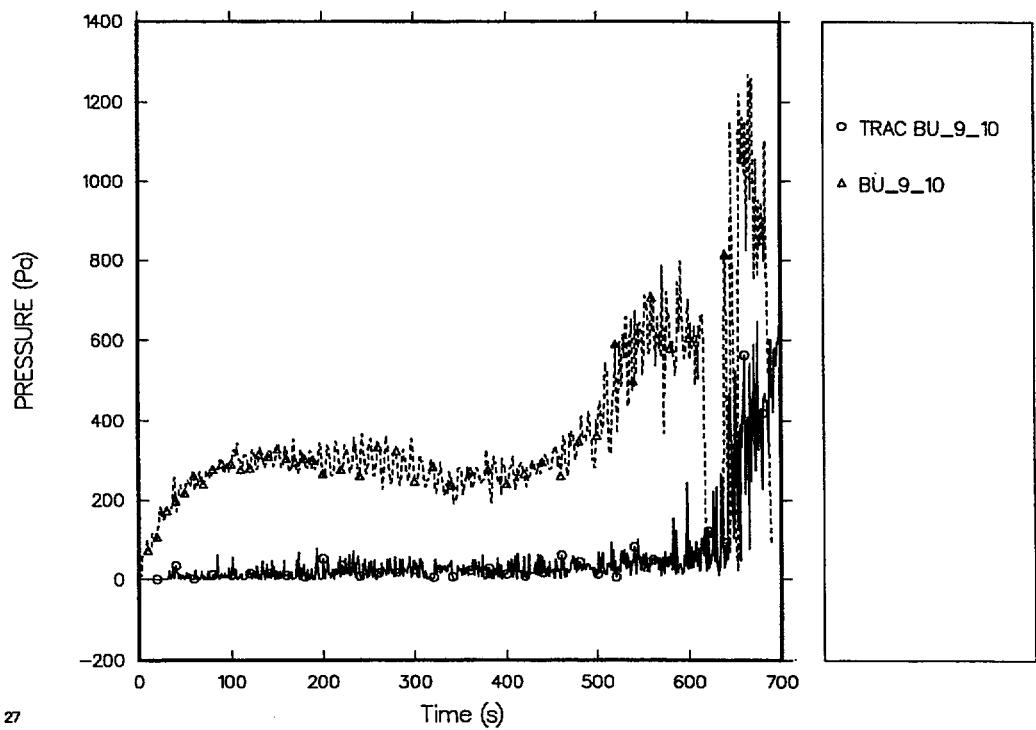


Fig. L-45. Comparison of predicted and measured differential pressures (9-10 ft, with grid-spacer model).

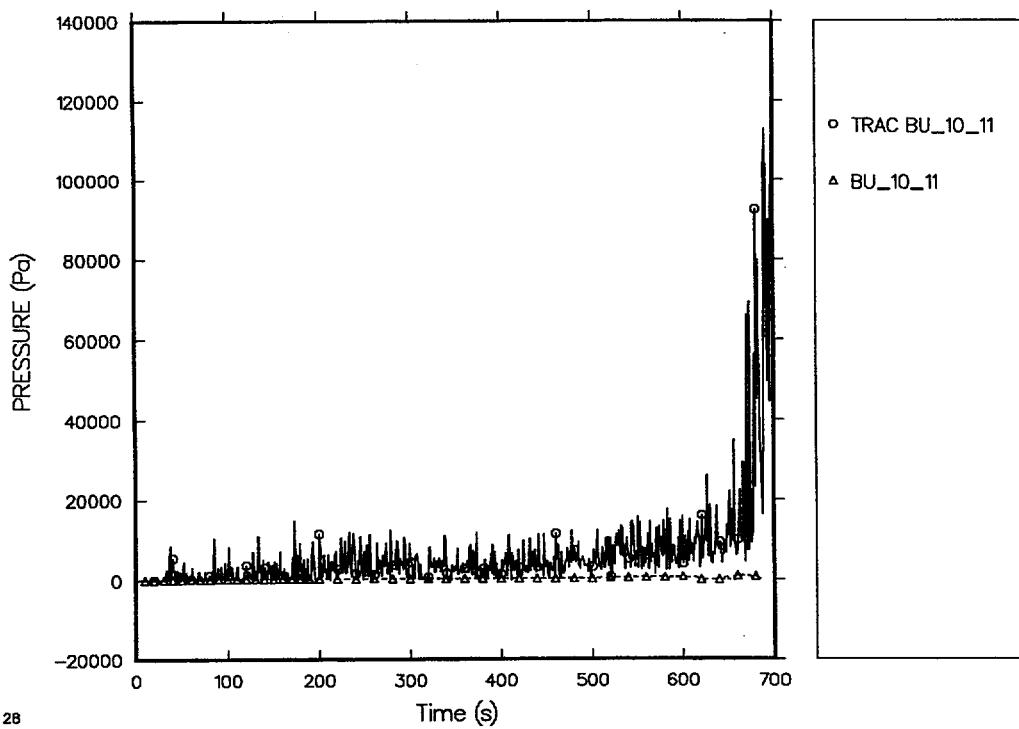


Fig. L-46. Comparison of predicted and measured differential pressures (10–11 ft, with grid-spacer model).

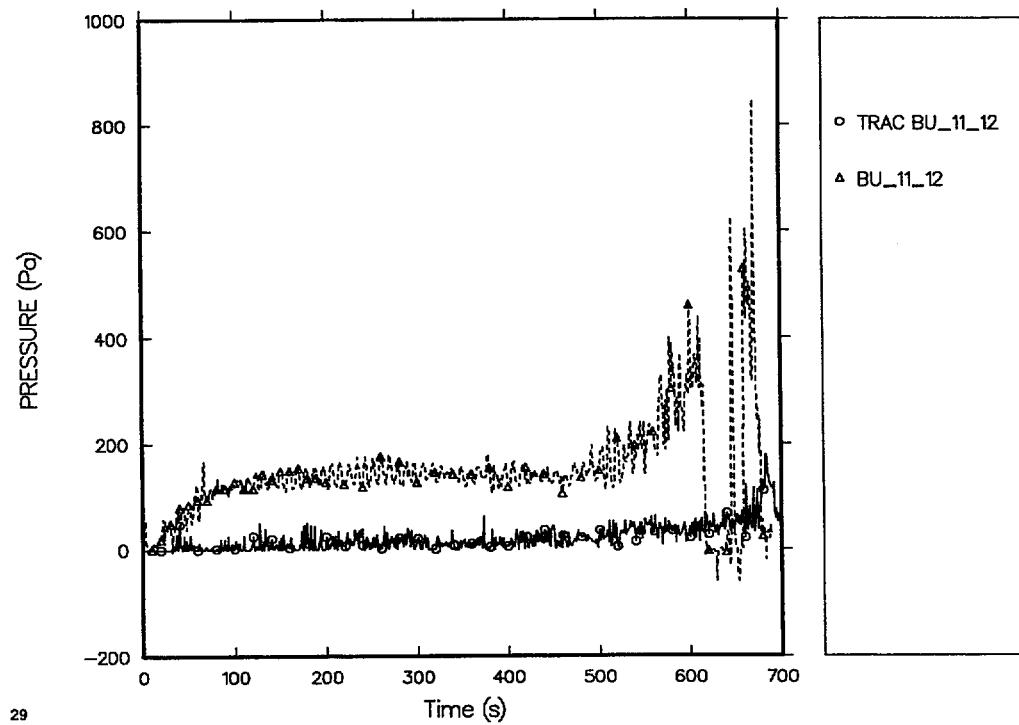


Fig. L-47. Comparison of predicted and measured differential pressures (11–12 ft, with grid-spacer model).

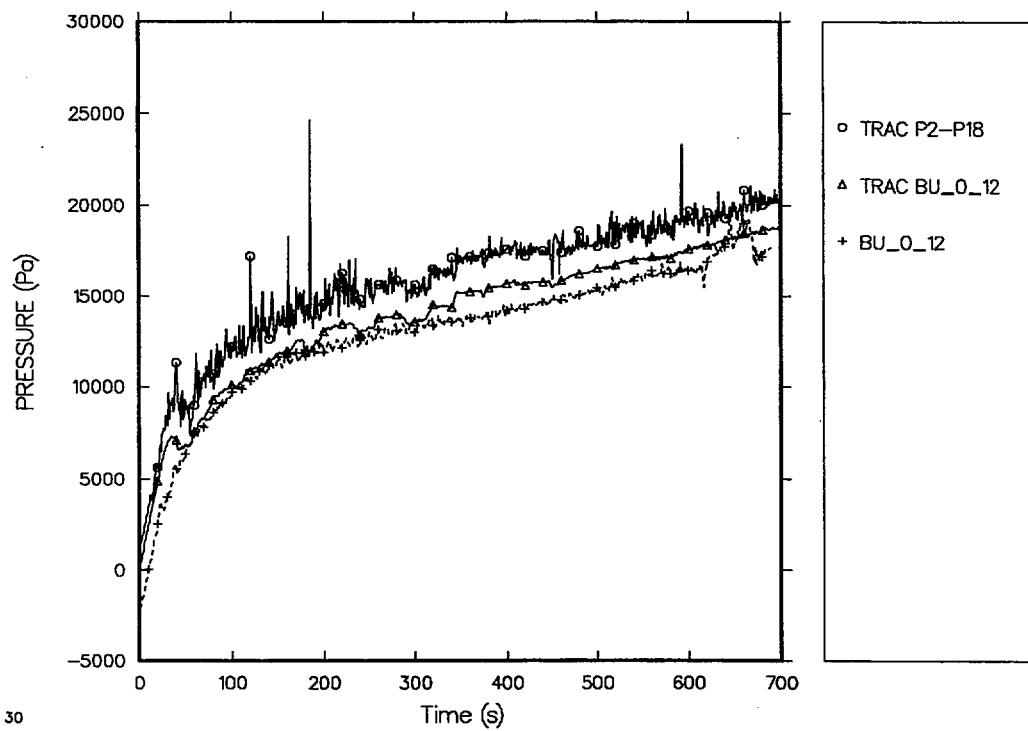


Fig. L-48. Comparison of predicted and measured total core differential pressures (0–12 ft, with grid-spacer model).

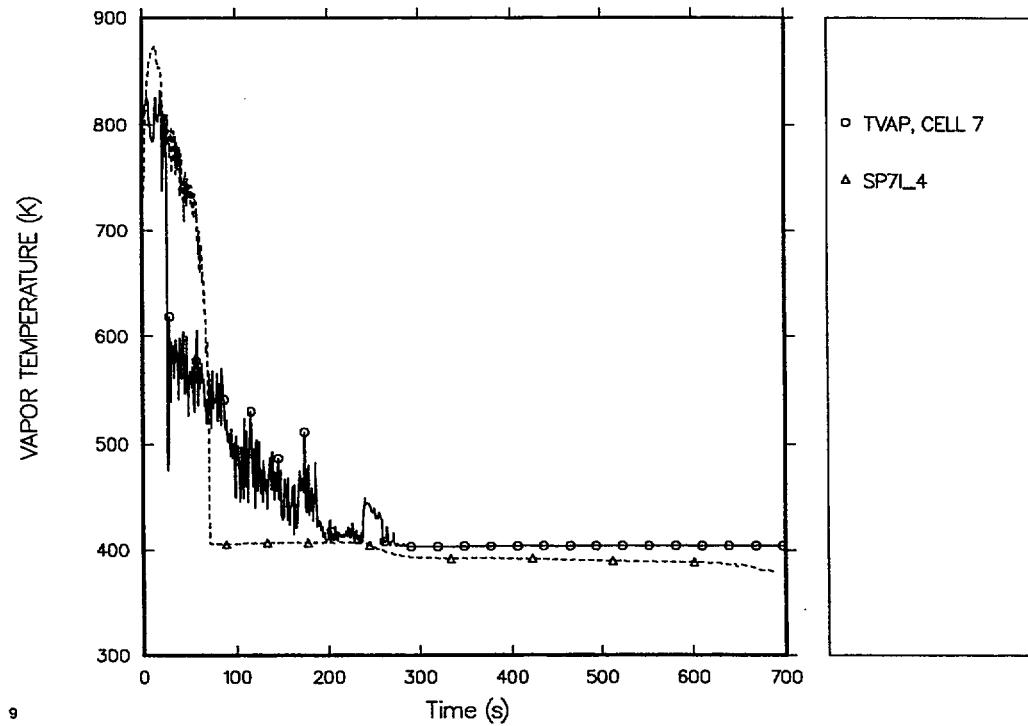


Fig. L-49. Comparison of predicted and measured vapor temperatures in cell 7 (with grid-spacer model).

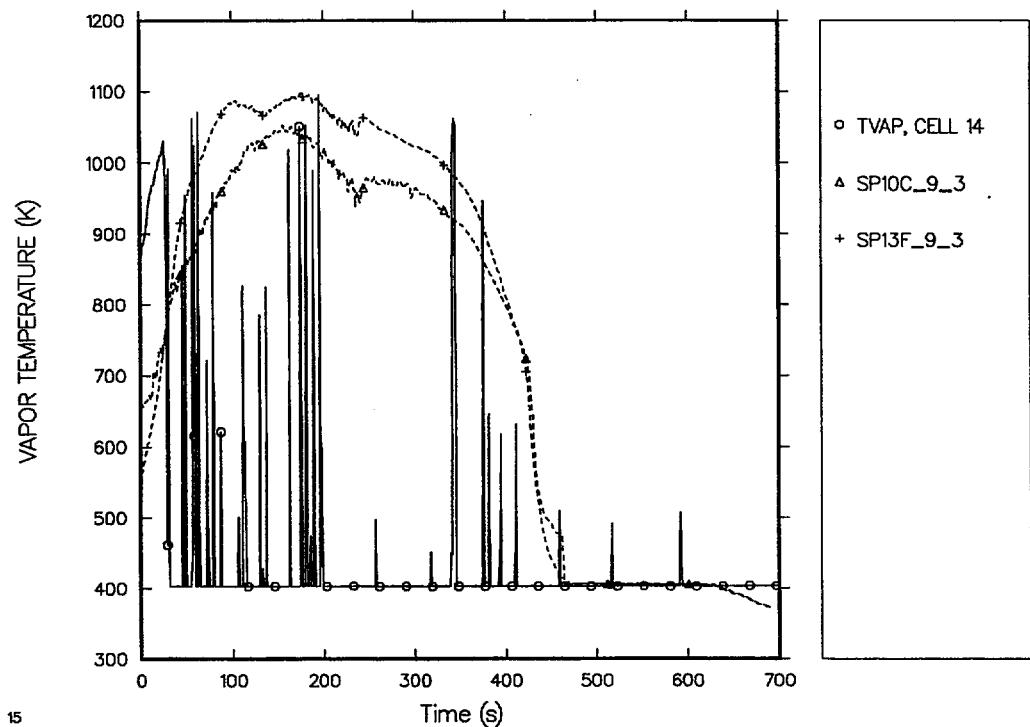


Fig. L-50. Comparison of predicted and measured vapor temperatures in cell 14 (with grid-spacer model).

APPENDIX M

FLECHT SEASET GRAVITY REFLOOD TEST 33436 INPUT LISTING

```

1 free format
2 *
3 *      numtcr      ieos      inopt      rmat
4 *          2          0          1          0
5 flecht-seaset 161-rod unblocked-bundle run no. 33436
6 trac-pf1, gravity reflood, subcooling = 77.3 k
7 *      flecht-seaset test no. 36
8 *      159 heater rods powered, rods 4g and 5g disconnected
9 *      rod peak power = 0.70 kw/ft
10 *     this deck created by thad d. knight -- 3/4/82
11 *     modifications incorporated to circumvent a condensation
12 *     problem in the downcomer resulting from the injection of
13 *     subcooled liquid. the input closely resembles a trac-pd2
14 *     input deck with the same modifications.
15 *     original trac-pd2 input created by thad d. knight -- 2/26/82
16 *     original trac-pf1 input created by thad d. knight -- 2/28/82
17 *     deck is as similar as possible to the trac-pd2 input deck
18 *     based on forced reflood deck by c. p. booker
19 *     tracin:/091122/flecht/pd2mod1/31504/run1/tracin
20 *     all input numbers have been checked with information
21 *     contained in "pwr flecht seaset unblocked bundle,
22 *     forced and gravity reflood task data report,"
23 *     volumes 1 and 2, epri np-1459, wcap-9699, nureg/cr-1532,
24 *     september 1981.
25 *     more detailed data will permit improved specification
26 *     of initial and boundary conditions.
27 *
28 *----- modeling distortions -----
29 *
30 *      the carryover tank was connected to the upper plenum
31 *      through a 2-in std pipe approximately 1-m long. the
32 *      top of the carryover tank was 2.5 in above the bottom
33 *      of the upper-plenum bottom plate, but the
34 *      connection to the tank was 7.5 in below the plate.
35 *      the pipe volume was added to the tank volume, and
36 *      an effective length was calculated. the tank was
37 *      located vertically below the upper plenum.
38 *
39 *      the exhaust line consisted of a 4-in std pipe, an
40 *      orifice, an entrainment-separator tank, a 3-in std
41 *      pipe, and a pressure-control valve. the top of the
42 *      downcomer was vented to the top of the entrainment-
43 *      separator tank. the volume of the entrainment-
44 *      separator tank is significant. however, the data
45 *      indicates that the pressure downstream of the orifice
46 *      and upstream of the pressure-control valve is constant.
47 *      therefore, the entrainment-separator tank, the pressure-
48 *      control valve, and the change in pipe size are ignored,
49 *      and the back-pressure is set with a constant-pressure
50 *      break component.
51 *
52 *      in order to eliminate a condensation problem associated
53 *      with the downcomer vent, the vent is represented as an
54 *      extension of the downcomer through pipe component 8 to
55 *      a constant pressure break component 9. this modeling
56 *      replaces a tee connection to the exhaust line via a
57 *      small-diameter tube. the original connection would have
58 *      been downstream of the fric value in component 6 (cell 2).
59 *
60 *
61 *&inopts
62 *      ielv=0 , ikfac=1 , nfrc1=1 , newrfd=3 , nhtstr=13 , imfr=3, iadded=20,
63 *      iblaus=1,
64 *      &end
65 *
66 *      dstep      timet
67 *          0          0.0
68 *
69 *      stdyst      transi      ncomp      njun      ipack
70 *          0          1          22          8          1
71 *
72 *      epso      epss
73 *          1.0e-04    1.0e-04
74 *
75 *      oitmax      sitmax      isolut      ncontr
76 *          10          10          0          0
77 *
78 *      ntsv      ntcb      ntcf      ntrp      ntcp
79 *          3            0            0            3            1
80 *
81 *      iorder      +
82 *          1            2            3            4            5
83 *          6            7            8            9            999

```

```

84          998        997        996        995s
85          994      993s
86          964      963        962        961        960
87          959e
88 *
89 ****
90 *
91 *           signal variable data
92 *
93 ****
94 *
95 *           signal
96 *           variable used by
97 *   -----
98 *
99 *           1 injection fill table
100 *           2 power shape and power tables
101 *           3 trips
102 *
103 *
104 *
105 *           idsv      isvn      ilcn      icn1      icn2
106     1          0          0          0          0
107     2          0          0          0          0
108     3          0          0          0          0
109 *
110 ****
111 *
112 *           trip data
113 *
114 ****
115 *
116 *           signal    trip cntr    setpoint    dump and    trip cntr
117 *           exp trip    trip       factor     termination    time step
118 *           data sets    data sets    tables     trips      data sets
119 *
120 *           ntse      ntct      ntsf      ntdp      ntsd
121     0          0          0          3          0
122 *
123 ****
124 * trip to start fill
125 ****
126 *
127 *           idtp      isrt      iset      itst      idsg
128     1001      2          0          1          3
129 *           setp(1)    setp(2)    setp(3)    setp(4)
130     0.0        1.e-5
131 *           dtsp(1)    dtsp(2)    dtsp(3)    dtsp(4)
132     0.0        0.0
133 *           ifsp(1)    ifsp(2)    ifsp(3)    ifsp(4)
134     0          0
135 *
136 ****
137 * trip to start power decay
138 ****
139 *
140 *           idtp      isrt      iset      itst      idsg
141     1002      2          0          1          3
142 *           setp(1)    setp(2)    setp(3)    setp(4)
143     0.0        1.e-5
144 *           dtsp(1)    dtsp(2)    dtsp(3)    dtsp(4)
145     0.0        0.0
146 *           ifsp(1)    ifsp(2)    ifsp(3)    ifsp(4)
147     0          0
148 *
149 ****
150 * trip to start fine mesh
151 ****
152 *
153 *           idtp      isrt      iset      itst      idsg
154     1003      2          0          1          3
155 *           setp(1)    setp(2)    setp(3)    setp(4)
156     0.0        1.e-5
157 *           dtsp(1)    dtsp(2)    dtsp(3)    dtsp(4)
158     0.0        0.0
159 *           ifsp(1)    ifsp(2)    ifsp(3)    ifsp(4)
160     0          0
161 *
162 ****
163 * trip initiated restart dump and problem termination
164 ****
165 *
166 *           ndmp
167     3
168 *
169 *           idmp(1)    idmp(2)    idmp(3)
170     1001      1002      1003
171 *
172 ****
173 *
174 *           component data
175 *

```

```

176 ****
177 *
178 *          num      id      ctitle
179 fill       1        01     $1$ coolant injection
180 *          jun1     ifty     ioff
181       1        8        0
182 *
183 *          iftr      ifsv     nftb      nfsv      nfrf
184       1001     1        5        0        0
185 *
186 *          twtold    rfmx     concin    felv
187       0.        1.e+6    0.        0.
188 *
189 *          dxin     volin    alpin     vlin      tlin
190       1.0      1.31344e-03  0.0      0.0      324.8
191 *
192 *          pin      pain     flowin    vwin      tvin
193       2.7e+05  0.0      0.0      0.0      402.1
194 *
195 *          vmscl    vvscl
196       1.        1.
197 *
198 *
199       0.0      0.0000s      * vmtb
200       1.0      6.3000s      * vmtb
201       15.0     5.3643s      * vmtb
202       16.0     0.7847s      * vmtb
203       700.0    0.7847e      * vmtb
204 *
205 *          type      num      id      ctitle
206 pipe      2        02     $2$ injection pipe
207 *
208 *          ncells    nodes    jun1     jun2      epsw
209       2        0        1        2        0.
210 *
211 *          ichf     iconc    iacc     ipow
212       0        0        0        0
213 *
214 *          radin    th      houtl    houtv    toutl
215       2.0447e-02  3.6830e-03  0.0      0.0      300.0
216 *
217 *          toutv    powin    powoff   rpowmx    powscl
218       300.0    0.        0.        0.        0.
219 *
220 f          1.0e      * dx
221 f          1.31344e-03e  * vol
222 f          1.31344e-03e  * fa
223 f          0.0e      * fric
224 f          0.0e      * grav
225 f          4.08940e-02e  * hd
226 f          -1e      * nff changed from 4 to -1
227 f          0.0e      * alp
228 f          0.0e      * vl
229 f          0.0e      * vv
230 f          324.8e    * tl
231 f          402.1e    * tv
232 f          2.6890e+05e  * p
233 f          0.0e      * pa
234 *
235 *          vessel   type      num      id      ctitle
236 vessel    3        03     $3$ vessel and downcomer
237 *
238 *          naxs    nrsx     ntsx     nscre    ivssbf
239       21        2        1        4        0
240 *
241 *          idcu    idcl     idcr     icru     icrl
242       21        1        1        17       2
243 *
244 *          icrr    ilcsp    iucsp    iuhp     iconc
245       1         2        17       21       0
246 *
247 *          igeom   nvent    nvvtb    nsgrid   0 * 8 *
248       1         0        0
249 *
250 *          shely   epsw     1.0e-05
251       0.
252 *
253 *          z       +
254       0.1651    0.4382    0.6211    0.8954    1.0783
255       1.2612    1.4441    1.6269    1.8098    1.9927
256       2.1756    2.3585    2.5413    2.9071    3.2729
257       3.6387    4.0958    4.3244    4.5149    5.1000
258       6.0960e
259 *
260 *          rad     +
261       5.23361e-01  2.809361e  +
262 *
263 *          th      +
264       5.23361e-01e  +
265 *
266 *          funh   +
267       0.20      0.0e

```

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268 *
269 * nhasca      +
270      999      +     0e      +
271      +
272 * zsgrid      +
273      .4064      .9398      1.4478      1.9812      2.5146s
274      3.0226      3.5560      4.0640e
275 *
276 *      lisrl      lisrc      lisrf      ljuns
277      1          2          3          2
278      18         1          -2         3
279      19         1          3          5
280      21         2          2          7
281 *
282 * level 1 (lower plenum)
283 *
284 f      0.0e      * cfz1-t
285 f      2.3 e      * cfz1-z
286 f      2.0 e      * cfz1-r
287 f      0.0e      * cfzv-t
288 f      2.3 e      * cfzv-z
289 f      2.0 e      * cfzv-r
290 9.49239e-01 1.32869e-01e
291 f      0.0e      * vol
292 5.67949e-02 9.59610e-03e      * fa-t
293 5.51976e-02 0.0e      * fa-z
294 f      0.0e      * fa-r
295 1.034e-02 1.209e-01e      * hd-t
296 7.793e-02 0.0e      * hd-z
297 f      0.0e      * hd-r
298 f      0.0e      * alpn
299 f      0.0e      * vvn-t
300 f      0.0e      * vvn-z
301 f      0.0e      * vln-t
302 f      0.0e      * vln-z
303 f      0.0e      * vln-r
304 402.1      402.1e      * tvn
305 f      324.8e      * tln
306 f      2.6890e+05e      * pn
307 f      0.0e      * pan
308 *
309 * level 2 (unheated length)
310 *
311 f      0.0e      * cfz1-t
312 0.05      0.0e      * cfz1-z
313 f      0.0e      * cfz1-r
314 f      0.0e      * cfzv-t
315 0.05      0.0e      * cfzv-z
316 f      0.0e      * cfzv-r
317 5.67949e-02 9.59610e-03e
318 f      0.0e      * vol
319 5.67949e-02 9.59610e-03e      * fa-t
320 f      0.0e      * fa-z
321 f      0.0e      * fa-r
322 1.034e-02 1.209e-01e      * hd-t
323 f      0.0e      * hd-z
324 f      0.0e      * hd-r
325 f      0.0e      * alpn
326 f      0.0e      * vvn-t
327 f      0.0e      * vvn-z
328 f      0.0e      * vln-t
329 f      0.0e      * vln-z
330 f      0.0e      * vln-r
331 402.1      402.1e      * tvn
332 f      402.07e      * tln
333 f      2.6890e+05e      * pn
334 f      0.0e      * pan
335 *
336 * level 3 (core)
337 *
338 f      0.0e      * cfz1-t
339 0.05      0.0e      * cfz1-z
340 f      0.0e      * cfz1-r
341 f      0.0e      * cfzv-t
342 0.05      0.0e      * cfzv-z
343 f      0.0e      * cfzv-r
344 5.67949e-02 9.59610e-03e
345 f      0.0e      * vol
346 5.67949e-02 9.59610e-03e      * fa-t
347 f      0.0e      * fa-z
348 f      0.0e      * fa-r
349 1.034e-02 1.209e-01e      * hd-t
350 f      0.0e      * hd-z
351 f      1.0e      * hd-r
352 f      0.0e      * alpn
353 f      0.0e      * vvn-t
354 f      0.0e      * vvn-z
355 f      0.0e      * vln-t
356 f      0.0e      * vln-z
357 f      0.0e      * vln-r
358 570.0      405.0e      * tvn
359 f      402.07e      * tln

```

```

360 f 2.6890e+05e * pn
361 f 0.0e * pan
362 *
363 * level 4 (core)
364 *
365 f 0.0e * cfzl-t
366 0.05 0.0e * cfzl-z
367 f 0.0e * cfzl-r
368 f 0.0e * cfzv-t
369 0.05 0.0e * cfzv-z
370 f 0.0e * cfzv-r
371 5.67949e-02 9.59610e-03e * vol
372 f 0.0e * fa-t
373 5.67949e-02 9.59610e-03e * fa-z
374 f 0.0e * fa-r
375 f 0.0e * hd-t
376 1.034e-02 1.209e-01e * hd-z
377 f 0.0e * hd-r
378 f 1.0e * alpn
379 f 0.0e * vvn-t
380 f 0.0e * vvn-z
381 f 0.0e * vvn-r
382 f 0.0e * vln-t
383 f 0.0e * vln-z
384 f 0.0e * vln-r
385 570.0 405.0e * tvn
386 f 402.07e * tln
387 f 2.6890e+05e * pn
388 f 0.0e * pan
389 *
390 * level 5 (core)
391 *
392 f 0.0e * cfzl-t
393 0.05 0.0e * cfzl-z
394 f 0.0e * cfzl-r
395 f 0.0e * cfzv-t
396 0.05 0.0e * cfzv-z
397 f 0.0e * cfzv-r
398 5.67949e-02 9.59610e-03e * vol
399 f 0.0e * fa-t
400 5.67949e-02 9.59610e-03e * fa-z
401 f 0.0e * fa-r
402 f 0.0e * hd-t
403 1.034e-02 1.209e-01e * hd-z
404 f 0.0e * hd-r
405 f 1.0e * alpn
406 f 0.0e * vvn-t
407 f 0.0e * vvn-z
408 f 0.0e * vvn-r
409 f 0.0e * vln-t
410 f 0.0e * vln-z
411 f 0.0e * vln-r
412 571.0 405.0e * tvn
413 f 402.07e * tln
414 f 2.6890e+05e * pn
415 f 0.0e * pan
416 *
417 * level 6 (core)
418 *
419 f 0.0e * cfzl-t
420 0.05 0.0e * cfzl-z
421 f 0.0e * cfzl-r
422 f 0.0e * cfzv-t
423 0.05 0.0e * cfzv-z
424 f 0.0e * cfzv-r
425 5.67949e-02 9.59610e-03e * vol
426 f 0.0e * fa-t
427 5.67949e-02 9.59610e-03e * fa-z
428 f 0.0e * fa-r
429 f 0.0e * hd-t
430 1.034e-02 1.209e-01e * hd-z
431 f 0.0e * hd-r
432 f 1.0e * alpn
433 f 0.0e * vvn-t
434 f 0.0e * vvn-z
435 f 0.0e * vvn-r
436 f 0.0e * vln-t
437 f 0.0e * vln-z
438 f 0.0e * vln-r
439 572.0 405.0e * tvn
440 f 402.07e * tln
441 f 2.6890e+05e * pn
442 f 0.0e * pan
443 *
444 * level 7 (core)
445 *
446 f 0.0e * cfzl-t
447 0.05 0.0e * cfzl-z
448 f 0.0e * cfzl-r
449 f 0.0e * cfzv-t
450 0.05 0.0e * cfzv-z
451 f 0.0e * cfzv-r

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452      5.67949e-02   9.59610e-03e          * vol
453 f      0.0e           0.0e          * fa-t
454      5.67949e-02   9.59610e-03e          * fa-z
455 f      0.0e           0.0e          * fa-r
456 f      0.0e           0.0e          * hd-t
457      1.034e-02    1.209e-01e          * hd-z
458 f      0.0e           0.0e          * hd-r
459 f      1.0e            0.0e          * alpn
460 f      0.0e           0.0e          * vvn-t
461 f      0.0e           0.0e          * vvn-z
462 f      0.0e           0.0e          * vvn-r
463 f      0.0e           0.0e          * vln-t
464 f      0.0e           0.0e          * vln-z
465 f      0.0e           0.0e          * vln-r
466      608.0          405.0e          * tvn
467 f      402.07e        0.0e          * tln
468 f      2.6890e+05e        0.0e          * pn
469 f      0.0e           0.0e          * pan
470 *
471 * level 8 (core)
472 *
473 f      0.0e           0.0e          * cfz1-t
474 0.05     0.0e           0.0e          * cfz1-z
475 f      0.0e           0.0e          * cfz1-r
476 f      0.0e           0.0e          * cfzv-t
477 0.05     0.0e           0.0e          * cfzv-z
478 f      0.0e           0.0e          * cfzv-r
479      5.67949e-02   9.59610e-03e          * vol
480 f      0.0e           0.0e          * fa-t
481      5.67949e-02   9.59610e-03e          * fa-z
482 f      0.0e           0.0e          * fa-r
483 f      0.0e           0.0e          * hd-t
484      1.034e-02    1.209e-01e          * hd-z
485 f      0.0e           0.0e          * hd-r
486 f      1.0e            0.0e          * alpn
487 f      0.0e           0.0e          * vvn-t
488 f      0.0e           0.0e          * vvn-z
489 f      0.0e           0.0e          * vvn-r
490 f      0.0e           0.0e          * vln-t
491 f      0.0e           0.0e          * vln-z
492 f      0.0e           0.0e          * vln-r
493      653.0          405.0e          * tvn
494 f      402.07e        0.0e          * tln
495 f      2.6890e+05e        0.0e          * pn
496 f      0.0e           0.0e          * pan
497 *
498 * level 9 (core)
499 *
500 f      0.0e           0.0e          * cfz1-t
501 0.05     0.0e           0.0e          * cfz1-z
502 f      0.0e           0.0e          * cfz1-r
503 f      0.0e           0.0e          * cfzv-t
504 0.05     0.0e           0.0e          * cfzv-z
505 f      0.0e           0.0e          * cfzv-r
506      5.67949e-02   9.59610e-03e          * vol
507 f      0.0e           0.0e          * fa-t
508      5.67949e-02   9.59610e-03e          * fa-z
509 f      0.0e           0.0e          * fa-r
510 f      0.0e           0.0e          * hd-t
511      1.034e-02    1.209e-01e          * hd-z
512 f      0.0e           0.0e          * hd-r
513 f      1.0e            0.0e          * alpn
514 f      0.0e           0.0e          * vvn-t
515 f      0.0e           0.0e          * vvn-z
516 f      0.0e           0.0e          * vvn-r
517 f      0.0e           0.0e          * vln-t
518 f      0.0e           0.0e          * vln-z
519 f      0.0e           0.0e          * vln-r
520      700.0          405.0e          * tvn
521 f      402.07e        0.0e          * tln
522 f      2.6890e+05e        0.0e          * pn
523 f      0.0e           0.0e          * pan
524 *
525 * level 10 (core)
526 *
527 f      0.0e           0.0e          * cfz1-t
528 0.05     0.0e           0.0e          * cfz1-z
529 f      0.0e           0.0e          * cfz1-r
530 f      0.0e           0.0e          * cfzv-t
531 0.05     0.0e           0.0e          * cfzv-z
532 f      0.0e           0.0e          * cfzv-r
533      5.67949e-02   9.59610e-03e          * vol
534 f      0.0e           0.0e          * fa-t
535      5.67949e-02   9.59610e-03e          * fa-z
536 f      0.0e           0.0e          * fa-r
537 f      0.0e           0.0e          * hd-t
538      1.034e-02    1.209e-01e          * hd-z
539 f      0.0e           0.0e          * hd-r
540 f      1.0e            0.0e          * alpn
541 f      0.0e           0.0e          * vvn-t
542 f      0.0e           0.0e          * vvn-z
543 f      0.0e           0.0e          * vvn-r

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```

544 f 0.0e * vln-t
545 f 0.0e * vln-z
546 f 0.0e * vln-r
547 755.0 405.0e * tvn
548 f 402.07e * tln
549 f 2.6890e+05e * pn
550 f 0.0e * pan
551 *
552 * level 11 (core)
553 *
554 f 0.0e * cfz1-t
555 0.05 0.0e * cfz1-z
556 f 0.0e * cfz1-r
557 f 0.0e * cfzv-t
558 0.05 0.0e * cfzv-z
559 f 0.0e * cfzv-r
560 5.67949e-02 9.59610e-03e * vol
561 f 0.0e * fa-t
562 5.67949e-02 9.59610e-03e * fa-z
563 f 0.0e * fa-r
564 f 0.0e * hd-t
565 1.034e-02 1.209e-01e * hd-z
566 f 0.0e * hd-r
567 f 1.0e * alpn
568 f 0.0e * vvn-t
569 f 0.0e * vvn-z
570 f 0.0e * vvn-r
571 f 0.0e * vln-t
572 f 0.0e * vln-z
573 f 0.0e * vln-r
574 791.0 405.0e * tvn
575 f 402.07e * tln
576 f 2.6890e+05e * pn
577 f 0.0e * pan
578 *
579 * level 12 (core)
580 *
581 f 0.0e * cfz1-t
582 0.05 0.0e * cfz1-z
583 f 0.0e * cfz1-r
584 f 0.0e * cfzv-t
585 0.05 0.0e * cfzv-z
586 f 0.0e * cfzv-r
587 5.67949e-02 9.59610e-03e * vol
588 f 0.0e * fa-t
589 5.67949e-02 9.59610e-03e * fa-z
590 f 0.0e * fa-r
591 f 0.0e * hd-t
592 1.034e-02 1.209e-01e * hd-z
593 f 0.0e * hd-r
594 f 1.0e * alpn
595 f 0.0e * vvn-t
596 f 0.0e * vvn-z
597 f 0.0e * vvn-r
598 f 0.0e * vln-t
599 f 0.0e * vln-z
600 f 0.0e * vln-r
601 902.0 405.0e * tvn
602 f 402.07e * tln
603 f 2.6890e+05e * pn
604 f 0.0e * pan
605 *
606 * level 13 (core)
607 *
608 f 0.0e * cfz1-t
609 0.05 0.0e * cfz1-z
610 f 0.0e * cfz1-r
611 f 0.0e * cfzv-t
612 0.05 0.0e * cfzv-z
613 f 0.0e * cfzv-r
614 5.67949e-02 9.59610e-03e * vol
615 f 0.0e * fa-t
616 5.67949e-02 9.59610e-03e * fa-z
617 f 0.0e * fa-r
618 f 0.0e * hd-t
619 1.034e-02 1.209e-01e * hd-z
620 f 0.0e * hd-r
621 f 1.0e * alpn
622 f 0.0e * vvn-t
623 f 0.0e * vvn-z
624 f 0.0e * vvn-r
625 f 0.0e * vln-t
626 f 0.0e * vln-z
627 f 0.0e * vln-r
628 902.0 405.0e * tvn
629 f 402.07e * tln
630 f 2.6890e+05e * pn
631 f 0.0e * pan
632 *
633 * level 14 (core)
634 *
635 f 0.0e * cfz1-t

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```

636   0.05      0.0e          * cfzl-z
637   f          0.0e          * cfzl-r
638   f          0.0e          * cfzv-t
639   0.05      0.0e          * cfzv-z
640   f          0.0e          * cfzv-r
641   5.67949e-02  9.59610e-03e
642   f          0.0e          * vol
643   5.67949e-02  9.59610e-03e          * fa-t
644   f          0.0e          * fa-z
645   f          0.0e          * fa-r
646   1.034e-02   1.209e-01e          * hd-t
647   f          0.0e          * hd-z
648   f          1.0e          * hd-r
649   f          0.0e          * alpn
650   f          0.0e          * vvn-t
651   f          0.0e          * vvn-z
652   f          0.0e          * vvn-r
653   f          0.0e          * vln-t
654   f          0.0e          * vln-z
655   800.0      405.0e          * vln-r
656   f          402.07e         * tvn
657   f          2.6890e+05e        * tln
658   f          0.0e          * pn
659   *
660   * level 15 (core)
661   *
662   f          0.0e          * cfzl-t
663   0.05      0.0e          * cfzl-z
664   f          0.0e          * cfzl-r
665   f          0.0e          * cfzv-t
666   0.05      0.0e          * cfzv-z
667   f          0.0e          * cfzv-r
668   5.67949e-02  9.59610e-03e
669   f          0.0e          * vol
670   5.67949e-02  9.59610e-03e          * fa-t
671   f          0.0e          * fa-z
672   f          0.0e          * fa-r
673   1.034e-02   1.209e-01e          * hd-t
674   f          0.0e          * hd-z
675   f          1.0e          * hd-r
676   f          0.0e          * alpn
677   f          0.0e          * vvn-t
678   f          0.0e          * vvn-z
679   f          0.0e          * vvn-r
680   f          0.0e          * vln-t
681   f          0.0e          * vln-z
682   690.0      405.0e          * vln-r
683   f          402.07e         * tvn
684   f          2.6890e+05e        * tln
685   f          0.0e          * pn
686   *
687   * level 16 (core)
688   *
689   f          0.0e          * cfzl-t
690   0.05      0.0e          * cfzl-z
691   f          0.0e          * cfzl-r
692   f          0.0e          * cfzv-t
693   0.05      0.0e          * cfzv-z
694   f          0.0e          * cfzv-r
695   5.67949e-02  9.59610e-03e
696   f          0.0e          * vol
697   5.67949e-02  9.59610e-03e          * fa-t
698   f          0.0e          * fa-z
699   f          0.0e          * fa-r
700   1.034e-02   1.209e-01e          * hd-t
701   f          0.0e          * hd-z
702   f          1.0e          * hd-r
703   f          0.0e          * alpn
704   f          0.0e          * vvn-t
705   f          0.0e          * vvn-z
706   f          0.0e          * vvn-r
707   f          0.0e          * vln-t
708   f          0.0e          * vln-z
709   609.0      405.0e          * vln-r
710   f          402.07e         * tvn
711   f          2.6890e+05e        * tln
712   f          0.0e          * pn
713   *
714   * level 17 (core)
715   *
716   f          0.0e          * cfzl-t
717   2.1       0.0e          * cfzl-z
718   f          0.0e          * cfzl-r
719   f          0.0e          * cfzv-t
720   2.1       0.0e          * cfzv-z
721   f          0.0e          * cfzv-r
722   5.67949e-02  9.59610e-03e
723   f          0.0e          * vol
724   5.67949e-02  9.59610e-03e          * fa-t
725   f          0.0e          * fa-z
726   f          0.0e          * fa-r
727   1.034e-02   1.209e-01e          * hd-t

```

```

728 f 0.0e * hd-r
729 f 1.0e * alpn
730 f 0.0e * vvn-t
731 f 0.0e * vvn-z
732 f 0.0e * vvn-r
733 f 0.0e * vln-t
734 f 0.0e * vln-z
735 f 0.0e * vln-r
736 540.0 405.0e * tvn
737 f 402.07e * tln
738 f 2.6890e+05e * pn
739 f 0.0e * pan
740 *
741 * level 18 (upper plenum)
742 *
743 f 0.0e * cfzl-t
744 f 0.0e * cfzl-z
745 f 0.0e * cfzl-r
746 f 0.0e * cfzv-t
747 f 0.0e * cfzv-z
748 f 0.0e * cfzv-r
749 8.21163e-01 9.59610e-03e * vol
750 f 0.0e * fa-t
751 f 9.49239e-01 9.59610e-03e * fa-z
752 f 0.0e * fa-r
753 f 0.0e * hd-t
754 1.034e-02 1.209e-01e * hd-z
755 f 0.0e * hd-r
756 f 1.0e * alpn
757 f 0.0e * vvn-t
758 f 0.0e * vvn-z
759 f 0.0e * vvn-r
760 f 0.0e * vln-t
761 f 0.0e * vln-z
762 f 0.0e * vln-r
763 408.0 405.0e * tvn
764 f 402.07e * tln
765 f 2.6890e+05e * pn
766 f 0.0e * pan
767 *
768 * level 19 (upper plenum)
769 *
770 f 0.0e * cfzl-t
771 f 0.0e * cfzl-z
772 f 0.0e * cfzl-r
773 f 0.0e * cfzv-t
774 f 0.0e * cfzv-z
775 f 0.0e * cfzv-r
776 9.49240e-01 9.59610e-03e * vol
777 f 0.0e * fa-t
778 0.0 9.59610e-03e * fa-z
779 f 0.0e * fa-r
780 f 0.0e * hd-t
781 1.034e-02 1.209e-01e * hd-z
782 f 0.0e * hd-r
783 f 1.0e * alpn
784 f 0.0e * vvn-t
785 f 0.0e * vvn-z
786 f 0.0e * vvn-r
787 f 0.0e * vln-t
788 f 0.0e * vln-z
789 f 0.0e * vln-r
790 408.0 405.0e * tvn
791 f 402.07e * tln
792 f 2.6890e+05e * pn
793 f 0.0e * pan
794 *
795 * level 20 (downcomer)
796 *
797 f 0.0e * cfzl-t
798 f 0.0e * cfzl-z
799 f 0.0e * cfzl-r
800 f 0.0e * cfzv-t
801 f 0.0e * cfzv-z
802 f 0.0e * cfzv-r
803 0.0 9.59610e-03e * vol
804 f 0.0e * fa-t
805 0.0 9.59610e-03e * fa-z
806 f 0.0e * fa-r
807 f 0.0e * hd-t
808 1.034e-02 1.209e-01e * hd-z
809 f 0.0e * hd-r
810 f 1.0e * alpn
811 f 0.0e * vvn-t
812 f 0.0e * vvn-z
813 f 0.0e * vvn-r
814 f 0.0e * vln-t
815 f 0.0e * vln-z
816 f 0.0e * vln-r
817 402.1 405.0e * tvn
818 f 402.07e * tln
819 f 2.6890e+05e * pn

```

```

820 f 0.0e * pan
821 * *
822 * level 21 (downcomer)
823 *
824 f 0.0e * cfzl-t
825 f 0.0e * cfzl-z
826 f 0.0e * cfzl-r
827 f 0.0e * cfzv-t
828 f 0.0e * cfzv-z
829 f 0.0e * cfzv-r
830 f 0.0 9.59610e-03e * vol
831 f 0.0e * fa-t
832 f 0.0 0.0e * fa-z
833 f 0.0e * fa-r
834 f 0.0e * hd-t
835 f 1.034e-02 1.209e-01e * hd-z
836 f 0.0e * hd-r
837 f 1.0e * alpn
838 f 0.0e * vvn-t
839 f 0.0e * vvn-z
840 f 0.0e * vvn-r
841 f 0.0e * vln-t
842 f 0.0e * vln-z
843 f 0.0e * vln-r
844 f 402.1 405.0e * tvn
845 f 402.07e * tln
846 f 2.6890e+05e * pn
847 f 0.0e * pan
848 *
849 * type num id ctitle
850 pipe 4 04 $4$ carryover tank
851 *
852 * ncells nodes jun1 jun2 epsw
853 5 4 4 3 0.
854 *
855 * ichf iconc iacc ipow
856 0 0 0 0
857 *
858 * iq3tr iq3sv nq3tb nq3sv nq3rf
859 0 1 1 0 0
860 *
861 * radin th houtl houtv toutl
862 7.7026e-02 7.1120e-03 0.0 0.0 300.0
863 *
864 * toutv powin powoff rpowmx powscl
865 300.0 0. 0. 0. 1.
866 *
867 * qp3in qp3off rqp3mx qp3scl
868 0. 0. 0. 1.
869 *
870 r 4 1.0s * dx
871 0.33256e * dx
872 1.86388e-02s * vol
873 1.86388e-02s * vol
874 1.86388e-02s * vol
875 1.86388e-02s * vol
876 6.19850e-03e * vol
877 f 1.86388e-02e * fa
878 f 0.0e * fric
879 f 1.0e * grav
880 f 1.54051e-01e * hd
881 f -1e * nff changed from 4 to -1
882 f 1.0e * alp
883 f 0.0e * vl
884 f 0.0e * vv
885 f 402.07e * tl
886 f 405.0e * tv
887 f 2.6890e+05e * p
888 f 0.0e * pa
889 f 0.0e * qppp
890 f 9e * matid
891 f 405.0e * tw
892 f 0.0e * qp3tb
893 *
894 * fill num id ctitle
895 fill 5 05 $5$ c-tank terminal
896 * jun1 ifty ioff
897 4 1 0
898 *
899 * twtold rfmx concin felv
900 0. 1.e+6 0. 0.
901 *
902 * dxin violin alpin vlin tlin
903 1.0 1.86388e-02 1.0 0.0 402.07
904 *
905 * pin pain flowin vvin tvin
906 2.6890e+05 0.0 0.0 0.0 402.1
907 *
908 * type num id ctitle
909 pipe 6 06 $6$ exhaust line
910 *
911 * ncells nodes jun1 jun2 epsw

```

```

912          3      4      5      6      0.
913 *      ichf    iconc    iacc    ipow
914   0      0      0      0
915
916 *
917 *      iq3tr    iq3sv    nq3tb    nq3sv    nq3rf
918   0      1      1      0      0
919 *
920 *      radin    th      houtl    houtv    toutl
921   5.1130e-02  6.0198e-03  0.0      0.0      300.0
922 *
923 *      toutv    powin    powoff    rpowmx    powscl
924   300.0      0.      0.      0.      1.
925 *
926 *      qp3in    qp3off    rqp3mx    qp3scl
927   0.      0.      0.      1.
928 *
929 f      1.2586e * dx
930 f      1.03370e-02e * vol
931 f      8.21306e-03e * fa
932   0.0s      * fric
933   33.5711s      * fric
934 r 2     0.0e      * fric
935 f      0.0e      * grav
936 f      1.02260e-01e * hd
937 f      -1e      * nff changed from 4 to -1
938 f      1.0e      * alp
939 f      0.0e      * vl
940 f      0.0e      * vv
941 f      402.07e     * tl
942 f      405.0e     * tv
943 f      2.6890e+05e * p
944 f      0.0e      * pa
945 f      0.0e      * qppp
946 f      9e       * matid
947 f      405.0e     * tw
948 f      0.0e      * qp3tb
949 *
950 *      type      num      id      ctitle
951 break      7      07      $7$ back pressure
952 *
953 *      jun1      ibty      isat      ioff
954   6      0      3      0
955 *
956 *      dxin      vclin      alpin      tin      pin
957   1.2586  1.03370e-01  1.0      402.1      2.6890e+05
958 *
959 *      pain      concin      rkmx      poff      belv
960   0.      0.      0.      0.      0.0
961 *
962 *      type      num      id      ctitle
963 pipe      8      08      $8$ downcomer vent
964 *
965 *      ncells      nodes      jun1      jun2      epsw
966   2      4      7      8      0.
967 *
968 *      ichf    iconc    iacc    ipow
969   0      0      0      0
970 *
971 *      iq3tr    iq3sv    nq3tb    nq3sv    nq3rf
972   0      1      1      0      0
973 *
974 *      radin    th      houtl    houtv    toutl
975   6.0452e-02  3.0480e-03  0.0      0.0      300.0
976 *
977 *      toutv    powin    powoff    rpowmx    powscl
978   300.0      0.      0.      0.      1.
979 *
980 *      qp3in    qp3off    rqp3mx    qp3scl
981   0.      0.      0.      1.
982 *
983 f      1.0e      * dx
984 f      1.14808e-02e * vol
985 f      1.14808e-02e * fa
986 f      0.0e      * fric
987 f      1.0e      * grav
988 f      1.20904e-01e * hd
989 f      -1e      * nff changed from 4 to -1
990 f      1.0e      * alp
991 f      0.0e      * vl
992 f      0.0e      * vv
993 f      402.07e     * tl
994 f      405.0e     * tv
995 f      2.6890e+05e * p
996 f      0.0e      * pa
997 f      0.0e      * qppp
998 f      9e       * matid
999 f      405.0e     * tw
1000 f      0.0e      * qp3tb
1001 *
1002 *      type      num      id      ctitle
1003 break      9      09      $9$ downcomer back pressure

```

1004	*					
1005	*	jun1	ibty	isat	ioff	
1006	*	8	0	3	0	
1007	*					
1008	*	dxin	volin	alpin	tin	pin
1009	*	1.0	1.14808e-01	1.0	402.1	2.6884e+05
1010	*					
1011	*	pain	concin	rbmx	poff	belv
1012	*	0.	0.	0.	0.	0.0
1013	*					
1014	*					
1015	*	type	num	id	ctitle	
1016	rod		999	999	\$999\$ fuel rods	
1017	*					
1018	*	ncrx	ncrz	ittc		cd 2
1019	*	1	15	0		
1020	*					
1021	*	nopowr	nridr	modez	liqlev	iaxcnd
1022	*	0	0	1	1	1
1023	*					
1024	*	idbci	idbco	hdri	hdro	cd 4
1025	*	0	2	0.	9.4996e-3	
1026	*					
1027	*	nrods	nodes	irftr	nzmax	irftr2
1028	*	1	9	1003	250	1003
1029	*					
1030	*	dtxht(1)	dtxht(2)	dznht	hgapo	shelv
1031	*	4.	20.	5.e-3	6.e4	0.
1032	*					
1033	*	irpwty	ndgx	ndhx	nrts	nhist
1034	*	7	0	0	10000	0
1035	*					
1036	*	irpwtr	irpwsv	nrpwtb	nrpwsf	nrpwrf
1037	*	1002	2	25	0	0
1038	*					
1039	*	izpwtr	izpwsv	nzpwtb	nzpwsv	nzpwrf
1040	*	0	2	1	0	0
1041	*					
1042	*	nmwrx	nfc1	nfcil		cd 16
1043	*	0	0	0		
1044	*					
1045	*	nzpwz	nzpw1	nfbpwt		cd 17
1046	*	16	1	0		
1047	*					
1048	*	react	tneut	rpwoff	rrpwmx	rpwsc1
1049	*	0.	0.	0.	1.e10	1.
1050	*					
1051	*	rpowri	zpown	zpwoff	rzpwmx	cd 19
1052	*	8.045e05	0.	0.	1.e10	
1053	*					
1054	*	extsou	pldr	pdrat	fucrac	cd 20
1055	*	0.	0.	1.3262	1.	
1056	*					
1057	*	nhcomo				
1058	f		3e			
1059	*					
1060	*	nhcelo				
1061		-3s				
1062		3s				
1063		4s				
1064		5s				
1065		6s				
1066		7s				
1067		8s				
1068		9s				
1069		10s				
1070		11s				
1071		12s				
1072		13s				
1073		14s				
1074		15s				
1075		16s				
1076		17s				
1077		18e				
1078	*					
1079	*	+	+	+	+	+
1080	*	dz	* .1829	.2743	.1829	.1829s
1081	*	dz	* .1829	.1828	.1829	.1829s
1082	*	dz	* .1829	.1829	.1828	.3658s
1083	*	dz	* .3658	.3658	.4571e	
1084	*	grav	* f 1.e			
1085	*	rdx	* 159.0e			
1086	*	+	+	+	+	+
1087	*	radrd	* 0.0	6.0325e-04	1.2065e-03	1.7145e-03s
1088	*	radrd	* 2.2225e-03	3.1687e-03	4.1148e-03	4.4323e-03s
1089	*	radrd	* 4.7498e-03e			
1090	*	matrd	* 4	4	5	5s
1091	*	matrd	* 4	4	8	8e
1092	*	nfax	* r15 1e			
1093	*	+	+	+	+	+
1094	*	rftn	* r 9 633.67r 9	633.67r 9	677.56r 9	721.44s
1095	*	rftn	* r 9 829.22r 9	937.00r 9	963.57r 9	1014.55s

```

1096 * rftn * r 9    1065.52r 9   1095.97r 9   1117.70r 9   1067.44s
1097 * rftn * r 9    977.74r 9   828.39r 9   674.54r 9   598.85e
1098 * rdpwr * r 2      0.r 3     1.0r 4     0.e
1099 * cpowr * f      1.0e
1100 *          +      +      +      +
1101 * zpwzt *      0.     .1829     .4572     .6401s
1102 * zpwzt *      .8230    1.0059    1.1887    1.3716s
1103 * zpwzt *      1.5545    1.7374    1.9203    2.1031s
1104 * zpwzt *      2.4689    2.8347    3.2005    3.6576e
1105 *          +      +      +      +
1106 * zpwtb *      0.s
1107 * zpwtb *      0.4300    0.4300    0.4300    0.6800s
1108 * zpwtb *      0.8800    1.1100    1.3000    1.4900s
1109 * zpwtb *      1.6000    1.6600    1.6600    1.5633s
1110 * zpwtb *      1.3000    0.8875    0.4856    0.4300e
1111 *          +      +      +      +
1112 * rpwtb *      0.     8.0777e+05   1.7500e+01   7.4443e+05s
1113 * rpwtb *      3.5000e+01   7.0349e+05   5.2500e+01   6.7295e+05s
1114 * rpwtb *      7.0000e+01   6.4958e+05   8.7500e+01   6.2645e+05s
1115 * rpwtb *      1.0500e+02   6.0800e+05   1.2250e+02   5.9035e+05s
1116 * rpwtb *      1.4000e+02   5.7625e+05   1.5750e+02   5.6351e+05s
1117 * rpwtb *      1.7500e+02   5.5247e+05   1.9250e+02   5.4288e+05s
1118 * rpwtb *      2.2000e+02   5.2773e+05   2.5500e+02   5.1234e+05s
1119 * rpwtb *      2.9000e+02   4.9832e+05   3.2500e+02   4.8655e+05s
1120 * rpwtb *      3.6000e+02   4.7608e+05   3.9500e+02   4.6649e+05s
1121 * rpwtb *      4.3000e+02   4.5754e+05   4.6500e+02   4.4956e+05s
1122 * rpwtb *      5.0000e+02   4.4287e+05   5.3500e+02   4.3570e+05s
1123 * rpwtb *      5.7000e+02   4.2950e+05   6.0500e+02   4.2369e+05s
1124 * rpwtb *      1.0000e+03   3.8310e+05e
1125 *          +      +      +      +
1126 * fpuc2 * f      0.e
1127 * ftd * f       1.e
1128 * gmix * f      0.e
1129 * gmles * f      0.e
1130 * pgapt * f      0.e
1131 * plvol * f      0.e
1132 * pslen * f      0.e
1133 * clemn * f      0.e
1134 * burn * f      0.e
1135 *
1136 *      type      num      id      ctitle
1137   slab      998      998      slab level 1 cell 1
1138 *      ncrx      ncrz
1139   1          1
1140 *      nopowr     nrdr      modez      liqlev      iaxcmd
1141   1          1          1          0          0
1142 *      idbci      idbco
1143   0          2
1144 *      width
1145   4.7892E+00
1146 *      nrods      nodes      irftr      nzmax
1147   1          4          0          5
1148 *      dtxht(1)   dtxht(2)   dznht      hgapo
1149   3.0000E+00   1.0000E+01   5.0000E-03   0.0000E+00
1150 *      nhcomo     3e
1151 f      nhcelo
1152 *      -1          1          2e
1153 *      dz
1154 f      1.6510E-01e
1155 *      grav
1156 f      1.0000E+00e
1157 *      idrod
1158 *      1e
1159 *      rdx
1160 f      1.0000E+00e
1161 *      radrd
1162 *      0.0000E+00s
1163 2.4030E-02s
1164 2.6030E-02s
1165 2.7030E-02e
1166 *      matrd * f      9e
1167 *      nfax
1168 f      1e
1169 *      rftn
1170 f      3.248E+02e
1171 *
1172 *
1173 *      type      num      id      ctitle
1174   slab      997      997      slab level 1 cell 2
1175 *      ncrx      ncrz
1176   1          1
1177 *      nopowr     nrdr      modez      liqlev      iaxcmd
1178   1          1          1          0          0
1179 *      idbci      idbco
1180   0          2
1181 *      width
1182   5.2592E+00
1183 *      nrods      nodes      irftr      nzmax
1184   1          4          0          5
1185 *      dtxht(1)   dtxht(2)   dznht      hgapo
1186   3.0000E+00   1.0000E+01   5.0000E-03   0.0000E+00
1187 *      nhcomo

```

```

1188 f 3e
1189 * nhcelo
1190 -1 1 2e
1191 * dz
1192 f 1.6510E-01e
1193 * grav
1194 f 1.0000E+00e
1195 * idrod
1196 2e
1197 * rdx
1198 f 1.0000E+00e
1199 * radrd
1200 6.0452E-02s
1201 6.1500E-02s
1202 6.2500E-02s
1203 6.3500E-02e
1204 * matrd * f 9e
1205 * nfax
1206 f 1e
1207 * rftn
1208 f 3.248E+02e
1209 *
1210 * type num id ctitle
1211 slab 996 996 slab level 2 cell 1
1212 * ncrx ncrz
1213 1 1
1214 * nopowr nrindr modez liqlev iaxcnd
1215 1 1 0 0
1216 * idbci idbco
1217 0 2
1218 * width
1219 6.0845E-01
1220 * nrods nodes irftr nzmax
1221 1 4 0 5
1222 * dtxht(1) dtxht(2) dzmht hgapo
1223 3.0000E+00 1.0000E+01 5.0000E-03 0.0000E+00
1224 * nhcomo
1225 f 3e
1226 * nhcelo
1227 -2 2 3e
1228 * dz
1229 f 2.7310E-01e
1230 * grav
1231 f 1.0000E+00e
1232 * idrod
1233 1e
1234 * rdx
1235 f 1.0000E+00e
1236 * radrd
1237 9.6837E-02s
1238 9.9918E-02s
1239 1.0092E-01s
1240 1.0192E-01e
1241 * matrd * f 6e
1242 * nfax
1243 f 1e
1244 * rftn
1245 f 4.021E+02e
1246 *
1247 * type num id ctitle
1248 slab 995 995 slab level 2 cell 2
1249 * ncrx ncrz
1250 1 1
1251 * nopowr nrindr modez liqlev iaxcnd
1252 1 1 0 0
1253 * idbci idbco
1254 0 2
1255 * width
1256 3.7983E-01
1257 * nrods nodes irftr nzmax
1258 1 4 0 5
1259 * dtxht(1) dtxht(2) dzmht hgapo
1260 3.0000E+00 1.0000E+01 5.0000E-03 0.0000E+00
1261 * nhcomo
1262 f 3e
1263 * nhcelo
1264 -2 2 3e
1265 * dz
1266 f 2.7310E-01e
1267 * grav
1268 f 1.0000E+00e
1269 * idrod
1270 2e
1271 * rdx
1272 f 1.0000E+00e
1273 * radrd
1274 6.0452E-02s
1275 6.1500E-02s
1276 6.2500E-02s
1277 6.3500E-02e
1278 * matrd * f 9e
1279 * nfax

```

```

1280 f le
1281 * rftn
1282 f 4.021E+02e
1283 *
1284 * type num id ctitle
1285 slab 994 994 core section of vessel wall
1286 *
1287 * ncrx ncrz
1288 1 15
1289 *
1290 * nopowr nrindr modez liqlev iaxcnd
1291 1 1 0 0
1292 *
1293 * idbci idbco
1294 0 2
1295 *
1296 * width
1297 6.0845E-01
1298 *
1299 * nrods nodes irftr nzmax irftr2
1300 1 4 1003 150 1003
1301 *
1302 * dtxht(1) dtxht(2) dznht hgapo shelv
1303 4. 50. 5.0000E-03 0.0000E+00 .4382
1304 *
1305 * nhcomo
1306 f 3e
1307 *
1308 * nhcelo + + + +
1309 -3 3 4 5 6
1310 7 8 9 10 11
1311 12 13 14 15 16
1312 17 18e
1313 *
1314 * dz + + + +
1315 .1829 .2743 .1829 .1829 .1829
1316 .1828 .1829 .1829 .1829 .1829
1317 .1828 .3658 .3658 .3658 .4571e
1318 *
1319 * grav
1320 f 1.0000E+00e
1321 *
1322 * idrod
1323 1e
1324 *
1325 * rdx
1326 f 1.0000E+00e
1327 *
1328 * radrd
1329 9.68375E-02s
1330 9.99180E-02s
1331 1.00918E-01s
1332 1.01918E-01e
1333 *
1334 * matrd
1335 f 6e
1336 *
1337 * nfax
1338 f 1e
1339 *
1340 * rftn + + + +
1341 r 4 406.4r 4 406.4r 4 406.4r 4 409.6r 4 412.8
1342 r 4 416.0r 4 419.2r 4 487.0r 4 554.8r 4 560.0
1343 r 4 554.8r 4 549.5r 4 421.7r 4 409.2r 4 409.2
1344 r 4 408.0e
1345 *
1346 * type num id ctitle
1347 slab 993 993 core section of downcomer wall
1348 *
1349 * ncrx ncrz
1350 1 15
1351 *
1352 * nopowr nrindr modez liqlev iaxcnd
1353 1 1 0 0
1354 *
1355 * idbci idbco
1356 0 2
1357 *
1358 * width
1359 3.7983E-01
1360 *
1361 * nrods nodes irftr nzmax
1362 1 4 0 31
1363 *
1364 * dtxht(1) dtxht(2) dznht hgapo shelv
1365 4. 50. 5.0000E-03 0.0000E+00 .4382
1366 *
1367 * nhcomo
1368 f 3e
1369 *
1370 * nhcelo
1371 -3 3 4 5 6

```

	7	8	9	10	11
1372					
1373	12	13	14	15	16
1374	17	18e			
1375	*				
1376	*	dz			
1377	.1829	.2743	.1829	.1829	.1829
1378	.1828	.1829	.1829	.1829	.1829
1379	.1828	.3658	.3658	.3658	.4571e
1380	*				
1381	*	grav			
1382	f	1.0000E+00e			
1383	*				
1384	*	idrod			
1385		2e			
1386	*				
1387	*	rdx			
1388	f	1.0000E+00e			
1389	*				
1390	*	radrd			
1391		6.04520E-02s			
1392		6.15000E-02s			
1393		6.25000E-02s			
1394		6.35000E-02e			
1395	*				
1396	*	matrd			
1397	f	9e			
1398	*				
1399	*	nfax			
1400	f	1e			
1401	*				
1402	*	rftn	+	+	+
1403	f	405.0e			
1404	*				
1405	*	type	num	id	ctitle
1406		slab	964	964	slab level 18 cell 1
1407	*	ncrx	ncrz		
1408		1	1		
1409	*	nopowr	nridr	modez	liqlev iaxcnd
1410		1	1	1	0 0
1411	*	idbci	idbco		
1412		0	2		
1413	*	width			
1414		2.4668E+00			
1415	*	nrods	nodes	irftr	nzmax
1416		1	4	0	5
1417	*	dtxht(1)	dtxht(2)	dznht	hgapo
1418		3.0000E+00	1.0000E+01	5.0000E-03	0.0000E+00
1419	*	nhcomo			
1420	f	3e			
1421	*	nhcelo			
1422		-18	18	19e	
1423	*	dz			
1424	f	2.2860E-01e			
1425	*	grav			
1426	f	1.0000E+00e			
1427	*	idrod			
1428		1e			
1429	*	rdx			
1430	f	1.0000E+00e			
1431	*	radrd			
1432		0.0000E+00s			
1433		1.7191E-02s			
1434		1.9191E-02s			
1435		2.0191E-02e			
1436	*	matrd	* f	9e	
1437	*	nfax			
1438	f	1e			
1439	*	rftn			
1440	f	4.080E+02e			
1441	*				
1442	*	type	num	id	ctitle
1443		slab	963	963	slab level 18 cell 2
1444	*	ncrx	ncrz		
1445		1	1		
1446	*	nopowr	nridr	modez	liqlev iaxcnd
1447		1	1	1	0 0
1448	*	idbci	idbco		
1449		0	2		
1450	*	width			
1451		3.7983E-01			
1452	*	nrods	nodes	irftr	nzmax
1453		1	4	0	5
1454	*	dtxht(1)	dtxht(2)	dznht	hgapo
1455		3.0000E+00	1.0000E+01	5.0000E-03	0.0000E+00
1456	*	nhcomo			
1457	f	3e			
1458	*	nhcelo			
1459		-18	18	19e	
1460	*	dz			
1461	f	2.2860E-01e			
1462	*	grav			
1463	f	1.0000E+00e			

```

1464 *      idrod
1465 *      2e
1466 *      rdx
1467 f   1.0000E+00e
1468 *      radrd
1469 6.0452E-02s
1470 6.1500E-02s
1471 6.2500E-02s
1472 6.3500E-02e
1473 * matrd * f      9e
1474 *      nfax
1475 f   1e
1476 *      rftn
1477 f   4.050E+02e
1478 *
1479 *      type      num      id      ctitle
1480 slab      962      962      slab level 19 cell  1
1481 *      ncrx      ncrz
1482 1          1
1483 *      nopowr    nrindr
1484 1          1
1485 *      idbci     idbco
1486 0          2
1487 *      width
1488 3.2931E+00
1489 *      nrods     nodes      irftr      nzmax
1490 1          4          0          5
1491 *      dtxht(1)  dtxht(2)  dznht      hgapo
1492 3.0000E+00  1.0000E+01  5.0000E-03  0.0000E+00
1493 *      nhcomo
1494 f   3e
1495 *      nhcelo
1496 -19          19          20e
1497 *
1498 f   1.9050E-01e
1499 *      grav
1500 f   1.0000E+00e
1501 *      idrod
1502 1e
1503 *      rdx
1504 f   1.0000E+00e
1505 *      radrd
1506 0.0000E+00s
1507 1.9180E-02s
1508 2.1180E-02s
1509 2.2180E-02e
1510 * matrd * f      9e
1511 *      nfax
1512 f   1e
1513 *      rftn
1514 f   4.080E+02e
1515 *
1516 *      type      num      id      ctitle
1517 slab      961      961      slab level 19 cell  2
1518 *      ncrx      ncrz
1519 1          1
1520 *      nopowr    nrindr
1521 1          1
1522 *      idbci     idbco
1523 0          2
1524 *      width
1525 3.7983E-01
1526 *      nrods     nodes      irftr      nzmax
1527 1          4          0          5
1528 *      dtxht(1)  dtxht(2)  dznht      hgapo
1529 3.0000E+00  1.0000E+01  5.0000E-03  0.0000E+00
1530 *      nhcomo
1531 f   3e
1532 *      nhcelo
1533 -19          19          20e
1534 *
1535 f   1.9050E-01e
1536 *      grav
1537 f   1.0000E+00e
1538 *      idrod
1539 2e
1540 *      rdx
1541 f   1.0000E+00e
1542 *      radrd
1543 6.0452E-02s
1544 6.1500E-02s
1545 6.2500E-02s
1546 6.3500E-02e
1547 * matrd * f      9e
1548 *      nfax
1549 f   1e
1550 *      rftn
1551 f   4.050E+02e
1552 *
1553 *      type      num      id      ctitle
1554 slab      960      960      slab level 20 cell  2
1555 *      ncrx      ncrz

```

```

1556      1      1
1557 *    nopowr     nrindr      modez      liqlev      iaxcnd
1558      1      1      1      0      0
1559 *    idbci      idbco      2
1560      0
1561 *    width      3.7983E-01
1562      3.7983E-01
1563 *    nrrods     nodes      irftr      nzmax
1564      1      4      0      5
1565 *    dtxht(1)   dtxht(2)   dznhrt   hgapo
1566      3.0000E+00  1.0000E+01  5.0000E-03  0.0000E+00
1567 *    nhcomo
1568 f    3e
1569 *    nhcelo
1570      -20      20      21e
1571 *    dz
1572 f    5.8510E-01e
1573 *    grav
1574 f    1.0000E+00e
1575 *    idrod
1576      2e
1577 *    rdx
1578 f    1.0000E+00e
1579 *    radrd
1580      6.0452E-02s
1581      6.1500E-02s
1582      6.2500E-02s
1583      6.3500E-02e
1584 *    matrd * f      9e
1585 *    nfax
1586 f    1e
1587 *    rftn
1588 f    4.050E+02e
1589 *
1590 *    type      num      id      ctitle
1591 slab      959      959      slab level 21 cell 2
1592 *    ncrx      ncrz
1593      1      1
1594 *    nopowr     nrindr      modez      liqlev      iaxcnd
1595      1      1      1      0      0
1596 *    idbci      idbco      2
1597      0
1598 *    width      3.7983E-01
1599      3.7983E-01
1600 *    nrrods     nodes      irftr      nzmax
1601      1      4      0      5
1602 *    dtxht(1)   dtxht(2)   dznhrt   hgapo
1603      3.0000E+00  1.0000E+01  5.0000E-03  0.0000E+00
1604 *    nhcomo
1605 f    3e
1606 *    nhcelo
1607      -21      21      21e
1608 *    dz
1609 f    9.9600E-01e
1610 *    grav
1611 f    1.0000E+00e
1612 *    idrod
1613      2e
1614 *    rdx
1615 f    1.0000E+00e
1616 *    radrd
1617      6.0452E-02s
1618      6.1500E-02s
1619      6.2500E-02s
1620      6.3500E-02e
1621 *    matrd * f      9e
1622 *    nfax
1623 f    1e
1624 *    rftn
1625 f    4.050E+02e
1626 *
1627 end
1628 *
1629 **** time step data ****
1630 *
1631 ****
1632 *
1633 *    dtmin      dtmax      tend      trwfp
1634 1.0e-06  0.0025  17.5  1.0
1635 *
1636 *    edint      gfint      dmpint      sedint
1637 5.0e+01  0.5  5.0e+01  50.0
1638 *
1639 *    dtmin      dtmax      tend      trwfp
1640 1.0e-06  0.0010  20.0  1.0
1641 *
1642 *    edint      gfint      dmpint      sedint
1643 2.5e+00  0.5  5.0e+01  2.5
1644 *
1645 *    dtmin      dtmax      tend      trwfp
1646 1.0e-06  0.0025  400.0  1.0
1647 *

```

1648 * edint gfint dmpint sedint
1649 5.0e+01 0.5 5.0e+01 50.0
1650 -1.0

APPENDIX N

CODE-DATA COMPARISON FOR FLECHT-SEASET TEST 33436 WITH NEWRFD=1

The calculation results for the reflood option newrfd=1, without and with grid spacers modeled, are presented in this appendix. The same set of plots that are presented in the main body of the report for the reflood option newrfd=3 are 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
N-1	4.9-6	N-26	4.9-31
N-2	4.9-7	N-27	4.9-32
N-3	4.9-8	N-28	4.9-33
N-4	4.9-9	N-29	4.9-34
N-5	4.9-10	N-30	4.9-35
N-6	4.9-11	N-31	4.9-36
N-7	4.9-12	N-32	4.9-37
N-8	4.9-13	N-33	4.9-38
N-9	4.9-14	N-34	4.9-39
N-10	4.9-15	N-35	4.9-40
N-11	4.9-16	N-36	4.9-41
N-12	4.9-17	N-37	4.9-42
N-13	4.9-18	N-38	4.9-43
N-14	4.9-19	N-39	4.9-44
N-15	4.9-20	N-40	4.9-45
N-16	4.9-21	N-41	4.9-46
N-17	4.9-22	N-42	4.9-47
N-18	4.9-23	N-43	4.9-48
N-19	4.9-24	N-44	4.9-49
N-20	4.9-25	N-45	4.9-50
N-21	4.9-26	N-46	4.9-51
N-22	4.9-27	N-47	4.9-52
N-23	4.9-28	N-48	4.9.53
N-24	4.9-29	N-49	4.9.54
N-25	4.9-30	N-50	4.9.55

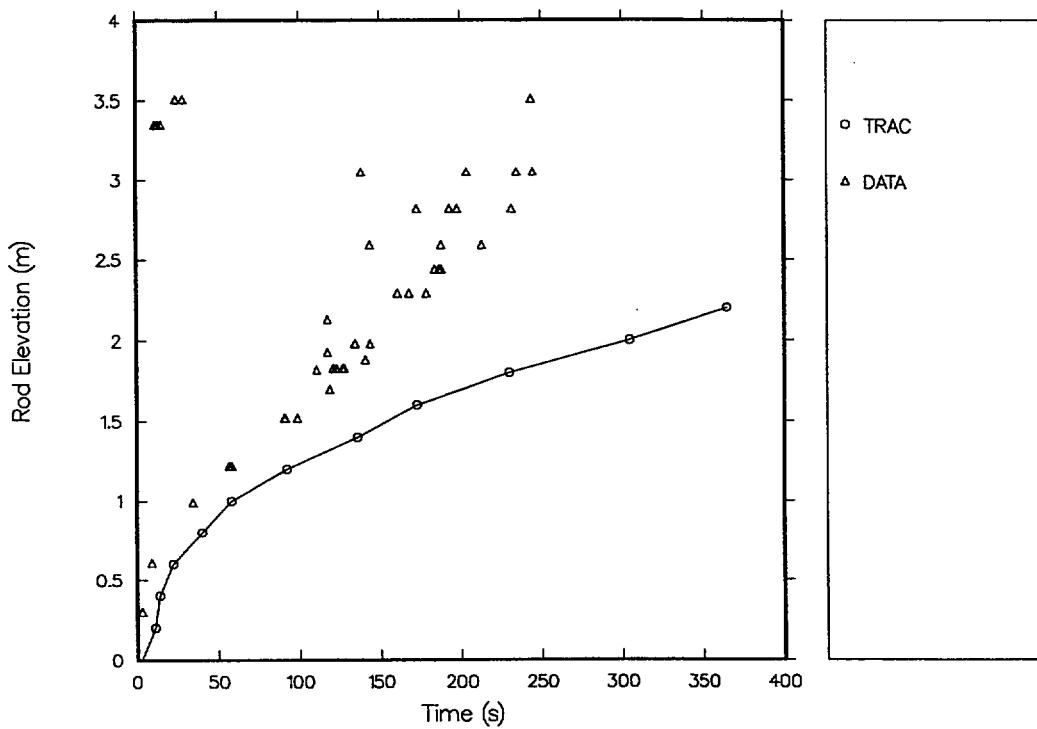


Fig. N-1. Comparison of predicted and measured cladding quench times.

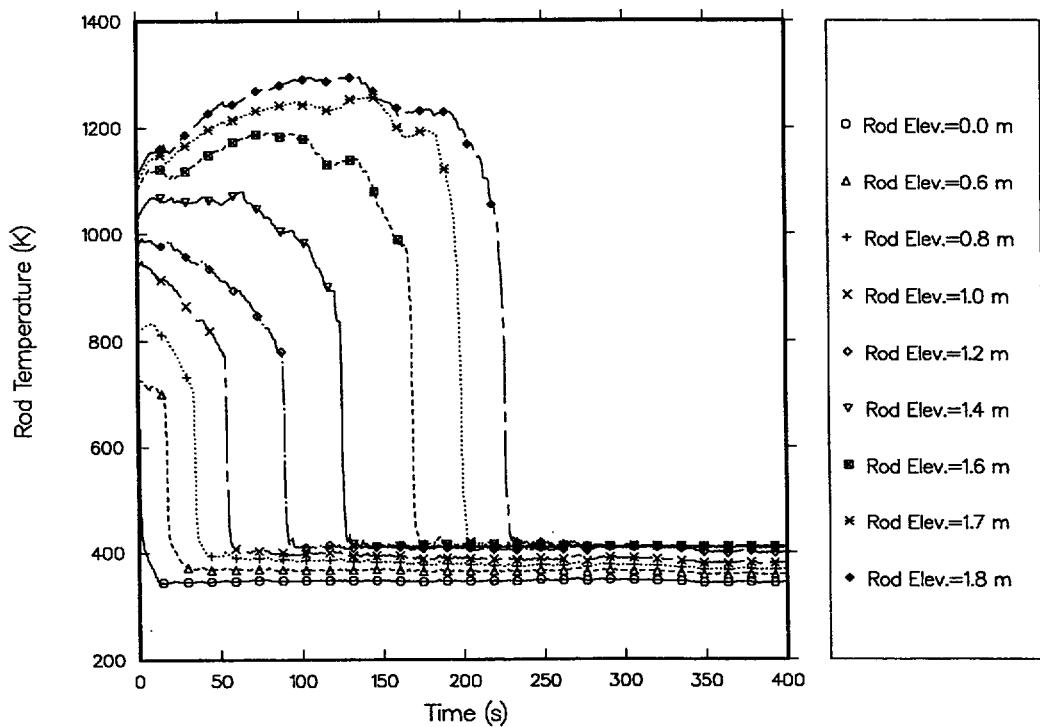


Fig. N-2. Predicted cladding temperature responses in lower half of core.

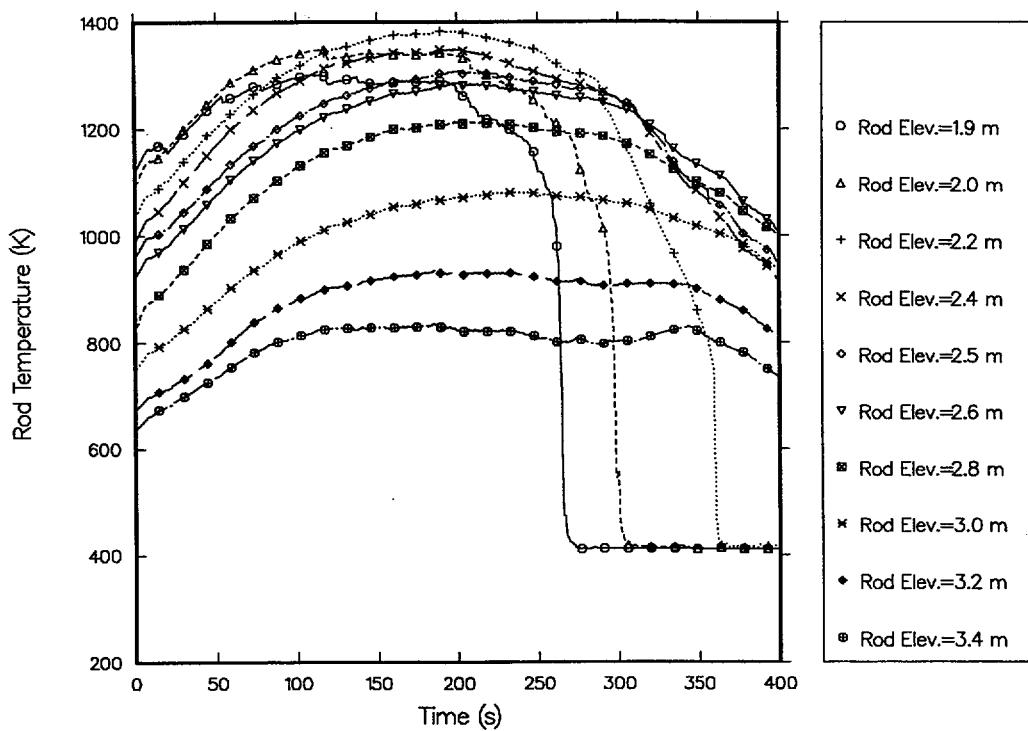


Fig. N-3. Predicted cladding temperature responses in upper half of core.

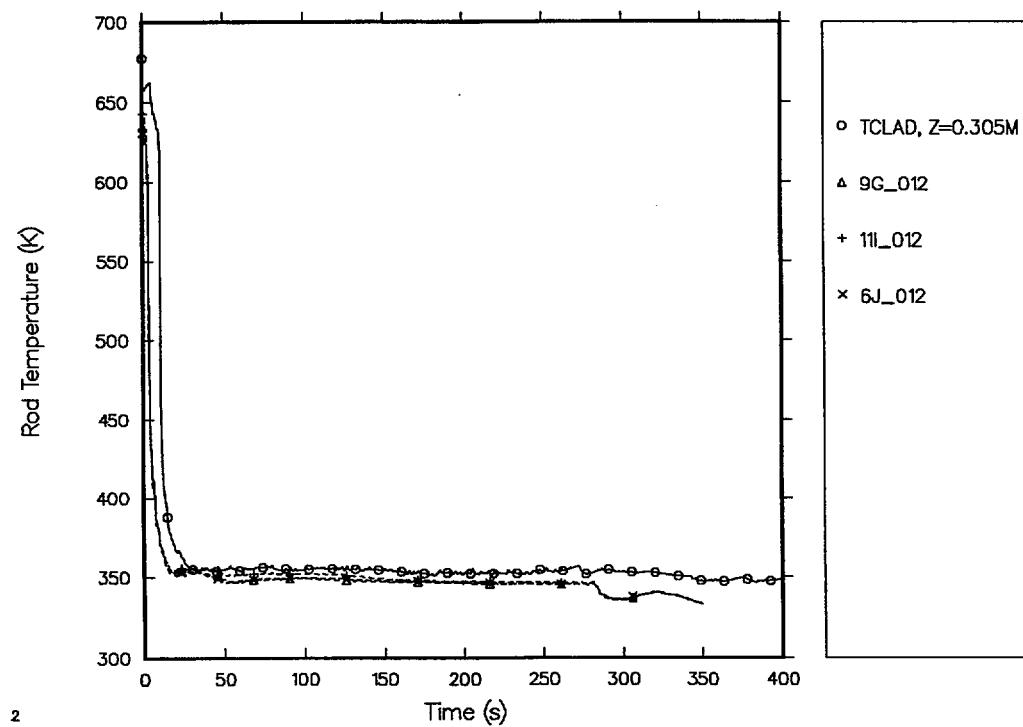


Fig. N-4. Comparison of predicted and measured heater-rod cladding temperatures at 0.3048-m elevation.

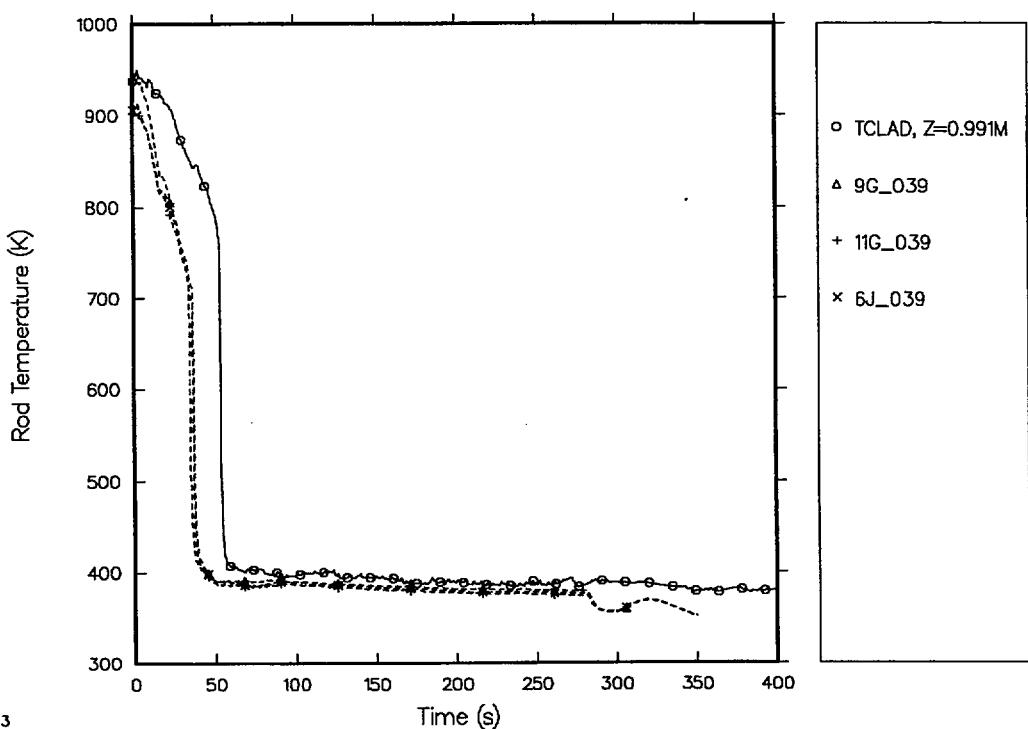


Fig. N-5. Comparison of predicted and measured heater-rod cladding temperatures at 0.9906-m elevation.

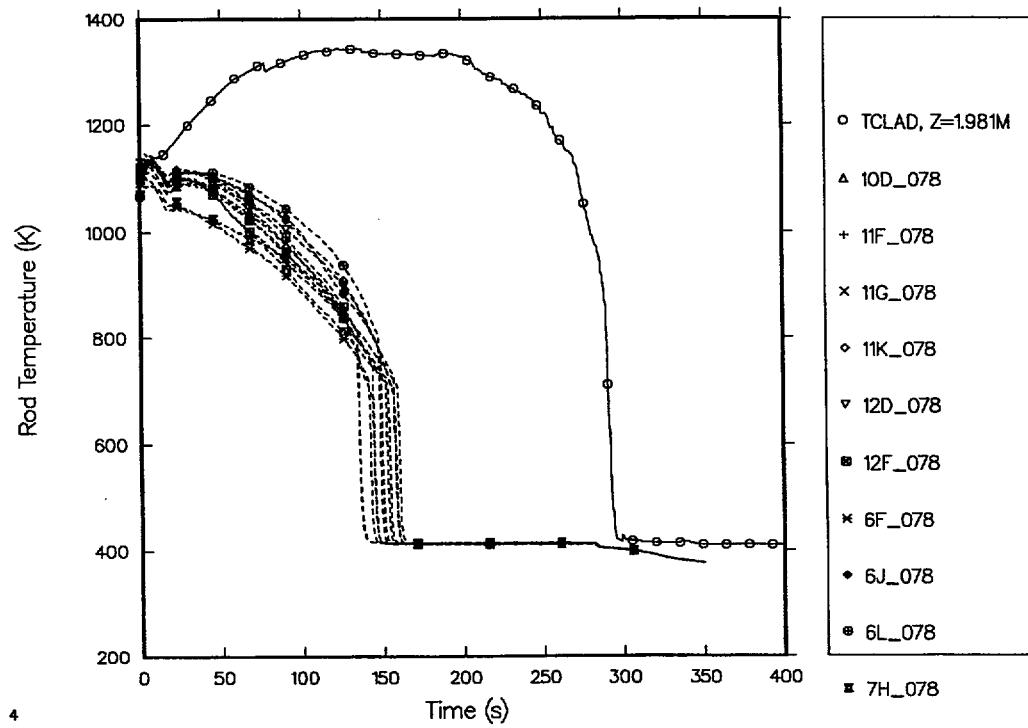


Fig. N-6. Comparison of predicted and measured heater-rod cladding temperatures at 1.9812-m elevation.

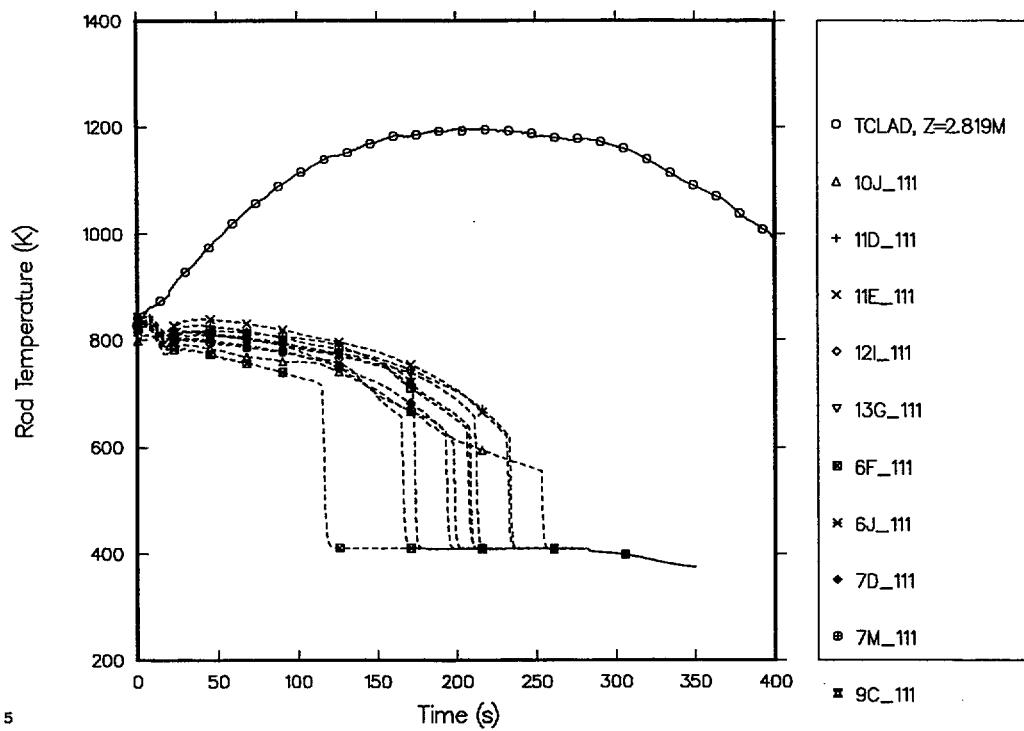


Fig. N-7. Comparison of predicted and measured heater-rod cladding temperatures at 2.8194-m elevation.

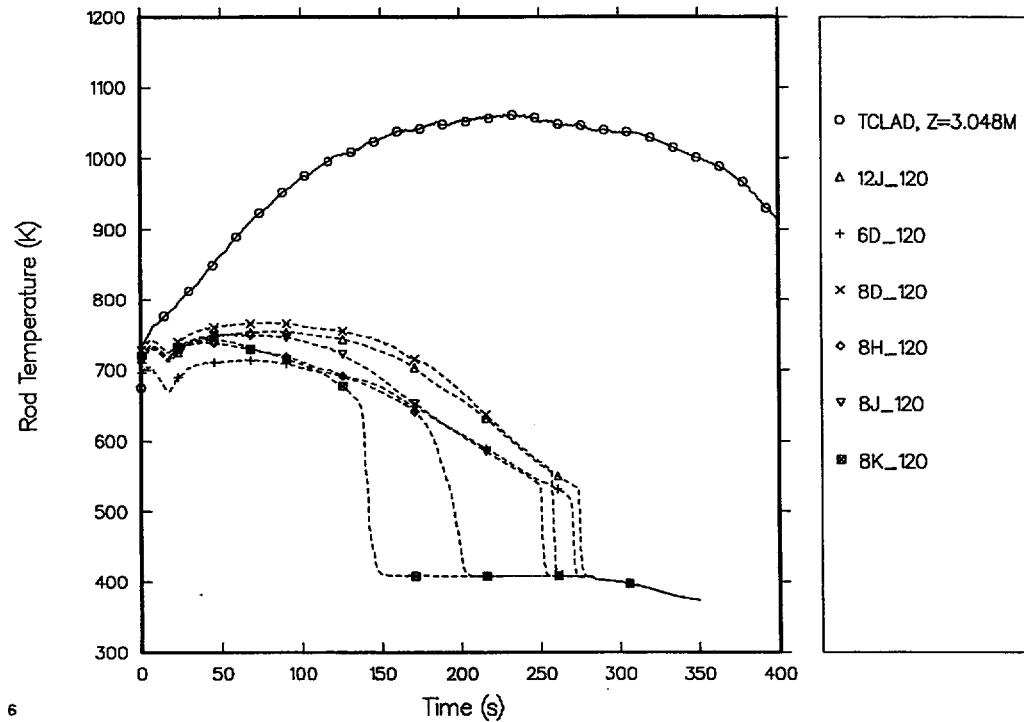


Fig. N-8. Comparison of predicted and measured heater-rod cladding temperatures at 3.0480-m elevation.

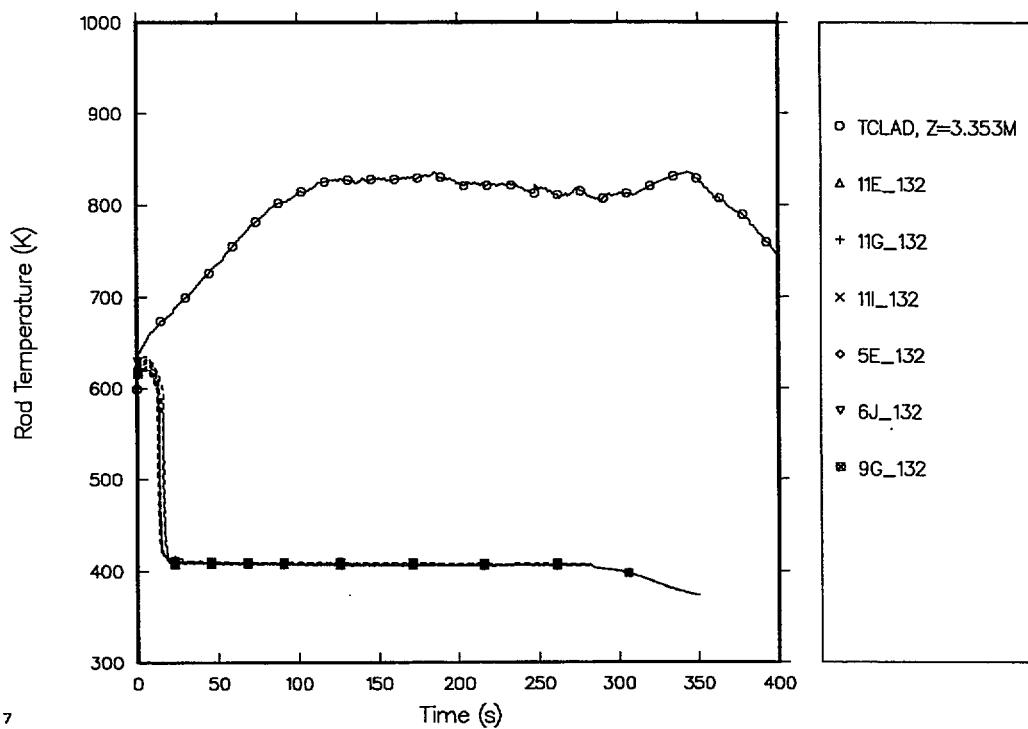


Fig. N-9. Comparison of predicted and measured heater-rod cladding temperatures at 3.3528-m elevation.

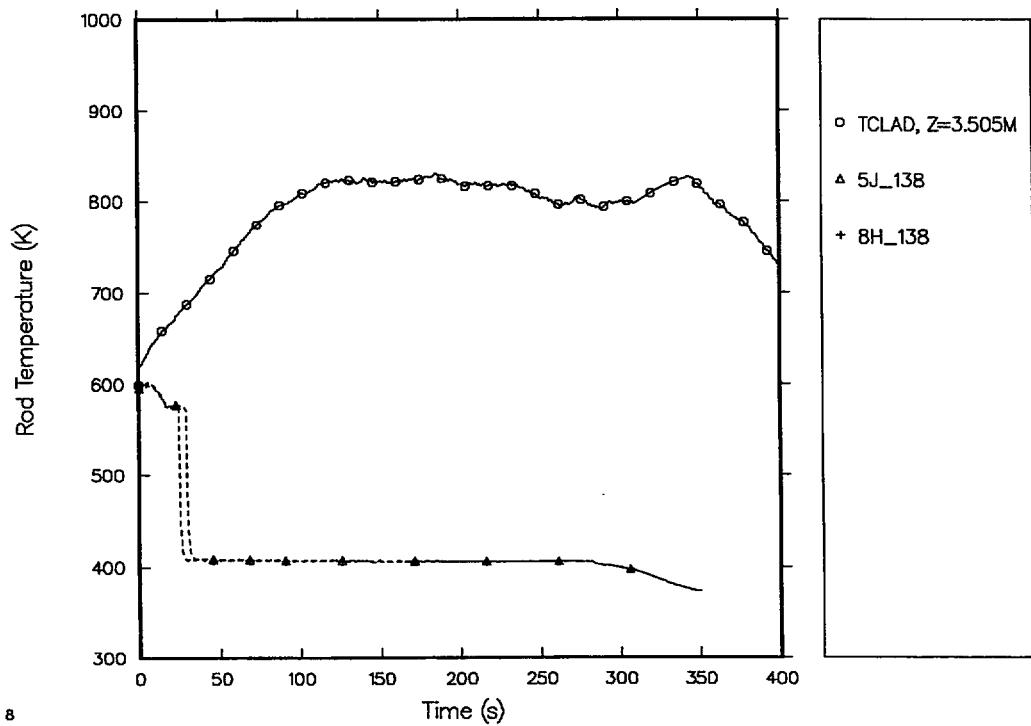


Fig. N-10. Comparison of predicted and measured heater-rod cladding temperatures at 3.5052-m elevation.

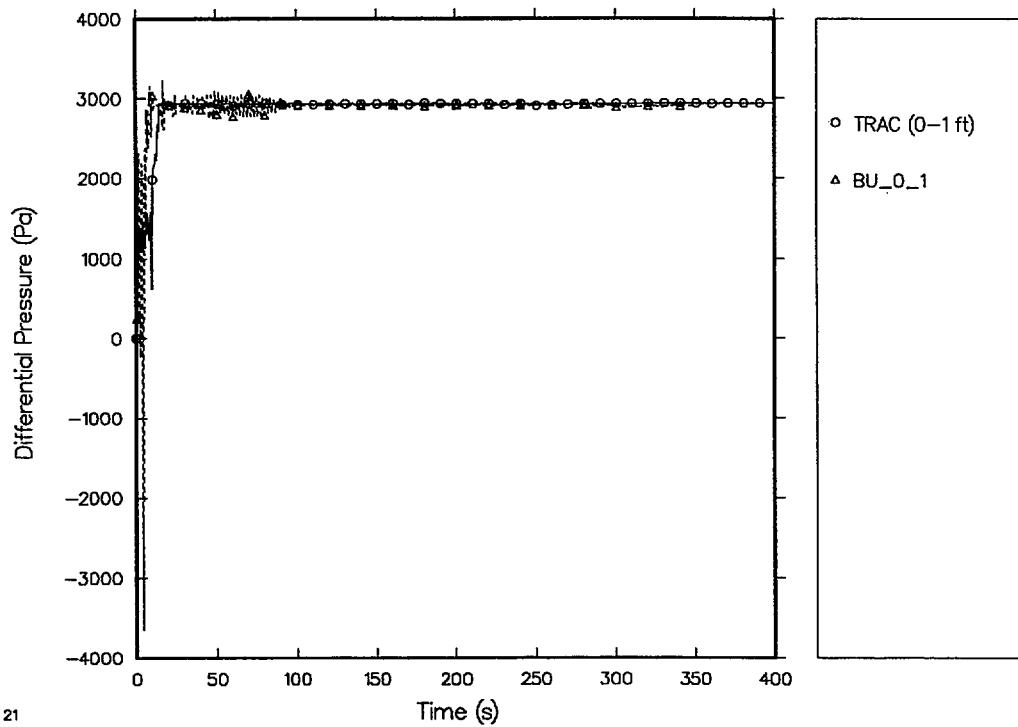


Fig. N-11. Comparison of predicted and measured differential pressures (0-1 ft).

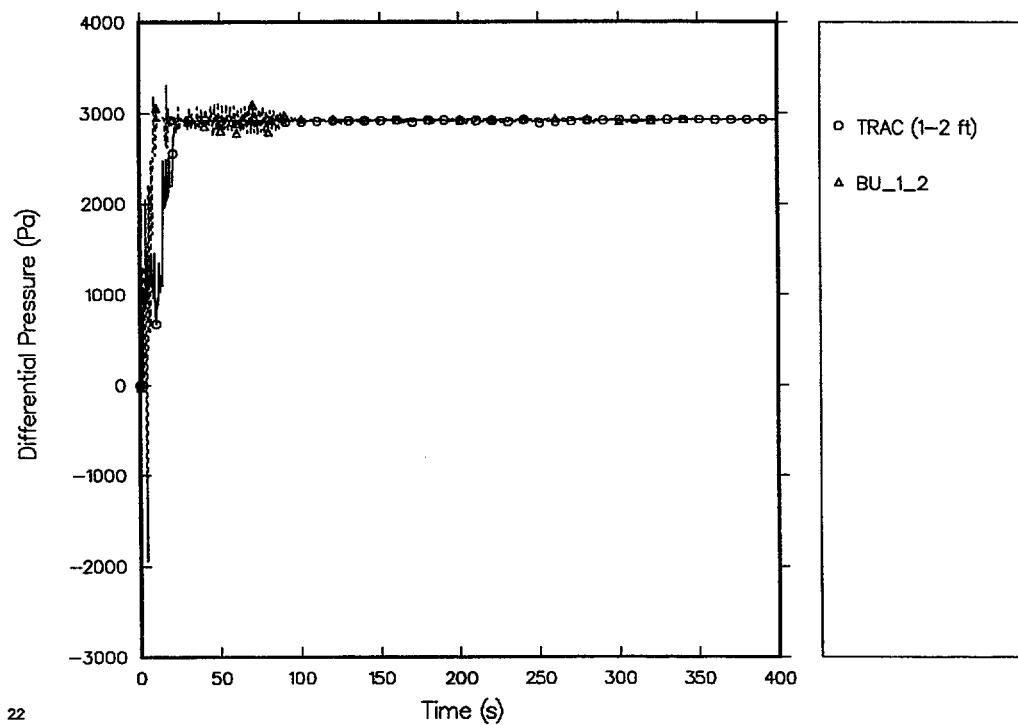
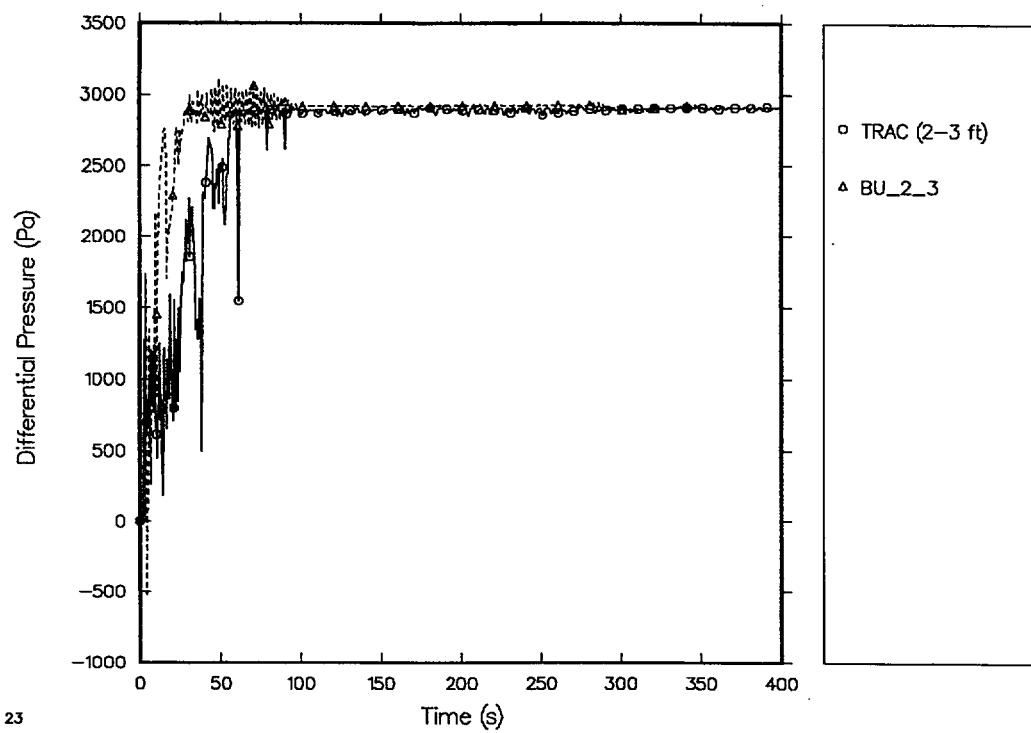
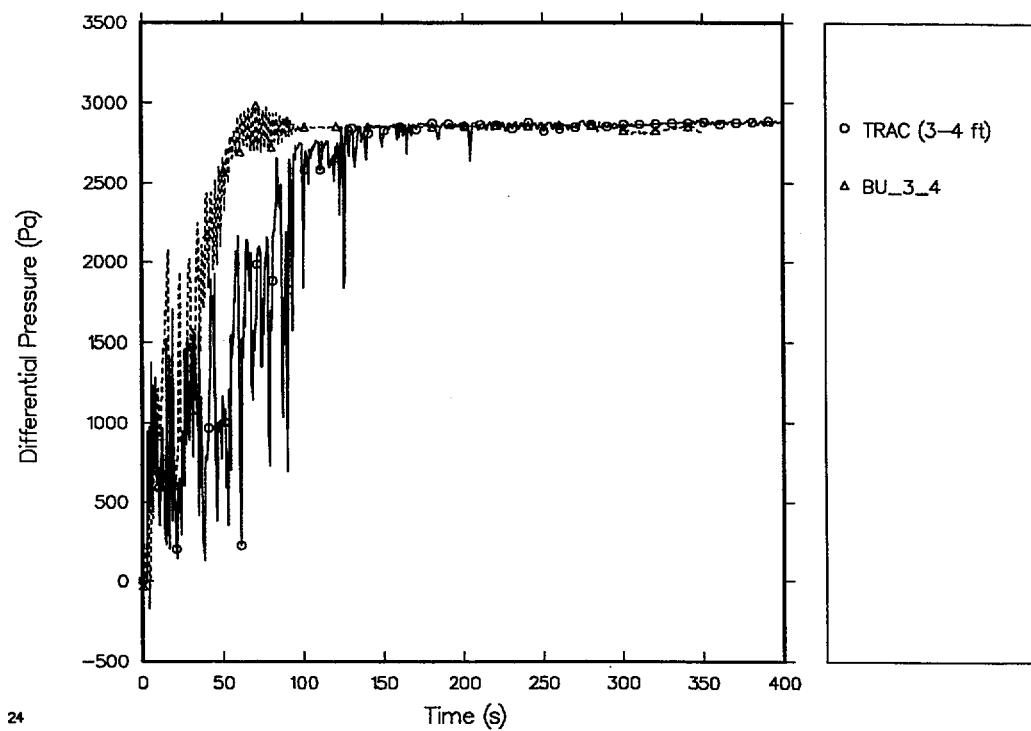


Fig. N-12. Comparison of predicted and measured differential pressures (1-2 ft).



23

Fig. N-13. Comparison of predicted and measured differential pressures (2-3 ft).



24

Fig. N-14. Comparison of predicted and measured differential pressures (3-4 ft).

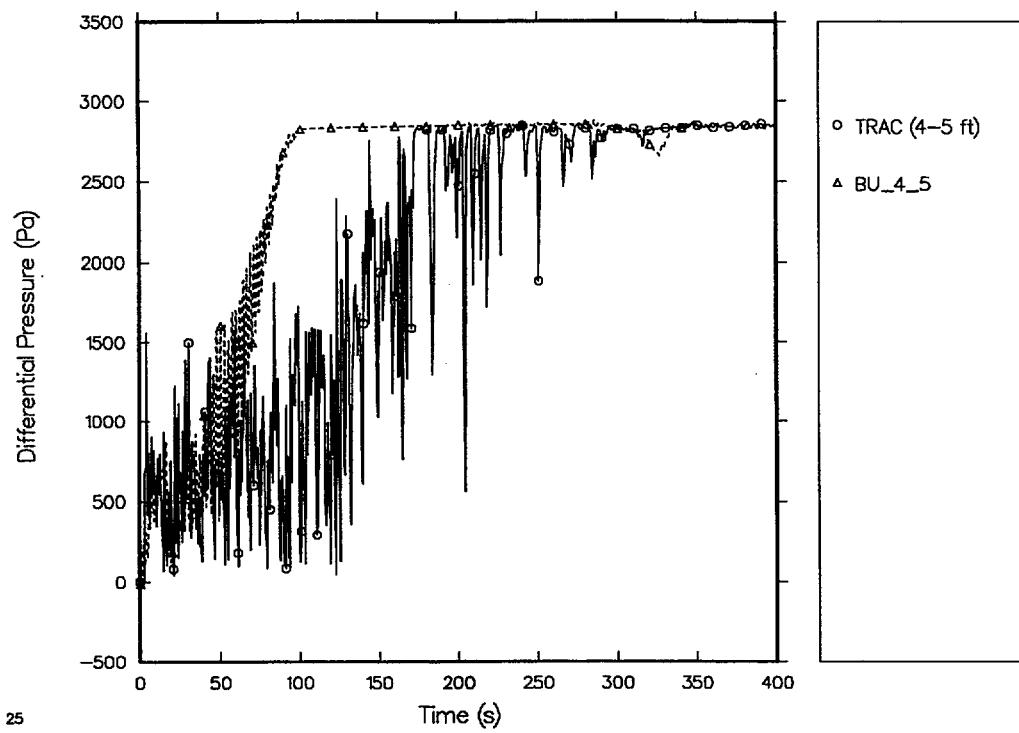


Fig. N-15. Comparison of predicted and measured differential pressures (4-5 ft).

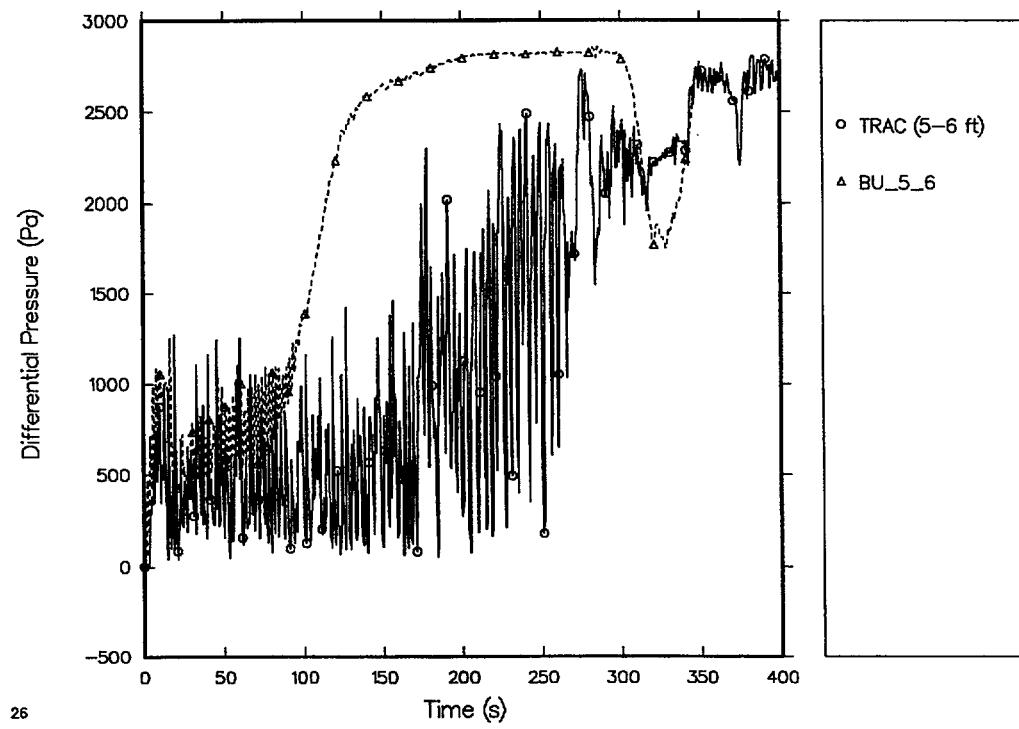
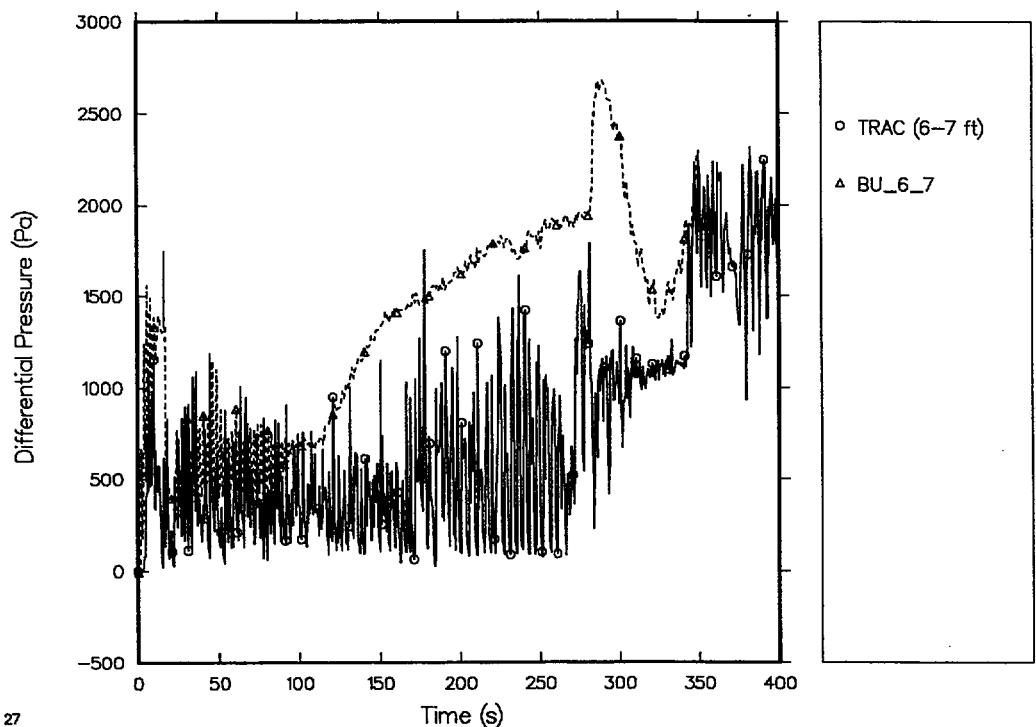
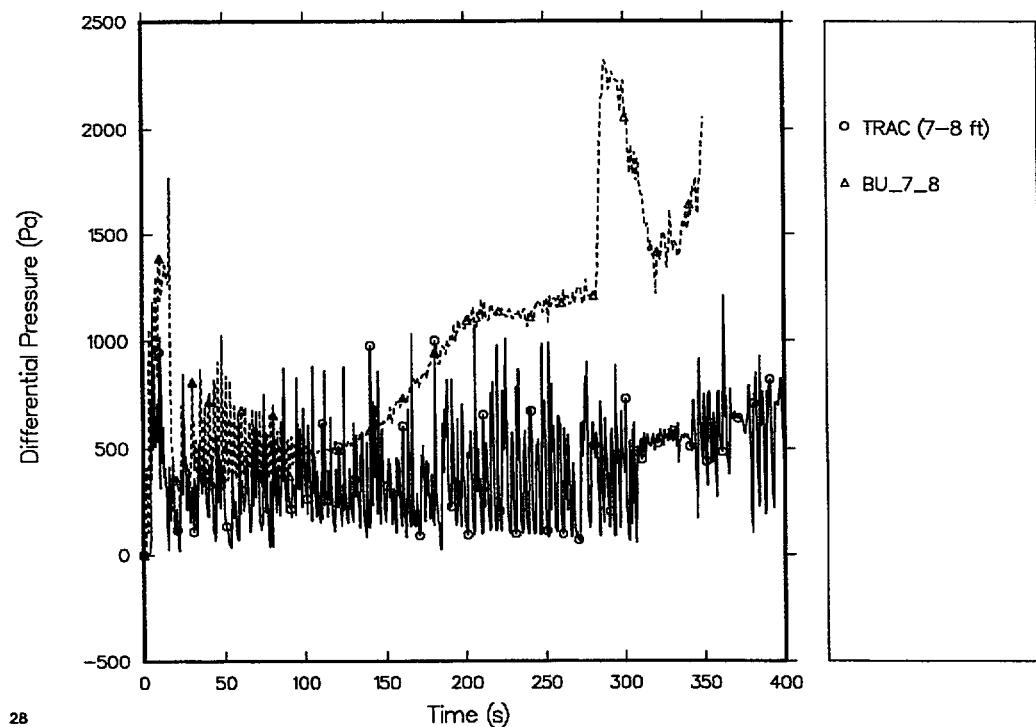


Fig. N-16. Comparison of predicted and measured differential pressures (5-6 ft).



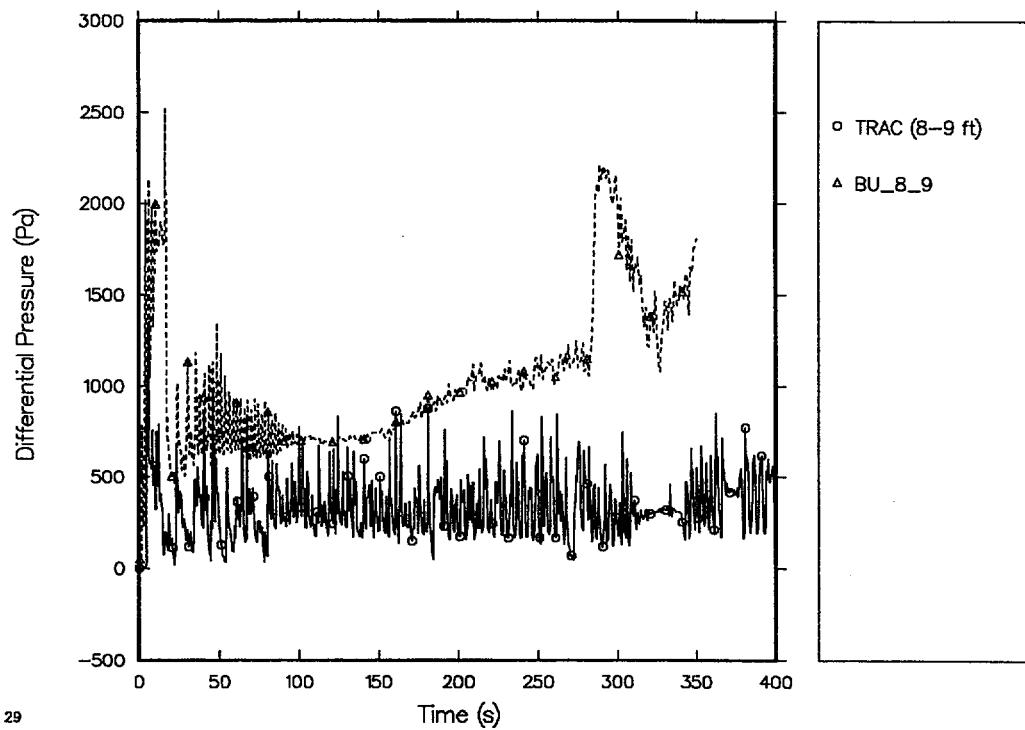
27

Fig. N-17. Comparison of predicted and measured differential pressures (6-7 ft).



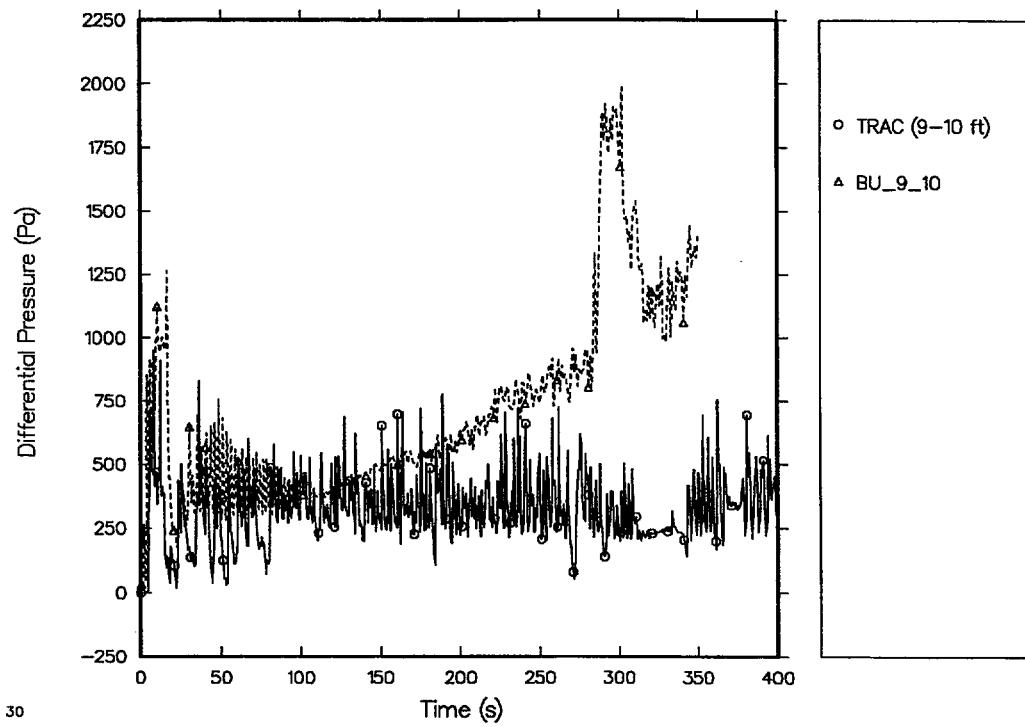
28

Fig. N-18. Comparison of predicted and measured differential pressures (7-8 ft).



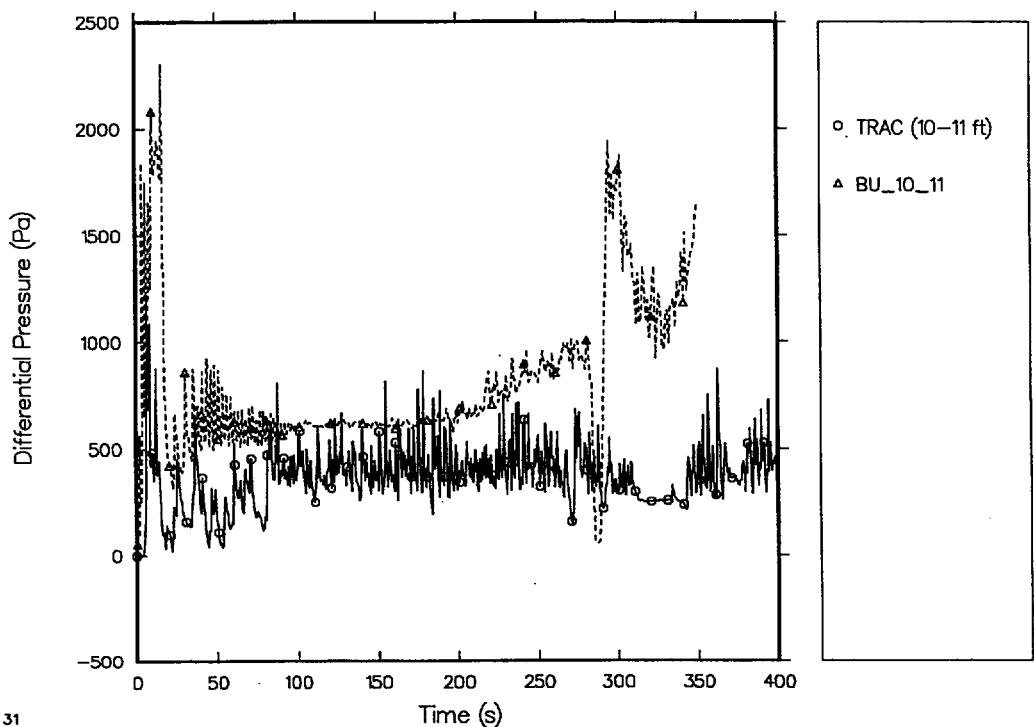
29

Fig. N-19. Comparison of predicted and measured differential pressures (8-9ft).



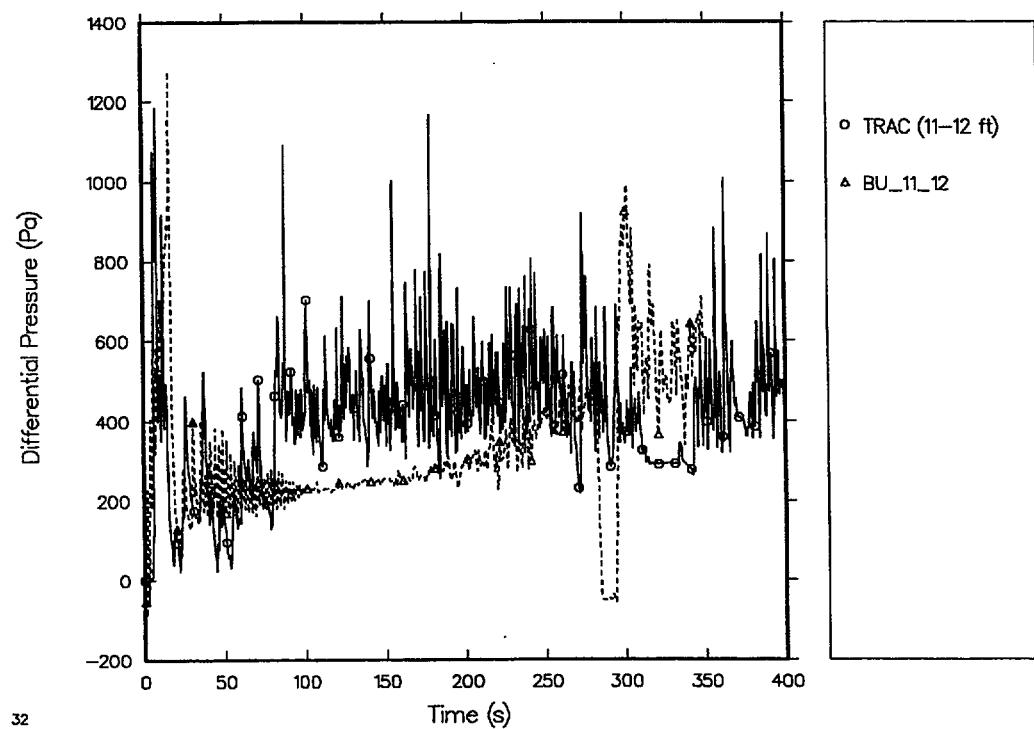
30

Fig. N-20. Comparison of predicted and measured differential pressures (9-10 ft).



31

Fig. N-21. Comparison of predicted and measured differential pressures (10-11 ft).



32

Fig. N-22. Comparison of predicted and measured differential pressures (11-12 ft).

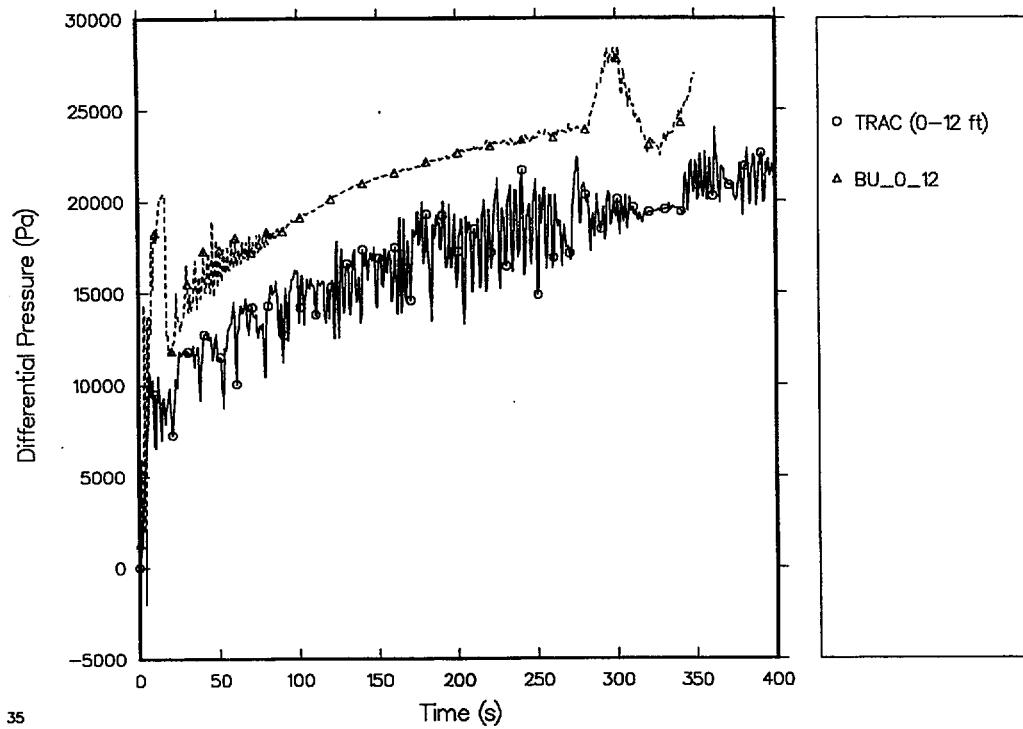


Fig. N-23. Comparison of predicted and measured total core differential pressures (0-12 ft).

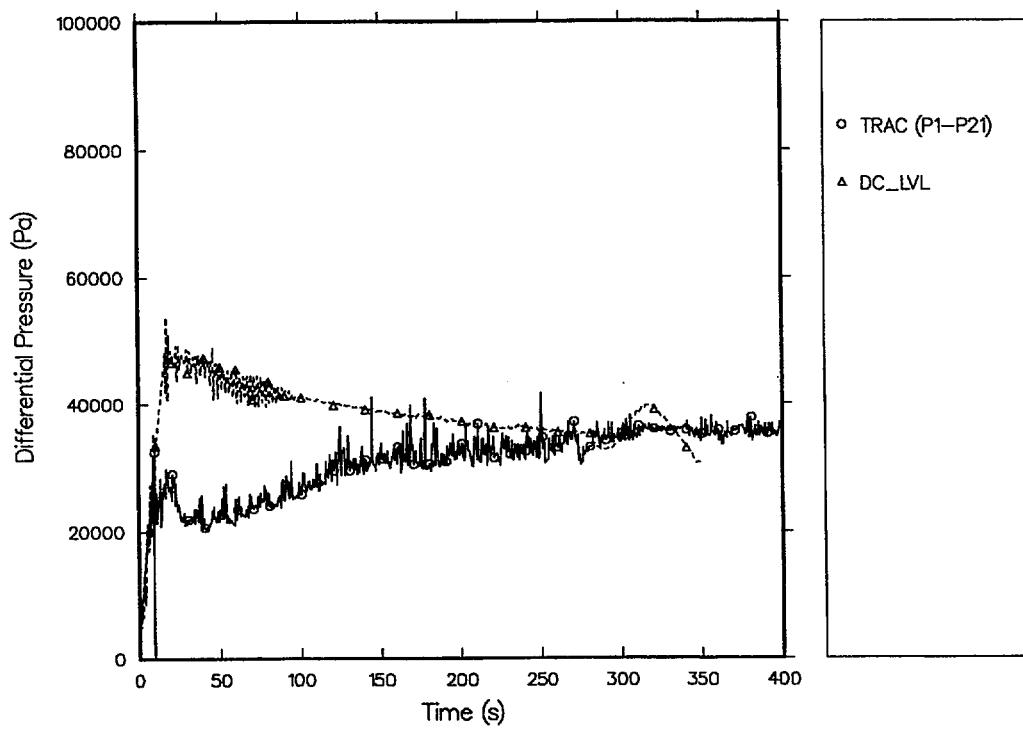


Fig. N-24. Comparison of predicted and measured downcomer differential pressures.

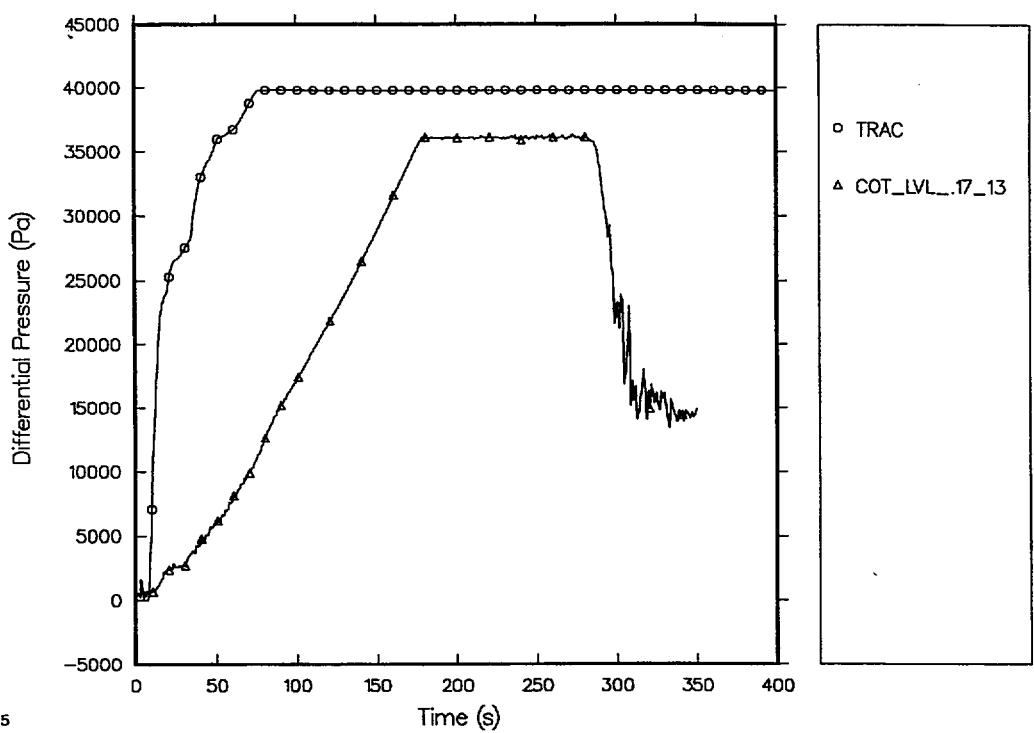


Fig. N-25. Comparison of predicted and measured carryover tank differential pressures (0–12 ft).

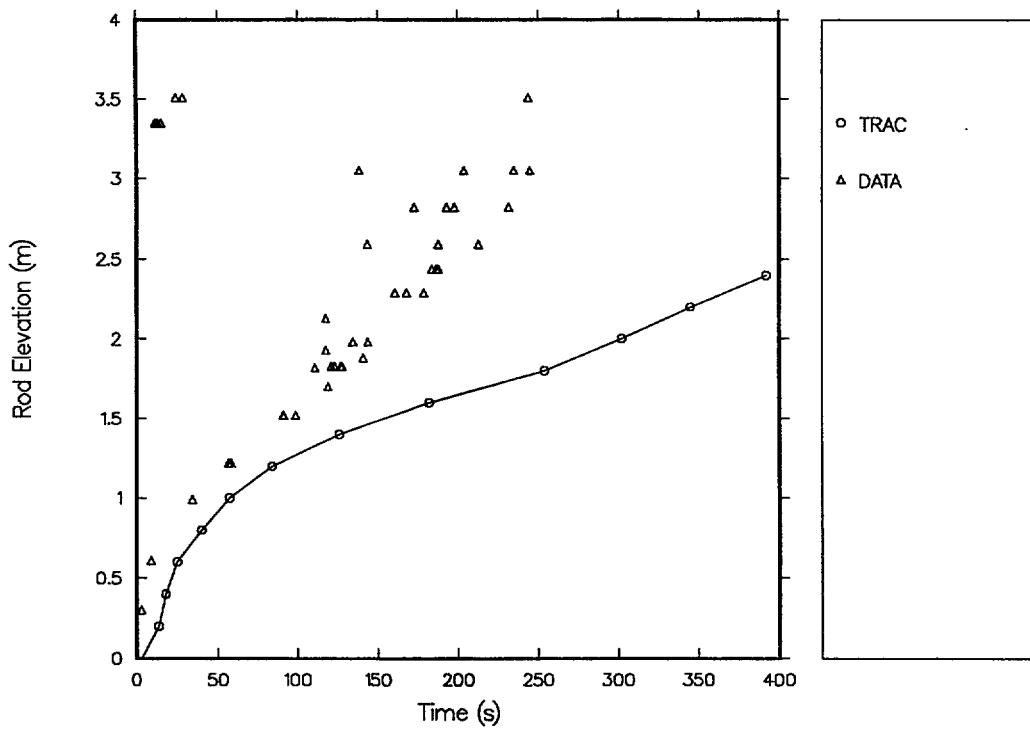


Fig. N-26. Comparison of predicted and measured cladding quench times (with grid-spacer model).

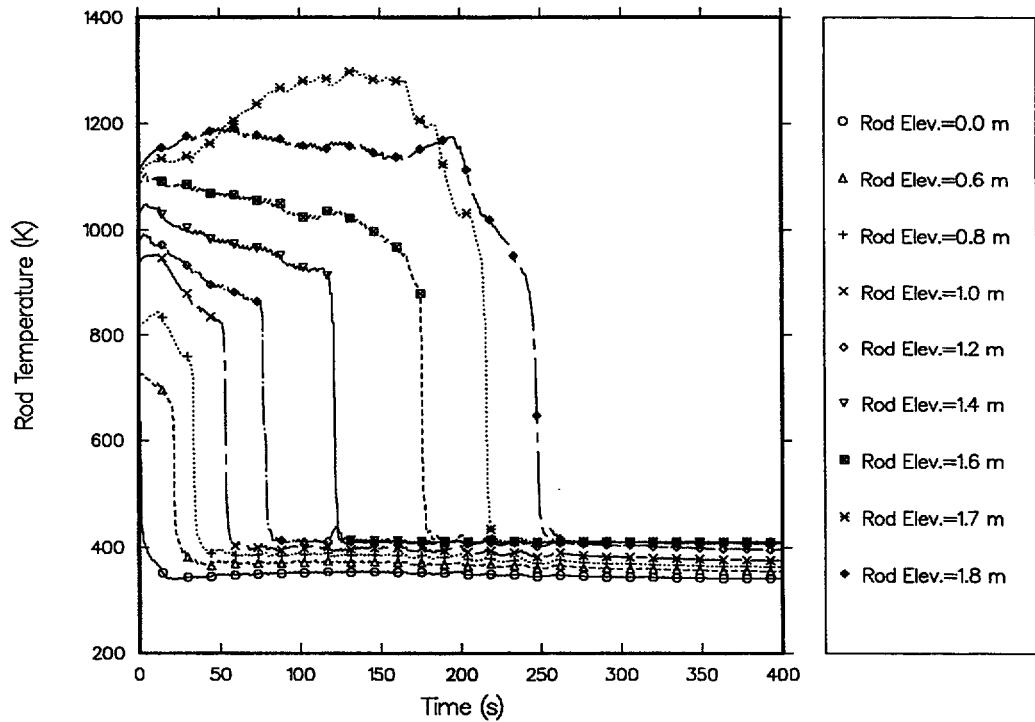


Fig. N-27. Predicted cladding temperature responses in lower half of core (with grid-spacer model).

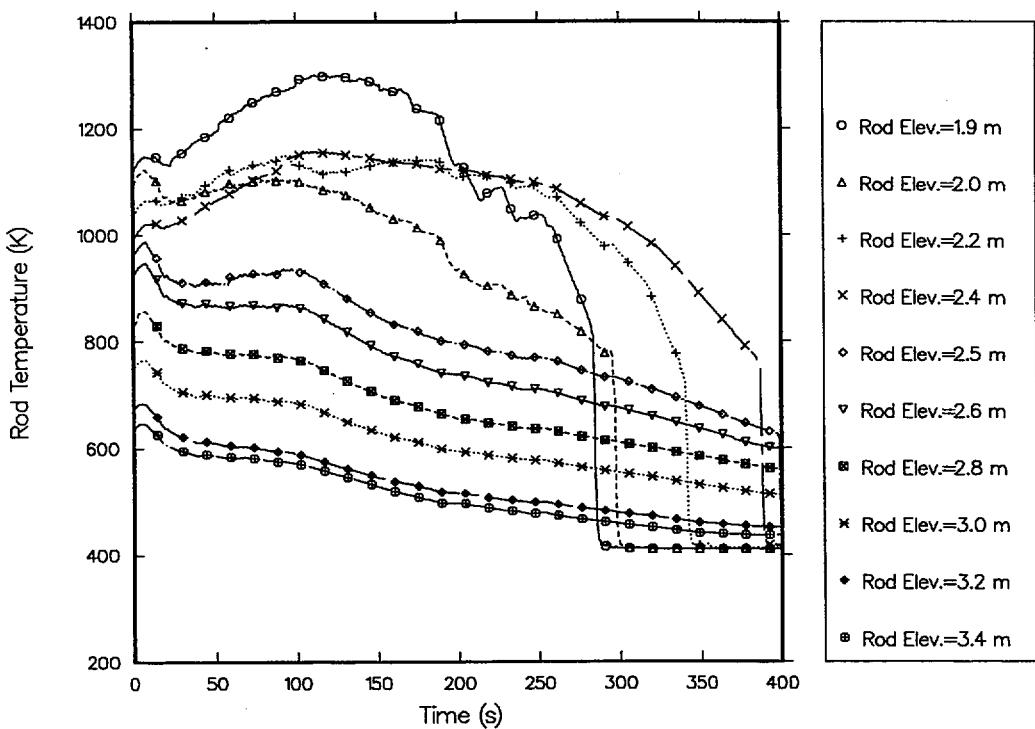


Fig. N-28. Predicted cladding temperature responses in upper half of core (with grid-spacer model).

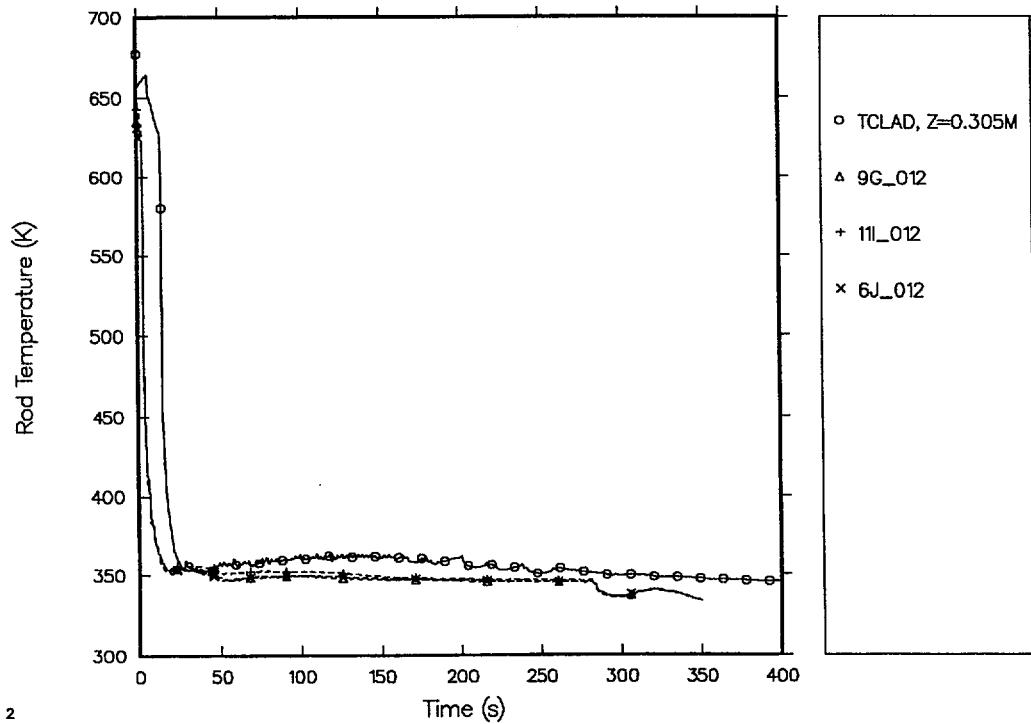


Fig. N-29. Comparison of predicted and measured heater-rod cladding temperatures at 0.3048-m elevation (with grid-spacer model).

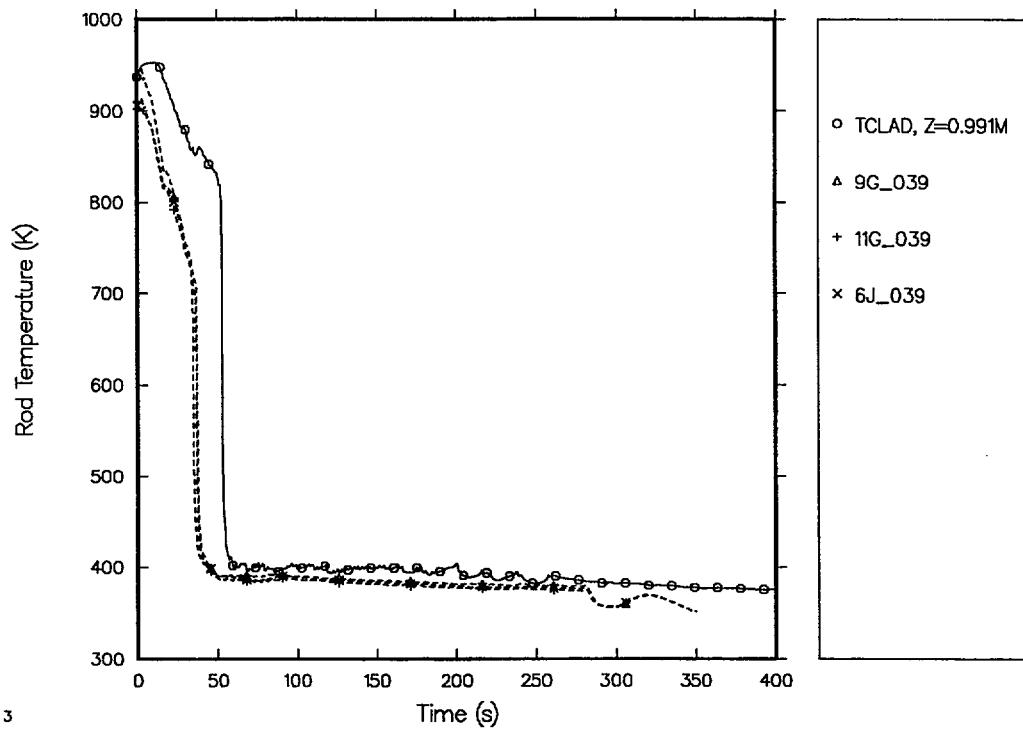


Fig. N-30. Comparison of predicted and measured heater-rod cladding temperatures at 0.9906-m elevation (with grid-spacer model).

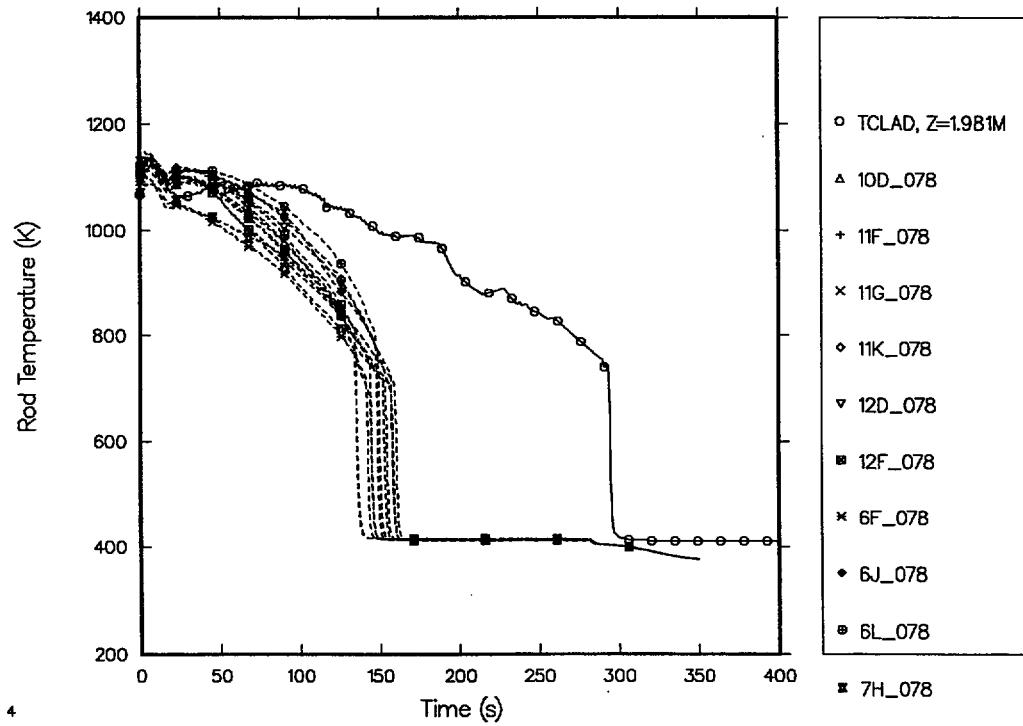


Fig. N-31. Comparison of predicted and measured heater-rod cladding temperatures at 1.9812-m elevation (with grid-spacer model).

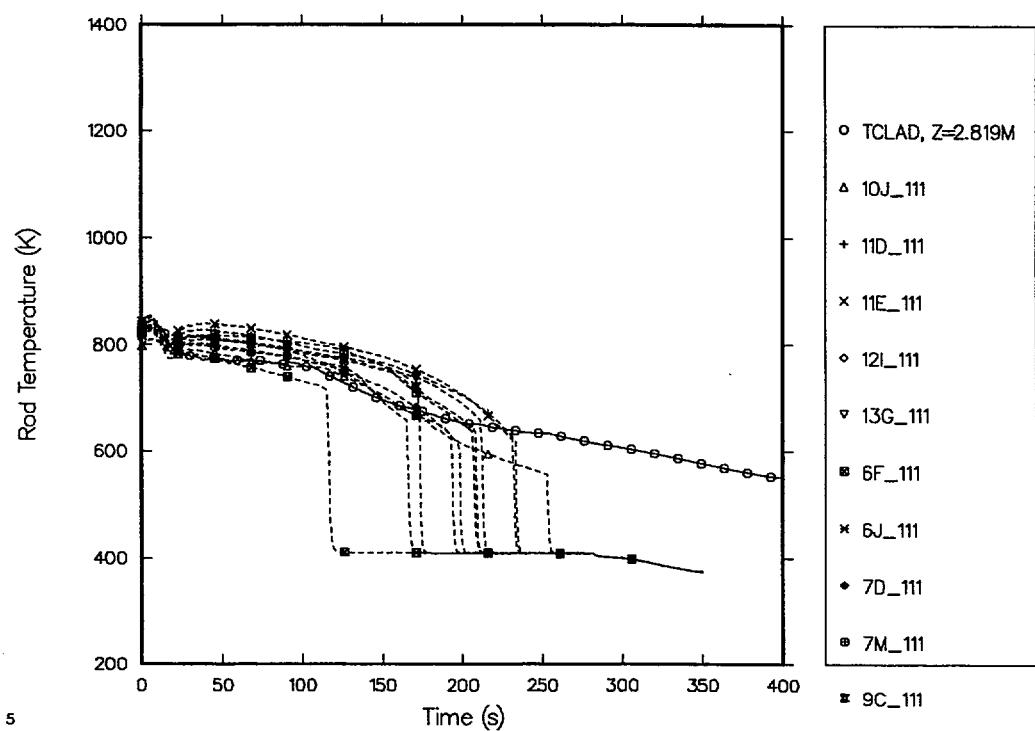


Fig. N-32. Comparison of predicted and measured heater-rod cladding temperatures at 2.8194-m elevation (with grid-spacer model).

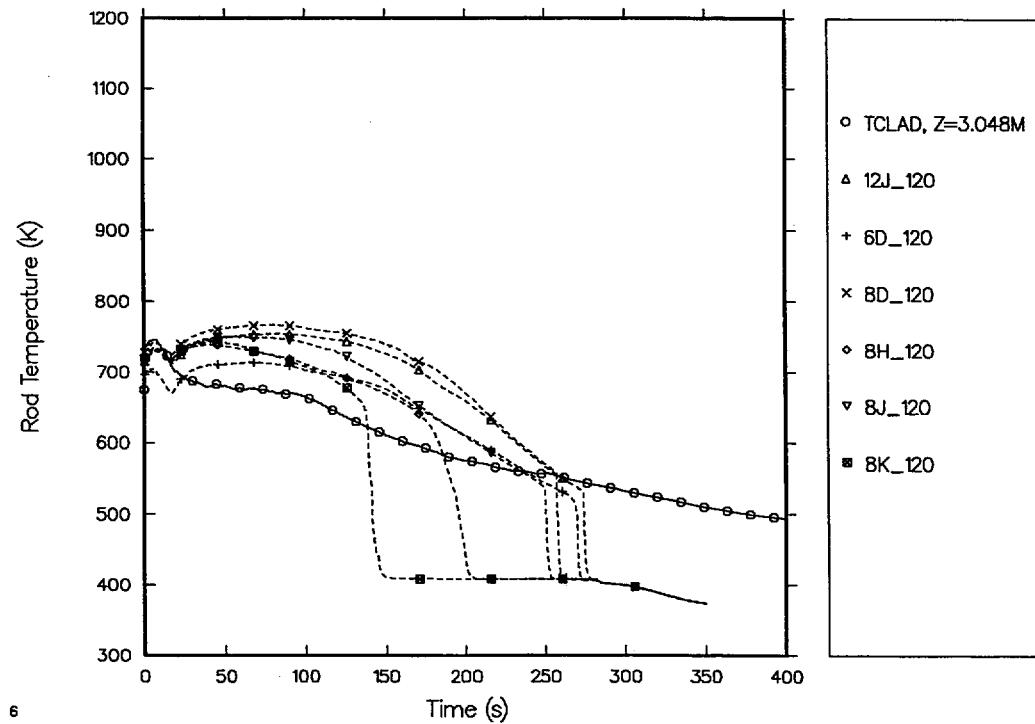


Fig. N-33. Comparison of predicted and measured heater-rod cladding temperatures at 3.0480-m elevation (with grid-spacer model).

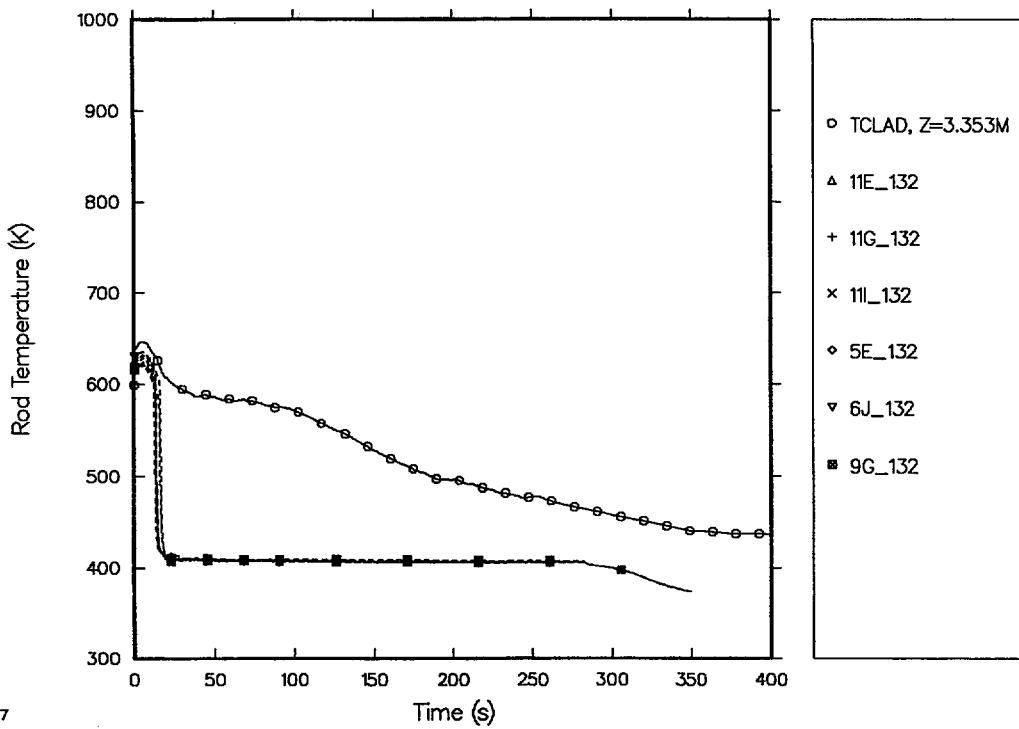


Fig. N-34. Comparison of predicted and measured heater-rod cladding temperatures at 3.3528-m elevation (with grid-spacer model).

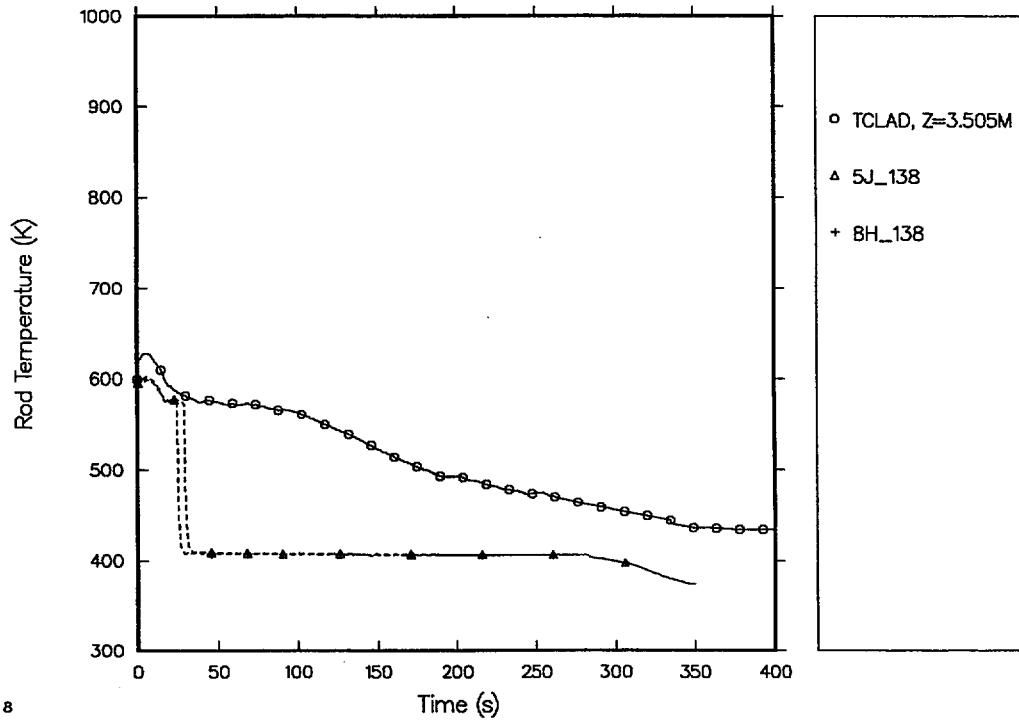


Fig. N-35. Comparison of predicted and measured heater-rod cladding temperatures at 3.5052-m elevation (with grid-spacer model).

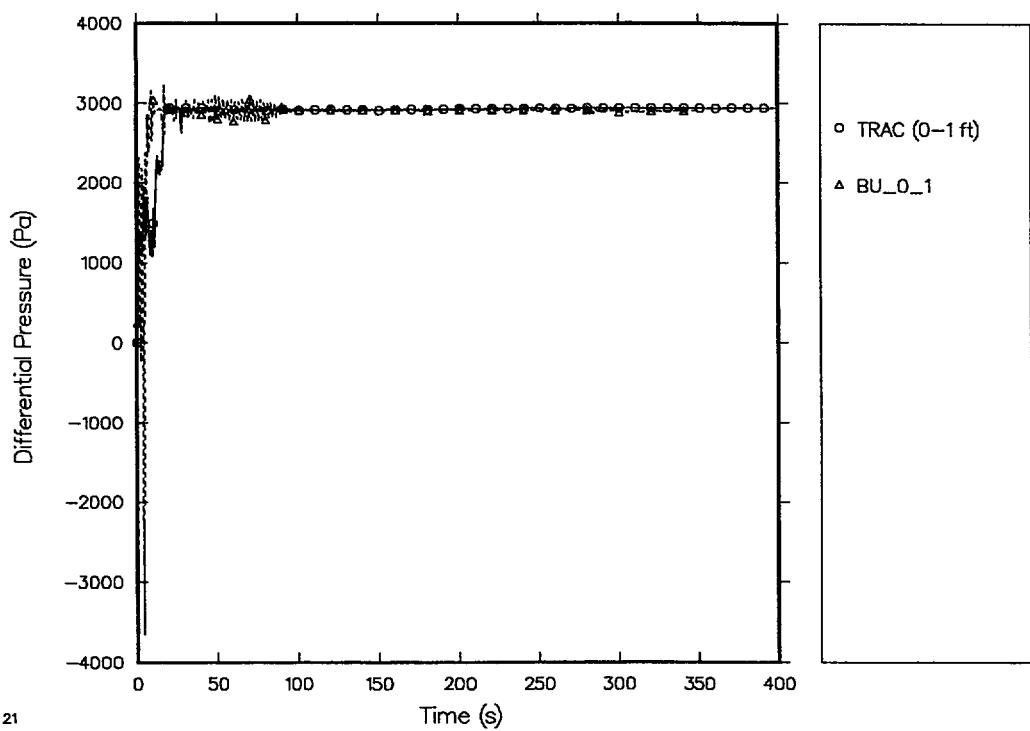


Fig. N-36. Comparison of predicted and measured differential pressures (0-1 ft, with grid-spacer model).

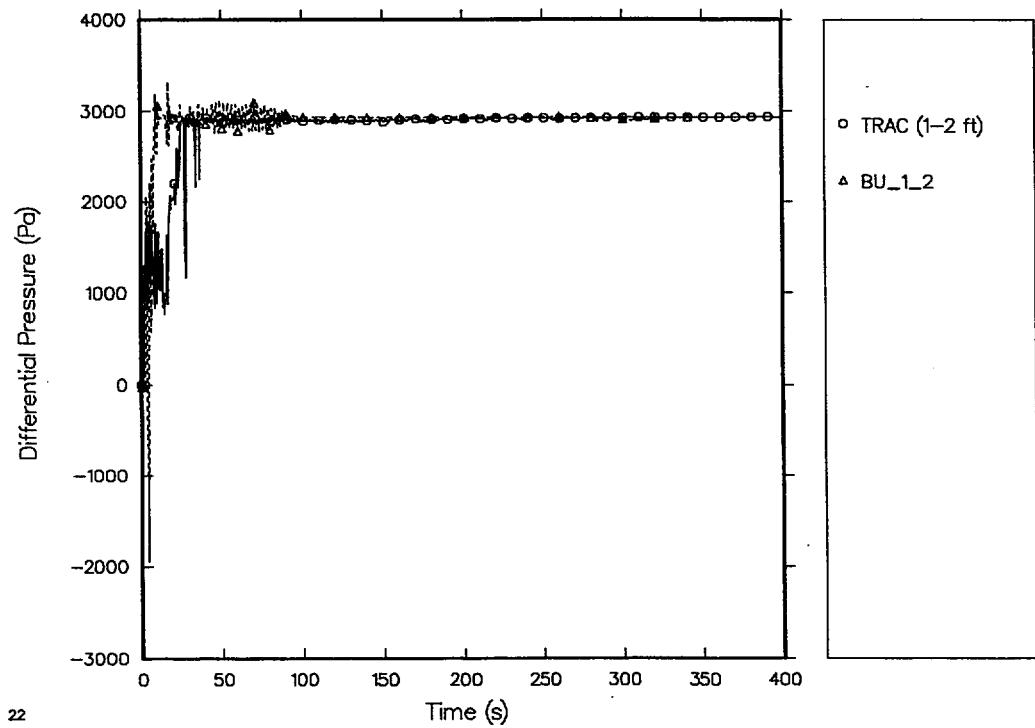


Fig. N-37. Comparison of predicted and measured differential pressures (1-2 ft, with grid-spacer model).

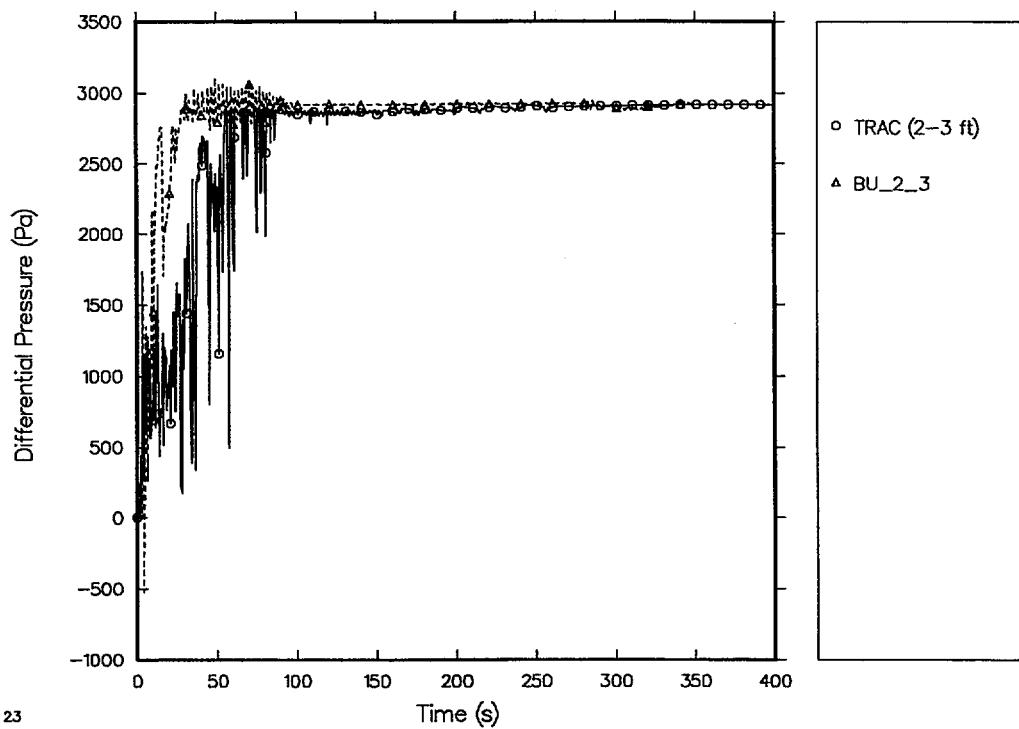


Fig. N-38. Comparison of predicted and measured differential pressures (2–3 ft, with grid-spacer model).

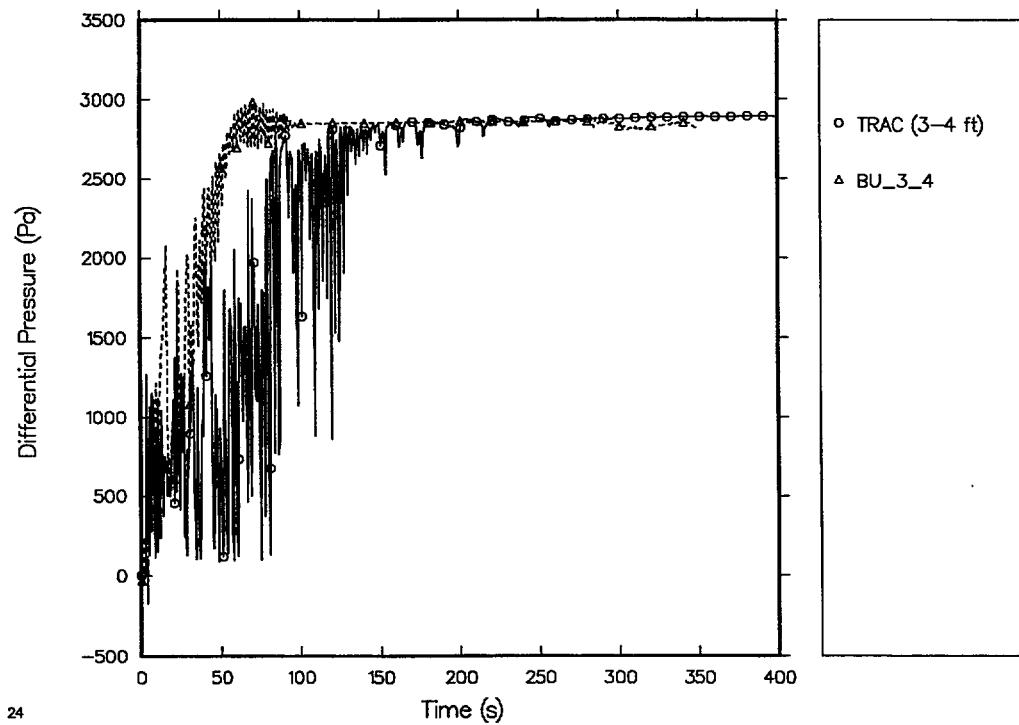


Fig. N-39. Comparison of predicted and measured differential pressures (3–4 ft, with grid-spacer model).

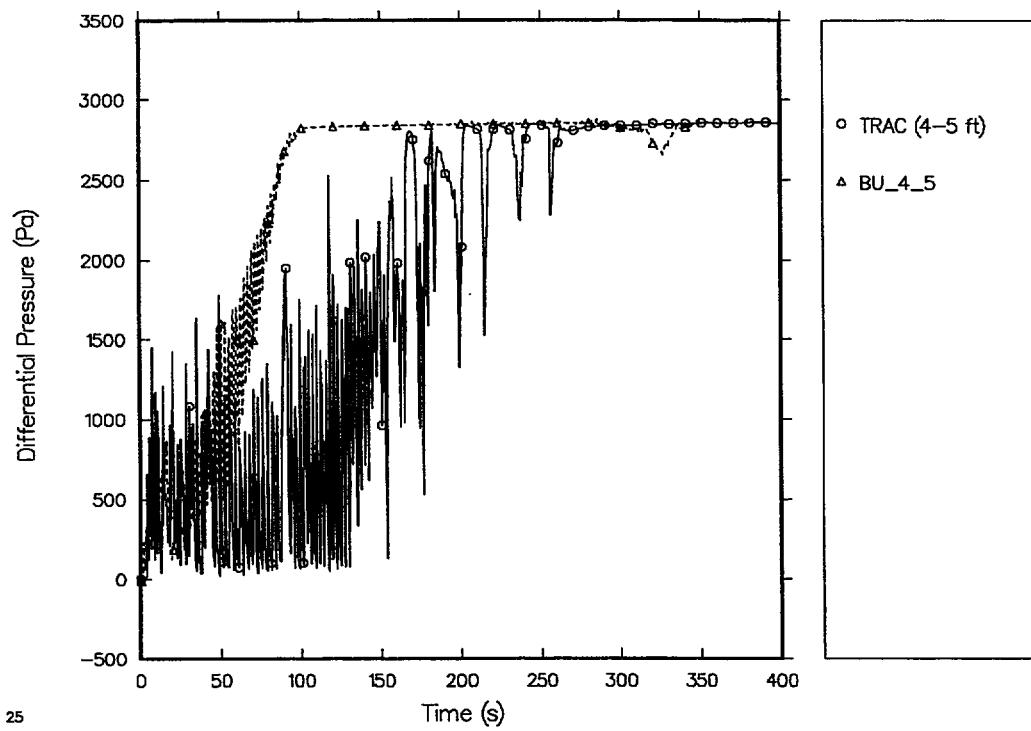


Fig. N-40. Comparison of predicted and measured differential pressures (4-5 ft, with grid-spacer model).

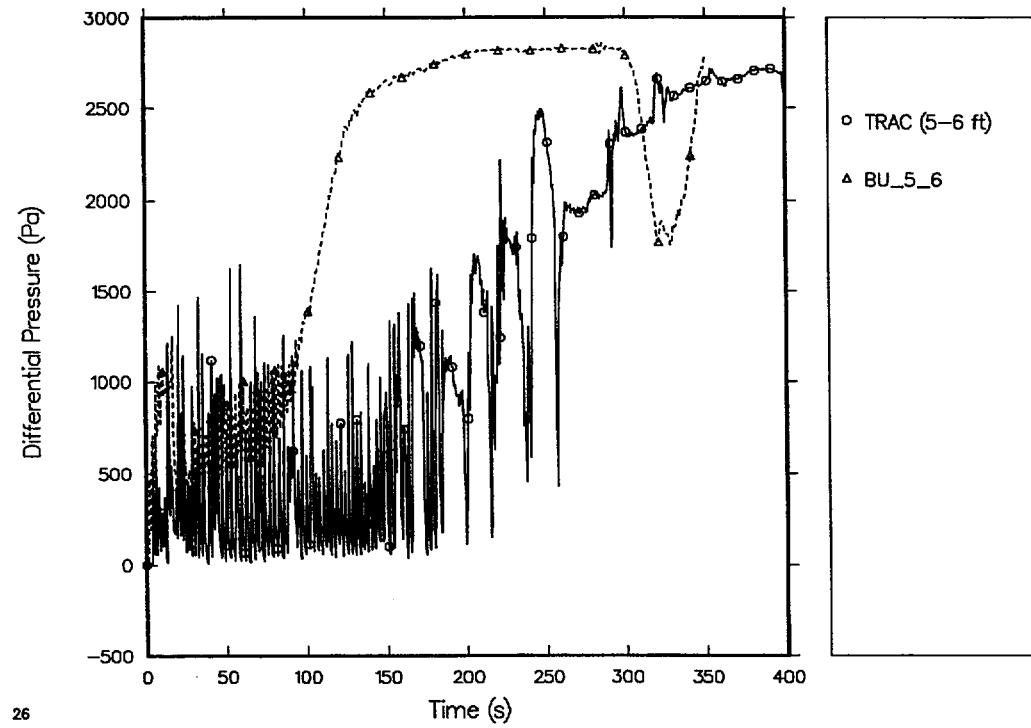
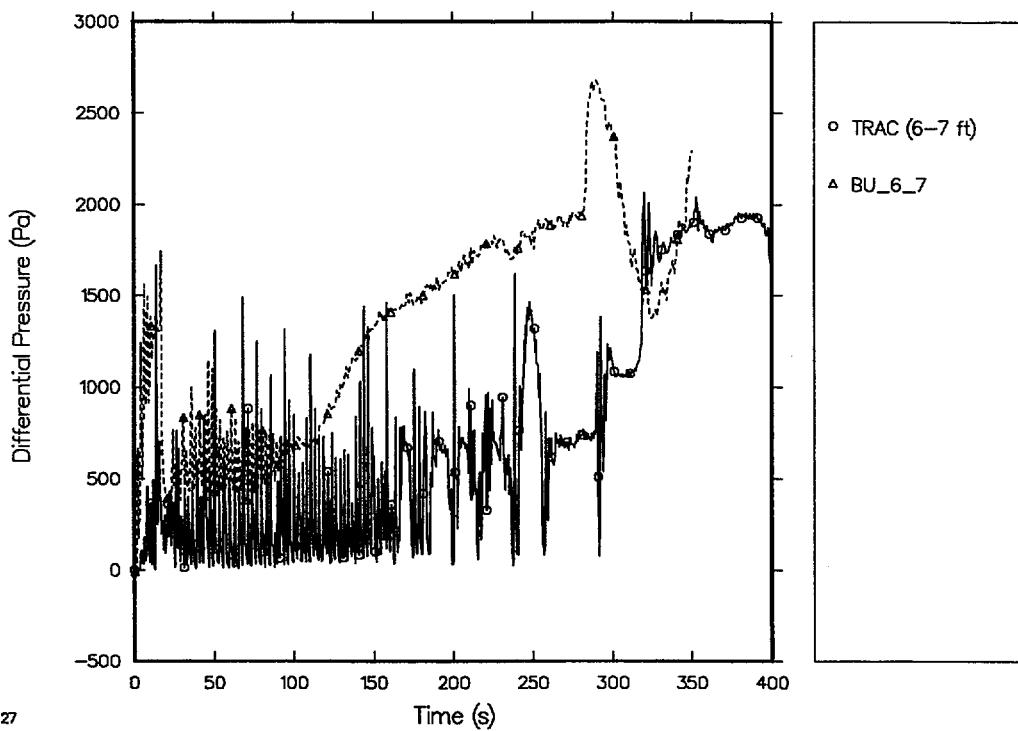
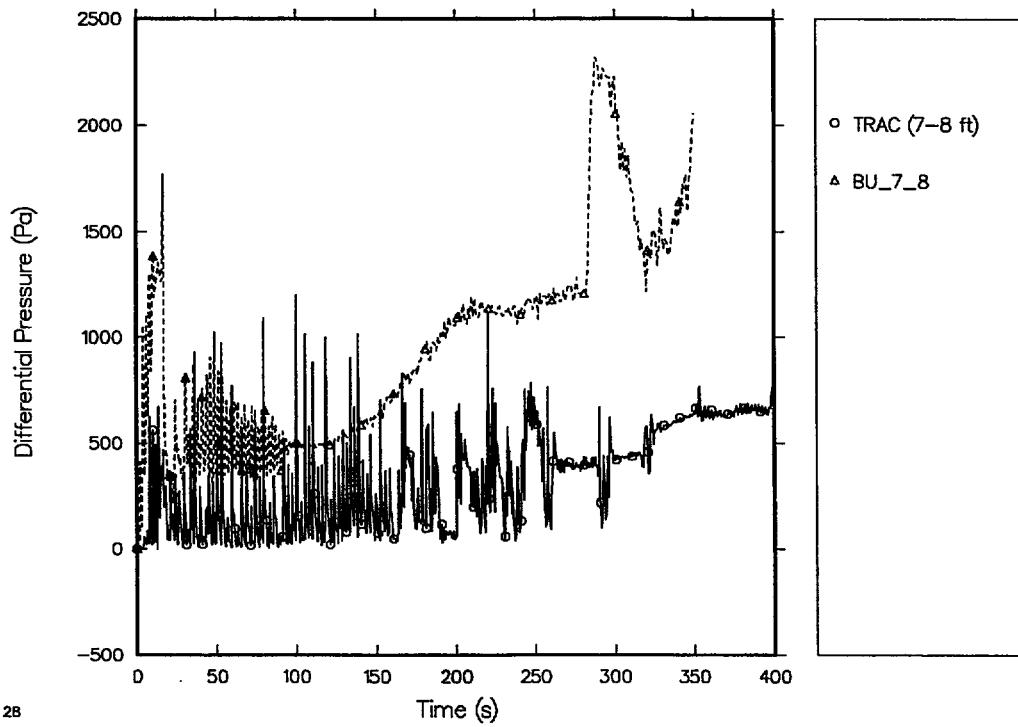


Fig. N-41. Comparison of predicted and measured differential pressures (5-6 ft, with grid-spacer model).



27

Fig. N-42. Comparison of predicted and measured differential pressures (6-7 ft, with grid-spacer model).



28

Fig. N-43. Comparison of predicted and measured differential pressures (7-8 ft, with grid-spacer model).

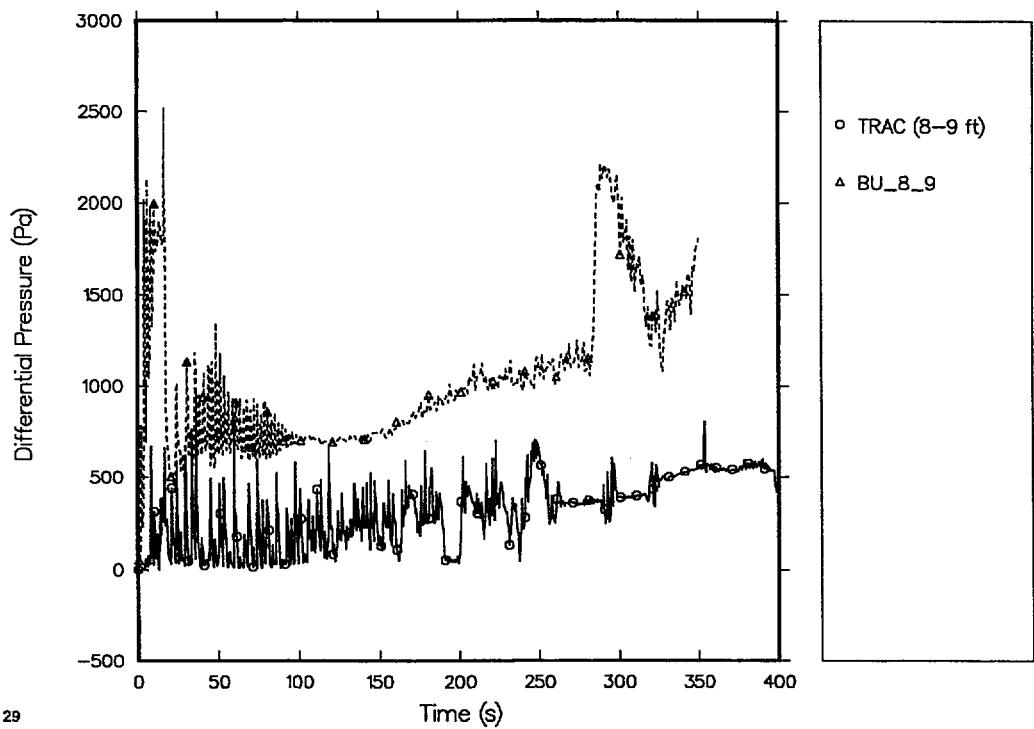


Fig. N-44. Comparison of predicted and measured differential pressures (8-9 ft, with grid-spacer model).

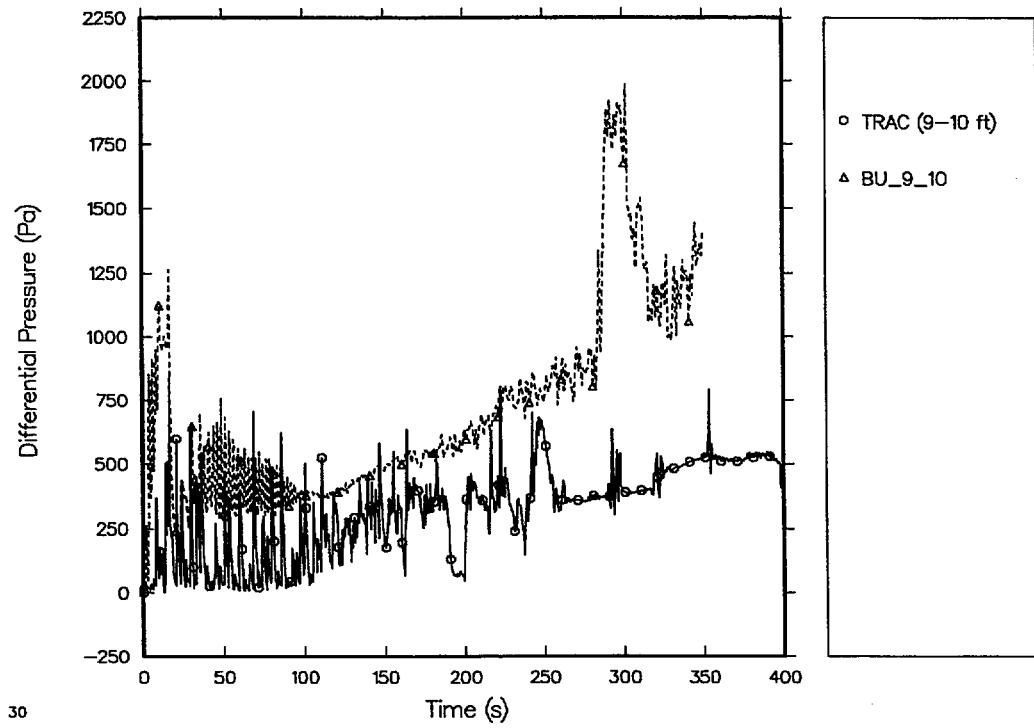
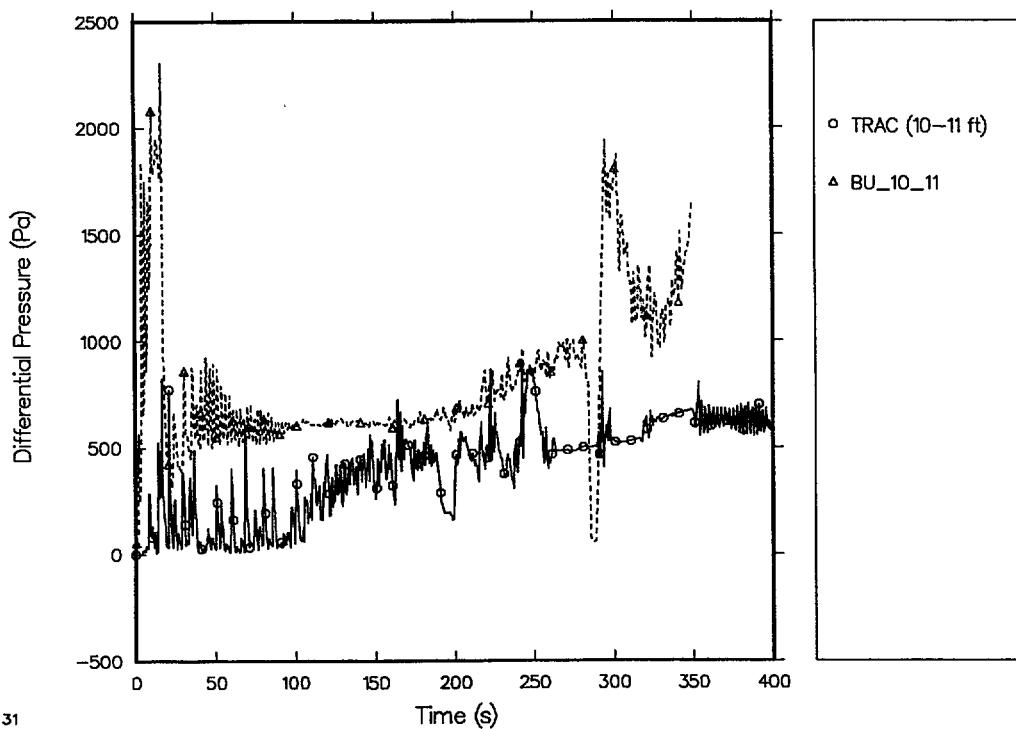
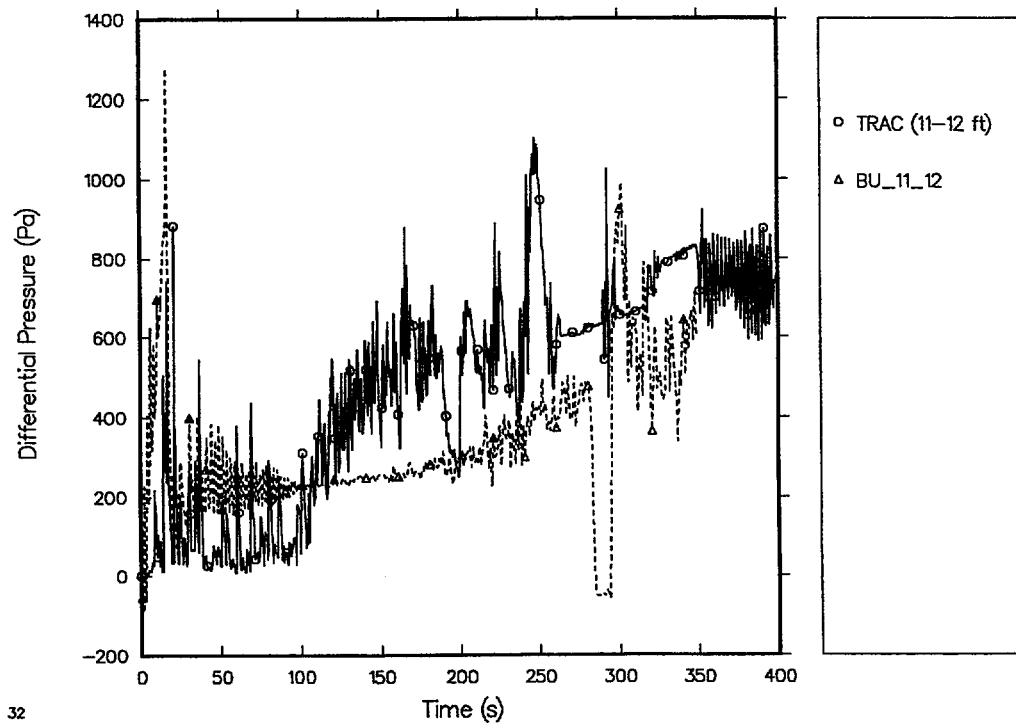


Fig. N-45. Comparison of predicted and measured differential pressures (9-10 ft, with grid-spacer model).



31

Fig. N-46. Comparison of predicted and measured differential pressures (10–11 ft, with grid-spacer model).



32

Fig. N-47. Comparison of predicted and measured differential pressures (11–12 ft, with grid-spacer model).

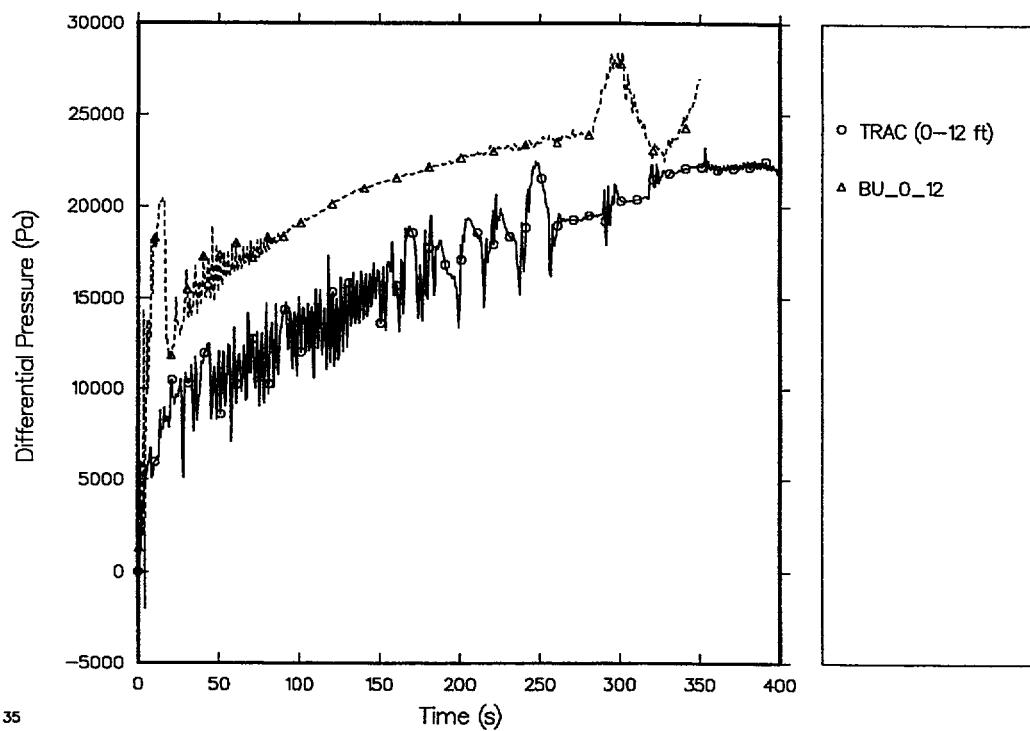


Fig. N-48. Comparison of predicted and measured total core differential pressures (0-12 ft, with grid-spacer model).

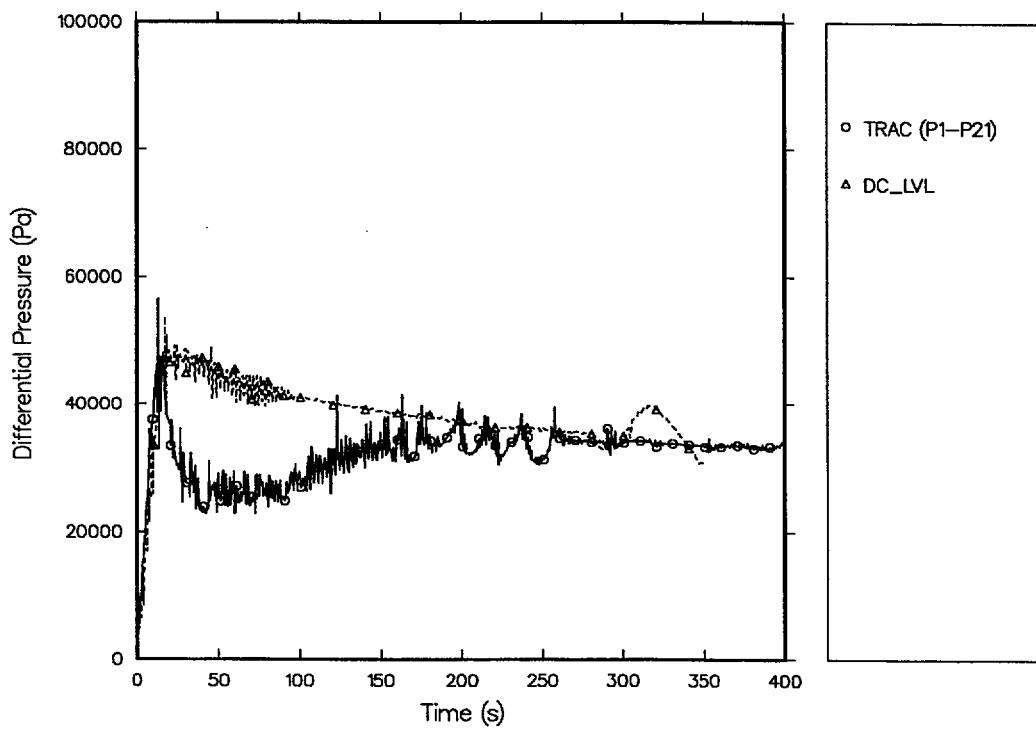


Fig. N-49. Comparison of predicted and measured downcomer differential pressures (with grid-spacer model).

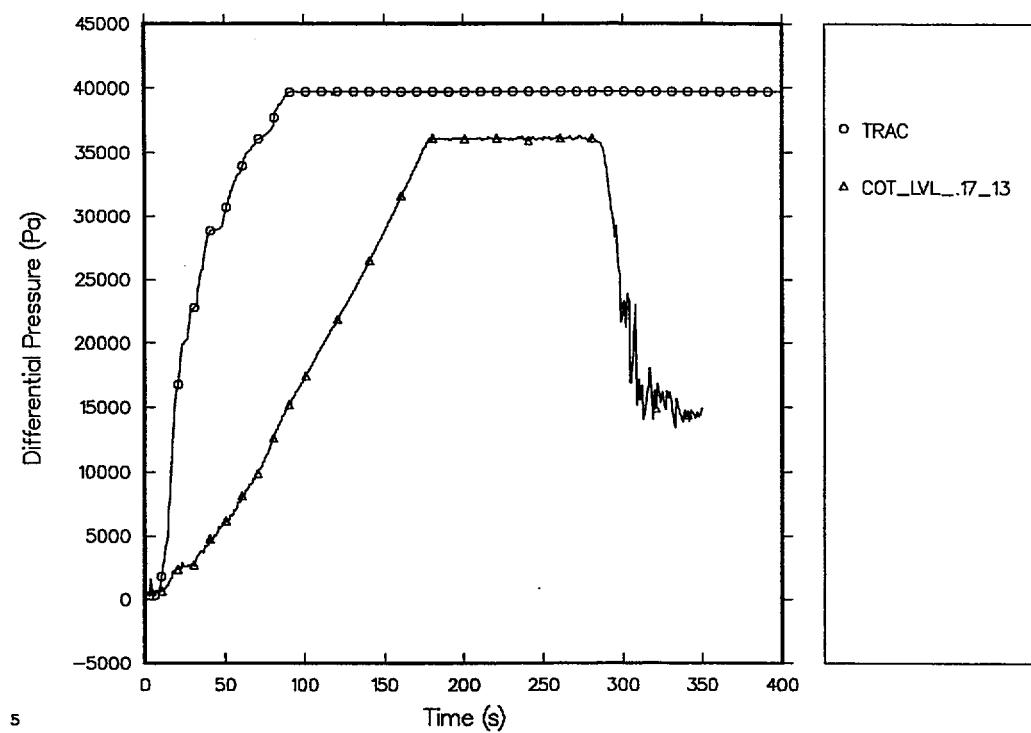


Fig. N-50. Comparison of predicted and measured carryover tank differential pressures (with grid-spacer model).

APPENDIX O

LOFT L2-6 STEADY-STATE AND TRANSIENT INPUT LISTINGS

This appendix contains the steady-state and transient-restart input listings for the LOFT L2-6 assessment problem as follows:

<u>Problem</u>	<u>Page</u>
1. LOFT L2-6 steady-state input listing	O-2
2. LOFT L2-6 transient-restart input listing, reflood trip at 1 s	O-42
3. LOFT L2-6 transient-restart input listing, reflood trip at 20 s	O-45

LOFT L2-6 STEADY-STATE INPUT LISTING

```

1 free format
2 *
3 *****
4 * main data *
5 *****
6 *
7 *      numtcr      ieos      inopt      nmat
8       86          0          1          0
9 loft test lp-02-6 ss deck for trac-pf1/mod2
10 4/25/95 convert STGEN component (comp. 2) to PIPES, TEES, and Heat Structures:
11 new component numbers: 20 (PIPE), 21 (TEE), 22 (TEE), and
12 Heat Structures 831, 833-848.
13 4/21/95 deck from Bob Steinke (/073417/loftl261):
14 this deck was apparently from /n9mod2/unicos/ptracc1.
15 the deck in ptracc1 and from /devass/mod2-5.4/loft-12-6/run06/loftin
16 were essentially identical.
17 Bob updated the TEE components to be consistent with the current
18 TEE modeling in PF1/MOD2 and with user guidelines. He also reordered
19 the deck and renumbered a few components to produce a more logical order.
20 Thad Knight reviewed the deck in general and Bob's changes for consistency.
21 This review did not include an accuracy check of the overall geometry;
22 the check was to verify that the geometry in the current deck was
23 consistent with the geometry in the previous deck, that options were set
24 correctly, and that control parameters were set correctly. Some changes
25 were made to signal variables 15, 32, and 33 to correct apparent
26 errors. Trip 102 was added for the reflood option. Unused signal
27 variables, control blocks, and trips were removed.
28
29 loft test 12-6 ss deck for trac-pf1(mod1)
30 the data is based on the 12-3 deck from lanl for trac-pf1(mod1)
31 * control system added to facilitate initialization
32 * accumulator model replaced
33 * initial nitrogen volume reduced to allow for t>=273 k restriction
34 * pcs flow resistance reduced, resistance added for lp-core, rods, core-up
35 * changes to vessel fluid volume and flow area fractions
36 * to reflect data provided in nureg-cr/0247 (tree-1208)
37 * directional friction factors used, fric<0 needs special code version
38 * core 131 mm lower
39 * bypass lower plenum to upper plenum - paths 1,2,6+guide tubes
40 * upper plenum to downcomer - paths 4,5
41 * environmental heat losses - pcs 6.0 w/m**2 k, prizer 2.0 w/m**2 k
42 * scs 1.6 w/m**2 k
43 * hot rods in cells 1 2 4 5 9
44 * variable pump inertia data used
45 * changes in vessel heat slabs to represent large break heat transfer
46 *
47 deck needs changing for other lb transients
48 - accumulator volume
49 - lpis, hpis flows
50 - pump characteristics
51 - pcs flow rate, pcs pressure, ecc liquid temp(?)
52 - initial power and decay heat levels
53 other changes might be made for future 12-6 calculations
54 - scs valve closure rate and incomplete closure
55 - set pump speed, pumped ecc flow as functions of time
56 - nff reset to 1
57 - disabling of interphase sharpener in core (namelist isharp)
58 *
59 ****
60 * base deck 126input.data(126ss)
61 * 23/09/86
62 * this is a revised data set obtained using 'extract' on
63 * the input data set 'zeszj1.pfiloft.dump.126ss2.one'
64 *
65 * 23/09/86 reduce fuel-clad gap to zero (0.0)
66 *
67 ****
68 *
69 * p. coddington
70 * 12/may/1988
71 * 12-6 input deck modified to run on trac-pf1/mod2
72 * (version 4.0) so far
73 *
74 * mods required
75 *      1. replace nff=2 with nff=1
76 *           2. remove -ve frics replace with zeros
77 *           3. adjust wall roughness (initially zero)
78 *           4. move vessel junctions for bypass
79 *              to correct location
80 *
81 * errors cvrt does not include idrod array
82 * 27/may/88..... move bypass vessel up. junctions to improve code convergence
83 * 27/may/88..... reset fuel clad gap to 95 microns to be consistent
84 * ..... with temperature distribution
85 * 01/jun/88..... redefine time step selection
86 * 01/jun/88..... reduce vessel no fluid call volumes to less than 1.0e-12
87 *

```

```

88 *15/08/89 mods to run with code version 4.4/4.5
89 *      re-node the accumulator to stop flow of n2
90 *      9/12/90 added CSS controllers
91 *              made all necessary fa's and nff adjustments to pass MOD2 input
92 *      checker
93
94 * End of Title Cards
95 *
96 ****
97 * namelist data *
98 ****
99 *
100 &inopts chm12=1.0, chm22=0.84, iadded=10, icflow=2, idiag=1,
101      igeom3=1, inlab=0, iolab=1, ipowr=-1, newrfd=3,
102      nfrc1=2, nhtstr=39, noair=0, nrslv=1, tpowr=0.50,
103      iblaus=1,
104      &
105      *
106      *      dstep      timet
107          0      0.0000e+00
108      *      stdyst      transi      ncomp      njun      ipak
109          2      0      67      30      1
110      *      epso      epss
111          1.0000e-04      1.0000e-04
112      *      oitmax      sitmax      isolut      ncontr      nccfl
113          10      25      0      4      0
114      *      ntsv      ntcb      ntcf      ntrp      ntcp
115          28      22      114      8      2
116      *
117 ****
118 * component-number data *
119 ****
120 *
121 * iorder*      1      2      3      4      5
122 * iorder*      6      7      8      11      12
123 * iorder*      13      14      15      16      17
124 * iorder*      18      19      20      21      22
125 * iorder*      23      24      25      31      32
126 * iorder*      41      42      50      831      833
127 * iorder*      834      835      836      837      838
128 * iorder*      839      840      841      842      843
129 * iorder*      844      845      846      847      848
130 * iorder*      851      852      853      854      855
131 * iorder*      856      857      858      859      860
132 * iorder*      861      862      863      864      865
133 * iorder*      866      867      868      869      870
134 * iorder*      871s
135 * iorder*      991e
136 *
137 ****
138 ***** CSS INPUT *****
139 ****
140 *      numcss      amncss      amxcss      nmpcss      napcss
141 *      the following controller type 14 requires RGS's update to be valid.
142 *      when RGS's update for the constrained steady-state controllers goes in,
143 *      uncomment the following controller that looks at component 831.
144 *      intact-loop steam-generator type-14 controller adjusts
145 *          the heat-transfer across the tubes (equivalent to old type 4)
146 *          831      0.5      1.5      7005      14
147 *      intact-loop pump 1 type-1 controller adjusts impeller rotational speed
148 *          4      0.0000e+00      2.0000e+02      0      0
149 *      intact-loop pump 2 type-1 controller adjusts impeller rotational speed
150 *          5      0.0000e+00      2.0000e+02      0      0
151 *      steam-flow control valve type-2 controller adjusts upstream pressure
152 *          23      0.0000e+00      1.0000e+00      1      0
153 *      aux-feedwater type 3 controller adjusts mass flow out of a fill
154 *          24      0.0000e+00      5.0000e+01      23005      1
155 *
156 ****
157 * control-parameter data *
158 ****
159 *
160 * multi-pass control-parameter input
161 *
162 * cntr-p*      1      17      -1      -15s
163 * cntr-p*      1      102      19      61s
164 * cntr-p*      -16      -26      1      0e
165 *
166 * signal variables
167 *
168 * SV      Parameter      Component/Trip      Location      Referenced by
169 * 1      t
170 * 10      reactor power      991      lots
171 * 11      void fraction      20      ave/cells 1-5      CB -10
172 * 12      void fraction      22      ave/cells 1-6      CB -9
173 * 14      vapor mass flow      23      interface 6      CB -6
174 * 15      void fraction      22      cell 7      CB -4
175 * 16      void fraction      21      ave/cells 1-4      CB -7
176 * 17      void fraction      21      cell 5      CB -7
177 * 19      trip set status      100      cell 1      CB -16
178 * 32      pressure      12      cell 1      FILL 16
179 * 33      pressure      13      cell 1      FILL 17

```

```

180 * 34 pressure 14 cell 3 trip 6
181 *
182 * 4/21/95: deleted signal variables 4, 6, 13, 21, and 22 -- tk
183 *      idsv      isvn      ilcn      icnl      icn2
184     1          0          0          0          0
185     10         18         991        0          0
186     11         27         20          1         -5
187     12         27         22          1         -6
188     14         29         23          6          0
189     15         27         22          7          0
190     16         27         21          1         -4
191     17         27         21          5          0
192     19         56         100        0          0
193     32         21         12          1          0
194     33         21         13          1          0
195     34         21         14          3          0
196 * signal variables added by jfl for graphics purposes
197 40 20 8 3 1 * pressurizer water level height
198 41 21 8 1 0 * pressurizer pressure
199 42 20 15 3 1 * accumulator water level height
200 43 76 41 3 0 * broken cold leg mixture density
201 50 27 50 1001 -16002 * lower-plenum vap. vol. fr., levels 1 and 2
202 51 27 50 1003 -12003 * lower-plenum vap. vol. fr., level 3
203 52 27 50 1004 -12008 * core vap. vol. fr.
204 53 27 50 1009 -12011 * upper-plenum vap. vol. fr.
205 54 27 50 1012 -12012 * upper-head vap. vol. fr.
206 55 27 50 9002 -16012 * downcomer vap. vol. fr.
207 56 69 50 1003 -12003 * core inlet total mass flow
208 57 29 50 1003 -12003 * core inlet vapor mass flow
209 58 32 50 1003 -12003 * core inlet liquid mass flow
210 59 69 50 1008 -12008 * core outlet total mass flow
211 60 29 50 1008 -12008 * core outlet vapor mass flow
212 61 32 50 1008 -12008 * core outlet liquid mass flow
213 *
214 *
215 * control blocks
216 *
217 * CB Refers to Referenced by Function
218 * -4 SV 14 CB -5 table lookup based on secondary steam flow
219 * -5 CB -4 CB -13 table lookup based on CB -5
220 * -6 SV 12, 15 CB -8 calc steam volume of comp. 22
221 * -7 SV 16, 17 CB -8 calc steam volume of comp. 21
222 * -8 CB -6, -7 CB -9 calc steam volume of comp. 21 and 22
223 * -9 SV 11/CB -8 CB -11 calc steam volume in comp 20, 21, and 22
224 * -10 SV 10 CB -12 table lookup based on reactor power
225 * -11 CB -9 CB -12 table lookup based on secondary steam volume
226 * -12 CB -10, -11 CB -13 sums and applies gain
227 * -13 CB -12, -5 CB -14 sums
228 * -14 CB -13, -15 CB -15 subtracts, gain, and limits
229 * -15 CB -14 CB -14, -17 integrator
230 * -16 SV 19 CB -17 integrates trip set status with gain/limits
231 * -17 CB -15, -16 CB -18 sums
232 * -18 CB -17 FILL 24 table lookup (provides the independent variable for the FILL table)
233 *
234 *
235 * 4/21/95: deleted CB -42 through -65 -- tk
236 *      idcb      icbm      icbl      icb2      icb3
237     -4          101        14          7          0
238 *      lugain      luxmin      luxmax      luconl      lucon2
239 *      lunounit    lunounit    lunounit    lunounit    lunounit
240 *      cbgain      cbxmin      cbxmax      cbconl      cbcon2
241 1.0000e+00 0.0000e+00 1.0000e+00 0.0000e+00 0.0000e+00
242 *      luytab      luxtab      luxtab      luconl      lucon2
243 *      lunounit    lunounit    lunounit    lunounit    lunounit
244 *
245 *      cbftb * r02 0.0000e+00 6.8700e+00 2.0000e-01 1.3720e+01 3.9170e-01
246 *      cbftb * 2.0580e+01 5.7700e-01 2.7440e+01 7.5600e-01 3.7130e+01
247 *      cbftb * 1.0000e+00 9.9900e+02 1.0000e+00e
248 *
249 *      idcb      icbm      icbl      icb2      icb3
250     -5          101        -4          19          0
251 *      lugain      luxmin      luxmax      luconl      lucon2
252 *      lunounit    lunounit    lunounit    lunounit    lunounit
253 *      cbgain      cbxmin      cbxmax      cbconl      cbcon2
254 1.0000e+00 0.0000e+00 1.0000e+00 0.0000e+00 0.0000e+00
255 *      luytab      luxtab      luxtab      luconl      lucon2
256 *      lunounit    lunounit    lunounit    lunounit    lunounit
257 *
258 *      cbftb * r02 0.0000e+00 1.8940e-01 2.5000e-02 2.4600e-01 5.0000e-02
259 *      cbftb * 3.3710e-01 1.0000e-01 3.9170e-01 1.3600e-01 4.1290e-01
260 *      cbftb * 1.5000e-01 4.7350e-01 2.0000e-01 5.2650e-01 2.5000e-01
261 *      cbftb * 5.6820e-01 3.0000e-01 6.1360e-01 3.5000e-01 6.5150e-01
262 *      cbftb * 4.0000e-01 6.8940e-01 4.5000e-01 7.1970e-01 5.0000e-01
263 *      cbftb * 7.5000e-01 5.5000e-01 7.8410e-01 6.0000e-01 8.4850e-01
264 *      cbftb * 7.0000e-01 8.9770e-01 8.0000e-01 9.5450e-01 9.0000e-01
265 *      cbftb * r02 1.0000e+00e
266 *
267 *      idcb      icbm      icbl      icb2      icb3
268     -6          59          12          15          0
269 *      lugain      luxmin      luxmax      luconl      lucon2
270 *      lunounit    luvolume    luvolume    luvolume    luvolume
271 *      cbgain      cbxmin      cbxmax      cbconl      cbcon2

```

272	*	1.0000e+00	0.0000e+00	1.2803e+00	1.2641e+00	1.6215e-02
273	*	idcb	icbn	icb1	icb2	icb3
275	*	-7	59	16	17	0
276	*	lugain	luxmin	luxmax	luconl	lucon2
277	*	lunounit	luvolume	luvolume	luvolume	luvolume
278	*	cbgain	cbxmin	cbxmax	cbconl	cbcon2
279	*	1.0000e+00	0.0000e+00	2.6178e+00	2.2348e+00	3.8297e-01
280	*	idcb	icbn	icb1	icb2	icb3
282	*	-8	3	-6	-7	0
283	*	lugain	luxmin	luxmax	luconl	lucon2
284	*	lunounit	luvolume	luvolume	lunounit	lunounit
285	*	cbgain	cbxmin	cbxmax	cbconl	cbcon2
286	*	1.0000e+00	0.0000e+00	3.8981e+00	0.0000e+00	0.0000e+00
287	*	idcb	icbn	icb1	icb2	icb3
289	*	-9	59	11	-8	0
290	*	lugain	luxmin	luxmax	luconl	lucon2
291	*	lunounit	luvolume	luvolume	luvolume	lunounit
292	*	cbgain	cbxmin	cbxmax	cbconl	cbcon2
293	*	1.0000e+00	0.0000e+00	6.6702e+00	2.7721e+00	1.0000e+00
294	*	idcb	icbn	icb1	icb2	icb3
296	*	-10	101	10	2	0
297	*	lugain	luxmin	luxmax	luconl	lucon2
298	*	lunounit	lunounit	lunounit	lunounit	lunounit
299	*	cbgain	cbxmin	cbxmax	cbconl	cbcon2
300	*	1.0000e+00	2.9464e+00	3.2004e+00	0.0000e+00	0.0000e+00
301	*	luytab	luxtab			
302	*	lunounit	lupower			
303	*					
304	*	cbftb	*	0.0000e+00	2.9464e+00	5.0000e+07
305	*					3.2004e+00e
306	*	idcb	icbn	icb1	icb2	icb3
307	*	-11	101	-9	10	0
308	*	lugain	luxmin	luxmax	luconl	lucon2
309	*	lunounit	lunounit	lunounit	lunounit	lunounit
310	*	cbgain	cbxmin	cbxmax	cbconl	cbcon2
311	*	1.0000e+00	0.0000e+00	5.6103e+00	0.0000e+00	0.0000e+00
312	*	luytab	luxtab			
313	*	lunounit	luvolume			
314	*					
315	*	cbftb	*	0.0000e+00	5.6103e+00	2.2660e+00
316	*	cbftb	*	4.6810e+00	4.1502e+00	3.2004e+00
317	*	cbftb	*	4.8360e+00	2.5440e+00	5.0294e+00
318	*	cbftb	*	1.8860e+00	5.8402e+00	2.3500e+00
319	*	cbftb	*	e	1.2460e+00	5.6702e+00
320	*					0.0000e+00
321	*	idcb	icbn	icb1	icb2	icb3
322	*	-12	54	-10	-11	0
323	*	lugain	luxmin	luxmax	luconl	lucon2
324	*	lunounit	lunounit	lunounit	lunounit	lunounit
325	*	cbgain	cbxmin	cbxmax	cbconl	cbcon2
326	*	3.1496e+00	-8.3902e+00	1.0080e+01	0.0000e+00	0.0000e+00
327	*					
328	*	idcb	icbn	icb1	icb2	icb3
329	*	-13	3	-12	-5	0
330	*	lugain	luxmin	luxmax	luconl	lucon2
331	*	lunounit	lunounit	lunounit	lunounit	lunounit
332	*	cbgain	cbxmin	cbxmax	cbconl	cbcon2
333	*	1.0000e+00	0.0000e+00	1.0000e+00	0.0000e+00	0.0000e+00
334	*					
335	*	idcb	icbn	icb1	icb2	icb3
336	*	-14	54	-13	-15	0
337	*	lugain	luxmin	luxmax	luconl	lucon2
338	*	lunounit	lunounit	lunounit	lunounit	lunounit
339	*	cbgain	cbxmin	cbxmax	cbconl	cbcon2
340	*	7.0000e+00	-5.0000e-02	5.0000e-02	0.0000e+00	0.0000e+00
341	*					
342	*	idcb	icbn	icb1	icb2	icb3
343	*	-15	23	-14	0	0
344	*	lugain	luxmin	luxmax	luconl	lucon2
345	*	lurtime	lunounit	lunounit	lunounit	lunounit
346	*	cbgain	cbxmin	cbxmax	cbconl	cbcon2
347	*	1.0000e+00	0.0000e+00	1.0000e+00	0.0000e+00	1.0000e-20
348	*					
349	*	idcb	icbn	icb1	icb2	icb3
350	*	-16	23	19	0	0
351	*	lugain	luxmin	luxmax	luconl	lucon2
352	*	lurtime	lunounit	lunounit	lunounit	lunounit
353	*	cbgain	cbxmin	cbxmax	cbconl	cbcon2
354	*	-5.0000e-01	-1.0000e+00	0.0000e+00	0.0000e+00	0.0000e+00
355	*					
356	*	idcb	icbn	icb1	icb2	icb3
357	*	-17	3	-15	-16	0
358	*	lugain	luxmin	luxmax	luconl	lucon2
359	*	lunounit	lunounit	lunounit	lunounit	lunounit
360	*	cbgain	cbxmin	cbxmax	cbconl	cbcon2
361	*	1.0000e+00	0.0000e+00	6.3486e-01	0.0000e+00	0.0000e+00
362	*					
363	*	idcb	icbn	icb1	icb2	icb3

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364      -18          101          -17          19          0
365 *     lugain       luxmin       luxmax       luconl       lucon2
366 *     lunounit    lunounit    lunounit    lunounit    lunounit
367 *     cbgain       cbxmin       cbxmax       cbconl       cbcon2
368 *     1.0000e+00   0.0000e+00   8.0655e-01   0.0000e+00   0.0000e+00
369 *     luytab       luxtab       luxtab       luconl       lucon2
370 *     lunounit    lunounit    lunounit    lunounit    lunounit
371 *
372 *     cbftb * r02 0.0000e+00  2.5000e-02  1.8940e-01  5.0000e-02  2.4620e-01
373 *     cbftb * 1.0000e-01  3.3710e-01  1.3600e-01  3.9170e-01  1.5000e-01
374 *     cbftb * 4.1290e-01  2.0000e-01  4.7350e-01  2.5000e-01  5.2650e-01
375 *     cbftb * 3.0000e-01  5.6820e-01  3.5000e-01  6.1360e-01  4.0000e-01
376 *     cbftb * 6.5150e-01  4.5000e-01  6.8940e-01  5.0000e-01  7.1970e-01
377 *     cbftb * 5.5000e-01  7.5000e-01  6.0000e-01  7.8410e-01  7.0000e-01
378 *     cbftb * 8.4850e-01  8.0000e-01  8.9770e-01  9.0000e-01  9.5450e-01
379 *     cbftb * r02 1.0000e+00e
380 *
381 * control blocks added by jfl for graphics
382 *
383 *     idcb      ichn      icbl1      icb2      icb3
384 *     lugain    luxmin    luxmax    luconl    lucon2
385 *     cbgain    cbxmin    cbxmax    cbconl    cbcon2
386 *
387 *     constant 1.0
388 *     -20      9         *const*
389 *     lunounit lunounit    lunounit    lunounit    lunounit
390 *     1.0       1.0       1.0       1.0       0.0
391 *
392 *     weighted lower-plenum vapor volume fraction
393 *     -21      59        *wsum*   50        51
394 *     lunounit lunounit    lunounit    lunounit    lunounit
395 *     1.0       0.0       1.0       0.70722   0.29278
396 *
397 *     lower-plenum liquid volume fraction
398 *     -22      54        *subtr*  -20       -21
399 *     lunounit lunounit    lunounit    lunounit    lunounit
400 *     0.0       0.0       0.0       0.0       0.0
401 *
402 *     core liquid volume fraction
403 *     -23      54        *subtr*  -20       52
404 *     lunounit lunounit    lunounit    lunounit    lunounit
405 *     0.0       0.0       0.0       0.0       0.0
406 *
407 *     upper-plenum liquid volume fraction
408 *     -24      54        *subtr*  -20       53
409 *     lunounit lunounit    lunounit    lunounit    lunounit
410 *     0.0       0.0       0.0       0.0       0.0
411 *
412 *     upper-head liquid volume fraction
413 *     -25      54        *subtr*  -20       54
414 *     lunounit lunounit    lunounit    lunounit    lunounit
415 *     0.0       0.0       0.0       0.0       0.0
416 *
417 *     downcomer liquid volume fraction
418 *     -26      54        *subtr*  -20       55
419 *     lunounit lunounit    lunounit    lunounit    lunounit
420 *     0.0       0.0       0.0       0.0       0.0
421 *
422 * trips
423 *
424 * Trip References Referenced by Function
425 * 2 SV 1 (time) FILL 16 Controls the time at which HPIS starts
426 * 3 SV 1 (time) FILL 17 Controls the time at which LPIS starts
427 * 6 SV 34 (p) VALVE 14 Controls pressure at which accumulator
428 * injection starts
429 * 8 SV 1 (time) VALVE 23 Set status is always on forward so that
430 *                      FILL 24 the steam valve and feedwater operate
431 *                      during the steady state and transient
432 * 10 SV 1 (time) PUMP 4, 5 Controls time of pump trip
433 * 100 SV 1 (time) ROD 991 Core power trip
434 * 101 SV 1 (time) ROD 991 Fine mesh trip
435 * 102 SV 1 (time) ROD 991 New reflood heat transfer trip
436 *
437 * 4/21/95: deleted Trips -21 and 22; added trip 102 -- tk
438 *
439 *     ntse      ntct      ntsf      ntdp      ntsd
440 *     0         0         0         0         0
441 *
442 *     idtp      isrt      iset      itst      idsg
443 *     2         2         0         1         1
444 *     setp(1)   setp(2)
445 *     0.0000e+00 2.1800e+01
446 *     dtsp(1)   dtsp(2)
447 *     0.0000e+00 0.0000e+00
448 *     ifsp(1)   ifsp(2)
449 *     0         0
450 *
451 *     idtp      isrt      iset      itst      idsg
452 *     3         2         0         1         1
453 *     setp(1)   setp(2)
454 *     0.0000e+00 3.4800e+01
455 *     dtsp(1)   dtsp(2)

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456      0.0000e+00  0.0000e+00
457 *     ifsp(1)      ifsp(2)
458     0          0
459 *
460 *     idtp      isrt      iset      itst      idsg
461     6          1          0          1          34
462 *     setp(1)      setp(2)
463     4.1100e+06  4.1300e+06
464 *     dtsp(1)      dtsp(2)
465     0.0000e+00  0.0000e+00
466 *     ifsp(1)      ifsp(2)
467     0          0
468 *
469 *     idtp      isrt      iset      itst      idsg
470     8          2          1          1          1
471 *     setp(1)      setp(2)
472     -2.0000e-05 -1.0000e-05
473 *     dtsp(1)      dtsp(2)
474     0.0000e+00  0.0000e+00
475 *     ifsp(1)      ifsp(2)
476     0          0
477 *
478 *     idtp      isrt      iset      itst      idsg
479     10         2          0          1          1
480 *     setp(1)      setp(2)
481     0.0000e+00  8.0000e-01
482 *     dtsp(1)      dtsp(2)
483     0.0000e+00  0.0000e+00
484 *     ifsp(1)      ifsp(2)
485     0          0
486 *
487 *     idtp      isrt      iset      itst      idsg
488     100        2          0          1          1
489 *     setp(1)      setp(2)
490     0.0000e+00  1.0000e-01
491 *     dtsp(1)      dtsp(2)
492     0.0000e+00  0.0000e+00
493 *     ifsp(1)      ifsp(2)
494     0          0
495 *
496 *     idtp      isrt      iset      itst      idsg
497     101        2          0          1          1
498 *     setp(1)      setp(2)
499     0.0000e+00  1.0000e-05
500 *     dtsp(1)      dtsp(2)
501     0.0000e+00  0.0000e+00
502 *     ifsp(1)      ifsp(2)
503     0          0
504 *
505 *     idtp      isrt      iset      itst      idsg
506     102        2          0          1          1
507 *     setp(1)      setp(2)
508     0.0          20.0
509 *     dtsp(1)      dtsp(2)
510     0.0          0.0
511 *     ifsp(1)      ifsp(2)
512     0          0
513 *
514 ****
515 * component data *
516 ****
517 *
518 ***** type      num      id      ctitle
519 tee       1      1 $1$ intact-loop hot leg
520 *     jcell      nodes      ichf      cost      epsw
521     5          4          1          0.0000e+00  0.0000e+00
522 *     iconcl1    ncell1     jun1      jun2      ipow1
523     0          10         1          2          0
524 *     iqptr1     iqpsv1     nqptbl     nqpsv1     nqprfl
525     0          0          0          0          0
526 *     radin1     th1       houtl1     houtv1     toutl1
527     1.4209e-01  3.5710e-02   0.0       6.0000e+00  3.0000e+02
528 *     toutv1
529     3.0000e+02
530 *     qpin1      qpooff1    rcpmx1     qpsc11
531     0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
532 *     iconc2     ncell2     jun3      ipow2
533     0          3          10         0
534 *     iqptr2     iqpsv2     nqptb2     nqpsv2     nqprf2
535     0          0          0          0          0
536 *     radin2     th2       houtl2     houtv2     toutl2
537     2.3300e-02  8.6968e-03   0.0       2.0000e+00  3.0000e+02
538 *     toutv2
539     3.0000e+02
540 *     qpin2      qpooff2    rcpmx2     qpsc12
541     0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
542 *
543 * dx      * r02  7.8365e-01   4.9258e-01r03  2.5861e-01   1.1941e+00   8.6575e-01
544 * dx      *      4.1795e-01   6.2692e-01e
545 * vol     * r02  5.0993e-02   3.2063e-02r03  1.6827e-02   5.9691e-02   5.6280e-02
546 * vol     *      3.1381e-02   5.2188e-02e
547 * fa      * r04  6.3425e-02r02  6.5067e-02r04  6.3425e-02   5.1600e-02e

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548 * fric * r08 0.0000e+00 7.5250e-02 0.0000e+00 1.7040e-01e
549 * rv fri* 3.1000e-02r07 0.0000e+00 7.5250e-02 0.0000e+00 1.7040e-01
550 * rv fri* e
551 * grav * r10 0.0000e+00 6.8974e-01e
552 * hd * r10 2.8400e-01 2.5630e-01e
553 * icflg * f oe
554 * nff * f le
555 * alp * f 0.0000e+00e
556 * vl * r06 5.7267e+00r04 5.7276e+00 7.0402e+00e
557 * vv * 5.8408e+00 5.8513e+00r04 5.8519e+00 5.8536e+00 5.8531e+00
558 * vv * 5.9747e+00 5.8615e+00 7.4169e+00e
559 * tl * f 5.9129e+02e
560 * tv * r08 6.1557e+02r02 6.1555e+02e
561 * p * r06 1.5056e+07r02 1.5055e+07r02 1.5050e+07e
562 * pa * f 0.0000e+00e
563 * qppp * f 0.0000e+00e
564 * matid * f 7e
565 * tw * 5.9119e+02 5.8986e+02 5.8862e+02 5.8747e+02s
566 * tw * 5.9119e+02 5.8986e+02 5.8862e+02 5.8747e+02s
567 * tw * 5.9118e+02 5.8985e+02 5.8862e+02 5.8747e+02s
568 * tw * 5.9118e+02 5.8985e+02 5.8862e+02 5.8747e+02s
569 * tw * 5.9118e+02 5.8985e+02 5.8862e+02 5.8747e+02s
570 * tw * 5.9118e+02 5.8985e+02 5.8862e+02 5.8747e+02s
571 * tw * 5.9118e+02 5.8985e+02 5.8862e+02 5.8747e+02s
572 * tw * 5.9118e+02 5.8985e+02 5.8862e+02 5.8747e+02s
573 * tw * 5.9118e+02 5.8985e+02 5.8861e+02 5.8747e+02s
574 * tw * 5.9119e+02 5.8986e+02 5.8862e+02 5.8747e+02e
575 *
576 * dx * 2.1499e+00 2.6428e+00 2.2217e+00e
577 * vol * 3.1149e-03 3.6954e-03 5.7059e-03e
578 * fa * r03 1.4493e-03 5.7321e-03e
579 * fric * 1.6530e-01 5.5032e-03r02 4.6688e-03e
580 * rv fri* 1.6530e-01 5.5032e-03r02 4.6688e-03e
581 * grav * 5.4510e-01r02 0.0000e+00 6.0410e-01e
582 * hd * r03 4.2957e-02 8.5430e-02e
583 * icflg * f oe
584 * nff * r03 1 -1e
585 * alp * f 0.0000e+00e
586 * vl * -4.2355e-02 -4.2640e-02 -4.3011e-02 -1.1017e-02e
587 * vv * 1.6335e-01 -1.3936e-01 -1.4049e-01 2.0502e-01e
588 * tl * 5.9474e+02 5.9977e+02 6.0682e+02e
589 * tv * f 6.1555e+02e
590 * p * 1.5051e+07r02 1.5052e+07e
591 * pa * f 0.0000e+00e
592 * qppp * f 0.0000e+00e
593 * matid * f 7e
594 * tw * 5.9346e+02 5.9328e+02 5.9310e+02 5.9292e+02 5.9847e+02
595 * tw * 5.9829e+02 5.9811e+02 5.9792e+02 6.0514e+02 6.0492e+02
596 * tw * 6.0472e+02 6.0453e+02e
597 *
598 ***** type num id ctitle
599 pipe 2 2 $2$ stgen primary
600 * ncells nodes jun1 jun2 epsw
601 * 10 0 2 3 0.0
602 * ichf iconc iacc ipow
603 * 1 0 0 0
604 * radin th hout1 houtv toutl
605 5.1055e-03 1.2446e-03 0.0 0.0 300.0
606 * toutv powin powoff rpownmx powscl
607 300.0 0.0 0.0 0.0 0.0
608 *
609 * dx * 9.6360e-01r08 5.6895e-01 9.6360e-01e
610 * vol * 3.7950e-01r08 8.5950e-02 3.7950e-01e
611 * fa * 5.1600e-02r09 1.5110e-01 5.1600e-02e
612 * fric * 1.7040e-01r09 0.0000e+00 1.8610e-01e
613 * rv fri* 1.7040e-01r09 0.0000e+00 1.8610e-01e
614 * grav * 6.8974e-01r04 1.0000e+00 0.0000e+00r04-1.0000e+00 -7.1160e-01
615 * grav * e
616 * hd * 2.5630e-01r09 1.0211e-02 2.5600e-01e
617 * icflg * f oe
618 * nff * 1 -1r07 1 -1 1
619 * nff * e
620 * alp * f 0.0000e+00e
621 * vl * 7.0402e+00 2.4040e+00 2.3432e+00 2.2986e+00 2.2638e+00
622 * vl * 2.2356e+00 2.2125e+00 2.1936e+00 2.1781e+00 2.1655e+00
623 * vl * 6.3408e+00e
624 * vv * 7.4169e+00 2.5343e+00 2.6082e+00 2.5625e+00 2.5266e+00
625 * vv * 2.4320e+00 2.0099e+00 1.9888e+00 1.9731e+00 1.9604e+00
626 * vv * 6.7131e+00e
627 * tl * 5.9123e+02 5.8412e+02 5.7796e+02 5.7279e+02 5.6847e+02
628 * tl * 5.6482e+02 5.6172e+02 5.5911e+02 5.5693e+02 5.5685e+02
629 * tl * e
630 * tv * r02 6.1540e+02 6.1537e+02 6.1534e+02r02 6.1530e+02 6.1531e+02
631 * tv * 6.1532e+02 6.1534e+02 6.1536e+02e
632 * p * r02 1.5022e+07 1.5016e+07 1.5011e+07 1.5005e+07 1.5003e+07
633 * p * 1.5006e+07 1.5009e+07 1.5011e+07 1.5015e+07e
634 * pa * f 0.0000e+00e
635 *
636 ***** type num id ctitle
637 tee 3 3 $3$ pump suction
638 * jcell nodes ichf cost epsw
639 3 4 1 0.0000e+00 0.0000e+00

```

```

640 *      iconcl      ncell1      jun1      jun2      ipow1
641      0          5          4          5          0
642 *      iqptr1      iqpsv1      nqptb1      nqpsv1      nqprf1
643      0          0          0          0          0
644 *      radin1      th1      hout11      houtv1      toutl1
645      1.4209e-01  3.5710e-02      0.0      6.0000e+00  3.0000e+02
646 *      toutv1
647      3.0000e+02
648 *      qpin1      qpoff1      rqpmx1      qpsc11
649      0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
650 *      iconc2      ncell2      jun3      ipow2
651      0          3          3          0
652 *      iqptr2      iqpsv2      nqptb2      nqpsv2      nqprf2
653      0          0          0          0          0
654 *      radin2      th2      hout12      houtv2      toutl2
655      1.4209e-01  3.5710e-02      0.0      6.0000e+00  3.0000e+02
656 *      toutv2
657      3.0000e+02
658 *      qpin2      qpoff2      rqpmx2      qpsc12
659      0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
660 *
661 *      dx      *      6.3500e-01r03  6.0113e-01      6.3500e-01e
662 *      vol      *      2.7467e-02r03  3.8127e-02      2.7467e-02e
663 *      fa      *      3.6613e-02r04  6.3425e-02      3.6613e-02e
664 *      fric      *      f      0.0000e+00e
665 *      rv fri*      f      0.0000e+00e
666 *      grav      *      -6.2659e-01      -1.0      -9.1789e-02      9.1789e-02      1.0
667 *      grav      *      6.2659e-01e
668 *      hd      *      2.1591e-01r04  2.8417e-01      2.1591e-01e
669 *      icflg      *      f      0e
670 *      nff      *      r05      1      -1e
671 *      alp      *      f      0.0000e+00e
672 *      vl      *      -4.4722e+00r02-2.5816e+00r02  2.5770e+00      4.4642e+00e
673 *      vv      *      -4.7363e+00r02-2.8498e+00r02  2.8452e+00      4.7282e+00e
674 *      tl      *      5.5674e+02r03  5.5676e+02      5.5674e+02e
675 *      tv      *      6.1516e+02r03  6.1524e+02      6.1516e+02e
676 *      p      *      1.4978e+07r03  1.4994e+07      1.4978e+07e
677 *      pa      *      f      0.0000e+00e
678 *      qppp      *      f      0.0000e+00e
679 *      matid      *      f      7e
680 *      tw      *      5.5661e+02      5.5541e+02      5.5430e+02      5.5326e+02s
681 *      tw      *      5.5453e+02      5.5333e+02      5.5223e+02      5.5119e+02s
682 *      tw      *      5.5453e+02      5.5333e+02      5.5223e+02      5.5119e+02s
683 *      tw      *      5.5453e+02      5.5333e+02      5.5223e+02      5.5119e+02s
684 *      tw      *      5.5661e+02      5.5541e+02      5.5430e+02      5.5326e+02e
685 *
686 *      dx      *      1.3141e+00r02  6.2230e-01e
687 *      vol      *      7.7371e-02      4.0000e-02      5.0048e-02e
688 *      fa      *      r02 6.3425e-02      6.8714e-02      5.1600e-02e
689 *      fric      *      1.0000e-10r02  0.0000e+00      1.8610e-01e
690 *      rv fri*      1.0000e-10r02  0.0000e+00      1.8610e-01e
691 *      grav      *      0.0000e+00      6.7940e-01      1.0000e+00      7.1160e-01e
692 *      hd      *      r02 2.8417e-01      2.9579e-01      2.5600e-01e
693 *      icflg      *      f      0e
694 *      nff      *      f      1e
695 *      alp      *      f      0.0000e+00e
696 *      vl      *      r02-5.1587e+00      -4.7617e+00      -6.3408e+00e
697 *      vv      *      -5.2548e+00      -4.9689e+00      -4.4757e+00      -6.7131e+00e
698 *      tl      *      5.5679e+02r02  5.5682e+02e
699 *      tv      *      6.1525e+02      6.1523e+02      6.1518e+02e
700 *      p      *      1.4994e+07      1.4991e+07      1.4981e+07e
701 *      pa      *      f      0.0000e+00e
702 *      qppp      *      f      0.0000e+00e
703 *      matid      *      f      7e
704 *      tw      *      5.5660e+02      5.5419e+02      5.5197e+02      5.4991e+02s
705 *      tw      *      5.5661e+02      5.5419e+02      5.5197e+02      5.4990e+02s
706 *      tw      *      5.5664e+02      5.5421e+02      5.5199e+02      5.4992e+02e
707 *
708 *****      type      num      id      cttitle
709 pump      4      4 $4$ pump no. 2
710 *      ncells      nodes      jun1      jun2      epsw
711      2          4          4          6      0.0000e+00
712 *      ichf      iconc      ipmpty      irp      ipm
713      1          0          2          1          1
714 *      ipmptr      ipmpsv      npmpb      npmpsv      nqmprf
715      10         0          0          0          0
716 *      iq3ptr      iq3sv      nq3tb      nq3sv      nq3rf
717      0          0          0          0          0
718 *      radin      th      hout1      houtv      toutl
719      1.0795e-01  2.8580e-02      0.0      6.0000e+00  3.0000e+02
720 *      toutv      effmi
721      3.0000e+02  -1.0000e+00
722 *      tfr0      tfr1      tfr2      tfr3      tfrb
723      0.0          0.0      1.5300e+02      0.0          0.0
724 *      tfr10      tfr11      tfr12      tfr13
725      0.0          0.0      1.5300e+02      0.0          0.0
726 *      effmi1      aeffmi      beffmi      ceffmi      omtest
727      1.4300e+00  -2.2865e+01  2.7016e+01  5.7459e+00  7.3540e+01
728 *      ipmps
729      0
730 *      rhead      rtork      rflow      rrho      romega
731      9.4154e+02  5.0000e+02  3.1500e-01  6.1400e+02  3.6966e+02

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732 *      omegan      omgoff      romgmx      omgscl      npmpsd
733 *      1.7668e+02  0.0000e+00  1.0000e+20  1.0000e+00  0
734 *      qp3in      qp3off      rqp3mx      qp3scl
735 *      0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
736 *      option      2
737 *
738 *
739 * dx   * f  1.3521e+00e
740 * vol  * f  4.9555e-02e
741 * fa   * f  3.6613e-02e
742 * fric * f  0.0000e+00e
743 * rv fri* f  0.0000e+00e
744 * grav * f  6.2659e-01r02 0.0000e+00e
745 * hd   * f  2.1591e-01e
746 * icflg * f  0e
747 * nff  * f  1          0          1e
748 * alp  * f  0.0000e+00e
749 * vl   * r02 4.4721e+00  4.4715e+00e
750 * vv   *     4.7363e+00  4.4721e+00  4.5844e+00e
751 * tl   *     5.5672e+02  5.5676e+02e
752 * tv   *     6.1510e+02  6.1588e+02e
753 * p    *     1.4967e+07  1.5113e+07e
754 * pa   * f  0.0000e+00e
755 * qppp * f  0.0000e+00e
756 * matid * f  7e
757 * tw   *     5.5651e+02  5.5459e+02  5.5281e+02  5.5116e+02  5.5656e+02
758 * tw   *     5.5464e+02  5.5287e+02  5.5121e+02e
759 *
760 ***** type num id ctitle
761 pump      5 $5$ pump no. 1
762 *      ncells      nodes      jun1      jun2      epsw
763 *      2           4           5           7       0.0000e+00
764 *      ichf       iconc      ipmpty      irp      ipm
765 *      1           0           2           1           1
766 *      ipmptr     ipmpsv     npmptb     npmpsv     npmprf
767 *      10          0           0           0           0
768 *      iqp3tr     iqp3sv     nqp3tb     nqp3sv     nqp3rf
769 *      0           0           0           0           0
770 *      radin      th         houtl      houtv     toutl
771 *      1.0795e-01  2.8580e-02  0.0       6.0000e+00  3.0000e+02
772 *      toutv      effmi      effmi      effmi      omtest
773 *      3.0000e+02 -1.0000e+00
774 *      tfr0       tfr1       tfr2       tfr3       tfrb
775 *      0.0        0.0       1.5300e+02  0.0       0.0
776 *      tfr10      tfr11      tfr12      tfr13
777 *      0.0        0.0       1.5300e+02  0.0       0.0
778 *      effmi      aeffmi    beffmi    ceffmi
779 *      1.4300e+00 -2.2865e+01  2.7016e+01  5.7459e+00  7.3540e+01
780 *      ipmps
781 *      0
782 *      rhead      rtork      rflow      rrho      romega
783 *      9.4154e+02  5.0000e+02  3.1500e-01  6.1400e+02  3.6966e+02
784 *      omegan      omgoff      romgmx      omgscl      npmpsd
785 *      1.7668e+02  0.0000e+00  1.0000e+20  1.0000e+00  0
786 *      qp3in      qp3off      rqp3mx      qp3scl
787 *      0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
788 *      option      2
789 *
790 *
791 * dx   * f  1.3521e+00e
792 * vol  * f  4.9555e-02e
793 * fa   * f  3.6613e-02e
794 * fric * f  0.0000e+00e
795 * rv fri* f  0.0000e+00e
796 * grav * f  6.2659e-01r02 0.0000e+00e
797 * hd   * f  2.1591e-01e
798 * icflg * f  0e
799 * nff  * f  -1          0          1e
800 * alp  * f  0.0000e+00e
801 * vl   * r02 4.4642e+00  4.4635e+00e
802 * vv   *     4.7282e+00  4.4642e+00  4.5777e+00e
803 * tl   *     5.5672e+02  5.5676e+02e
804 * tv   *     6.1510e+02  6.1588e+02e
805 * p    *     1.4967e+07  1.5114e+07e
806 * pa   * f  0.0000e+00e
807 * qppp * f  0.0000e+00e
808 * matid * f  7e
809 * tw   *     5.5651e+02  5.5459e+02  5.5281e+02  5.5116e+02s
810 * tw   *     5.5656e+02  5.5464e+02  5.5287e+02  5.5121e+02e
811 *
812 ***** type num id ctitle
813 tee      6 $6$ pump discharge
814 *      jcell      nodes      ichf      cost      epsw
815 *      3           4           1       0.0000e+00  0.0000e+00
816 *      iconcl     ncell1    jun1      jun2      ipowl
817 *      0           4           7           8           0
818 *      iqptri     iqpsv1    nqpbt1    nqpsv1    ngprf1
819 *      0           0           0           0           0
820 *      radin1    th1       houtl1    houtv1    toutl1
821 *      1.0795e-01  2.8580e-02  0.0       6.0000e+00  3.0000e+02
822 *      toutv1
823 *      3.0000e+02

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824 *      qpin1      qpooff1      rqpmax1      qpsc11
825 *      0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
826 *      iconc2      ncell2      jun3      ipow2
827 *          0          1          6          0
828 *      iqptr2      iqpsv2      nqptb2      nqpsv2      nqprf2
829 *          0          0          0          0          0
830 *      radin2      th2      houtl2      houtv2      toutl2
831 *      1.0795e-01  2.8580e-02  0.0      6.0000e+00  3.0000e+02
832 *      toutv2
833 *      3.0000e+02
834 *      qpin2      qpooff2      rqpmax2      qpsc12
835 *      0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
836 *
837 *      dx      *      1.3081e+00r03  3.7253e-01e
838 *      vol      *      4.7856e-02r03  2.2103e-02e
839 *      fa      *      r02 3.6613e-02r02  5.9332e-02  6.3423e-02e
840 *      fric      *      r04 0.0000e+00  1.9778e-02e
841 *      rv fri*      r04 0.0000e+00  1.9778e-02e
842 *      grav      *      f 0.0000e+00e
843 *      hd      *      r02 2.1591e-01r02  2.7485e-01  2.8417e-01e
844 *      icflg      *      f      0e
845 *      nff      *      f      1e
846 *      alp      *      f 0.0000e+00e
847 *      vl      *      r02 4.4635e+00  2.7545e+00  5.5138e+00  5.1578e+00e
848 *      vv      *      r02 4.5777e+00  4.5807e+00  2.8268e+00  5.7649e+00  5.3927e+00
849 *      vv      *      e
850 *      tl      *      f 5.5675e+02e
851 *      tv      *      f 6.1588e+02e
852 *      p      *      f 1.5113e+07e
853 *      pa      *      f 0.0000e+00e
854 *      qppp      *      f 0.0000e+00e
855 *      matid      *      f      7e
856 *      tw      *      5.5665e+02  5.5570e+02  5.5481e+02  5.5398e+02s
857 *      tw      *      5.5665e+02  5.5570e+02  5.5481e+02  5.5398e+02s
858 *      tw      *      5.5666e+02  5.5570e+02  5.5482e+02  5.5398e+02s
859 *      tw      *      5.5666e+02  5.5570e+02  5.5482e+02  5.5398e+02e
860 *
861 *      dx      *      5.4292e-01e
862 *      vol      *      2.5439e-02e
863 *      fa      *      f 3.6613e-02e
864 *      fric      *      1.0000e-10  0.0000e+00e
865 *      rv fri*      1.0000e-10  0.0000e+00e
866 *      grav      *      f 0.0000e+00e
867 *      hd      *      f 2.1591e-01e
868 *      icflg      *      f      0e
869 *      nff      *      f      1e
870 *      alp      *      0.0000e+00e
871 *      vl      *      f -4.4714e+00e
872 *      vv      *      -4.5885e+00 -4.5844e+00e
873 *      tl      *      5.5675e+02e
874 *      tv      *      6.1588e+02e
875 *      p      *      1.5113e+07e
876 *      pa      *      0.0000e+00e
877 *      qppp      *      f 0.0000e+00e
878 *      matid      *      f      7e
879 *      tw      *      5.5655e+02  5.5464e+02  5.5287e+02  5.5121e+02e
880 *
881 *****      type      num      id      ctitle
882 tee      7      7 $7$ intact-loop cold leg
883 *      jcell      nodes      ichf      cost      epsw
884 *          5          4          1 0.0000e+00  0.0000e+00
885 *      iconcl      ncell1      jun1      jun2      ipowl
886 *          0          9          8          9          0
887 *      iqptr1      iqpsv1      nqptb1      nqpsv1      nqprf1
888 *          0          0          0          0          0
889 *      radin1      th1      houtl1      houtv1      toutl1
890 *      1.4209e-01  3.5710e-02  0.0      6.0000e+00  0.0000e+00
891 *      toutv1
892 *      3.0000e+02
893 *      qpin1      qpooff1      rqpmax1      qpsc11
894 *      0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
895 *      iconc2      ncell2      jun3      ipow2
896 *          0          2          14          0
897 *      iqptr2      iqpsv2      nqptb2      nqpsv2      nqprf2
898 *          0          0          0          0          0
899 *      radin2      th2      houtl2      houtv2      toutl2
900 *      4.3663e-02  1.3487e-02  0.0      6.0000e+00  3.0000e+02
901 *      toutv2
902 *      3.0000e+02
903 *      qpin2      qpooff2      rqpmax2      qpsc12
904 *      0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
905 *
906 *      dx      *      r03 3.8947e-01r03  2.3625e-01r03  4.6567e-01e
907 *      vol      *      r03 2.4732e-02r03  1.4914e-02r03  2.9534e-02e
908 *      fa      *      r03 6.3423e-02r04  6.3128e-02r03  6.3423e-02e
909 *      fric      *      r04 1.9778e-02r03  0.0000e+00  5.0000e-01r04  0.0000e+00  2.0225e-01
910 *      fric      *      e
911 *      rv fri*      r04 0.0000e+00  5.0000e-01r04  0.0000e+00  2.0225e-01
912 *      rv fri*      e
913 *      grav      *      f 0.0000e+00e
914 *      hd      *      f 2.8417e-01e
915 *      icflg      *      f      0e

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916 * nff    *          1r08      1      1e
917 * alp    * f   0.0000e+00e
918 * vl     * f   5.1578e+00e
919 * vv     *      5.3927e+00  5.2837e+00  5.2747e+00  5.2738e+00x05 5.2737e+00
920 * vv     *      5.4470e+00e
921 * tl     * f   5.5675e+02e
922 * tv     * f   6.1585e+02e
923 * p      * f   1.5107e+07e
924 * pa     * f   0.0000e+00e
925 * qppp   * f   0.0000e+00e
926 * matid  * f   7e
927 * tw     *      5.5666e+02  5.5548e+02  5.5438e+02  5.5334e+02  5.5666e+02
928 * tw     *      5.5548e+02  5.5438e+02  5.5334e+02  5.5666e+02  5.5548e+02
929 * tw     *      5.5438e+02  5.5334e+02  5.5666e+02  5.5548e+02  5.5438e+02
930 * tw     *      5.5334e+02  5.5666e+02  5.5548e+02  5.5438e+02  5.5334e+02
931 * tw     *      5.5666e+02  5.5549e+02  5.5438e+02  5.5334e+02  5.5667e+02
932 * tw     *      5.5549e+02  5.5438e+02  5.5334e+02  5.5667e+02  5.5549e+02
933 * tw     *      5.5438e+02  5.5334e+02  5.5667e+02  5.5549e+02  5.5438e+02
934 * tw     *      5.5334e+02e
935 *
936 * dx     *      3.0000e-01  2.9080e+00e
937 * vol    *      1.7970e-03  1.7420e-02e
938 * fa     * f   5.9900e-03e
939 * fric   *      1.0000e-10  2.0400e-02  9.7500e-02e
940 * rv fri* 1.0000e-10  2.0400e-02  9.7500e-02e
941 * grav   * f   -1.0000e+00e
942 * hd     * f   8.7325e-02e
943 * icflg  * f   0e
944 * nff    * f   1e
945 * alp    * f   0.0000e+00e
946 * vl     *      -2.6103e-05 -2.7775e-05 -2.6729e-05e
947 * vv     *      -2.2967e-01 -2.1107e-01 -2.1069e-01e
948 * tl     *      3.5029e+02  3.0272e+02e
949 * tv     *      6.1586e+02  6.1594e+02e
950 * p      *      1.5109e+07  1.5125e+07e
951 * pa     * f   0.0000e+00e
952 * qppp   * f   0.0000e+00e
953 * matid  * f   7e
954 * tw     *      3.4867e+02  3.4845e+02  3.4825e+02  3.4807e+02  3.0251e+02
955 * tw     *      3.0250e+02  3.0249e+02  3.0248e+02e
956 *
957 ***** type num id ctitle
958 prizer   8 8 $8$ pressurizer
959 * ncells nodes jun1 jun2
960 *       3       0      12      10
961 *       ichf iconc qp3in
962 *       1       0      0.0000e+00
963 *       radin th houtl houtv toutl
964 * 0.0000e+00 0.0000e+00 0.0 2.0000e+00 3.0000e+02
965 * toutv  qheat pset dmax zhtr
966 * 3.0000e+02 0.0000e+00 0.0000e+00 1.0000e+00 0.0000e+00
967 *
968 * dx     *      5.3073e-01  1.1500e+00  2.0000e-01e
969 * vol    *      3.0000e-01  6.5005e-01  1.2770e-02e
970 * fa     * r03 5.6526e-01  5.7321e-03e
971 * fric   * r03 0.0000e+00  4.6688e-03e
972 * rv fri* r03 0.0000e+00  4.6688e-03e
973 * grav   * r03-1.0000e+00 -6.0410e-01e
974 * hd     * r03 8.4836e-01  8.5430e-02e
975 * icflg  * f   0e
976 * nff    * r02 1f -1e
977 * alp    * 1.0000e+00  8.0267e-02  0.0000e+00e
978 * vl     * 0.0000e+00  2.2092e-01 -1.2000e-10  1.1017e-02e
979 * vv     * 0.0000e+00  5.5075e-08 -2.4411e-01 -2.0502e-01e
980 * tl     * 6.1549e+02r02 6.1537e+02e
981 * tv     * 6.1573e+02  6.1647e+02  6.1553e+02e
982 * p      * 1.5041e+07  1.5044e+07  1.5048e+07e
983 * pa     * f   0.0000e+00e
984 *
985 ***** type num id ctitle
986 fill    11 11 $11$ accumulator cap
987 *       jun1 ifty ioff
988 *       11       1      0
989 *       twtold rfmx concin felv
990 * 0.0000e+00 1.0000e+20 0.0000e+00 0.0000e+00
991 *       obin volin alpin vlin tlin
992 * 5.6500e-01 7.0700e-01 0.0000e+00 0.0000e+00 3.0200e+02
993 *       pin pain flowin vvin tvin
994 * 4.1100e+06 4.1100e+06 0.0000e+00 0.0000e+00 5.2499e+02
995 *
996 ***** type num id ctitle
997 pipe    12 12 $12$ hpis line
998 * ncells nodes jun1 jun2      epsw
999 *       1       0      15      18  0.0000e+00
1000 *       ichf iconc iacc ipow
1001 *       1       0      0      0
1002 *       radin th houtl houtv toutl
1003 * 1.0000e+00 1.0000e-01 0.0000e+00 0.0000e+00 3.0000e+02
1004 * toutv
1005 * 3.0000e+02
1006 *
1007 * dx     * 5.0000e+00e

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1008 * vol   *    4.5357e-03e
1009 * fa    * f    9.0713e-04e
1010 * fric  * f    0.0000e+00e
1011 * rv fri* f    0.0000e+00e
1012 * grav  * f    0.0000e+00e
1013 * hd    * f    3.3985e-02e
1014 * icflg * f    0e
1015 * nff   * f    1e
1016 * alp   *    0.0000e+00e
1017 * vl    * -2.4370e-06  0.0000e+00e
1018 * vv    * 1.2364e-04  0.0000e+00e
1019 * tl    * 3.0200e+02e
1020 * tv    * 6.1605e+02e
1021 * p     * 1.5145e+07e
1022 * pa    * 0.0000e+00e
1023 *
1024 ***** type      num      id      ctitle
1025 pipe      13      13 $13$ lpis line
1026 *      ncells      nodes      jun1      jun2      epsw
1027      1            0          20         19        0.0000e+00
1028 *      ichf       iconc      iacc      ipow
1029      1            0          0          0
1030 *      radin      th      houtl      houtv      toutl
1031      1.0000e+00  1.0000e-01  0.0000e+00  0.0000e+00  3.0000e+02
1032 *      toutv
1033      3.0000e+02
1034 *
1035 * dx    *    1.0000e+00e
1036 * vol   *    5.9900e-03e
1037 * fa    * f    5.9900e-03e
1038 * fric  * f    0.0000e+00e
1039 * rv fri* f    0.0000e+00e
1040 * grav  * f    0.0000e+00e
1041 * hd    * f    8.7330e-02e
1042 * icflg * f    0e
1043 * nff   * f    1e
1044 * alp   *    0.0000e+00e
1045 * vl    * -4.8826e-07  0.0000e+00e
1046 * vv    * 2.0576e-03  0.0000e+00e
1047 * tl    * 3.0200e+02e
1048 * tv    * 6.1605e+02e
1049 * p     * 1.5145e+07e
1050 * pa    * 0.0000e+00e
1051 *
1052 ***** type      num      id      ctitle
1053 valve      14      14 $14$ ecc line - check valve
1054 *      ncells      nodes      jun1      jun2      epsw
1055      13           0          17         16        0.0000e+00
1056 *      ichf       iconc      ivty      ivps      nvtb2
1057      0            0          3          3          0
1058 *      ivtr       ivsv      nvtb1      nvsv      nvrf
1059      6            1          2          0          0
1060 *      ivtroy      ivtyov
1061      0            0
1062 *      rvmx      rvov      fminov      fmaxov
1063      2.0000e+01  0.0000e+00  0.0000e+00  0.0000e+00
1064 *      radin      th      houtl      houtv      toutl
1065      4.3663e-02  1.3487e-02  0.0000e+00  0.0000e+00  3.0000e+02
1066 *      toutv      avlve      hvive      favlve      xpos
1067      3.0000e+02  8.2100e-03  1.0224e-01  0.0000e+00  0.0000e+00
1068 *
1069 * dx    *    1.4220e+00  2.6820e+00  5.6100e-01r05 2.3580e+00  3.6900e-01
1070 * dx    * 3.0500e-01r02  2.4840e+00  4.5400e-01e
1071 * vol   * 1.1675e-02  2.2019e-02  1.2684e-02r05 4.3953e-02  5.0370e-03
1072 * vol   * 1.8270e-03r02 3.3907e-02  2.7190e-03e
1073 * fa    * r02 8.2100e-03  0.0000e+00r05 1.8640e-02  1.3650e-02r02 5.9900e-03
1074 * fa    * 1.3650e-02r02 5.9900e-03e
1075 * fric  * 6.1000e-02  1.0746e+00  7.0900e-02  1.1084e+00  7.3500e-02
1076 * fric  * r03 0.0000e+00  6.7440e-02  0.0000e+00  6.1000e-02  0.0000e+00
1077 * fric  * 1.1970e-01  4.0050e-02
1078 * rv fri* 6.1000e-02  1.0746e+00  7.0900e-02  1.1084e+00  7.3500e-02
1079 * rv fri* r03 0.0000e+00  6.7440e-02  0.0000e+00  6.1000e-02  0.0000e+00
1080 * rv fri* 1.1970e-01  4.0050e-02e
1081 * grav  * r02-1.0000e+00r12 0.0000e+00e
1082 * hd    * r02 1.0224e-01  1.0000e-10r05 1.5406e-01  1.3183e-01r02 8.7330e-02
1083 * hd    * 1.3183e-01r02 8.7330e-02e
1084 * icflg * f    0e
1085 * nff   * r09      1      -1r03      1      -1e
1086 * alp   * f    0.0000e+00e
1087 * vl    * r03 0.0000e+00  3.3433e-07  1.4928e-06  2.6508e-06  3.8079e-06
1088 * vl    * 4.9638e-06  8.3548e-06  1.9450e-05  1.9599e-05  9.8104e-06
1089 * vl    * 2.5106e-05  2.5813e-05e
1090 * vv    * r03 0.0000e+00  1.6367e-05  9.5107e-06  1.8970e-05  2.8049e-05
1091 * vv    * 3.6335e-05  5.9040e-05  1.2123e-04  1.2441e-04  4.4631e-04
1092 * vv    * 3.4637e-03  1.7215e-03e
1093 * tl    * r11 3.0720e+02  3.0713e+02 3.0200e+02e
1094 * tv    * 5.2519e+02  5.2548e+02r11 6.1605e+02e
1095 * p     * 4.1232e+06  4.1432e+06r11 1.5145e+07e
1096 * pa    * f    0.0000e+00e
1097 * vtbl  * 0.0000e+00  1.0000e+00  1.0000e+04  1.0000e+00e
1098 *
1099 ***** type      num      id      ctitle

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```

1100 pipe      15      15 $15$ accumulator
1101 *      ncells      3      nodes      5      jun1      jun2      epsw
1102           3           5           11           17      0.0000e+00
1103 *      ichf       iconc      iacc      ipow
1104           1           0           1           0
1105 *      iq3tr      iq3sv      nq3tb      nq3sv      nq3rf
1106           0           0           0           0           0
1107 *      radin      th      houtl      houtv      toutl
1108     1.0000e+00  1.0000e-01  0.0000e+00  0.0000e+00  3.0000e+02
1109 *      toutv
1110     3.0000e+02
1111 *      qp3in      qp3off      rqp3mx      qp3scl
1112     0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
1113 *
1114 *      dx      5.1000e-01  1.0000e+00  5.0000e-02e
1115 *      vol      6.4200e-01  1.2610e+00  6.3050e-02e
1116 *      fa      *      r03 1.2610e+00  8.2100e-03e
1117 *      fric      *      r03 0.0000e+00  6.1000e-02e
1118 *      rv fri* r03 0.0000e+00  6.1000e-02e
1119 *      grav      *      f -1.0000e+00e
1120 *      hd      *      r03 1.2595e+00  1.0224e-01e
1121 *      icflg      *      f      0e
1122 *      nff      *      f      1e
1123 *      alp      *      1.0000e+00r02 0.0000e+00e
1124 *      vl      *      f      0.0000e+00e
1125 *      vv      *      f      0.0000e+00e
1126 *      tl      *      f      3.0200e+02e
1127 *      tv      *      3.0200e+02r02 5.2501e+02e
1128 *      p      *      4.1100e+06r02 4.1111e+06e
1129 *      pa      *      4.1060e+06r02 0.0000e+00e
1130 *      qppp      *      f      0.0000e+00e
1131 *      matid      *      f      7e
1132 *      tw      *      f      3.0200e+02e
1133 *
1134 ***** type      num      id      ctitle
1135 fill      16      16 $16$ hpis injection
1136 *      jun1      ifty      ioff
1137           18           7           0
1138 *      iftr      ifsv      nftb      nfsv      nfrf
1139           2           32           4           0           0
1140 *      twtold      rfmx      concin      felv
1141     0.0000e+00  1.0000e+20  0.0000e+00  0.0000e+00
1142 *      dxin      volin      alpin      vlin      tlin
1143     5.0000e+00  4.5357e-03  0.0000e+00  0.0000e+00  3.0500e+02
1144 *      pin      pain      flowin      vvin      tvin
1145     1.0000e+05  0.0000e+00  0.0000e+00  0.0000e+00  3.7300e+02
1146 *      vmscl      vvscl
1147     1.0000e+00  0.0000e+00
1148 *
1149 *      vmtb      *      1.0000e+00  1.7655e+00  8.5013e+04  1.7655e+00  8.3588e+06
1150 *      vmtb      *      7.3564e-01  1.0000e+08  7.3564e-01e
1151 *
1152 ***** type      num      id      ctitle
1153 fill      17      17 $17$ lpis injection
1154 *      jun1      ifty      ioff
1155           19           7           0
1156 *      iftr      ifsv      nftb      nfsv      nfrf
1157           3           33           13           0           0
1158 *      twtold      rfmx      concin      felv
1159     0.0000e+00  1.0000e+20  0.0000e+00  0.0000e+00
1160 *      dxin      volin      alpin      vlin      tlin
1161     1.0000e+00  5.9892e-03  0.0000e+00  0.0000e+00  3.0500e+02
1162 *      pin      pain      flowin      vvin      tvin
1163     1.0000e+05  0.0000e+00  0.0000e+00  0.0000e+00  3.7300e+02
1164 *      vmscl      vvscl
1165     1.0000e+00  0.0000e+00
1166 *
1167 *      vmtb      *      1.0000e+04  1.1780e+00  8.2090e+04  1.1780e+00  2.9630e+05
1168 *      vmtb      *      1.0930e+00  4.6410e+05  1.0120e+00  6.4750e+05  9.2980e-01
1169 *      vmtb      *      8.2990e+05  8.2480e-01  1.0110e+06  6.9720e-01  1.1920e+06
1170 *      vmtb      *      5.4700e-01  1.3100e+06  3.7910e-01  1.3990e+06  2.5880e-01
1171 *      vmtb      *      1.4570e+06  1.4100e-01  1.5140e+06  0.0000e+00  1.9000e+07
1172 *      vmtb      *      0.0000e+00e
1173 *
1174 ***** type      num      id      ctitle
1175 plenum      18      18 $18$ ecc line
1176 *      npljn      iconc      juns1      juns2
1177           4           0           1           1
1178 *      junj      *      16           14           20           15e
1179 *      dx      *      f      0.5620e+00e
1180 *      vol      *      6.7327e-03e
1181 *      elev      *      0.0000e+00e
1182 *      alp      *      0.0000e+00e
1183 *      tl      *      3.0205e+02e
1184 *      tv      *      6.1605e+02e
1185 *      p      *      1.5145e+07e
1186 *      pa      *      0.0000e+00e
1187 *
1188 ***** type      num      id      ctitle
1189 fill      19      19 $19$ pressurizer cap
1190 *      jun1      ifty      ioff
1191           12           1           0

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1192 *      twtold      rfmx      concin      felv
1193   0.0000e+00  1.0000e+20  0.0000e+00  0.0000e+00
1194 *      dxin       violin     alpin      vlin      tlin
1195   4.6990e-01  2.4414e-02  0.0000e+00  0.0000e+00  5.5030e+02
1196 *      pin        pain      flowin     vwin      tvin
1197   1.4840e+07  0.0000e+00  0.0000e+00  0.0000e+00  6.1442e+02
1198 *
1199 ***** type      num      id      ctitle
1200 pipe      20      20 $20$ stgen secondary boiler
1201 *      ncells      nodes      jun1      jun2      epsw
1202   5          0          24          21          0.0
1203 *      ichf       iconc      iacc      ipow
1204   1          0          0          0
1205 *      radin      th      houtl      houtv      toutl
1206   6.4453e-01  1.2700e-02  0.0          0.0          300.0
1207 *      toutv      powin     powoff     rpwmxc      powscl
1208   300.0      0.0          0.0          0.0          0.0
1209 *
1210 *      dx      * r04 5.6895e-01  1.1115e+00e
1211 *      vol     * r04 4.4356e-01  9.9786e-01e
1212 *      fa      * 2.1890e-01r03 7.7961e-01r02 8.9776e-01e
1213 *      fric    * 2.0000e+00r05 0.0000e+00e
1214 *      rv fri* 2.0000e+00r05 0.0000e+00e
1215 *      grav    * 0.0000e+00r05 1.0000e+00e
1216 *      hd      * r05 6.3500e-03  1.0691e+00e
1217 *      icflg   * f      0e
1218 *      nff     * -1r05 1e
1219 *      alp     * 3.7301e-01  6.6229e-01  7.1389e-01  7.3316e-01  6.9255e-01
1220 *      alp     * e
1221 *      vl      * 3.9032e-01  1.8531e-01  3.1060e-01  3.2750e-01  2.6974e-01
1222 *      vl      * 2.7100e-01e
1223 *      vv      * 1.0204e+00  4.4066e-01  7.6003e-01  1.1473e+00  1.3286e+00
1224 *      vv      * 1.4068e+00e
1225 *      tl      * 5.4468e+02  5.4465e+02  5.4463e+02  5.4461e+02  5.4458e+02
1226 *      tl      * e
1227 *      tv      * 5.4466e+02  5.4463e+02  5.4461e+02  5.4460e+02  5.4457e+02
1228 *      tv      * e
1229 *      p       * 5.6344e+06  5.6322e+06  5.6307e+06  5.6294e+06  5.6273e+06
1230 *      p       * e
1231 *      pa     * f      0.0000e+00e
1232 *
1233 ***** type      num      id      ctitle
1234 tee      21      21 $21$ stgen secondary separator
1235 *      jcell      nodes      ichf      cost      epsw
1236   2          0          1          0.0          0.0
1237 *      iconcl1   ncell1      jun1      jun2      ipowl
1238   0          4          21         22          0
1239 *      radin1     th1      houtl1     houtv1     toutl1
1240   7.1120e-01  5.3975e-02  0.0          0.0          300.0
1241 *      toutv1     pwin1     pwoff1     rpwmxl1  pwscl1
1242   300.0      0.0          0.0          0.0          0.0
1243 *      iconcl2   ncell2      jun3      ipow2
1244   0          1          23         0
1245 *      radin2     th2      houtl2     houtv2     toutl2
1246   7.1120e-01  5.3975e-02  0.0          0.0          300.0
1247 *      toutv2     pwin2     pwoff2     rpwmxl2  pwscl2
1248   300.0      0.0          0.0          0.0          0.0
1249 *
1250 *      dx      * r03 3.7050e-01  1.1115e+00e
1251 *      vol     * r03 3.3262e-01  1.2370e+00e
1252 *      fa      * r03 8.9776e-01  1.0000e+00  4.6329e-02e
1253 *      fric    * r02 0.0000e+00  1.0000e+30  0.0          2.4460e-01e
1254 *      rv fri* r02 0.0000e+00  1.0000e+30  0.0          2.4460e-01e
1255 *      grav    * f      1.0000e+00e
1256 *      hd      * r04 1.0691e+00  2.4290e-01e
1257 *      icflg   * f      0e
1258 *      nff     * f      1e
1259 *      alp     * r03 7.5588e-01  9.9999e-01e
1260 *      vl      * r03 2.7100e-01  -1.2000e-10  1.6561e+01e
1261 *      vv      * r03 1.4068e+00  7.5110e-01  1.9601e+01e
1262 *      tl      * f      5.4455e+02e
1263 *      tv      * f      5.4454e+02e
1264 *      p       * r03 5.6248e+06  5.6245e+06e
1265 *      pa     * f      0.0000e+00e
1266 *
1267 *      dx      * 7.4100e-01e
1268 *      vol     * 3.8297e-01e
1269 *      fa      * f      5.1684e-01e
1270 *      fric    * f      0.0000e+00e
1271 *      rv fri* f      0.0000e+00e
1272 *      grav    * f      -3.3763e-01e
1273 *      hd      * f      2.5400e-01e
1274 *      icflg   * f      0e
1275 *      nff     * f      1e
1276 *      alp     * 0.0000e+00e
1277 *      vl      * 4.5195e-01  1.1034e-01e
1278 *      vv      * -9.3594e-02  -1.0138e-01e
1279 *      tl      * 5.4433e+02e
1280 *      tv      * 5.4456e+02e
1281 *      p       * 5.6258e+06e
1282 *      pa     * 0.0000e+00e
1283 *

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1284 ***** type num id ctitle
1285 tee 22 22 $22$ stgen secondary downcomer
1286 * jcell nodes ichf cost epsw
1287 3 0 1 0.0 0.0
1288 * iconcl ncell1 jun1 jun2 ipow1
1289 0 6 23 24 0
1290 * radin1 th1 hout1 houtv1 toutl1
1291 7.1120e-01 5.3975e-02 0.0 0.0 300.0
1292 * toutv1 pwini pwoff1 rpwmxx1 pwscl1
1293 300.0 0.0 0.0 0.0 0.0
1294 * iconc2 ncell2 jun3 ipow2
1295 0 1 25 0
1296 * radin2 th2 hout12 houtv2 toutl2
1297 5.0800e-02 6.0000e-03 0.0 0.0 300.0
1298 * toutv2 pwini2 pwoff2 rpwmxx2 pwscl2
1299 300.0 0.0 0.0 0.0 0.0
1300 *
1301 * dx * 7.4100e-01r03 2.4700e-01 1.7069e+00 5.6895e-01e
1302 * vol * 3.8297e-01r03 1.2766e-01 3.7363e-01 1.2454e-01e
1303 * fa * r04 5.1684e-01r03 2.1890e-01e
1304 * fric * r06 0.0000e+00 2.0000e+00e
1305 * rv fri* r06 0.0000e+00 2.0000e+00e
1306 * grav * -3.3763e-01r05-1.0000e+00 0.0000e+00e
1307 * hd * r04 2.5400e-01r02 1.0160e-01 6.3500e-03e
1308 * icflg * f 0e
1309 * nff * r04 1 -1 1 -1e
1310 * alp * 5.1735e-04r05 0.0000e+00e
1311 * vl * 1.1034e-01r03 1.1033e-01 3.8999e-01 3.9024e-01 3.9032e-01
1312 * vl * e
1313 * vv * -1.0138e-01r02-1.6483e-01 4.9637e-02 1.1720e-01 1.1683e-01
1314 * vv * 1.0204e+00e
1315 * tl * 5.4427e+02r03 5.2306e+02 5.2324e+02 5.2332e+02e
1316 * tv * 5.4458e+02r03 5.4465e+02 5.4476e+02 5.4486e+02e
1317 * p * 5.6277e+06r03 5.6335e+06 5.6430e+06 5.6520e+06e
1318 * pa * f 0.0000e+00e
1319 *
1320 * dx * 2.0000e+00e
1321 * vol * 1.6215e-02e
1322 * fa * f 8.1073e-03e
1323 * fric * 1.0000e-10 0.0000e+00e
1324 * rv fri* 1.0000e-10 0.0000e+00e
1325 * grav * f 0.0000e+00e
1326 * hd * f 1.0160e-01e
1327 * icflg * f 0e
1328 * nff * f 1e
1329 * alp * 0.0000e+00e
1330 * vl * -3.5940e+00 -3.5900e+00e
1331 * vv * -3.7371e+00 -3.5900e+00e
1332 * tl * 4.8169e+02e
1333 * tv * 5.4465e+02e
1334 * p * 5.6342e+06e
1335 * pa * 0.0000e+00e
1336 *
1337 ***** type num id ctitle
1338 valve 23 23 $23$ steam line valve
1339 * ncells nodes jun1 jun2 epsw
1340 6 0 22 26 0.0000e+00
1341 * ichf iconc ivty ivps nvtb2
1342 1 0 3 6 0
1343 * ivtr ivsv nvtbl nvsv nvrf
1344 8 1 3 0 0
1345 * ivtroy ivtroyv
1346 0 0
1347 * rvmx rvov fminov fmaxov
1348 1.0000e+20 0.0000e+00 0.0000e+00 1.0000e+00
1349 * radin th hout1 houtv toutl
1350 1.2140e-01 1.5100e-02 0.0 1.6000e+00 3.0537e+02
1351 * toutv avlive hvlive favlive xpos
1352 3.0537e+02 4.0945e-02 2.2832e-01 7.2789e-01 6.8317e-01
1353 *
1354 * dx * f 5.0119e+00e
1355 * vol * f 2.3220e-01e
1356 * fa * r05 4.6329e-02 2.9803e-02 4.6329e-02e
1357 * fric * 2.4460e-01r04 0.0000e+00 6.4900e+00 0.0000e+00e
1358 * rv fri* 2.4460e-01r04 0.0000e+00 6.4900e+00 0.0000e+00e
1359 * grav * 1.0000e+00r06 0.0000e+00e
1360 * hd * r05 2.4290e-01 1.8152e-01 2.4290e-01e
1361 * icflg * r05 0 1 0e
1362 * nff * r06 1 -1e
1363 * alp * r05 9.9994e-01 9.9896e-01e
1364 * vl * 1.6561e+01 1.8585e+01 1.8746e+01 1.8783e+01 1.8806e+01
1365 * vl * 2.1816e+01 4.3756e+01e
1366 * vv * 1.9601e+01 1.9770e+01 1.9797e+01 1.9824e+01 1.9850e+01
1367 * vv * 3.0900e+01 4.8548e+01e
1368 * tl * 5.4402e+02 5.4401e+02 5.4400e+02 5.4398e+02 5.4397e+02
1369 * tl * 4.8899e+02e
1370 * tv * 5.4399e+02 5.4400e+02 5.4399e+02 5.4398e+02 5.4397e+02
1371 * tv * 4.8777e+02e
1372 * p * 5.5787e+06 5.5777e+06 5.5768e+06 5.5759e+06 5.5750e+06
1373 * p * 2.1621e+06e
1374 * pa * f 0.0000e+00e
1375 * vtbl * 0.0000e+00 6.0000e-01s

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1376 * vtbl * 1.0000e+01 0.0000e+00s
1377 * vtbl * 1.0000e+03 0.0000e+00e
1378 *
1379 ***** type num id ctitle
1380 fill 24 24 $24$ steam generator feedwater
1381 * junl ifty ioff
1382 25 8 0
1383 * iftr ifsv nftb nfsv nfrf
1384 8 -18 6 0 0
1385 * twtold rfmx concin felv
1386 0.0000e+00 1.0000e+20 0.0000e+00 0.0000e+00
1387 * dxin violin alpin vlin
1388 2.0000e+00 1.6215e-02 0.0000e+00 3.5900e+00 4.8200e+02
1389 * pin pain flowin vvin tvin
1390 7.2600e+06 0.0000e+00 2.4992e+01 3.5900e+00 5.6149e+02
1391 * vmscl vvscl
1392 1.0000e+00 0.0000e+00
1393 *
1394 * vmtb * r02 0.0000e+00 2.0000e-01 6.8700e+00 3.9170e-01 1.3720e+01
1395 * vmtb * 5.7700e-01 2.0580e+01 7.5620e-01 2.7440e+01 1.0000e+00
1396 * vmtb * 3.7130e+01e
1397 *
1398 ***** type num id ctitle
1399 break 25 25 $25$ stm gen sec brk
1400 * junl ibty isat ioff
1401 26 0 3 0
1402 * dxin violin alpin tin pin
1403 5.0119e+00 2.3220e-01 1.0000e+00 4.8800e+02 2.1500e+06
1404 * pain concin rfmx poff belv
1405 0.0000e+00 0.0000e+00 1.0000e+20 2.1500e+06 0.0000e+00
1406 *
1407 ***** type num id ctitle
1408 tee 31 31 $31$ broken-loop hot leg
1409 * jcell nodes ichf cost epsw
1410 2 4 1 0.0000e+00 0.0000e+00
1411 * iconcl ncell1 jun1 jun2 ipow1
1412 0 26 31 32 0
1413 * iqptr1 iqpsv1 nqptb1 nqpsv1 nqprf1
1414 0 0 0 0 0
1415 * radin1 th1 hout1 houtv1 tout1
1416 1.4209e-01 3.5710e-02 0.0 6.0000e+00 3.0000e+02
1417 * toutv1
1418 3.0000e+02
1419 * qpin1 qpooff1 rqpmx1 qpsc11
1420 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
1421 * iconc2 ncell2 jun3 ipow2
1422 0 3 43 0
1423 * iqptr2 iqpsv2 nqptb2 nqpsv2 nqprf2
1424 0 0 0 0 0
1425 * radin2 th2 hout12 houtv2 tout12
1426 1.0795e-01 2.8580e-01 0.0 6.0000e+00 3.0000e+02
1427 * toutv2
1428 3.0000e+02
1429 * qpin2 qpooff2 rqpmx2 qpsc12
1430 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
1431 *
1432 * dx * r03 6.6898e-01 5.2578e-01 4.6749e-01 5.5861e-01 1.9875e+00
1433 * dx * r02 1.0772e+00 1.9875e+00 5.1029e-01 5.4629e-01 4.8628e-01
1434 * dx * 2.5400e-01 1.7145e-01 3.0000e-01 2.7940e-01r02 2.1184e-01
1435 * dx * r04 1.8717e-01 2.9922e-01 2.4448e-01 8.1598e-01e
1436 * vol * r03 4.2460e-02 4.7280e-03 3.7579e-03 4.6603e-03 1.9686e-01
1437 * vol * r02 1.1383e-01 1.9686e-01 4.2684e-03 4.5696e-03 3.1715e-03
1438 * vol * 2.7500e-02 1.8500e-02 1.8900e-02 6.8606e-03r02 1.7667e-03
1439 * vol * r04 1.5674e-03 2.4920e-03 2.0450e-03 4.2395e-02e
1440 * fa * r03 6.3469e-02 1.3913e-02r03 8.3647e-03r03 1.9141e-02r03 8.3647e-03
1441 * fa * 6.3425e-02r02 9.4624e-03 6.3425e-02r09 8.3647e-03 5.1956e-02
1442 * fa * e
1443 * fric * 0.0000e+00r02 2.2035e-01 2.3956e-01 2.6400e-01 0.0000e+00
1444 * fric * 7.7200e-03r03 1.4000e-02 1.9300e-02r03 0.0000e+00 1.4000e-01
1445 * fric * 1.7000e-01 1.1200e-01r02 0.0000e+00 4.3970e-02r04 0.0000e+00
1446 * fric * 1.8904e-02 3.4793e-01 0.0000e+00e
1447 * rv fri* 3.5000e-02r02 2.2035e-01 2.3956e-01 2.6400e-01 0.0000e+00
1448 * rv fri* 7.7200e-03r03 1.4000e-02 1.9300e-02r03 0.0000e+00 1.4000e-01
1449 * rv fri* 1.7000e-01 1.1200e-01r02 0.0000e+00 4.3970e-02r04 0.0000e+00
1450 * rv fri* 1.8904e-02 3.4793e-01 0.0000e+00e
1451 * grav * r05 0.0000e+00 6.2137e-01r02 1.0000e+00 0.0000e+00r05-1.0000e+00
1452 * grav * -6.6537e-01r02 0.0000e+00 2.9153e-01r05 1.0000e+00 6.9241e-01
1453 * grav * r03 0.0000e+00e
1454 * hd * r03 2.8400e-01 1.3300e-01r03 1.0300e-01r03 1.7500e-02r03 1.0300e-01
1455 * hd * 2.8400e-01r02 1.1900e-02 2.8400e-01r09 1.0320e-01 2.5720e-01
1456 * hd * e
1457 * icflg * r25 0 2 0e
1458 * nff * r13 1 -1r03 1 -1r08 1
1459 * nff * -1e
1460 * alp * f 0.0000e+00e
1461 * vl * -2.7128e-01 -2.7129e-01 2.1913e-04 9.4392e-04 1.5015e-03
1462 * vl * 1.4435e-03 1.3750e-03 4.8827e-04 4.2806e-04 3.6837e-04
1463 * vl * 5.9408e-04 5.3404e-04 4.7244e-04 5.5294e-05 3.4300e-04
1464 * vl * 3.2446e-04 4.3416e-05 2.9402e-04 2.6964e-04 2.4576e-04
1465 * vl * 2.2471e-04 2.0370e-04 1.8273e-04 1.6181e-04 1.2845e-04
1466 * vl * 1.0125e-04 0.0000e+00e
1467 * vv * -1.7888e-01 -3.4516e-01 -3.8433e-02 2.1004e-02 1.4251e-02

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1468 * vv * 2.1154e-01 2.3867e-01 2.3792e-01 1.6864e-03 -2.3678e-01
1469 * vv * -2.3630e-01 -2.3557e-01 -2.3547e-01 -2.3614e-01 -2.1332e-01
1470 * vv * 1.6682e-02 2.2337e-02 1.7371e-01r02 2.3619e-01 2.3615e-01
1471 * vv * 2.3612e-01 2.3608e-01 2.1535e-01 7.0167e-03 -2.2062e-02
1472 * vv * 0.0000e+00e
1473 * tl * r02 5.5628e+02 5.6359e+02 5.5889e+02 5.5715e+02 5.5663e+02
1474 * tl * 5.6202e+02 5.6135e+02 5.6062e+02 5.5925e+02 5.5256e+02
1475 * tl * 5.5117e+02 5.4988e+02 5.5802e+02 5.5797e+02 5.5735e+02
1476 * tl * 5.5560e+02 5.5120e+02 5.5063e+02 5.5050e+02 5.5038e+02
1477 * tl * 5.5026e+02 5.5013e+02 5.4994e+02 5.4980e+02 5.5547e+02
1478 * tl * e
1479 * tv * r05 6.1568e+02 6.1566e+02 6.1562e+02r02 6.1556e+02 6.1562e+02
1480 * tv * 6.1566e+02 6.1569e+02 6.1571e+02r13 6.1568e+02e
1481 * p * r05 1.5075e+07 1.5073e+07 1.5063e+07r02 1.5052e+07 1.5063e+07
1482 * p * 1.5073e+07 1.5077e+07 1.5081e+07 1.5083e+07r04 1.5084e+07
1483 * p * 1.5082e+07 1.5081e+07 1.5079e+07 1.5078e+07 1.5076e+07
1484 * p * r03 1.5075e+07e
1485 * pa * f 0.0000e+00e
1486 * qppp * r99 0.0000e+00r05 0.0000e+00e
1487 * matid * f 7e
1488 * tw * 5.5528e+02 5.5408e+02 5.5297e+02 5.5193e+02 5.5455e+02
1489 * tw * 5.5336e+02 5.5225e+02 5.5121e+02 5.6137e+02 5.6016e+02
1490 * tw * 5.5903e+02 5.5798e+02 5.5675e+02 5.5560e+02 5.5452e+02
1491 * tw * 5.5349e+02 5.5506e+02 5.5393e+02 5.5287e+02 5.5184e+02
1492 * tw * 5.5454e+02 5.5343e+02 5.5236e+02 5.5134e+02 5.5992e+02
1493 * tw * 5.5871e+02 5.5758e+02 5.5653e+02 5.5970e+02 5.5849e+02
1494 * tw * 5.5737e+02 5.5632e+02 5.5898e+02 5.5778e+02 5.5665e+02
1495 * tw * 5.5560e+02 5.5717e+02 5.5596e+02 5.5485e+02 5.5380e+02
1496 * tw * 5.5047e+02 5.4936e+02 5.4830e+02 5.4729e+02 5.4912e+02
1497 * tw * 5.4803e+02 5.4699e+02 5.4598e+02 5.4784e+02 5.4677e+02
1498 * tw * 5.4574e+02 5.4474e+02 5.5580e+02 5.5461e+02 5.5350e+02
1499 * tw * 5.5246e+02 5.5646e+02 5.5526e+02 5.5415e+02 5.5310e+02
1500 * tw * 5.5514e+02 5.5395e+02 5.5284e+02 5.5181e+02 5.5343e+02
1501 * tw * 5.5226e+02 5.5117e+02 5.5014e+02 5.4912e+02 5.4801e+02
1502 * tw * 5.4696e+02 5.4595e+02 5.4856e+02 5.4746e+02 5.4642e+02
1503 * tw * 5.4542e+02 5.4844e+02 5.4734e+02 5.4630e+02 5.4530e+02
1504 * tw * 5.4831e+02 5.4722e+02 5.4617e+02 5.4517e+02 5.4819e+02
1505 * tw * 5.4710e+02 5.4605e+02 5.4505e+02 5.4806e+02 5.4697e+02
1506 * tw * 5.4593e+02 5.4493e+02 5.4787e+02 5.4678e+02 5.4574e+02
1507 * tw * 5.4474e+02 5.4773e+02 5.4664e+02 5.4560e+02 5.4460e+02
1508 * tw * 5.5327e+02 5.5209e+02 5.5099e+02 5.4996e+02e
1509 *
1510 * dx * 1.3890e+00 8.1400e-01 5.1044e+00e
1511 * vol * 5.4000e-02 3.1400e-02 1.9860e-01e
1512 * fa * f 3.1350e-02e
1513 * fric * 1.0000e-10r03 0.0000e+00e
1514 * rv fri* 1.0000e-10r03 0.0000e+00e
1515 * grav * 0.0000e+00 2.2420e-01 1.9120e-01 0.0000e+00e
1516 * hd * r03 2.2230e-01 1.4100e-03e
1517 * icflg * f 0e
1518 * nff * f 1e
1519 * alp * f 0.0000e+00a
1520 * vl * -5.4932e-01 -5.4937e-01 -5.4940e-01 -5.4958e-01e
1521 * vv * -5.3804e-01 -3.8671e-01 -3.9323e-01 -6.8625e-01e
1522 * tl * 5.5628e+02 5.5631e+02 5.5632e+02e
1523 * tv * 6.1568e+02 6.1567e+02 6.1565e+02e
1524 * p * 1.5075e+07 1.5073e+07 1.5069e+07e
1525 * pa * f 0.0000e+00e
1526 * qppp * f f 0.0000e+00e
1527 * matid * f 7e
1528 * tw * 5.5553e+02 5.4557e+02 5.3565e+02 5.2278e+02 5.5555e+02
1529 * tw * 5.4558e+02 5.3565e+02 5.2278e+02 5.5566e+02 5.4560e+02
1530 * tw * 5.3565e+02 5.2277e+02e
1531 *
1532 ***** type num id ctitle
1533 fill 32 32 $32$ broken-hot-leg terminal
1534 * jun1 ifty ioff
1535 * 32 1 0
1536 * twtold rfmx concin felv
1537 0.0000e+00 1.0000e+20 0.0000e+00 0.0000e+00
1538 * dxin violin alpin vlin tlin
1539 8.1598e-01 4.2395e-02 0.0000e+00 0.0000e+00 5.5650e+02
1540 * pin pain flowin vvin tvin
1541 1.5060e+07 0.0000e+00 0.0000e+00 0.0000e+00 6.1560e+02
1542 *
1543 ***** type num id ctitle
1544 tee 41 41 $41$ broken-loop cold leg
1545 * jcell nodes ichf cost epsw
1546 2 4 1 0.0000e+00 0.0000e+00
1547 * iconcl ncell1 jun1 jun2 ipow1
1548 0 6 41 42 0
1549 * iqptr1 iqpsv1 nqptb1 nqpsv1 nqprf1
1550 0 0 0 0 0
1551 * radin1 th1 hout11 houtv1 toutl1
1552 1.4209e-01 3.5710e-02 0.0 6.0000e+00 3.0000e+02
1553 * toutv1
1554 3.0000e+02
1555 * qpin1 qpoff1 rqpmx1 qpsc11
1556 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
1557 * iconc2 ncell2 jun3 ipow2
1558 0 2 43 0
1559 * iqptr2 iqpsv2 nqptb2 nqpsv2 nqprf2

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1560          0          0          0          0          0
1561 *      radin2      th2      houtl2      houtv2      toutl2
1562   1.0795e-01  2.8580e-01       0.0  6.0000e+00  3.0000e+02
1563 *
1564 3.0000e+02
1565 *      qpin2      qpooff2      rqpmax2      qpsc12
1566 0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
1567 *
1568 *      dx      * r03 8.0774e-01  5.1308e-01  1.1450e+00  1.0224e+00e
1569 *      vol      * r03 5.1268e-02  5.0514e-03  2.6238e-02  4.7249e-02e
1570 *      fa      * r03 6.3471e-02  1.3876e-02  8.3647e-03  2.3520e-02  5.1956e-02
1571 *      fa      * e
1572 *      fric      * 0.0000e+00  1.8470e+00  3.0679e-02  0.0000e+00  1.6150e-01
1573 *      fric      * 4.6010e-02  1.7170e-01e
1574 *      rv fri* 1.2910e-01  1.8470e+00  3.0679e-02  0.0000e+00  1.6150e-01
1575 *      rv fri* 4.6010e-02  1.7170e-01e
1576 *      grav      * f 0.0000e+00e
1577 *      hd      * r03 2.8400e-01  1.3292e-01  1.0320e-01  1.7305e-01  2.5720e-01
1578 *      hd      * e
1579 *      icflg      * r04      0      2r02      0e
1580 *      nff      * r03      1      -1r03      1e
1581 *      alp      * f 0.0000e+00e
1582 *      vl      * 2.7196e-01  2.7195e-01  5.3126e-05  1.8460e-04  2.4966e-04
1583 *      vl      * 4.1690e-05  0.0000e+00e
1584 *      vv      * 3.0123e-01  3.8705e-01  2.4718e-02  2.0026e-02  -9.7115e-03
1585 *      vv      * 2.6967e-03  0.0000e+00e
1586 *      tl      * 5.5677e+02  5.5675e+02  5.5330e+02  5.4796e+02  5.4970e+02
1587 *      tl      * 5.4960e+02e
1588 *      tv      * f 6.1579e+02e
1589 *      p      * f 1.5096e+07e
1590 *      pa      * f 0.0000e+00e
1591 *      qppp      * f 0.0000e+00e
1592 *      matid      * f 7e
1593 *      tw      * 5.5577e+02  5.5456e+02  5.5345e+02  5.5241e+02  5.5501e+02
1594 *      tw      * 5.5381e+02  5.5269e+02  5.5166e+02  5.5110e+02  5.4993e+02
1595 *      tw      * 5.4883e+02  5.4781e+02  5.4587e+02  5.4477e+02  5.4373e+02
1596 *      tw      * 5.4273e+02  5.4755e+02  5.4641e+02  5.4534e+02  5.4433e+02
1597 *      tw      * 5.4742e+02  5.4627e+02  5.4519e+02  5.4418e+02e
1598 *
1599 *      dx      * 8.8500e-01  7.2834e+00e
1600 *      vol      * 3.0330e-02  2.7680e-01e
1601 *      fa      * f 3.1350e-02e
1602 *      fric      * 1.0000e-10r02  0.0000e+00e
1603 *      rv fri* 1.0000e-10r02  0.0000e+00e
1604 *      grav      * 0.0000e+00  1.9900e-01  0.0000e+00e
1605 *      hd      * r02 2.2230e-01  1.4100e-03e
1606 *      icflg      * f 0e
1607 *      nff      * f 1e
1608 *      alp      * f 0.0000e+00e
1609 *      vl      * 5.5005e-01  5.5000e-01  5.4958e-01e
1610 *      vv      * 6.6218e-01  7.0827e-01  6.8625e-01e
1611 *      tl      * 5.5671e+02  5.5643e+02e
1612 *      tv      * 6.1579e+02  6.1575e+02e
1613 *      p      * 1.5096e+07  1.5090e+07e
1614 *      pa      * f 0.0000e+00e
1615 *      qppp      * f 0.0000e+00e
1616 *      matid      * f 7e
1617 *      tw      * 5.5553e+02  5.4022e+02  5.2786e+02  5.1460e+02  5.5541e+02
1618 *      tw      * 5.4013e+02  5.2779e+02  5.1453e+02e
1619 *
1620 ***** type num id ctitle
1621 fill      42 42 $42$ broken-cold-leg terminal
1622 *      jun1      ifty      ioff
1623 *      42      1      0
1624 *      twtold      rfmx      concin      felv
1625 0.0000e+00  1.0000e+20  0.0000e+00  0.0000e+00
1626 *      dxin      volin      alpin      vlin      tlin
1627 1.0224e+00  4.7249e-02  0.0000e+00  0.0000e+00  5.5030e+02
1628 *      pin      pain      flowin      vvin      tvin
1629 1.5060e+07  0.0000e+00  0.0000e+00  0.0000e+00  6.1560e+02
1630 *
1631 ***** type num id ctitle
1632 vessel      50 50 $50$ vessel
1633 *      nasx      nrsx      ntsx      ncsr      ivssbf
1634 *      12      4      4      4      0
1635 *      idcu      idcl      idcr      icru      icrl
1636 *      12      2      3      8      3
1637 *      icrr      ilcsp      iucsp      iuhp      iconc
1638 *      3      3      8      12      0
1639 *      igeom      nvent      nvvtb      nsgrid
1640 *      0      0      0      0      0 * 5 *
1641 *      shelv      epsw
1642 0.0000e+00  0.0000e+00
1643 *
1644 *      z      * 6.2700e-01  7.2700e-01  1.2480e+00  1.5530e+00  1.7810e+00
1645 *      z      * 2.0100e+00  2.4670e+00  2.9240e+00  3.4000e+00  4.8460e+00
1646 *      z      * 5.1300e+00  5.9000e+00e
1647 *      rad      * 1.0500e-01  2.3100e-01  3.2900e-01  4.7000e-01e
1648 *      th      * 1.570796327  3.141592654  4.712388981  6.283185308e
1649 *
1650 *      funh      * f 1.0000e-01e
1651 *      nhscs      * f 991e

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1652 * zgrid      1.5520e+00   1.7800e+00   2.0000e+00   2.4650e+00   2.9200e+00
1653 * zgrid e
1654 *
1655 *      lisrl      lisrc      lisrf      ljuns
1656      11          10          3          1
1657      11          15          3          9
1658      11          12          3          31
1659      11          13          3          41
1660 *
1661 * level 1
1662 *
1663 * cfzl-t* f  0.0000e+00e
1664 * cfzl-z* r12 0.0000e+00r04 2.0000e-01e
1665 * cfzl-r* r08 0.0000e+00r04 3.0000e-01r04 0.0000e+00e
1666 * cfzv-t* f  0.0000e+00e
1667 * cfzv-z* r12 0.0000e+00r04 2.0000e-01e
1668 * cfzv-r* r08 0.0000e+00r04 3.0000e-01r04 0.0000e+00e
1669 * vol * r12 1.0000e+00r04 5.8200e-02e
1670 * fa-t * r12 1.0000e+00r04 5.8200e-02e
1671 * fa-z * r12 1.0000e+00r04 5.8200e-02e
1672 * fa-r * r08 1.0000e+00r04 5.8200e-01r04 0.0000e+00e
1673 * hd-t * f  1.0000e-01e
1674 * hd-z * f  1.0000e-01e
1675 * hd-r * f  1.0000e-01e
1676 * alpn * f  0.0000e+00e
1677 * vvn-t * f  0.0000e+00e
1678 * vvn-z * f  0.0000e+00e
1679 * vvn-r * f  0.0000e+00e
1680 * vln-t * -2.0502e-01 -2.7073e-01 2.7057e-01 2.0562e-01 -2.0118e-01
1681 * vln-t * -2.1208e-01 2.1207e-01 2.0302e-01 -1.4392e-01 -1.3538e-01
1682 * vln-t * 1.3605e-01 1.4689e-01 -1.0533e-02 -2.7136e-02 2.8463e-02
1683 * vln-t * 1.3162e-02e
1684 * vln-z * 9.6331e-01 9.4341e-01 8.5300e-01 9.4345e-01 8.7748e-01
1685 * vln-z * 8.1439e-01 5.6696e-01 8.1406e-01 6.5182e-01 3.5550e-01
1686 * vln-z * -1.7955e-01 3.5362e-01 1.5052e-01 -5.0226e-01 -1.2346e+00
1687 * vln-z * -5.0633e-01e
1688 * vln-r * 1.8076e-01 -3.7161e-02 -4.1603e-01 -3.7642e-02 9.4277e-02
1689 * vln-r * -1.3213e-01 -4.1925e-01 -1.3294e-01 3.4636e-02 -1.4168e-01
1690 * vln-r * -3.2196e-01 -1.4244e-01r04 0.0000e+00e
1691 * tnv * f  6.1598e+02e
1692 * tln * r06 5.5680e+02 5.5681e+02r03 5.5680e+02 5.5681e+02r03 5.5680e+02
1693 * tln * f  5.5682e+02 5.5680e+02e
1694 * pn * f  1.5131e+07e
1695 * pan * f  0.0000e+00e
1696 *
1697 * level 2
1698 *
1699 * cfzl-t* f  0.0000e+00e
1700 * cfzl-z* f  0.0000e+00e
1701 * cfzl-r* r08 0.0000e+00r04 5.0000e-01r04 0.0000e+00e
1702 * cfzv-t* f  0.0000e+00e
1703 * cfzv-z* f  0.0000e+00e
1704 * cfzv-r* r08 0.0000e+00r04 5.0000e-01r04 0.0000e+00e
1705 * vol * r12 1.0000e+00r04 5.8200e-01e
1706 * fa-t * r12 1.0000e+00r04 5.8200e-01e
1707 * fa-z * r12 4.0900e-01r04 5.8200e-01e
1708 * fa-r * r08 1.0000e+00r04 5.8200e-01r04 0.0000e+00e
1709 * hd-t * f  1.0000e-01e
1710 * hd-z * f  1.0000e-01e
1711 * hd-r * f  1.0000e-01e
1712 * alpn * f  0.0000e+00e
1713 * vvn-t * f  0.0000e+00e
1714 * vvn-z * f  0.0000e+00e
1715 * vvn-r * f  0.0000e+00e
1716 * vln-t * -1.1236e-01 -1.0166e-01 1.0246e-01 1.1290e-01 -3.7110e-02
1717 * vln-t * 1.1255e-01 -1.1084e-01 3.8445e-02 1.4918e-01 3.4101e-01
1718 * vln-t * -3.3798e-01 -1.4858e-01 2.2499e-01 2.0615e-01 -2.0335e-01
1719 * vln-t * -2.2515e-01e
1720 * vln-z * 2.8789e+00 2.8338e+00 2.7162e+00 2.8337e+00 2.8824e+00
1721 * vln-z * 2.7516e+00 2.4209e+00 2.7507e+00 2.3272e+00 1.6864e+00
1722 * vln-z * 8.6191e-01 1.6829e+00 -3.3861e-01 -1.4500e+00 -2.6289e+00
1723 * vln-z * -1.4559e+00e
1724 * vln-r * 3.0974e-02 -1.2001e-01 -2.6537e-01 -1.1980e-01 -2.3589e-01
1725 * vln-r * -3.9153e-01 -4.3085e-01 -3.9127e-01 -4.7230e-01 -5.9005e-01
1726 * vln-r * -6.1752e-01 -5.8977e-01r04 0.0000e+00e
1727 * tnv * f  6.1596e+02e
1728 * tln * r06 5.5679e+02 5.5681e+02r03 5.5680e+02 5.5682e+02r03 5.5680e+02
1729 * tln * f  5.5682e+02 5.5680e+02e
1730 * pn * r12 1.5128e+07r04 1.5129e+07e
1731 * pan * f  0.0000e+00e
1732 *
1733 * level 3
1734 *
1735 * cfzl-t* f  0.0000e+00e
1736 * cfzl-z* r12 6.7100e-02r04 0.0000e+00e
1737 * cfzl-r* f  0.0000e+00e
1738 * cfzv-t* f  0.0000e+00e
1739 * cfzv-z* r12 6.7100e-02r04 0.0000e+00e
1740 * cfzv-r* f  0.0000e+00e
1741 * vol * r12 6.5600e-01r04 5.8200e-01e
1742 * fa-t * r12 6.5600e-01r04 5.8200e-01e
1743 * fa-z * r12 4.4800e-01r04 5.8200e-01e

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1744 * fa-r * r08 7.0000e-01r08 0.0000e+00e
1745 * hd-t * r12 1.2200e-02r04 1.0000e-01e
1746 * hd-z * r12 1.2200e-02r04 1.0000e-01e
1747 * hd-r * r12 1.2200e-02r04 1.0000e-01e
1748 * alpn * f 0.0000e+00e
1749 * vvn-t * f 0.0000e+00e
1750 * vvn-z * f 0.0000e+00e
1751 * vvn-r * f 0.0000e+00e
1752 * vln-t * -4.8498e-03 -3.6438e-02 3.6851e-02 5.2974e-03 4.2077e-02
1753 * vln-t * 7.9656e-02 -7.8665e-02 -4.1194e-02 1.3145e-01 1.5873e-01
1754 * vln-t * -1.5744e-01 -1.3097e-01 2.3811e-01 2.1417e-01 -2.1136e-01
1755 * vln-t * -2.3801e-01e
1756 * vln-z * 2.0258e+00 2.0173e+00 2.0017e+00 2.0172e+00 2.0173e+00
1757 * vln-z * 1.9926e+00 1.9545e+00 1.9924e+00 1.9454e+00 1.8672e+00
1758 * vln-z * 1.7875e+00 1.8669e+00 -7.3389e-01 -1.4301e+00 -2.2756e+00
1759 * vln-z * -1.4337e+00e
1760 * vln-r * 4.5319e-02 5.6863e-02 -1.5825e-02 5.6834e-02 6.0825e-02
1761 * vln-r * 7.1279e-02 7.6565e-02 7.1225e-02r08 0.0000e+00e
1762 * tvn * r12 6.1594e+02r04 6.1595e+02e
1763 * tln * r14 5.5680e+02 5.5683e+02 5.5680e+02e
1764 * pn * r12 1.5124e+07r04 1.5126e+07e
1765 * pan * f 0.0000e+00e
1766 *
1767 * level 4
1768 *
1769 * cfz1-t* f 0.0000e+00e
1770 * cfz1-z* r04 0.0000e+00r08 7.3200e-03r04 0.0000e+00e
1771 * cfz1-r* f 0.0000e+00e
1772 * cfzv-t* f 0.0000e+00e
1773 * cfzv-z* r04 0.0000e+00r08 7.3200e-03r04 0.0000e+00e
1774 * cfzv-r* f 0.0000e+00e
1775 * vol * r12 4.7800e-01r04 5.8200e-01e
1776 * fa-t * r12 2.5100e-01r04 5.8200e-01e
1777 * fa-z * r12 4.4800e-01r04 5.8200e-01e
1778 * fa-r * r08 2.5100e-01r08 0.0000e+00e
1779 * hd-t * r12 1.2200e-02r04 1.0000e-01e
1780 * hd-z * r12 1.2200e-02r04 1.0000e-01e
1781 * hd-r * r12 1.2200e-02r04 1.0000e-01e
1782 * alpn * f 0.0000e+00e
1783 * vvn-t * f 0.0000e+00e
1784 * vvn-z * f 0.0000e+00e
1785 * vvn-r * f 0.0000e+00e
1786 * vln-t * -2.6806e-02 -5.5915e-02 5.6002e-02 2.7487e-02 1.5874e-02
1787 * vln-t * 3.3260e-02 -3.2690e-02 -1.4924e-02 8.5211e-02 1.0218e-01
1788 * vln-t * -1.0132e-01 -8.4683e-02 7.9028e-02 4.9232e-02 -4.7024e-02
1789 * vln-t * -7.7899e-02e
1790 * vln-z * 2.2544e+00 2.2478e+00 2.2294e+00 2.2476e+00 1.9986e+00
1791 * vln-z * 1.9905e+00 1.9775e+00 1.9903e+00 1.9339e+00 1.8982e+00
1792 * vln-z * 1.8682e+00 1.8977e+00 -8.1017e-01 -1.4156e+00 -2.2288e+00
1793 * vln-z * -1.4187e+00e
1794 * vln-r * -1.2890e-02 -2.9512e-02 -1.1846e-01 -2.9839e-02 2.2231e-02
1795 * vln-r * 1.0418e-02 -1.4522e-02 1.0231e-02r08 0.0000e+00e
1796 * tvn * r12 6.1588e+02r04 6.1593e+02e
1797 * tln * 5.6978e+02 5.6974e+02 5.6947e+02 5.6974e+02 5.6645e+02
1798 * tln * 5.6657e+02 5.6668e+02 5.6657e+02 5.6121e+02 5.6134e+02
1799 * tln * 5.6150e+02 5.6134e+02 5.5679e+02 5.5681e+02 5.5683e+02
1800 * tln * 5.5681e+02e
1801 * pn * r12 1.5114e+07r04 1.5123e+07e
1802 * pan * f 0.0000e+00e
1803 *
1804 * level 5
1805 *
1806 * cfz1-t* f 0.0000e+00e
1807 * cfz1-z* r04 0.0000e+00r08 7.3200e-03r04 0.0000e+00e
1808 * cfz1-r* f 0.0000e+00e
1809 * cfzv-t* f 0.0000e+00e
1810 * cfzv-z* r04 0.0000e+00r08 7.3200e-03r04 0.0000e+00e
1811 * cfzv-r* f 0.0000e+00e
1812 * vol * r12 4.7800e-01r04 5.8200e-01e
1813 * fa-t * r12 2.5100e-01r04 5.8200e-01e
1814 * fa-z * r12 4.4800e-01r04 5.8200e-01e
1815 * fa-r * r08 2.5100e-01r08 0.0000e+00e
1816 * hd-t * r12 1.2200e-02r04 1.0000e-01e
1817 * hd-z * r12 1.2200e-02r04 1.0000e-01e
1818 * hd-r * r12 1.2200e-02r04 1.0000e-01e
1819 * alpn * f 0.0000e+00e
1820 * vvn-t * f 0.0000e+00e
1821 * vvn-z * f 0.0000e+00e
1822 * vvn-r * f 0.0000e+00e
1823 * vln-t * -3.1480e-02 -5.6137e-02 5.5701e-02 3.2615e-02 6.0283e-03
1824 * vln-t * 1.5968e-02 -1.5928e-02 -4.7640e-03 6.4924e-02 7.7596e-02
1825 * vln-t * -7.7184e-02 -6.4171e-02 2.5781e-02 1.1251e-02 -9.1636e-03
1826 * vln-t * -2.4435e-02e
1827 * vln-z * 2.4632e+00 2.4540e+00 2.4275e+00 2.4534e+00 2.0270e+00
1828 * vln-z * 2.0249e+00 2.0189e+00 2.0240e+00 1.9355e+00 1.9176e+00
1829 * vln-z * 1.9057e+00 1.9166e+00 -8.2841e-01 -1.4104e+00 -2.2214e+00
1830 * vln-z * -1.4132e+00e
1831 * vln-r * -1.1121e-02 -3.5199e-02 -1.1882e-01 -3.5999e-02 1.3267e-02
1832 * vln-r * -1.6434e-03 -3.0172e-02 -2.0546e-03r08 0.0000e+00e
1833 * tvn * r12 6.1587e+02r04 6.1592e+02e
1834 * tln * 5.8185e+02 5.8170e+02 5.8117e+02 5.8170e+02 5.7654e+02
1835 * tln * 5.7667e+02 5.7664e+02 5.7667e+02 5.6592e+02 5.6606e+02

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1836 * tln * 5.6628e+02 5.6606e+02 5.5679e+02 5.5681e+02 5.5683e+02
1837 * tln * 5.5681e+02e
1838 * pn * r12 1.5111e+07r04 1.5121e+07e
1839 * pan * f 0.0000e+00e
1840 *
1841 * level 6
1842 *
1843 * cfzl-t* f 0.0000e+00e
1844 * cfzl-z* r04 0.0000e+00r08 7.3200e-03r04 0.0000e+00e
1845 * cfzl-r* f 0.0000e+00e
1846 * cfzv-t* f 0.0000e+00e
1847 * cfzv-z* r04 0.0000e+00r08 7.3200e-03r04 0.0000e+00e
1848 * cfzv-r* f 0.0000e+00e
1849 * vol * r12 4.7800e-01r04 5.8200e-01e
1850 * fa-t * r12 2.5100e-01r04 5.8200e-01e
1851 * fa-z * r12 4.4800e-01r04 5.8200e-01e
1852 * fa-r * r08 2.5100e-01r08 0.0000e+00e
1853 * hd-t * r12 1.2200e-02r04 1.0000e-01e
1854 * hd-z * r12 1.2200e-02r04 1.0000e-01e
1855 * hd-r * r12 1.2200e-02r04 1.0000e-01e
1856 * alpn * f 0.0000e+00e
1857 * vvn-t * f 0.0000e+00e
1858 * vvn-z * f 0.0000e+00e
1859 * vvn-r * f 0.0000e+00e
1860 * vln-t * -3.1128e-02 -5.2830e-02 5.1046e-02 3.3555e-02 1.1336e-03
1861 * vln-t * 5.9665e-03 -7.0632e-03 1.0620e-03 5.1336e-02 6.0335e-02
1862 * vln-t * -6.0780e-02 -4.9901e-02 8.9383e-06 -6.4053e-03 8.4642e-03
1863 * vln-t * 1.4018e-03e
1864 * vln-z * 2.7114e+00 2.6987e+00 2.6577e+00 2.6959e+00 2.0869e+00
1865 * vln-z * 2.0865e+00 2.0791e+00 2.0842e+00 1.9327e+00 1.9258e+00
1866 * vln-z * 1.9228e+00 1.9233e+00 -8.2790e-01 -1.4080e+00 -2.2268e+00
1867 * vln-z * -1.4106e+00e
1868 * vln-r * -1.7302e-02 -4.3322e-02 -1.1782e-01 -4.5137e-02 -8.4701e-04
1869 * vln-r * -1.5483e-02 -4.2411e-02 -1.6417e-02r08 0.0000e+00e
1870 * tvn * r12 6.1586e+02r04 6.1591e+02e
1871 * tln * 5.9337e+02 5.9312e+02 5.9237e+02 5.9310e+02 5.8719e+02
1872 * tln * 5.8718e+02 5.8688e+02 5.8717e+02 5.7088e+02 5.7105e+02
1873 * tln * 5.7130e+02 5.7105e+02 5.5679e+02 5.5681e+02 5.5682e+02
1874 * tln * 5.5681e+02e
1875 * pn * r12 1.5109e+07r04 1.5120e+07e
1876 * pan * f 0.0000e+00e
1877 *
1878 * level 7
1879 *
1880 * cfzl-t* f 0.0000e+00e
1881 * cfzl-z* r04 0.0000e+00r08 7.3200e-03r04 0.0000e+00e
1882 * cfzl-r* f 0.0000e+00e
1883 * cfzv-t* f 0.0000e+00e
1884 * cfzv-z* r04 0.0000e+00r08 7.3200e-03r04 0.0000e+00e
1885 * cfzv-r* f 0.0000e+00e
1886 * vol * r12 4.7800e-01r04 5.8200e-01e
1887 * fa-t * r12 2.5100e-01r04 5.8200e-01e
1888 * fa-z * r12 4.4800e-01r04 5.8200e-01e
1889 * fa-r * r08 2.5100e-01r08 0.0000e+00e
1890 * hd-t * r12 1.2200e-02r04 1.0000e-01e
1891 * hd-z * r12 1.2200e-02r04 1.0000e-01e
1892 * hd-r * r12 1.2200e-02r04 1.0000e-01e
1893 * alpn * f 0.0000e+00e
1894 * vvn-t * f 0.0000e+00e
1895 * vvn-z * f 0.0000e+00e
1896 * vvn-r * f 0.0000e+00e
1897 * vln-t * -2.3456e-02 -4.3402e-02 3.7117e-02 3.0121e-02 -1.6681e-04
1898 * vln-t * -5.7100e-03 -5.3034e-04 7.0916e-03 3.6513e-02 3.7569e-02
1899 * vln-t * -4.1732e-02 -3.1684e-02 -1.9675e-02 -2.1180e-02 2.3255e-02
1900 * vln-t * 2.1087e-02e
1901 * vln-z * 2.9732e+00 2.9647e+00 2.9288e+00 2.9603e+00 2.2018e+00
1902 * vln-z * 2.2043e+00 2.1734e+00 2.1897e+00 1.9622e+00 1.9696e+00
1903 * vln-z * 1.9581e+00 1.9532e+00 -7.9822e-01 -1.4069e+00 -2.2592e+00
1904 * vln-z * -1.4090e+00e
1905 * vln-r * 1.7810e-02 -4.5657e-03 -6.9814e-02 -1.2480e-02 1.3560e-02
1906 * vln-r * 1.7434e-03 -2.3706e-02 -2.0846e-03r08 0.0000e+00e
1907 * tvn * r12 6.1584e+02r04 6.1590e+02e
1908 * tln * 6.0710e+02 6.0685e+02 6.0582e+02 6.0679e+02 6.0094e+02
1909 * tln * 6.0086e+02 6.0002e+02 6.0081e+02 5.7830e+02 5.7823e+02
1910 * tln * 5.7837e+02 5.7814e+02 5.5679e+02r03 5.5681e+02e
1911 * pn * r12 1.5105e+07r04 1.5117e+07e
1912 * pan * f 0.0000e+00e
1913 *
1914 * level 8
1915 *
1916 * cfzl-t* f 0.0000e+00e
1917 * cfzl-z* r12 2.0740e-02r04 0.0000e+00e
1918 * cfzl-r* f 0.0000e+00e
1919 * cfzv-t* f 0.0000e+00e
1920 * cfzv-z* r12 2.0740e-02r04 0.0000e+00e
1921 * cfzv-r* f 0.0000e+00e
1922 * vol * r12 4.7800e-01r04 5.8200e-01e
1923 * fa-t * r12 2.5100e-01r04 5.8200e-01e
1924 * fa-z * r12 4.4800e-01r04 5.8200e-01e
1925 * fa-r * r08 2.5100e-01r08 0.0000e+00e
1926 * hd-t * r12 1.2200e-02r04 1.0000e-01e
1927 * hd-z * r12 1.2200e-02r04 1.0000e-01e

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1928 * hd-r * r12 1.2200e-02r04 1.0000e-01e
 1929 * alpn * f 0.0000e+00e
 1930 * vvn-t * f 0.0000e+00e
 1931 * vvn-z * f 0.0000e+00e
 1932 * vvn-r * f 0.0000e+00e
 1933 * vln-t * -1.3631e-03 -4.0561e-02 1.4807e-02 2.8705e-02 1.6295e-02
 1934 * vln-t * -1.6231e-02 -9.7312e-03 9.6220e-03 4.0035e-02 1.5762e-02
 1935 * vln-t * -3.7754e-02 -1.8586e-02 -5.7963e-02 -5.7641e-02 5.9738e-02
 1936 * vln-t * 5.9441e-02e
 1937 * vln-z * 2.5676e+00 2.5693e+00 2.5436e+00 2.5594e+00 2.2206e+00
 1938 * vln-z * 2.2345e+00 2.2089e+00 2.2142e+00 2.0799e+00 2.1384e+00
 1939 * vln-z * 2.0835e+00 2.0710e+00 -7.1272e-01 -1.4072e+00 -2.3447e+00
 1940 * vln-z * -1.4088e+00e
 1941 * vln-r * 1.1702e-01 1.2068e-01 5.8034e-02 8.7964e-02 6.0791e-02
 1942 * vln-r * 7.2005e-02 2.8084e-02 4.1201e-02r08 0.0000e+00e
 1943 * tvn * r12 6.1581e+02r04 6.1588e+02e
 1944 * tln * 6.1122e+02 6.1097e+02 6.1006e+02 6.1094e+02 6.0557e+02
 1945 * tln * 6.0549e+02 6.0456e+02 6.0538e+02 5.8209e+02 5.8237e+02
 1946 * tln * 5.8124e+02 5.8128e+02 5.5680e+02r03 5.5681e+02e
 1947 * pn * r12 1.5101e+07r04 1.5114e+07e
 1948 * pan * f 0.0000e+00e
 1949 *
 1950 * level 9
 1951 *
 1952 * cfzl-t* f 0.0000e+00e
 1953 * cfzl-z* r04 0.0000e+00r04 1.4640e-02r04 6.1000e-03r04 0.0000e+00e
 1954 * cfzl-r* f 0.0000e+00e
 1955 * cfzv-t* f 0.0000e+00e
 1956 * cfzv-z* r04 0.0000e+00r04 1.4640e-02r04 6.1000e-03r04 0.0000e+00e
 1957 * cfzv-r* f 0.0000e+00e
 1958 * vol * r12 8.8500e-01r04 5.8200e-01e
 1959 * fa-t * r12 3.6600e-01r04 5.8200e-01e
 1960 * fa-z * r04 8.5000e-01r08 3.5600e-01r04 5.8200e-01e
 1961 * fa-r * r08 3.6600e-01r08 0.0000e+00e
 1962 * hd-t * r12 1.2200e-02r04 1.0000e-01e
 1963 * hd-z * r12 1.2200e-02r04 1.0000e-01e
 1964 * hd-r * r12 1.2200e-02r04 1.0000e-01e
 1965 * alpn * f 0.0000e+00e
 1966 * vvn-t * f 0.0000e+00e
 1967 * vvn-z * f 0.0000e+00e
 1968 * vvn-r * f 0.0000e+00e
 1969 * vln-t * 6.3277e-02 -5.8776e-02 -3.9144e-02 2.8707e-02 1.0788e-01
 1970 * vln-t * -8.4504e-02 -5.2355e-02 2.3847e-02 1.2406e-01 -8.0710e-02
 1971 * vln-t * -5.1219e-02 9.5716e-04 -1.1101e-01 -1.3477e-01 1.3676e-01
 1972 * vln-t * 1.1285e-01e
 1973 * vln-z * 2.8877e+00 2.9212e+00 2.8734e+00 2.8751e+00 -4.8695e-06
 1974 * vln-z * r02-4.8693e-06 -4.8695e-06 3.6209e+00 4.6080e+00 3.8052e+00
 1975 * vln-z * 3.6562e+00 -5.4293e-01 -1.3891e+00 -2.5507e+00 -1.3907e+00
 1976 * vln-z * e
 1977 * vln-r * -4.1539e-01 -3.2400e-01 -4.0542e-01 -4.3446e-01 3.0529e-01
 1978 * vln-r * 4.4608e-01 3.2508e-01 2.9783e-01r08 0.0000e+00e
 1979 * tvn * r12 6.1578e+02r04 6.1586e+02e
 1980 * tln * 6.0815e+02 6.0825e+02 6.0713e+02 6.0786e+02 6.0557e+02
 1981 * tln * 6.0545e+02 6.0459e+02 6.0538e+02 5.8981e+02 5.9175e+02
 1982 * tln * 5.8922e+02 5.8909e+02 5.5680e+02 5.5681e+02 5.5680e+02
 1983 * tln * 5.5681e+02e
 1984 * pn * r12 1.5095e+07r04 1.5110e+07e
 1985 * pan * f 0.0000e+00e
 1986 *
 1987 * level 10
 1988 *
 1989 * cfzl-t* f 0.0000e+00e
 1990 * cfzl-z* f 0.0000e+00e
 1991 * cfzl-r* f 0.0000e+00e
 1992 * cfzv-t* f 0.0000e+00e
 1993 * cfzv-z* f 0.0000e+00e
 1994 * cfzv-r* f 0.0000e+00e
 1995 * vol * r12 8.8500e-01r04 5.8200e-01e
 1996 * fa-t * r04 8.8500e-01r08 0.0000e+00r04 5.8200e-01e
 1997 * fa-z * r04 8.5000e-01r04 0.0000e+00r04 2.5000e-01r04 5.8200e-01e
 1998 * fa-r * f 0.0000e+00e
 1999 * hd-t * r12 1.2200e-02r04 1.0000e-01e
 2000 * hd-z * r12 1.2200e-02r04 1.0000e-01e
 2001 * hd-r * r12 1.2200e-02r04 1.0000e-01e
 2002 * alpn * f 0.0000e+00e
 2003 * vvn-t * f 0.0000e+00e
 2004 * vvn-z * f 0.0000e+00e
 2005 * vvn-r * f 0.0000e+00e
 2006 * vln-t * 3.2279e-03 -2.0280e-02 -8.6477e-03 2.2352e-02r08 0.0000e+00
 2007 * vln-t * -1.7790e-01 -3.6375e-01 3.6531e-01 1.8093e-01e
 2008 * vln-z * 3.2822e+00 3.4062e+00 2.6335e+00 2.2357e+00r04 0.0000e+00
 2009 * vln-z * 5.3011e+00 6.7463e+00 5.5709e+00 5.3528e+00 2.8054e-01
 2010 * vln-z * -1.1187e+00 -2.7377e+00 -1.1261e+00e
 2011 * vln-r * f 0.0000e+00e
 2012 * tvn * r04 6.1572e+02r04 6.1575e+02 6.1571e+02 6.1569e+02r02 6.1571e+02
 2013 * tvn * r04 6.1583e+02e
 2014 * tln * r02 6.0811e+02 6.0717e+02 6.0785e+02r04 5.8306e+02 5.8980e+02
 2015 * tln * 5.9174e+02 5.8921e+02 5.8909e+02 5.5680e+02 5.5681e+02
 2016 * tln * 5.5679e+02 5.5681e+02e
 2017 * pn * r04 1.5083e+07r04 1.5089e+07 1.5082e+07 1.5077e+07 1.5081e+07
 2018 * pn * 1.5082e+07r02 1.5103e+07 1.5102e+07 1.5103e+07e
 2019 * pan * f 0.0000e+00e

```

2020 *
2021 * level 11
2022 *
2023 * cfzl-t* f 0.0000e+00e
2024 * cfzl-z* f 0.0000e+00e
2025 * cfzl-r* r08 0.0000e+00r04 2.1396e-03r04 0.0000e+00e
2026 * cfzv-t* f 0.0000e+00e
2027 * cfzv-z* f 0.0000e+00e
2028 * cfzv-r* r08 0.0000e+00r04 2.1396e-03r04 0.0000e+00e
2029 * vol * r12 8.8500e-01r04 5.8200e-01e
2030 * fa-t * r12 3.6600e-01r04 5.8200e-01e
2031 * fa-z * r12 3.6500e-01r04 0.0000e+00e
2032 * fa-r * r08 3.6600e-01r04 3.3080e-03r04 0.0000e+00e
2033 * hd-t * r12 1.2200e-02r04 1.0000e-01e
2034 * hd-z * r12 1.2200e-02r04 1.0000e-01e
2035 * hd-r * r08 1.2200e-02r04 4.0600e-04r04 1.0000e-01e
2036 * alpn * f 0.0000e+00e
2037 * vvn-t * f 0.0000e+00e
2038 * vvn-z * f 0.0000e+00e
2039 * vvn-r * f 0.0000e+00e
2040 * vln-t * 7.7840e-01 -1.8402e+00 -3.6685e-01 1.7351e+00 2.1920e+00
2041 * vln-t * -3.0550e+00 -6.0309e-02 2.2998e+00 2.4886e+00 -2.7119e+00
2042 * vln-t * -2.1339e-01 1.0712e+00 1.4053e-01 -1.9377e+00 1.9357e+00
2043 * vln-t * -1.1112e-01e
2044 * vln-z * -6.1485e-01 2.0736e-02 3.0618e+00 2.8782e+00 -2.3308e+00
2045 * vln-z * -2.5757e+00 1.1342e+00 2.4720e+00 7.1120e+00 -5.0676e+00
2046 * vln-z * -1.3359e+00 -7.7181e-01r04 0.0000e+00e
2047 * vln-r * 2.1288e+00 3.1245e+00 -3.7479e-01 -9.1966e-01 1.7481e+00
2048 * vln-r * 4.1244e+00 -1.5752e+00 -1.9919e+00 -2.9427e+00 -4.9617e+00
2049 * vln-r * -4.4877e+00 -2.8966e+00r04 0.0000e+00e
2050 * tnv * r02 6.1566e+02r02 6.1568e+02 6.1565e+02r02 6.1563e+02r02 6.1568e+02
2051 * tnv * 6.1566e+02 6.1559e+02r02 6.1568e+02r02 6.1579e+02 6.1582e+02
2052 * tnv * 6.1579e+02e
2053 * tln * 6.0176e+02 6.0456e+02 6.0126e+02 5.9479e+02 5.9137e+02
2054 * tln * 5.9396e+02 5.8696e+02 5.8075e+02 5.8905e+02 5.9129e+02
2055 * tln * 5.8704e+02 5.8126e+02r02 5.5679e+02 5.5677e+02 5.5679e+02
2056 * tln * e
2057 * pn * r02 1.5072e+07 1.5075e+07 1.5076e+07 1.5071e+07 1.5066e+07
2058 * pn * r02 1.5076e+07 1.5071e+07 1.5058e+07 1.5074e+07 1.5075e+07
2059 * pn * r02 1.5096e+07 1.5102e+07 1.5096e+07e
2060 * pan * f 0.0000e+00e
2061 *
2062 * level 12
2063 *
2064 * cfzl-t* f 0.0000e+00e
2065 * cfzl-z* f 0.0000e+00e
2066 * cfzl-r* f 0.0000e+00e
2067 * cfzv-t* f 0.0000e+00e
2068 * cfzv-z* f 0.0000e+00e
2069 * cfzv-r* f 0.0000e+00e
2070 * vol * r12 8.8500e-01r04 0.0000e+00e
2071 * fa-t * r12 3.6600e-01r04 0.0000e+00e
2072 * fa-z * f 0.0000e+00e
2073 * fa-r * r08 3.6600e-01r08 0.0000e+00e
2074 * hd-t * r12 1.2200e-02r04 1.0000e-01e
2075 * hd-z * r12 1.2200e-02r04 1.0000e-01e
2076 * hd-r * r12 1.2200e-02r04 1.0000e-01e
2077 * alpn * f 0.0000e+00e
2078 * vvn-t * f 0.0000e+00e
2079 * vvn-z * f 0.0000e+00e
2080 * vvn-r * f 0.0000e+00e
2081 * vln-t * 5.3248e-01 -2.9955e-01 -5.4123e-01 -1.4318e-02 7.1226e-01
2082 * vln-t * -4.7252e-01 -3.6279e-01 -9.2121e-02 1.1664e+00 -4.3542e-01
2083 * vln-t * -2.3238e-01 -1.7027e-01r04 0.0000e+00e
2084 * vln-z * f 0.0000e+00e
2085 * vln-r * -3.8991e-01 5.3098e-01 3.6142e-01 -1.4026e-01 -7.3318e-01
2086 * vln-r * 3.4704e-01 2.6039e-01 1.3558e-01r08 0.0000e+00e
2087 * tnv * r12 6.1566e+02r04 6.1560e+02e
2088 * tln * 5.8905e+02 5.9081e+02 5.9383e+02 5.8929e+02 5.8905e+02
2089 * tln * 5.8945e+02 5.8803e+02 5.8157e+02 5.8905e+02 5.8894e+02
2090 * tln * 5.8714e+02 5.8346e+02r04 5.9300e+02e
2091 * pn * r08 1.5072e+07 1.5073e+07r03 1.5072e+07r04 1.5060e+07e
2092 * pan * f 0.0000e+00e
2093 *
2094 ***** type num id ctitle
2095 rod 831 831 $831$ stgen tubes
2096 * ncrx ncrz ittc iext mld
2097 1 8 0 0 0
2098 * nopowr nrindr modez liqlev iaxcmd
2099 1 0 1 0 0
2100 * idbci idbco hdri hdro
2101 2 2 1.0211e-02 6.3500e-03
2102 * nrods nodes irftr nzmax irftr2
2103 1 4 0 9 0
2104 * dtxht(1) dtxht(2) dznht hgapo shelv
2105 3.0 10.0 0.1 0.0 0.0
2106
2107 * nhcomi* f 2e
2108 * nhceli* -2 2 3 4 5
2109 * nhceli* 6 7 8 9 10
2110 * nhceli* e
2111 * nhcomi* f 20e

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2112 * nhcelo* -1 1 2 3 4
2113 * nhcelo* -4 -3 -2 -1 -1
2114 * nhcelo* e
2115 * dz * r08 5.6895e-01e
2116 * grav * r04 1.0r04 -1.0e
2117 * the value of rdx below preserves the total tube area in the original stgen
2118 * component. The actual number of tubes appears to be 1845 with varying
2119 * lengths.
2120 * rdx * 1857.353e
2121 * radrd * 5.10540e-03 5.52027e-03 5.93513e-03 6.35000e-03e
2122 * matrd * f 12e
2123 * nfax * f 0e
2124 * rftn * 5.8005e+02 5.7354e+02 5.6747e+02 5.6178e+02 5.6891e+02
2125 * rftn * 5.6240e+02 5.5633e+02 5.5064e+02 5.6525e+02 5.5982e+02
2126 * rftn * 5.5477e+02 5.5004e+02 5.6225e+02 5.5777e+02 5.5360e+02
2127 * rftn * 5.4970e+02 5.5974e+02 5.5605e+02 5.5261e+02 5.4940e+02
2128 * rftn * 5.5753e+02 5.5446e+02 5.5160e+02 5.4892e+02 5.5559e+02
2129 * rftn * 5.5301e+02 5.5061e+02 5.4836e+02 5.5397e+02 5.5181e+02
2130 * rftn * 5.4980e+02 5.4793e+02 5.5265e+02 5.5086e+02 5.4919e+02
2131 * rftn * 5.4764e+02e
2132 *
2133 ***** type num id ctitle
2134 rod 833 833 $833$ stgen inlet plenum
2135 * ncrx ncrz ittc iext mld
2136 1 1 0 0 0
2137 * nopowr nrdr modez liqlev iaxcmd
2138 1 0 1 0 0
2139 * idbci idbco hdri hdro
2140 2 1 2.5630e-01 1.0
2141 * tlo two hlo hvo
2142 300.0 300.0 0.0 1.6
2143 * nrods nodes irftr nzmax irftr2
2144 1 4 0 2 0
2145 * dtxht(1) dtxht(2) dznhc hgapo shelv
2146 3.0 10.0 0.1 0.0 0.0
2147
2148 * nhcomi* r03 2e
2149 * nhceli* -1 1 2e
2150 * dz * 9.6360e-01e
2151 * grav * 8.4487e-01e
2152 * the value of rdx below preserves the total area in the original stgen
2153 * component (slab 9, 1.3886 m^2)
2154 * rdx * 0.334428e
2155 * radrd * 6.8580e-01 7.1543e-01 7.4507e-01 7.7470e-01e
2156 * matrd * f 9e
2157 * nfax * 0e
2158 * rftn * 5.9118e+02 5.9056e+02 5.8996e+02 5.8939e+02 5.9118e+02
2159 * rftn * 5.9056e+02 5.8996e+02 5.8939e+02e
2160
2161 ***** type num id ctitle
2162 rod 834 834 $834$ stgen outlet plenum
2163 * ncrx ncrz ittc iext mld
2164 1 1 0 0 0
2165 * nopowr nrdr modez liqlev iaxcmd
2166 1 0 1 0 0
2167 * idbci idbco hdri hdro
2168 2 1 2.5600e-01 1.0
2169 * tlo two hlo hvo
2170 300.0 300.0 0.0 1.6
2171 * nrods nodes irftr nzmax irftr2
2172 1 4 0 2 0
2173 * dtxht(1) dtxht(2) dznhc hgapo shelv
2174 3.0 10.0 0.1 0.0 0.0
2175
2176 * nhcomi* r02 2 3e
2177 * nhceli* -10 10 -9e
2178 * dz * 9.6360e-01e
2179 * grav * -8.5580e-01e
2180 * the value of rdx below preserves the total area in the original stgen
2181 * component (slab 12, 1.3886 m^2)
2182 * rdx * 0.334428e
2183 * radrd * 6.8580e-01 7.1543e-01 7.4507e-01 7.7470e-01e
2184 * matrd * f 9e
2185 * nfax * 0e
2186 * rftn * 5.5679e+02 5.5621e+02 5.5569e+02 5.5521e+02 5.5679e+02
2187 * rftn * 5.5621e+02 5.5569e+02 5.5521e+02e
2188
2189 ***** type num id ctitle
2190 rod 835 835 $835$ stgen inlet tubesheet
2191 * ncrx ncrz ittc iext mld
2192 1 1 0 0 0
2193 * nopowr nrdr modez liqlev iaxcmd
2194 1 0 1 0 0
2195 * idbci idbco hdri hdro
2196 2 1 1.0211e-02 1.0
2197 * tlo two hlo hvo
2198 300.0 300.0 0.0 1.6
2199 * nrods nodes irftr nzmax irftr2
2200 1 4 0 2 0
2201 * dtxht(1) dtxht(2) dznhc hgapo shelv
2202 3.0 10.0 0.1 0.0 0.0
2203

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2204 * nhcomi* r03      2e
2205 * nhceli*      -1      1      2e
2206 * dz      * 9.6360e-01e
2207 * grav      * 8.4487e-01e
2208 *      the value of rdx below preserves the total area in the original stgen
2209 *      component (slab 10, 17.288 m^2)
2210 * rdx      * 559.292e
2211 * radrd * 5.1054e-03 7.1669e-03 9.2283e-03 1.1290e-02e
2212 * matrd * f      9e
2213 * nfax      * 0e
2214 * rftn      * 5.9113e+02 5.9106e+02 5.9100e+02 5.9096e+02 5.9113e+02
2215 * rftn      * 5.9106e+02 5.9100e+02 5.9096e+02
2216 *
2217 ***** type      num      id      ctitle
2218 rod      836      836 $836$ stgen outlet tubesheet
2219 *      ncrx      ncrz      ittc      iext      mld
2220 *      1          1          0          0          0
2221 *      nopolr     nrdr      modez      liqlev      iaxcnd
2222 *      1          0          1          0          0
2223 *      idbci     idbco      hdri      hdro
2224 *      2          1          1.0211e-02 1.0
2225 *      tlo       two       hlo       hvo
2226 *      300.0     300.0     0.0       1.6
2227 *      nrods     nodes     irftr      nzmax      irftr2
2228 *      1          4          0          2          0
2229 *      dtxht(1)   dtxht(2)   dnht      hgapo      shelv
2230 *      3.0        10.0      0.1       0.0       0.0
2231
2232 * nhcomi* r02      2      3e
2233 * nhceli*      -10      10      -9e
2234 * dz      * 9.6360e-01e
2235 * grav      * -8.5580e-01e
2236 *      the value of rdx below preserves the total area in the original stgen
2237 *      component (slab 13, 17.288 m^2)
2238 * rdx      * 559.292e
2239 * radrd * 5.1054e-03 7.1669e-03 9.2283e-03 1.1290e-02e
2240 * matrd * f      9e
2241 * nfax      * 0e
2242 * rftn      * 5.5675e+02 5.5669e+02 5.5664e+02 5.5661e+02 5.5675e+02
2243 * rftn      * 5.5669e+02 5.5664e+02 5.5661e+02
2244 *
2245 ***** type      num      id      ctitle
2246 slab      837      837 $837$ stgen plenum partition
2247 *      ncrx      ncrz      ittc      iext      mld
2248 *      1          1          0          0          0
2249 *      nopolr     nrdr      modez      liqlev      iaxcnd
2250 *      1          0          1          0          0
2251 *      idbci     idbco      hdri      hdro
2252 *      2          2          2.5630e-01 2.5600e-01
2253 *      width      ipatch
2254 *      7.6669e-01 0
2255 *      nrods     nodes     irftr      nzmax      irftr2
2256 *      1          4          0          9          0
2257 *      dtxht(1)   dtxht(2)   dnht      hgapo      shelv
2258 *      3.0        10.0      0.1       0.0       0.0
2259
2260 * nhcomi* r03      2e
2261 * nhceli*      -1      1      2e
2262 * nhcomi* r03      2e
2263 * nhcelo*      10      -10      -9e
2264 * dz      * 9.6360e-01e
2265 * grav      * 8.4487e-01e
2266 *      the value of rdx below preserves the total area in the original stgen
2267 *      component (slab 11, 0.73878 m^2)
2268 * rdx      * 1.0e
2269 * radrd * 0.0      1.0583e-02 2.1167e-02 3.1750e-02e
2270 * matrd * f      6e
2271 * nfax      * 0e
2272 * rftn      * 5.9035e+02 5.7956e+02 5.6869e+02 5.5774e+02 5.9035e+02
2273 * rftn      * 5.7956e+02 5.6869e+02 5.5774e+02
2274 *
2275 ***** type      num      id      ctitle
2276 rod      838      838 $838$ stgen downcomer wall 1
2277 *      ncrx      ncrz      ittc      iext      mld
2278 *      1          1          0          0          0
2279 *      nopolr     nrdr      modez      liqlev      iaxcnd
2280 *      1          0          1          0          0
2281 *      idbci     idbco      hdri      hdro
2282 *      2          2          6.3500e-03 1.0160e-01
2283 *      nrods     nodes     irftr      nzmax      irftr2
2284 *      1          4          0          2          0
2285 *      dtxht(1)   dtxht(2)   dnht      hgapo      shelv
2286 *      3.0        10.0      0.1       0.0       0.0
2287
2288 * nhcomi* r03      20e
2289 * nhceli*      -1      1      2e
2290 * nhcomi* r03      22e
2291 * nhcelo*      6      -6      -5e
2292 * dz      * 5.6895e-01e
2293 * grav      * 0.5e
2294 *      the value of rdx below preserves the total area in the original stgen
2295 *      component (slab 14, 2.3041 m^2)

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2296 * rdx      1.0e
2297 * radrd   6.4453e-01  6.4876e-01  6.5300e-01  6.5723e-01e
2298 * matrd   f      6e
2299 * nfax    0e
2300 * rftn    5.3971e+02  5.3571e+02  5.3171e+02  5.2772e+02  5.3971e+02
2301 * rftn    5.3571e+02  5.3171e+02  5.2772e+02e
2302 *
2303 ***** type      num      id      ctitle
2304 rod      839      839 $839$ stgen downcomer wall 2
2305 *      ncrx      ncrz      ittc      iext      mld
2306   1      1      0      0      0
2307 *      nopowr     nrdr      modez      liqlev      iaxcmd
2308   1      0      1      0      0
2309 *      idbci      idbco      hdri      hdro
2310   2      2      6.3500e-03  1.0160e-01
2311 *      nrods     nodes      irftr      nzmax      irftr2
2312   1      4      0      2      0
2313 *      dtxht(1)   dtxht(2)   dznht      hgapo      sholv
2314   3.0     10.0     0.1     0.0     0.0
2315
2316 * nhcomi* r03    20e
2317 * nhceli* -2      2      3e
2318 * nhcomo* r03    22e
2319 * nhcelo* 5      -5      -4e
2320 * dz      5.6895e-01e
2321 * grav   1.0e
2322 *      the value of rdx below preserves the total area in the original stgen
2323 *      component (slab 15, 2.3041 m^2)
2324 * rdx      1.0e
2325 * radrd   6.4453e-01  6.4876e-01  6.5300e-01  6.5723e-01e
2326 * matrd   f      6e
2327 * nfax    0e
2328 * rftn    5.3901e+02  5.3528e+02  5.3157e+02  5.2786e+02  5.3901e+02
2329 * rftn    5.3528e+02  5.3157e+02  5.2786e+02e
2330 *
2331 ***** type      num      id      ctitle
2332 rod      840      840 $840$ stgen downcomer wall 3
2333 *      ncrx      ncrz      ittc      iext      mld
2334   1      1      0      0      0
2335 *      nopowr     nrdr      modez      liqlev      iaxcmd
2336   1      0      1      0      0
2337 *      idbci      idbco      hdri      hdro
2338   2      2      6.3500e-03  1.0160e-01
2339 *      nrods     nodes      irftr      nzmax      irftr2
2340   1      4      0      2      0
2341 *      dtxht(1)   dtxht(2)   dznht      hgapo      sholv
2342   3.0     10.0     0.1     0.0     0.0
2343
2344 * nhcomi* r03    20e
2345 * nhceli* -3      3      4e
2346 * nhcomo* r03    22e
2347 * nhcelo* 5      -5      -4e
2348 * dz      5.6895e-01e
2349 * grav   1.0e
2350 *      the value of rdx below preserves the total area in the original stgen
2351 *      component (slab 16, 2.3041 m^2)
2352 * rdx      1.0e
2353 * radrd   6.4453e-01  6.4876e-01  6.5300e-01  6.5723e-01e
2354 * matrd   f      6e
2355 * nfax    0e
2356 * rftn    5.3970e+02  5.3582e+02  5.3194e+02  5.2807e+02  5.3970e+02
2357 * rftn    5.3582e+02  5.3194e+02  5.2807e+02e
2358 *
2359 ***** type      num      id      ctitle
2360 rod      841      841 $841$ stgen downcomer wall 4
2361 *      ncrx      ncrz      ittc      iext      mld
2362   1      1      0      0      0
2363 *      nopowr     nrdr      modez      liqlev      iaxcmd
2364   1      0      1      0      0
2365 *      idbci      idbco      hdri      hdro
2366   2      2      6.3500e-03  1.0160e-01
2367 *      nrods     nodes      irftr      nzmax      irftr2
2368   1      4      0      2      0
2369 *      dtxht(1)   dtxht(2)   dznht      hgapo      sholv
2370   3.0     10.0     0.1     0.0     0.0
2371
2372 * nhcomi* r03    20e
2373 * nhceli* -4      4      5e
2374 * nhcomo* r03    22e
2375 * nhcelo* 5      -5      -4e
2376 * dz      5.6895e-01e
2377 * grav   1.0e
2378 *      the value of rdx below preserves the total area in the original stgen
2379 *      component (slab 17, 2.3041 m^2)
2380 * rdx      1.0e
2381 * radrd   6.4453e-01  6.4876e-01  6.5300e-01  6.5723e-01e
2382 * matrd   f      6e
2383 * nfax    0e
2384 * rftn    5.3944e+02  5.3561e+02  5.3180e+02  5.2799e+02  5.3944e+02
2385 * rftn    5.3561e+02  5.3180e+02  5.2799e+02e
2386 *
2387 ***** type      num      id      ctitle

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2388 rod      842      842 $842$ stgen downcomer wall 5
2389 *      ncrx      ncrz      ittc      iext      mld
2390   1          1          0          0          0
2391 *      nopowr    nrindr    modez      liqlev    iaxcnd
2392   1          0          1          0          0
2393 *      idbci     idbco     hdri      hdro
2394   2          2  1.0691e+00  1.0160e-01
2395 *      nrods     nodes    irftr     nzmax    irftr2
2396   1          4          0          2          0
2397 *      dtxht(1)  dtxht(2)  dznht    hgapo    shelv
2398   3.0        10.0      0.1        0.0        0.0
2399
2400 *      nhcomi* r02      20      21e
2401 *      nhceli* -5          5          1e
2402 *      nhcomo* r03      22e
2403 *      nhcelo* 4          -4        -3e
2404 *      dz      * 2.4700e-01e
2405 *      grav     * 1.0e
2406 *      the value of rdx below preserves the total area in the original stgen
2407 *      component (slab 18, 0.88693 m^2)
2408 *      rdx     * 1.0e
2409 *      radrd    5.7150e-01  5.7573e-01  5.7997e-01  5.8420e-01e
2410 *      matrd    * f       6e
2411 *      nfax     * 0e
2412 *      rftn     * 5.3640e+02  5.3373e+02  5.3106e+02  5.2839e+02  5.3640e+02
2413 *      rftn     * 5.3373e+02  5.3106e+02  5.2839e+02e
2414 *
2415 ***** type      num      id      ctitle
2416 rod      843      843 $843$ stgen downcomer wall 6
2417 *      ncrx      ncrz      ittc      iext      mld
2418   1          1          0          0          0
2419 *      nopowr    nrindr    modez      liqlev    iaxcnd
2420   1          0          1          0          0
2421 *      idbci     idbco     hdri      hdro
2422   2          2  1.0691e+00  1.0160e-01
2423 *      nrods     nodes    irftr     nzmax    irftr2
2424   1          4          0          2          0
2425 *      dtxht(1)  dtxht(2)  dznht    hgapo    shelv
2426   3.0        10.0      0.1        0.0        0.0
2427
2428 *      nhcomi* r02      20      21e
2429 *      nhceli* -5          5          1e
2430 *      nhcomo* r03      22e
2431 *      nhcelo* 3          -3        -2e
2432 *      dz      * 2.4700e-01e
2433 *      grav     * 1.0e
2434 *      the value of rdx below preserves the total area in the original stgen
2435 *      component (slab 19, 0.88693 m^2)
2436 *      rdx     * 1.0e
2437 *      radrd    5.7150e-01  5.7573e-01  5.7997e-01  5.8420e-01e
2438 *      matrd    * f       6e
2439 *      nfax     * 0e
2440 *      rftn     * 5.3640e+02  5.3373e+02  5.3106e+02  5.2839e+02  5.3640e+02
2441 *      rftn     * 5.3373e+02  5.3106e+02  5.2839e+02e
2442 *
2443 ***** type      num      id      ctitle
2444 rod      844      844 $844$ stgen downcomer wall 7
2445 *      ncrx      ncrz      ittc      iext      mld
2446   1          1          0          0          0
2447 *      nopowr    nrindr    modez      liqlev    iaxcnd
2448   1          0          1          0          0
2449 *      idbci     idbco     hdri      hdro
2450   2          2  1.0691e+00  1.0160e-01
2451 *      nrods     nodes    irftr     nzmax    irftr2
2452   1          4          0          2          0
2453 *      dtxht(1)  dtxht(2)  dznht    hgapo    shelv
2454   3.0        10.0      0.1        0.0        0.0
2455
2456 *      nhcomi* r02      20      21e
2457 *      nhceli* -5          5          1e
2458 *      nhcomo* r03      22e
2459 *      nhcelo* 2          -2        -1e
2460 *      dz      * 2.4700e-01e
2461 *      grav     * 1.0e
2462 *      the value of rdx below preserves the total area in the original stgen
2463 *      component (slab 20, 0.88693 m^2)
2464 *      rdx     * 1.0e
2465 *      radrd    5.7150e-01  5.7573e-01  5.7997e-01  5.8420e-01e
2466 *      matrd    * f       6e
2467 *      nfax     * 0e
2468 *      rftn     * 5.3640e+02  5.3373e+02  5.3106e+02  5.2839e+02  5.3640e+02
2469 *      rftn     * 5.3373e+02  5.3106e+02  5.2839e+02e
2470 *
2471 ***** type      num      id      ctitle
2472 rod      845      845 $845$ stgen downcomer wall 8
2473 *      ncrx      ncrz      ittc      iext      mld
2474   1          1          0          0          0
2475 *      nopowr    nrindr    modez      liqlev    iaxcnd
2476   1          0          1          0          0
2477 *      idbci     idbco     hdri      hdro
2478   2          2  1.0691e+00  1.0160e-01
2479 *      nrods     nodes    irftr     nzmax    irftr2

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2480           1          4          0          2          0
2481 *      dtxht(1)      dtxht(2)      dznhht      hgapo      shlev
2482       3.0         10.0        0.1        0.0        0.0
2483
2484 * nhcomi* r02      20          21e
2485 * nhceli* -5          5          1e
2486 * nhcomi* r02      22          21e
2487 * nhcelo* 1          -1          -6e
2488 * dz      * 7.4100e-01e
2489 * grav   * 1.0e
2490 *      the value of rdx below preserves the total area in the original stgen
2491 *      component (slab 21, 2.8483 m^2)
2492 * rdx      * 1.0705e
2493 * raddrd * 5.7150e-01  5.7573e-01  5.7997e-01  5.8420e-01e
2494 * matrd * f          6e
2495 * nfax   * 0e
2496 * rftn   * 5.4451e+02  5.4449e+02  5.4446e+02  5.4442e+02  5.4451e+02
2497 * rftn   * 5.4449e+02  5.4446e+02  5.4442e+02
2498 *
2499 ***** type      num      id      ctitle
2500 rod      846      846 $846$ stgen shell 1
2501 *      ncrx      ncrz      ittc      iext      mld
2502     1          6          0          0          0
2503 *      nopowr    nrindr    modez      liqlev    iaxcnd
2504     1          0          1          0          0
2505 *      idbci     idbco     hdri      hdro
2506     2          1          2.5400e-01  1.0
2507 *      tlo       two       hlo       hvo
2508     300.0     300.0     0.0       1.6
2509 *      nrods    nodes     irftr     nzmax    irftr2
2510     1          4          0          2          0
2511 *      dtxht(1)      dtxht(2)      dznhht      hgapo      shlev
2512       3.0         10.0        0.1        0.0        0.0
2513
2514 * nhcomi* r07      22          20e
2515 * nhceli* -1          1          2          3          4
2516 * nhceli* 5          6          1e
2517 * dz      * 7.4100e-01r03 2.4700e-01  1.7069e+00  5.6895e-01e
2518 * grav   * f          -1.0e
2519 *      the value of rdx below preserves the total shell area in the original stgen
2520 *      component (slabs 22-29, 25.070 m^2) of heat structure components 846-848.
2521 * rdx      * 1.0e
2522 * raddrd * 7.1120e-01  7.2919e-01  7.4718e-01  7.6518e-01e
2523 * matrd * f          9e
2524 * nfax   * f          0e
2525 * rftn   * 5.4339e+02  5.4310e+02  5.4282e+02  5.4254e+02  5.4339e+02
2526 * rftn   * 5.4310e+02  5.4282e+02  5.4254e+02  5.2261e+02  5.2231e+02
2527 * rftn   * 5.2203e+02  5.2177e+02  5.2261e+02  5.2231e+02  5.2203e+02
2528 * rftn   * 5.2177e+02  5.2261e+02  5.2231e+02  5.2203e+02  5.2177e+02
2529 * rftn   * 5.2298e+02  5.2271e+02  5.2245e+02  5.2221e+02  5.2310e+02
2530 * rftn   * 5.2284e+02  5.2259e+02  5.2234e+02
2531 *
2532 ***** type      num      id      ctitle
2533 rod      847      847 $847$ stgen shell 2
2534 *      ncrx      ncrz      ittc      iext      mld
2535     1          1          0          0          0
2536 *      nopowr    nrindr    modez      liqlev    iaxcnd
2537     1          0          1          0          0
2538 *      idbci     idbco     hdri      hdro
2539     2          1          1.0691e+00 1.0
2540 *      tlo       two       hlo       hvo
2541     300.0     300.0     0.0       1.6
2542 *      nrods    nodes     irftr     nzmax    irftr2
2543     1          4          0          2          0
2544 *      dtxht(1)      dtxht(2)      dznhht      hgapo      shlev
2545       3.0         10.0        0.1        0.0        0.0
2546
2547 * nhcomi* r02      21          23e
2548 * nhceli* -4          4          1e
2549 * dz      * 1.1115e+00e
2550 * grav   * f          -1.0e
2551 *      the value of rdx below preserves the total shell area in the original stgen
2552 *      component (slabs 22-29, 25.070 m^2) of heat structure components 846-848.
2553 * rdx      * 1.0e
2554 * raddrd * 7.1120e-01  7.2919e-01  7.4718e-01  7.6518e-01e
2555 * matrd * f          9e
2556 * nfax   * 0e
2557 * rftn   * 5.4453e+02  5.4426e+02  5.4396e+02  5.4367e+02  5.4453e+02
2558 * rftn   * 5.4426e+02  5.4396e+02  5.4367e+02
2559 *
2560 ***** type      num      id      ctitle
2561 rod      848      848 $848$ stgen shell 3
2562 *      ncrx      ncrz      ittc      iext      mld
2563     1          1          0          0          0
2564 *      nopowr    nrindr    modez      liqlev    iaxcnd
2565     1          0          1          0          0
2566 *      idbci     idbco     hdri      hdro
2567     2          1          2.5400e-01 1.0
2568 *      tlo       two       hlo       hvo
2569     300.0     300.0     0.0       1.6
2570 *      nrods    nodes     irftr     nzmax    irftr2
2571     1          4          0          2          0

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2572 *      dtxht(1)      dtxht(2)      dznht      hgapo      shelv
2573      3.0          10.0        0.1        0.0        0.0
2574
2575 * nhcomi* r02       21         22e
2576 * nhceli*          -6          6          ie
2577 * dz   *    7.4100e-01e
2578 * grav  * f        -1.0e
2579 *      the value of rdx below preserves the total shell area in the original stgen
2580 *      component (slabs 22-29, 25.070 m^2) of heat structure components 846-848.
2581 * rdx  *           1.0e
2582 * radrd *    7.1120e-01  7.2919e-01  7.4718e-01  7.6518e-01e
2583 * matrd * f        9e
2584 * nfax  *          0e
2585 * rftn  *    5.4389e+02  5.4358e+02  5.4329e+02  5.4301e+02  5.4389e+02
2586 * rftn  *    5.4358e+02  5.4329e+02  5.4301e+02e
2587 *
2588 ***** type      num      id      ctitle
2589 slab     851      851 $851$ level 1 slabs
2590 *      ncrx      ncrz      ittc      iext      mld
2591      16          1          0          0          0
2592 *      nopowr    nrindr    modez    liqlev    iaxcmd
2593      1          1          0          0          0
2594 *      idbci     idbco     hdri     hdro
2595      0          2  0.0000e+00  0.0000e+00
2596 *      width     ipatch
2597      1.3876e-02  0
2598 *      nrods    nodes      irftr      nzmax
2599      16          4          0          5
2600 *      dtxht(1)  dtxht(2)      dznht      hgapo      shelv
2601      3.0000e+00  1.0000e+01  1.0000e-03  0.0000e+00  0.0000e+00
2602 *
2603 * nhcomo* f      50e
2604 * nhcelo*          -1          1          2e
2605 * z   *  0.0000e+00  6.2700e-01e
2606 * grav  * f        1.0000e+00e
2607 *      +          +          +
2608 *      idrod *      1          2          3          +
2609 *      idrod *      5          6          7          4s
2610 *      idrod *      9          10         11         8s
2611 *      idrod *      13         14         15         12s
2612 *      rdx  * r4    1.0000r4  3.8275r4  4.9539r4  125.9729e
2613 *      radrd *  0.0000e+00  7.5000e-02  8.5000e-02  9.2000e-02e
2614 *      matrd * f      6e
2615 *      nfax  * f      1e
2616 *      rftn  * f    5.5680e+02e
2617 *      rftn  * f    5.5680e+02e
2618 *      rftn  * f    5.5680e+02e
2619 *      rftn  * f    5.5680e+02e
2620 *      rftn  * f    5.5680e+02e
2621 *      rftn  * f    5.5680e+02e
2622 *      rftn  * f    5.5680e+02e
2623 *      rftn  * f    5.5680e+02e
2624 *      rftn  * f    5.5680e+02e
2625 *      rftn  * f    5.5680e+02e
2626 *      rftn  * f    5.5680e+02e
2627 *      rftn  * f    5.5680e+02e
2628 *      rftn  * f    5.5680e+02e
2629 *      rftn  * f    5.5680e+02e
2630 *      rftn  * f    5.5680e+02e
2631 *      rftn  * f    5.5680e+02e
2632 *
2633 ***** type      num      id      ctitle
2634 slab     852      852 $852$ level 2 slabs
2635 *      ncrx      ncrz      ittc      iext      mld
2636      4          1          0          0          0
2637 *      nopowr    nrindr    modez    liqlev    iaxcmd
2638      1          1          0          0          0
2639 *      idbci     idbco     hdri     hdro
2640      0          2  0.0000e+00  0.0000e+00
2641 *      width     ipatch
2642      3.0240e+00  0
2643 *      nrods    nodes      irftr      nzmax
2644      4          4          0          5
2645 *      dtxht(1)  dtxht(2)      dznht      hgapo      shelv
2646      3.0000e+00  1.0000e+01  1.0000e-03  0.0000e+00  0.0000e+00
2647 *
2648 * nhcomo* f      50e
2649 * nhcelo*          -2          2          3e
2650 * z   *  .627      .727e
2651 * grav  * f        1.0000e+00e
2652 *      +          +
2653 *      idrod *      13         14         15         +
2654 *      rdx  * r4    1.0000e
2655 *      radrd *  0.0000e+00  7.5000e-02  8.5000e-02  9.2000e-02e
2656 *      matrd * f      6e
2657 *      nfax  * f      1e
2658 *      rftn  * f    5.5680e+02e
2659 *      rftn  * f    5.5680e+02e
2660 *      rftn  * f    5.5680e+02e
2661 *      rftn  * f    5.5680e+02e
2662 *
2663 ***** type      num      id      ctitle

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2664 slab      853      853 $853$ level 3 cells 1-12 slabs
2665 *      ncrx      ncrz      ittc      iext      mld
2666      12      1      0      0      0
2667 *      nopowr    nrindr    modez    liqlev    iaxcnd
2668      1      1      0      0      0
2669 *      idbci     idbco     hdri     hdro
2670      0      2  0.0000e+00  0.0000e+00
2671 *      width     ipatch
2672      2.5739e-01      0
2673 *      nrods     nodes     irftr     nzmax
2674      12      4      0      5
2675 *      dtxht(1)  dtxht(2)  dznht    hgapo
2676      3.0000e+00  1.0000e+01  1.0000e-03  0.0000e+00  0.0000e+00
2677 *
2678 *      nhcomo* f   50e
2679 *      nhcelo*    -3      3      4e
2680 *      z         * .727  1.248e
2681 *      grav     * f  1.0000e+00e
2682 *      +         +      +      +
2683 *      idrod     * f  1      2      3      4s
2684 *      idrod     * f  5      6      7      8s
2685 *      idrod     * f  9      10     11     12e
2686 *      rdx     * r4  1.0000r4  3.8404r4  4.9784e
2687 *      radrd     * f  0.0000e+00  5.0000e-03  1.0000e-02  1.5300e-02e
2688 *      matrd     * f  6e
2689 *      nfax      * f  1e
2690 *      rftn      * f  5.5680e+02e
2691 *      rftn      * f  5.5680e+02e
2692 *      rftn      * f  5.5680e+02e
2693 *      rftn      * f  5.5680e+02e
2694 *      rftn      * f  5.5680e+02e
2695 *      rftn      * f  5.5680e+02e
2696 *      rftn      * f  5.5680e+02e
2697 *      rftn      * f  5.5680e+02e
2698 *      rftn      * f  5.5680e+02e
2699 *      rftn      * f  5.5680e+02e
2700 *      rftn      * f  5.5680e+02e
2701 *      rftn      * f  5.5680e+02e
2702 *
2703 ***** type      num      id      ctitle
2704 slab      854      854 $854$ level 3 cells 13-16 slabs
2705 *      ncrx      ncrz      ittc      iext      mld
2706      4      1      0      0      0
2707 *      nopowr    nrindr    modez    liqlev    iaxcnd
2708      1      1      0      0      0
2709 *      idbci     idbco     hdri     hdro
2710      0      2  0.0000e+00  0.0000e+00
2711 *      width     ipatch
2712      4.0704e+00      0
2713 *      nrods     nodes     irftr     nzmax
2714      4      4      0      5
2715 *      dtxht(1)  dtxht(2)  dznht    hgapo
2716      3.0000e+00  1.0000e+01  1.0000e-03  0.0000e+00  0.0000e+00
2717 *
2718 *      nhcomo* f   50e
2719 *      nhcelo*    -3      3      4e
2720 *      z         * .727  1.248e
2721 *      grav     * f  1.0000e+00e
2722 *      +         +      +      +
2723 *      idrod     * f  13     14     15     16e
2724 *      rdx     * r4  1.0000e
2725 *      radrd     * f  0.0000e+00  2.5000e-02  3.5000e-02  4.0000e-02e
2726 *      matrd     * f  6e
2727 *      nfax      * f  1e
2728 *      rftn      * f  5.5680e+02e
2729 *      rftn      * f  5.5680e+02e
2730 *      rftn      * f  5.5680e+02e
2731 *      rftn      * f  5.5680e+02e
2732 *
2733 ***** type      num      id      ctitle
2734 slab      855      855 $855$ level 4 cells 9-12 slabs
2735 *      ncrx      ncrz      ittc      iext      mld
2736      4      1      0      0      0
2737 *      nopowr    nrindr    modez    liqlev    iaxcnd
2738      1      1      0      0      0
2739 *      idbci     idbco     hdri     hdro
2740      0      2  0.0000e+00  0.0000e+00
2741 *      width     ipatch
2742      5.5836e-01      0
2743 *      nrods     nodes     irftr     nzmax
2744      4      4      0      5
2745 *      dtxht(1)  dtxht(2)  dznht    hgapo
2746      3.0000e+00  1.0000e+01  1.0000e-03  0.0000e+00  0.0000e+00
2747 *
2748 *      nhcomo* f   50e
2749 *      nhcelo*    -4      4      5e
2750 *      z         * 1.248  1.553e
2751 *      grav     * f  1.0000e+00e
2752 *      +         +      +      +
2753 *      idrod     * f  9      10     11     12e
2754 *      rdx     * r4  1.0000e+00e
2755 *      radrd     * f  0.0000e+00  5.0000e-02  6.0000e-02  6.6500e-02e

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2756 * matrd * f 6e
2757 * nfax * f 1e
2758 * rftn * f 5.6980e+02e
2759 * rftn * f 5.6980e+02e
2760 * rftn * f 5.6980e+02e
2761 * rftn * f 5.6980e+02e
2762 *
2763 ***** type num id ctitle
2764 slab 856 856 $856$ lev 4 & 5 cell 13-16 slabs
2765 * ncrx ncrz ittc iext mld
2766 4 2 0 0 0
2767 * nopowr nrdr modez liqlev iaxcnd
2768 1 1 0 0 0
2769 * idbci idbco hdri hdro
2770 0 2 0.0000e+00 0.0000e+00
2771 * width ipatch
2772 4.0689e+00 0
2773 * nrods nodes irftr nzmax
2774 4 4 0 5
2775 * dtxht(1) dtxht(2) dznhrt hgapo shlv
2776 3.0000e+00 1.0000e+01 1.0000e-03 0.0000e+00 0.0000e+00
2777 *
2778 * nhcomo* f 50e
2779 * nhcelo* -4 4 5 6e
2780 * z * 1.248 1.553 1.781e
2781 * grav * f 1.0000e+00e
2782 * + + + + +
2783 * idrod * 13 14 15 16e
2784 * rdx * r4 1.0000e+00e
2785 * radrd * 0.0000e+00 2.5000e-02 3.5000e-02 4.0000e-02e
2786 * matrd * f 6e
2787 * nfax * f 1e
2788 * + + + + +
2789 * rftn * r4 569.8r4 575.8r4 581.8e
2790 * rftn * r4 569.8r4 575.8r4 581.8e
2791 * rftn * r4 569.8r4 575.8r4 581.8e
2792 * rftn * r4 569.8r4 575.8r4 581.8e
2793 *
2794 ***** type num id ctitle
2795 slab 857 857 $857$ level 5 cells 9-12 slabs
2796 * ncrx ncrz ittc iext mld
2797 4 1 0 0 0
2798 * nopowr nrdr modez liqlev iaxcnd
2799 1 1 0 0 0
2800 * idbci idbco hdri hdro
2801 0 2 0.0000e+00 0.0000e+00
2802 * width ipatch
2803 5.5833e-01 0
2804 * nrods nodes irftr nzmax
2805 4 4 0 5
2806 * dtxht(1) dtxht(2) dznhrt hgapo shlv
2807 3.0000e+00 1.0000e+01 1.0000e-03 0.0000e+00 0.0000e+00
2808 *
2809 * nhcomo* f 50e
2810 * nhcelo* -5 5 6e
2811 * z * 1.553 1.781e
2812 * grav * f 1.0000e+00e
2813 * + + + + +
2814 * idrod * 9 10 11 12e
2815 * rdx * r4 1.0000e+00e
2816 * radrd * 0.0000e+00 5.0000e-02 6.0000e-02 6.6500e-02e
2817 * matrd * f 6e
2818 * nfax * f 1e
2819 * rftn * f 5.8180e+02e
2820 * rftn * f 5.8180e+02e
2821 * rftn * f 5.8180e+02e
2822 * rftn * f 5.8180e+02e
2823 *
2824 ***** type num id ctitle
2825 slab 858 858 $858$ level 6 cells 9-12 slabs
2826 * ncrx ncrz ittc iext mld
2827 4 1 0 0 0
2828 * nopowr nrdr modez liqlev iaxcnd
2829 1 1 0 0 0
2830 * idbci idbco hdri hdro
2831 0 2 0.0000e+00 0.0000e+00
2832 * width ipatch
2833 5.5852e-01 0
2834 * nrods nodes irftr nzmax
2835 4 4 0 5
2836 * dtxht(1) dtxht(2) dznhrt hgapo shlv
2837 3.0000e+00 1.0000e+01 1.0000e-03 0.0000e+00 0.0000e+00
2838 *
2839 * nhcomo* f 50e
2840 * nhcelo* -6 6 7e
2841 * z * 1.781 2.01e
2842 * grav * f 1.0000e+00e
2843 * + + + + +
2844 * idrod * 9 10 11 12e
2845 * rdx * r4 1.0000e+00e
2846 * radrd * 0.0000e+00 5.0000e-02 6.0000e-02 6.6500e-02e
2847 * matrd * f 6e

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2848 * nfax * f 1e
2849 * rftn * f 5.9340e+02e
2850 * rftn * f 5.9340e+02e
2851 * rftn * f 5.9340e+02e
2852 * rftn * f 5.9340e+02e
2853 *
2854 ***** type num id ctitle
2855 slab 859 859 $859$ level 6 cells 13-16 slabs
2856 * ncrx ncrz ittc iext mld
2857 4 1 0 0 0
2858 * nopowr nrdr modez liqlev iaxcmd
2859 1 1 0 0 0
2860 * idbci idbco hdri hdro
2861 0 2 0.0000e+00 0.0000e+00
2862 * width ipatch
2863 4.0528e+00 0
2864 * nrods nodes irftr nzmax
2865 4 4 0 5
2866 * dtxht(1) dtxht(2) dznht hgapo shlv
2867 3.0000e+00 1.0000e+01 1.0000e-03 0.0000e+00 0.0000e+00
2868 *
2869 * nhcomo* f 50e
2870 * nhcelo* -6 6 7e
2871 * z * 1.781 2.01e
2872 * grav * f 1.0000e+00e
2873 * + + + +
2874 * idrod * 13 14 15 16e
2875 * rdx * r4 1.0000e+00e
2876 * radrd * 0.0000e+00 2.5000e-02 3.5000e-02 4.0000e-02e
2877 * matrd * f 6e
2878 * nfax * f 1e
2879 * rftn * f 5.9340e+02e
2880 * rftn * f 5.9340e+02e
2881 * rftn * f 5.9340e+02e
2882 * rftn * f 5.9340e+02e
2883 *
2884 ***** type num id ctitle
2885 slab 860 860 $860$ levels 7 & 8 cell 9-12 slabs
2886 * ncrx ncrz ittc iext mld
2887 4 2 0 0 0
2888 * nopowr nrdr modez liqlev iaxcmd
2889 1 1 0 0 0
2890 * idbci idbco hdri hdro
2891 0 2 0.0000e+00 0.0000e+00
2892 * width ipatch
2893 5.5842e-01 0
2894 * nrods nodes irftr nzmax
2895 4 4 0 5
2896 * dtxht(1) dtxht(2) dznht hgapo shlv
2897 3.0000e+00 1.0000e+01 1.0000e-03 0.0000e+00 0.0000e+00
2898 *
2899 * nhcomo* f 50e
2900 * nhcelo* -7 7 8 9e
2901 * z * 2.01 2.467 2.924e
2902 * grav * f 1.0000e+00e
2903 * + + + +
2904 * idrod * 9 10 11 12e
2905 * rdx * r4 1.0000e+00e
2906 * radrd * 0.0000e+00 5.0000e-02 6.0000e-02 6.6500e-02e
2907 * matrd * f 6e
2908 * nfax * f 1e
2909 * + + + +
2910 * rftn * r4 607.1r4 609.15r4 611.2e
2911 * rftn * r4 607.1r4 609.15r4 611.2e
2912 * rftn * r4 607.1r4 609.15r4 611.2e
2913 * rftn * r4 607.1r4 609.15r4 611.2e
2914 *
2915 ***** type num id ctitle
2916 slab 861 861 $861$ levels 7 & 8 cell 13-16 slabs
2917 * ncrx ncrz ittc iext mld
2918 4 2 0 0 0
2919 * nopowr nrdr modez liqlev iaxcmd
2920 1 1 0 0 0
2921 * idbci idbco hdri hdro
2922 0 2 0.0000e+00 0.0000e+00
2923 * width ipatch
2924 4.0521e+00 0
2925 * nrods nodes irftr nzmax
2926 4 4 0 5
2927 * dtxht(1) dtxht(2) dznht hgapo shlv
2928 3.0000e+00 1.0000e+01 1.0000e-03 0.0000e+00 0.0000e+00
2929 *
2930 * nhcomo* f 50e
2931 * nhcelo* -7 7 8 9e
2932 * z * 2.01 2.467 2.924e
2933 * grav * f 1.0000e+00e
2934 * + + + +
2935 * idrod * 13 14 15 16e
2936 * rdx * r4 1.0000e+00e
2937 * radrd * 0.0000e+00 2.5000e-02 3.5000e-02 4.0000e-02e
2938 * matrd * f 6e
2939 * nfax * f 1e

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2940 *      +      +
2941 * rftn * r4    607.1r4    609.15r4    611.2e    +
2942 * rftn * r4    607.1r4    609.15r4    611.2e
2943 * rftn * r4    607.1r4    609.15r4    611.2e
2944 * rftn * r4    607.1r4    609.15r4    611.2e
2945 *
2946 ***** type    num      id      ctitle
2947 slab     862    $862$ level 9 cells 1-8 slabs
2948 *      ncrx    ncrz      ittc      iext      mld
2949   8       1        0        0        0        0
2950 *      nopowr   nrindr    modez      liqlev    iaxcmd
2951   1       1        0        0        0        0
2952 *      idbci    idbco    hdri      hdro
2953   0       2        0.0000e+00  0.0000e+00
2954 *      width    ipatch
2955   4.4118e-01  0
2956 *      nrods    nodes    irftr      nzmax
2957   8       4        0        5
2958 *      dtxht(1)  dtxht(2)  dznht      hgapo    shelv
2959   3.0000e+00  1.0000e+01  1.0000e-03  0.0000e+00  0.0000e+00
2960 *
2961 *      nhcom* f    50e
2962 *      nhcelo* -9    9        10e
2963 *      z      *    2.924    3.4e
2964 *      grav * f   1.0000e+00e
2965 *      +      +
2966 *      idrod *    1        2        3        4s
2967 *      idrod *    5        6        7        8e
2968 *      rdx * r4   1.0000r4  3.8381e
2969 *      radrd *   0.0000e+00  2.5000e-03  5.0000e-03  7.1000e-03e
2970 *      matrd * f   6e
2971 *      nfax * f   1e
2972 *      rftn * f   6.0820e+02e
2973 *      rftn * f   6.0820e+02e
2974 *      rftn * f   6.0820e+02e
2975 *      rftn * f   6.0820e+02e
2976 *      rftn * f   6.0820e+02e
2977 *      rftn * f   6.0820e+02e
2978 *      rftn * f   6.0820e+02e
2979 *      rftn * f   6.0820e+02e
2980 *
2981 ***** type    num      id      ctitle
2982 slab     863    $863$ level 9 cells 9-12 slabs
2983 *      ncrx    ncrz      ittc      iext      mld
2984   4       1        0        0        0        0
2985 *      nopowr   nrindr    modez      liqlev    iaxcmd
2986   1       1        0        0        0        0
2987 *      idbci    idbco    hdri      hdro
2988   0       2        0.0000e+00  0.0000e+00
2989 *      width    ipatch
2990   1.0866e+00  0
2991 *      nrods    nodes    irftr      nzmax
2992   4       4        0        5
2993 *      dtxht(1)  dtxht(2)  dznht      hgapo    shelv
2994   3.0000e+00  1.0000e+01  1.0000e-03  0.0000e+00  0.0000e+00
2995 *
2996 *      nhcom* f    50e
2997 *      nhcelo* -9    9        10e
2998 *      z      *    2.924    3.4e
2999 *      grav * f   1.0000e+00e
3000 *      +      +
3001 *      idrod *    9        10       11       12e
3002 *      rdx * r4   1.0000e
3003 *      radrd *   0.0000e+00  2.0000e-02  3.0000e-02  3.4100e-02e
3004 *      matrd * f   6e
3005 *      nfax * f   1e
3006 *      rftn * f   6.0820e+02e
3007 *      rftn * f   6.0820e+02e
3008 *      rftn * f   6.0820e+02e
3009 *      rftn * f   6.0820e+02e
3010 *
3011 ***** type    num      id      ctitle
3012 slab     864    $864$ level 9 cells 13-16 slabs
3013 *      ncrx    ncrz      ittc      iext      mld
3014   4       1        0        0        0        0
3015 *      nopowr   nrindr    modez      liqlev    iaxcmd
3016   1       1        0        0        0        0
3017 *      idbci    idbco    hdri      hdro
3018   0       2        0.0000e+00  0.0000e+00
3019 *      width    ipatch
3020   4.0693e+00  0
3021 *      nrods    nodes    irftr      nzmax
3022   4       4        0        5
3023 *      dtxht(1)  dtxht(2)  dznht      hgapo    shelv
3024   3.0000e+00  1.0000e+01  1.0000e-03  0.0000e+00  0.0000e+00
3025 *
3026 *      nhcom* f    50e
3027 *      nhcelo* -9    9        10e
3028 *      z      *    2.924    3.4e
3029 *      grav * f   1.0000e+00e
3030 *      +      +
3031 *      idrod *   13       14       15       16e

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3032 * rdx * r4 1.0000e
3033 * raddrd * 0.0000e+00 2.5000e-02 3.5000e-02 4.0000e-02e
3034 * matrd * f 6e
3035 * nfax * f 1e
3036 * rftn * f 6.0820e+02e
3037 * rftn * f 6.0820e+02e
3038 * rftn * f 6.0820e+02e
3039 * rftn * f 6.0820e+02e
3040 *
3041 ***** type num id ctitle
3042 slab 865 865 $865$ level 10 cells 1-8 slabs
3043 * ncrx ncrz ittc iext mld
3044 8 1 0 0 0
3045 * nopowr nrdr modez liqlev iaxcmd
3046 1 1 0 0 0
3047 * idbci idbco hdri hdro
3048 0 2 0.0000e+00 0.0000e+00
3049 * width ipatch
3050 7.5657e-01 0
3051 * nrods nodes irftr nzmax
3052 8 4 0 5
3053 * dtxht(1) dtxht(2) dznhc hgapo shelv
3054 3.0000e+00 1.0000e+01 1.0000e-03 0.0000e+00 0.0000e+00
3055 *
3056 * nhcomo* f 50e
3057 * nhcelo* -10 10 11e
3058 * z * 3.4 4.846e
3059 * grav * f 1.0000e+00e
3060 * + + +
3061 * idrod * 1 2 3 4s
3062 * idrod * 5 6 7 8e
3063 * rdx * r4 1.0000r4 3.8408e
3064 * raddrd * 0.0000e+00 1.0000e-03 2.0000e-03 3.0400e-03e
3065 * matrd * f 6e
3066 * nfax * f 1e
3067 * rftn * f 6.0810e+02e
3068 * rftn * f 6.0810e+02e
3069 * rftn * f 6.0810e+02e
3070 * rftn * f 6.0810e+02e
3071 * rftn * f 6.0810e+02e
3072 * rftn * f 6.0810e+02e
3073 * rftn * f 6.0810e+02e
3074 * rftn * f 6.0810e+02e
3075 *
3076 ***** type num id ctitle
3077 slab 866 866 $866$ level 10 cells 9-12 slabs
3078 * ncrx ncrz ittc iext mld
3079 4 1 0 0 0
3080 * nopowr nrdr modez liqlev iaxcmd
3081 1 1 0 0 0
3082 * idbci idbco hdri hdro
3083 0 2 0.0000e+00 0.0000e+00
3084 * width ipatch
3085 9.6432e-01 0
3086 * nrods nodes irftr nzmax
3087 4 4 0 5
3088 * dtxht(1) dtxht(2) dznhc hgapo shelv
3089 3.0000e+00 1.0000e+01 1.0000e-03 0.0000e+00 0.0000e+00
3090 *
3091 * nhcomo* f 50e
3092 * nhcelo* -10 10 11e
3093 * z * 3.4 4.846e
3094 * grav * f 1.0000e+00e
3095 * + + +
3096 * idrod * 9 10 11 12e
3097 * rdx * r4 1.0000e
3098 * raddrd * 0.0000e+00 2.0000e-02 3.0000e-02 3.4100e-02e
3099 * matrd * f 6e
3100 * nfax * f 1e
3101 * rftn * f 6.0810e+02e
3102 * rftn * f 6.0810e+02e
3103 * rftn * f 6.0810e+02e
3104 * rftn * f 6.0810e+02e
3105 *
3106 ***** type num id ctitle
3107 slab 867 867 $867$ level 10 cells 13-16 slabs
3108 * ncrx ncrz ittc iext mld
3109 4 1 0 0 0
3110 * nopowr nrdr modez liqlev iaxcmd
3111 1 1 0 0 0
3112 * idbci idbco hdri hdro
3113 0 2 0.0000e+00 0.0000e+00
3114 * width ipatch
3115 4.0692e+00 0
3116 * nrods nodes irftr nzmax
3117 4 4 0 5
3118 * dtxht(1) dtxht(2) dznhc hgapo shelv
3119 3.0000e+00 1.0000e+01 1.0000e-03 0.0000e+00 0.0000e+00
3120 *
3121 * nhcomo* f 50e
3122 * nhcelo* -10 10 11e
3123 * z * 3.4 4.846e

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3124 * grav * f 1.0000e+00e
3125 * + +
3126 * idrod * 13 14 15 16e
3127 * rdx * r4 1.0000e
3128 * radrd * 0.0000e+00 2.5000e-02 3.5000e-02 4.0000e-02e
3129 * matrd * f 6e
3130 * nfax * f 1e
3131 * rftn * f 6.0810e+02e
3132 * rftn * f 6.0810e+02e
3133 * rftn * f 6.0810e+02e
3134 * rftn * f 6.0810e+02e
3135 *
3136 ***** type num id ctitle
3137 slab 868 868 $868$ level 11 cells 1-12 slabs
3138 * ncrx ncrz ittc iext mld
3139 12 1 0 0 0
3140 * nopowr nrdr modez liqlev iaxcmd
3141 1 1 0 0 0
3142 * idbci idbco hdri hdro
3143 0 2 0.0000e+00 0.0000e+00
3144 * width ipatch
3145 7.5669e-01 0
3146 * nrods nodes irftr nzmax
3147 12 4 0 5
3148 * dtxht(1) dtxht(2) dznhht hgapo shlv
3149 3.0000e+00 1.0000e+01 1.0000e-03 0.0000e+00 0.0000e+00
3150 *
3151 * nhcomo* f 50e
3152 * nhcelo* -11 11 12e
3153 * z * 4.846 5.13e
3154 * grav * f 1.0000e+00e
3155 * + + + +
3156 * idrod * 1 2 3 4s
3157 * idrod * 5 6 7 8s
3158 * idrod * 9 10 11 12e
3159 * rdx * r4 1.0000r4 3.8395r4 4.9776e
3160 * radrd * 0.0000e+00 1.0000e-03 2.0000e-03 3.0400e-03e
3161 * matrd * f 6e
3162 * nfax * f 1e
3163 * rftn * f 6.0180e+02e
3164 * rftn * f 6.0180e+02e
3165 * rftn * f 6.0180e+02e
3166 * rftn * f 6.0180e+02e
3167 * rftn * f 6.0180e+02e
3168 * rftn * f 6.0180e+02e
3169 * rftn * f 6.0180e+02e
3170 * rftn * f 6.0180e+02e
3171 * rftn * f 6.0180e+02e
3172 * rftn * f 6.0180e+02e
3173 * rftn * f 6.0180e+02e
3174 * rftn * f 6.0180e+02e
3175 *
3176 ***** type num id ctitle
3177 slab 869 869 $869$ level 11 cells 13-16 slabs
3178 * ncrx ncrz ittc iext mld
3179 4 1 0 0 0
3180 * nopowr nrdr modez liqlev iaxcmd
3181 1 1 0 0 0
3182 * idbci idbco hdri hdro
3183 0 2 0.0000e+00 0.0000e+00
3184 * width ipatch
3185 4.0690e+00 0
3186 * nrods nodes irftr nzmax
3187 4 4 0 5
3188 * dtxht(1) dtxht(2) dznhht hgapo shlv
3189 3.0000e+00 1.0000e+01 1.0000e-03 0.0000e+00 0.0000e+00
3190 *
3191 * nhcomo* f 50e
3192 * nhcelo* -11 11 12e
3193 * z * 4.846 5.13e
3194 * grav * f 1.0000e+00e
3195 * + + + +
3196 * idrod * 13 14 15 16e
3197 * rdx * r4 1.0000e
3198 * radrd * 0.0000e+00 2.5000e-02 3.5000e-02 4.0000e-02e
3199 * matrd * f 6e
3200 * nfax * f 1e
3201 * rftn * f 6.0180e+02e
3202 * rftn * f 6.0180e+02e
3203 * rftn * f 6.0180e+02e
3204 * rftn * f 6.0180e+02e
3205 *
3206 ***** type num id ctitle
3207 slab 870 870 $860$ level 12 cells 1-8 slabs
3208 * ncrx ncrz ittc iext mld
3209 8 1 0 0 0
3210 * nopowr nrdr modez liqlev iaxcmd
3211 1 1 0 0 0
3212 * idbci idbco hdri hdro
3213 0 2 0.0000e+00 0.0000e+00
3214 * width ipatch
3215 7.5675e-01 0

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3216 * nrods nodes irftr nzmax
3217 * 8 4 0 5
3218 * dtxht(1) dtxht(2) dznhht hgapo shlev
3219 3.0000e+00 1.0000e+01 1.0000e-03 0.0000e+00 0.0000e+00
3220 *
3221 * nhcomo* f 50e
3222 * nhcelo* -12 12 13e
3223 * z * 5.13 5.9e
3224 * grav * f 1.0000e+00e
3225 * + + + +
3226 * idrod * 1 2 3 4s
3227 * idrod * 5 6 7 8e
3228 * rdx * r4 1.0000r4 3.8392e
3229 * radrd * 0.0000e+00 1.0000e-03 2.0000e-03 3.0400e-03e
3230 * matrd * f 6e
3231 * nfax * f 1e
3232 * rftn * f 5.8900e+02e
3233 * rftn * f 5.8900e+02e
3234 * rftn * f 5.8900e+02e
3235 * rftn * f 5.8900e+02e
3236 * rftn * f 5.8900e+02e
3237 * rftn * f 5.8900e+02e
3238 * rftn * f 5.8900e+02e
3239 * rftn * f 5.8900e+02e
3240 *
3241 ***** type num id ctitle
3242 slab 871 871 $871$ level 12 cells 9-12 slabs
3243 * ncrx ncrz ittc iext mld
3244 4 1 0 0 0
3245 * nopowr nrindr modez liqlev iaxcnd
3246 1 1 0 0 0
3247 * idbci idbco hdri hdro
3248 0 2 0.0000e+00 0.0000e+00
3249 * width ipatch
3250 9.6442e-01 0
3251 * nrods nodes irftr nzmax
3252 4 4 0 5
3253 * dtxht(1) dtxht(2) dznhht hgapo shlev
3254 3.0000e+00 1.0000e+01 1.0000e-03 0.0000e+00 0.0000e+00
3255 *
3256 * nhcomo* f 50e
3257 * nhcelo* -12 12 13e
3258 * z * 5.13 5.9e
3259 * grav * f 1.0000e+00e
3260 * + + + +
3261 * idrod * 9 10 11 12e
3262 * rdx * r4 1.0000e
3263 * radrd * 0.0000e+00 2.0000e-02 3.0000e-02 3.4100e-02e
3264 * matrd * f 6e
3265 * nfax * f 1e
3266 * rftn * f 5.8900e+02e
3267 * rftn * f 5.8900e+02e
3268 * rftn * f 5.8900e+02e
3269 * rftn * f 5.8900e+02e
3270 *
3271 ***** type num id ctitle
3272 rod 991 991 $991$ fuel rod component
3273 * ncrx ncrz ittc iext mld
3274 12 5 0 0 0
3275 * nopowr nrindr modez liqlev iaxcnd
3276 0 0 0 1 1
3277 * idbci idbco hdri hdro
3278 0 2 0.0000e+00 0.0000e+00
3279 * nrods nodes irftr nzmax irftr2
3280 17 10 101 250 102
3281 * dtxht(1) dtxht(2) dznhht hgapo shlev
3282 5.0000e+00 2.0000e+01 1.0000e-03 2.0000e+03 0.0000e+00
3283 * irpwty ndgx ndhx nrt s nhist
3284 7 0 0 10 0
3285 * irpwtr irpwsv nrpwtb nrpwsv nrpwrf
3286 100 1 21 0 0
3287 * izpwtr izpwsv nzpwtb nzpwsv nzpwrf
3288 0 1 1 0 0
3289 * nmwrx nfc1 nfcil ipwrad ipwdp
3290 1 1 1 0 0
3291 * nzpwz nzpwi nfbpwt nrpwtr nrpwri
3292 0 0 0 0 0
3293 * react tneut rpwoff rrpwmx rpwsc1
3294 0.0000e+00 0.0000e+00 -1.0000e+20 1.0000e+30 1.0000e+00
3295 * rpowzi zpwin zpwoff zpwmx
3296 4.7000e+07 0.0000e+00 0.0000e+00 0.0000e+00
3297 * extsou pldr pdrat fucrac
3298 0.0000e+00 0.0000e+00 1.3360e+00 7.0000e-01
3299 *
3300 * nhcomo* f 50e
3301 * nhcelo* -4 4 5 6 7
3302 * nhcelo* 8 9e
3303 * z * 1.2480e+00 1.5530e+00 1.7810e+00 2.0100e+00 2.4670e+00
3304 * z * 2.9240e+00e
3305 * grav * f 1.0000e+00e
3306 * idrod * 1 2 4 5
3307 * idrod * e

```

3308	*	rdx	*	r04	4.0500e+01r04	1.5250e+02r04	1.3200e+02e			
3309	*	radrd	*		0.0000e+00	7.7449e-04	1.5489e-03	2.3235e-03	3.0979e-03	
3310	*	radrd	*		3.8725e-03	4.6470e-03	4.7250e-03	5.0508e-03	5.3590e-03	
3311	*	radrd	*	e						
3312	*	matrd	*	r06		1	3r02		2e	
3313	*	nfax	*	f		3e				
3314	*	rftn	*		1.2745e+03	1.2598e+03	1.2160e+03	1.1455e+03	1.0518e+03	
3315	*	rftn	*		9.3930e+02	8.1349e+02	6.2453e+02	6.1308e+02	6.0224e+02	
3316	*	rftn	*		2.2274e+03	2.1873e+03	2.0631e+03	1.8485e+03	1.5576e+03	
3317	*	rftn	*		1.2285e+03	8.9897e+02	6.7605e+02	6.5072e+02	6.2653e+02	
3318	*	rftn	*		2.4107e+03	2.3685e+03	2.2364e+03	2.0002e+03	1.6631e+03	
3319	*	rftn	*		1.2759e+03	8.9700e+02	6.8708e+02	6.5847e+02	6.3109e+02	
3320	*	rftn	*		2.3509e+03	2.3094e+03	2.1802e+03	1.9506e+03	1.6285e+03	
3321	*	rftn	*		1.2623e+03	9.0076e+02	6.8692e+02	6.5959e+02	6.3345e+02	
3322	*	rftn	*		1.5480e+03	1.5255e+03	1.4589e+03	1.3523e+03	1.2122e+03	
3323	*	rftn	*		1.0477e+03	8.6902e+02	6.5722e+02	6.4235e+02	6.2824e+02	
3324	*	rftn	*		6.4319e+02	6.4275e+02	6.4143e+02	6.3924e+02	6.3615e+02	
3325	*	rftn	*		6.3217e+02	6.2727e+02	6.1389e+02	6.1331e+02	6.1277e+02	
3326	*	rftn	*	e						
3327	*	rftn	*		1.2746e+03	1.2598e+03	1.2161e+03	1.1456e+03	1.0518e+03	
3328	*	rftn	*		9.3936e+02	8.1354e+02	6.2460e+02	6.1314e+02	6.0230e+02	
3329	*	rftn	*		2.2274e+03	2.1873e+03	2.0631e+03	1.8485e+03	1.5576e+03	
3330	*	rftn	*		1.2285e+03	8.9896e+02	6.7605e+02	6.5072e+02	6.2652e+02	
3331	*	rftn	*		2.4106e+03	2.3684e+03	2.2363e+03	2.0002e+03	1.6631e+03	
3332	*	rftn	*		1.2759e+03	8.9698e+02	6.8704e+02	6.5844e+02	6.3106e+02	
3333	*	rftn	*		2.3508e+03	2.3094e+03	2.1801e+03	1.9505e+03	1.6285e+03	
3334	*	rftn	*		1.2622e+03	9.0072e+02	6.8687e+02	6.5954e+02	6.3340e+02	
3335	*	rftn	*		1.5479e+03	1.5254e+03	1.4589e+03	1.3522e+03	1.2121e+03	
3336	*	rftn	*		1.0476e+03	8.6897e+02	6.5716e+02	6.4228e+02	6.2818e+02	
3337	*	rftn	*		6.4293e+02	6.4250e+02	6.4118e+02	6.3898e+02	6.3590e+02	
3338	*	rftn	*		6.3192e+02	6.2702e+02	6.1363e+02	6.1306e+02	6.1252e+02	
3339	*	rftn	*	e						
3340	*	rftn	*		1.2745e+03	1.2597e+03	1.2160e+03	1.1455e+03	1.0518e+03	
3341	*	rftn	*		9.3929e+02	8.1347e+02	6.2451e+02	6.1306e+02	6.0222e+02	
3342	*	rftn	*		2.2274e+03	2.1873e+03	2.0630e+03	1.8484e+03	1.5575e+03	
3343	*	rftn	*		1.2285e+03	8.9893e+02	6.7600e+02	6.5067e+02	6.2647e+02	
3344	*	rftn	*		2.4105e+03	2.3683e+03	2.2362e+03	2.0000e+03	1.6629e+03	
3345	*	rftn	*		1.2758e+03	8.9690e+02	6.8693e+02	6.5832e+02	6.3094e+02	
3346	*	rftn	*		2.3506e+03	2.3092e+03	2.1799e+03	1.9503e+03	1.6283e+03	
3347	*	rftn	*		1.2621e+03	9.0060e+02	6.8669e+02	6.5935e+02	6.3321e+02	
3348	*	rftn	*		1.5476e+03	1.5251e+03	1.4586e+03	1.3519e+03	1.2119e+03	
3349	*	rftn	*		1.0474e+03	8.6878e+02	6.5690e+02	6.4202e+02	6.2791e+02	
3350	*	rftn	*		6.4202e+02	6.4158e+02	6.4027e+02	6.3807e+02	6.3499e+02	
3351	*	rftn	*		6.3102e+02	6.2612e+02	6.1272e+02	6.1214e+02	6.1160e+02	
3352	*	rftn	*	e						
3353	*	rftn	*		1.2746e+03	1.2598e+03	1.2161e+03	1.1456e+03	1.0518e+03	
3354	*	rftn	*		9.3936e+02	8.1354e+02	6.2459e+02	6.1314e+02	6.0230e+02	
3355	*	rftn	*		2.2274e+03	2.1873e+03	2.0631e+03	1.8485e+03	1.5576e+03	
3356	*	rftn	*		1.2285e+03	8.9896e+02	6.7605e+02	6.5072e+02	6.2652e+02	
3357	*	rftn	*		2.4106e+03	2.3684e+03	2.2363e+03	2.0002e+03	1.6631e+03	
3358	*	rftn	*		1.2759e+03	8.9698e+02	6.8704e+02	6.5843e+02	6.3105e+02	
3359	*	rftn	*		2.3508e+03	2.3094e+03	2.1801e+03	1.9505e+03	1.6285e+03	
3360	*	rftn	*		1.2622e+03	9.0072e+02	6.8686e+02	6.5953e+02	6.3339e+02	
3361	*	rftn	*		1.5479e+03	1.5254e+03	1.4588e+03	1.3522e+03	1.2121e+03	
3362	*	rftn	*		1.0476e+03	8.6896e+02	6.5714e+02	6.4227e+02	6.2816e+02	
3363	*	rftn	*		6.4291e+02	6.4247e+02	6.4115e+02	6.3896e+02	6.3587e+02	
3364	*	rftn	*		6.3189e+02	6.2699e+02	6.1361e+02	6.1303e+02	6.1249e+02	
3365	*	rftn	*	e						
3366	*	rftn	*		1.0787e+03	1.0690e+03	1.0403e+03	9.9351e+02	9.3048e+02	
3367	*	rftn	*		8.5349e+02	7.6520e+02	6.0742e+02	5.9879e+02	5.9063e+02	
3368	*	rftn	*		1.8225e+03	1.7907e+03	1.6968e+03	1.5463e+03	1.3502e+03	
3369	*	rftn	*		1.1245e+03	8.8756e+02	6.5854e+02	6.3947e+02	6.2133e+02	
3370	*	rftn	*		1.9983e+03	1.9618e+03	1.8515e+03	1.6723e+03	1.4386e+03	
3371	*	rftn	*		1.1719e+03	8.9735e+02	6.6840e+02	6.4685e+02	6.2632e+02	
3372	*	rftn	*		1.9398e+03	1.9045e+03	1.7995e+03	1.6306e+03	1.4105e+03	
3373	*	rftn	*		1.1586e+03	8.9723e+02	6.6892e+02	6.4833e+02	6.2874e+02	
3374	*	rftn	*		1.2909e+03	1.2762e+03	1.2325e+03	1.1620e+03	1.0681e+03	
3375	*	rftn	*		9.5543e+02	8.2918e+02	6.4600e+02	6.3484e+02	6.2428e+02	
3376	*	rftn	*		6.2947e+02	6.2915e+02	6.2818e+02	6.2657e+02	6.2430e+02	
3377	*	rftn	*		6.2137e+02	6.1776e+02	6.0766e+02	6.0723e+02	6.0682e+02	
3378	*	rftn	*	e						
3379	*	rftn	*		1.0791e+03	1.0694e+03	1.0406e+03	9.9386e+02	9.3082e+02	
3380	*	rftn	*		8.5381e+02	7.6549e+02	6.0778e+02	5.9914e+02	5.9099e+02	
3381	*	rftn	*		1.8226e+03	1.7908e+03	1.6969e+03	1.5464e+03	1.3503e+03	
3382	*	rftn	*		1.1246e+03	8.8762e+02	6.5863e+02	6.3956e+02	6.2142e+02	
3383	*	rftn	*		1.9983e+03	1.9618e+03	1.8515e+03	1.6723e+03	1.4386e+03	
3384	*	rftn	*		1.1719e+03	8.9737e+02	6.6842e+02	6.4686e+02	6.2633e+02	
3385	*	rftn	*		1.9397e+03	1.9045e+03	1.7995e+03	1.6306e+03	1.4105e+03	
3386	*	rftn	*		1.1585e+03	8.9722e+02	6.6891e+02	6.4833e+02	6.2873e+02	
3387	*	rftn	*		1.2909e+03	1.2761e+03	1.2325e+03	1.1620e+03	1.0681e+03	
3388	*	rftn	*		9.5541e+02	8.2916e+02	6.4598e+02	6.3481e+02	6.2425e+02	
3389	*	rftn	*		6.2938e+02	6.2906e+02	6.2809e+02	6.2648e+02	6.2421e+02	
3390	*	rftn	*		6.2128e+02	6.1767e+02	6.0757e+02	6.0714e+02	6.0674e+02	
3391	*	rftn	*	e						
3392	*	rftn	*		1.0796e+03	1.0699e+03	1.0412e+03	9.9435e+02	9.3129e+02	
3393	*	rftn	*		8.5424e+02	7.6589e+02	6.0826e+02	5.9963e+02	5.9148e+02	
3394	*	rftn	*		1.8227e+03	1.7909e+03	1.6970e+03	1.5465e+03	1.3504e+03	
3395	*	rftn	*		1.1247e+03	8.8768e+02	6.5872e+02	6.3965e+02	6.2151e+02	
3396	*	rftn	*		1.9983e+03	1.9617e+03	1.8515e+03	1.6723e+03	1.4385e+03	
3397	*	rftn	*		1.1719e+03	8.9735e+02	6.6839e+02	6.4684e+02	6.2631e+02	
3398	*	rftn	*		1.9396e+03	1.9044e+03	1.7994e+03	1.6305e+03	1.4104e+03	
3399	*	rftn	*		1.1584e+03	8.9714e+02	6.6879e+02	6.4820e+02	6.2861e+02	

3400	*	rftn	*	1.2907e+03	1.2759e+03	1.2322e+03	1.1617e+03	1.0679e+03
3401	*	rftn	*	9.5522e+02	8.2898e+02	6.4576e+02	6.3459e+02	6.2403e+02
3402	*	rftn	*	6.2845e+02	6.2813e+02	6.2717e+02	6.2556e+02	6.2329e+02
3403	*	rftn	*	6.2037e+02	6.1676e+02	6.0665e+02	6.0621e+02	6.0581e+02
3404	*	rftn	*	e				
3405	*	rftn	*	1.0791e+03	1.0694e+03	1.0406e+03	9.9386e+02	9.3082e+02
3406	*	rftn	*	8.5381e+02	7.6549e+02	6.0778e+02	5.9914e+02	5.9099e+02
3407	*	rftn	*	1.8226e+03	1.7908e+03	1.6969e+03	1.5464e+03	1.3503e+03
3408	*	rftn	*	1.1246e+03	8.8762e+02	6.5863e+02	6.3956e+02	6.2142e+02
3409	*	rftn	*	1.9983e+03	1.9618e+03	1.8515e+03	1.6723e+03	1.4386e+03
3410	*	rftn	*	1.1719e+03	8.9737e+02	6.6842e+02	6.4687e+02	6.2633e+02
3411	*	rftn	*	1.9397e+03	1.9045e+03	1.7995e+03	1.6306e+03	1.4105e+03
3412	*	rftn	*	1.1585e+03	8.9722e+02	6.6890e+02	6.4832e+02	6.2872e+02
3413	*	rftn	*	1.2909e+03	1.2761e+03	1.2325e+03	1.1620e+03	1.0681e+03
3414	*	rftn	*	9.5540e+02	8.2915e+02	6.4597e+02	6.3480e+02	6.2424e+02
3415	*	rftn	*	6.2928e+02	6.2896e+02	6.2799e+02	6.2638e+02	6.2411e+02
3416	*	rftn	*	6.2118e+02	6.1757e+02	6.0747e+02	6.0704e+02	6.0663e+02
3417	*	rftn	*	e				
3418	*	rftn	*	8.8717e+02	8.8174e+02	8.6553e+02	8.3893e+02	8.0256e+02
3419	*	rftn	*	7.5722e+02	7.0387e+02	5.8848e+02	5.8277e+02	5.7738e+02
3420	*	rftn	*	1.3545e+03	1.3373e+03	1.2866e+03	1.2050e+03	1.0970e+03
3421	*	rftn	*	9.6842e+02	8.2613e+02	6.2513e+02	6.1240e+02	6.0035e+02
3422	*	rftn	*	1.4798e+03	1.4590e+03	1.3976e+03	1.2992e+03	1.1697e+03
3423	*	rftn	*	1.0170e+03	8.5034e+02	6.3876e+02	6.2442e+02	6.1083e+02
3424	*	rftn	*	1.4443e+03	1.4248e+03	1.3671e+03	1.2744e+03	1.1523e+03
3425	*	rftn	*	1.0077e+03	8.4908e+02	6.4329e+02	6.2964e+02	6.1670e+02
3426	*	rftn	*	1.0214e+03	1.0133e+03	9.8936e+02	9.5030e+02	8.9738e+02
3427	*	rftn	*	8.3221e+02	7.5673e+02	6.1650e+02	6.0907e+02	6.0205e+02
3428	*	rftn	*	5.9765e+02	5.9745e+02	5.9684e+02	5.9582e+02	5.9440e+02
3429	*	rftn	*	5.9255e+02	5.9027e+02	5.8343e+02	5.8315e+02	5.8288e+02
3430	*	rftn	*	e				
3431	*	rftn	*	8.8786e+02	8.8242e+02	8.6620e+02	8.3958e+02	8.0319e+02
3432	*	rftn	*	7.5783e+02	7.0445e+02	5.8914e+02	5.8343e+02	5.7805e+02
3433	*	rftn	*	1.3553e+03	1.3381e+03	1.2873e+03	1.2057e+03	1.0976e+03
3434	*	rftn	*	9.6901e+02	8.2666e+02	6.2581e+02	6.1309e+02	6.0105e+02
3435	*	rftn	*	1.4804e+03	1.4596e+03	1.3981e+03	1.2997e+03	1.1701e+03
3436	*	rftn	*	1.0174e+03	8.5070e+02	6.3923e+02	6.2490e+02	6.1131e+02
3437	*	rftn	*	1.4444e+03	1.4249e+03	1.3672e+03	1.2745e+03	1.1523e+03
3438	*	rftn	*	1.0078e+03	8.4915e+02	6.4339e+02	6.2973e+02	6.1680e+02
3439	*	rftn	*	1.0214e+03	1.0134e+03	9.8941e+02	9.5035e+02	8.9742e+02
3440	*	rftn	*	8.3225e+02	7.5677e+02	6.1655e+02	6.0911e+02	6.0210e+02
3441	*	rftn	*	5.9791e+02	5.9771e+02	5.9710e+02	5.9609e+02	5.9466e+02
3442	*	rftn	*	5.9281e+02	5.9053e+02	5.8370e+02	5.8341e+02	5.8314e+02
3443	*	rftn	*	e				
3444	*	rftn	*	8.8863e+02	8.8320e+02	8.6696e+02	8.4033e+02	8.0391e+02
3445	*	rftn	*	7.5852e+02	7.0510e+02	5.8989e+02	5.8419e+02	5.7881e+02
3446	*	rftn	*	1.3560e+03	1.3388e+03	1.2880e+03	1.2064e+03	1.0983e+03
3447	*	rftn	*	9.6959e+02	8.2717e+02	6.2648e+02	6.1377e+02	6.0173e+02
3448	*	rftn	*	1.4809e+03	1.4601e+03	1.3986e+03	1.3002e+03	1.1705e+03
3449	*	rftn	*	1.0178e+03	8.5104e+02	6.3968e+02	6.2536e+02	6.1178e+02
3450	*	rftn	*	1.4446e+03	1.4251e+03	1.3674e+03	1.27474e+03	1.1525e+03
3451	*	rftn	*	1.0079e+03	8.4928e+02	6.4355e+02	6.2990e+02	6.1697e+02
3452	*	rftn	*	1.0210e+03	1.0129e+03	9.8899e+02	9.4994e+02	8.9703e+02
3453	*	rftn	*	8.3188e+02	7.5643e+02	6.1614e+02	6.0870e+02	6.0169e+02
3454	*	rftn	*	5.9679e+02	5.9659e+02	5.9599e+02	5.9497e+02	5.9355e+02
3455	*	rftn	*	5.9170e+02	5.8942e+02	5.8258e+02	5.8229e+02	5.8202e+02
3456	*	rftn	*	e				
3457	*	rftn	*	8.8786e+02	8.8242e+02	8.6620e+02	8.3959e+02	8.0319e+02
3458	*	rftn	*	7.5783e+02	7.0445e+02	5.8914e+02	5.8343e+02	5.7805e+02
3459	*	rftn	*	1.3553e+03	1.3381e+03	1.2873e+03	1.2057e+03	1.0976e+03
3460	*	rftn	*	9.6902e+02	8.2667e+02	6.2582e+02	6.1310e+02	6.0105e+02
3461	*	rftn	*	1.4804e+03	1.4596e+03	1.3982e+03	1.2997e+03	1.1701e+03
3462	*	rftn	*	1.0174e+03	8.5071e+02	6.3925e+02	6.2492e+02	6.1133e+02
3463	*	rftn	*	1.4444e+03	1.4249e+03	1.3672e+03	1.2745e+03	1.1523e+03
3464	*	rftn	*	1.0078e+03	8.4914e+02	6.4337e+02	6.2972e+02	6.1678e+02
3465	*	rftn	*	1.0209e+03	1.0129e+03	9.8894e+02	9.4989e+02	8.9698e+02
3466	*	rftn	*	8.3184e+02	7.5639e+02	6.1609e+02	6.0865e+02	6.0163e+02
3467	*	rftn	*	5.9684e+02	5.9664e+02	5.9604e+02	5.9502e+02	5.9360e+02
3468	*	rftn	*	5.9175e+02	5.8947e+02	5.8263e+02	5.8234e+02	5.8207e+02
3469	*	rftn	*	e				
3470	*	rftn	*	1.3331e+03	1.3166e+03	1.2681e+03	1.1899e+03	1.0862e+03
3471	*	rftn	*	9.6251e+02	8.2513e+02	6.2862e+02	6.1633e+02	6.0470e+02
3472	*	rftn	*	2.3324e+03	2.2910e+03	2.1621e+03	1.9335e+03	1.6148e+03
3473	*	rftn	*	1.2539e+03	8.9730e+02	6.8086e+02	6.5368e+02	6.2770e+02
3474	*	rftn	*	2.5122e+03	2.4691e+03	2.3333e+03	2.0875e+03	1.7256e+03
3475	*	rftn	*	1.3016e+03	8.9232e+02	6.9224e+02	6.6155e+02	6.3214e+02
3476	*	rftn	*	2.4516e+03	2.4091e+03	2.2757e+03	2.0360e+03	1.6895e+03
3477	*	rftn	*	1.2882e+03	8.9739e+02	6.9177e+02	6.6244e+02	6.3437e+02
3478	*	rftn	*	1.6249e+03	1.5999e+03	1.5260e+03	1.4078e+03	1.2529e+03
3479	*	rftn	*	1.0721e+03	8.7752e+02	6.6007e+02	6.4410e+02	6.2893e+02
3480	*	rftn	*	6.4562e+02	6.4515e+02	6.4373e+02	6.4136e+02	6.3804e+02
3481	*	rftn	*	6.3374e+02	6.2846e+02	6.1409e+02	6.1347e+02	6.1289e+02
3482	*	rftn	*	e				
3483	*	rftn	*	1.3332e+03	1.3167e+03	1.2681e+03	1.1899e+03	1.0863e+03
3484	*	rftn	*	9.6257e+02	8.2519e+02	6.2869e+02	6.1640e+02	6.0477e+02
3485	*	rftn	*	2.3324e+03	2.2910e+03	2.1621e+03	1.9335e+03	1.6148e+03
3486	*	rftn	*	1.2539e+03	8.9730e+02	6.8085e+02	6.5368e+02	6.2769e+02
3487	*	rftn	*	2.5122e+03	2.4691e+03	2.3333e+03	2.0875e+03	1.7255e+03
3488	*	rftn	*	1.3016e+03	8.9229e+02	6.9220e+02	6.6151e+02	6.3210e+02
3489	*	rftn	*	2.4516e+03	2.4090e+03	2.2756e+03	2.0360e+03	1.6895e+03
3490	*	rftn	*	1.2882e+03	8.9735e+02	6.9172e+02	6.6239e+02	6.3432e+02
3491	*	rftn	*	1.6248e+03	1.5998e+03	1.5260e+03	1.4077e+03	1.2529e+03

3492	*	rftn	*	1.0720e+03	8.7747e+02	6.6001e+02	6.4403e+02	6.2887e+02
3493	*	rftn	*	6.4537e+02	6.4489e+02	6.4348e+02	6.4111e+02	6.3778e+02
3494	*	rftn	*	6.3349e+02	6.2821e+02	6.1384e+02	6.1322e+02	6.1263e+02
3495	*	rftn	*	e				
3496	*	rftn	*	1.3332e+03	1.3167e+03	1.2681e+03	1.1899e+03	1.0863e+03
3497	*	rftn	*	9.6257e+02	8.2519e+02	6.2869e+02	6.1640e+02	6.0477e+02
3498	*	rftn	*	2.3324e+03	2.2910e+03	2.1621e+03	1.9335e+03	1.6148e+03
3499	*	rftn	*	1.2539e+03	8.9730e+02	6.8085e+02	6.5368e+02	6.2769e+02
3500	*	rftn	*	2.5122e+03	2.4691e+03	2.3333e+03	2.0875e+03	1.7255e+03
3501	*	rftn	*	1.3016e+03	8.9229e+02	6.9220e+02	6.6151e+02	6.3210e+02
3502	*	rftn	*	2.4516e+03	2.4090e+03	2.2756e+03	2.0359e+03	1.6895e+03
3503	*	rftn	*	1.2882e+03	8.9735e+02	6.9171e+02	6.6238e+02	6.3431e+02
3504	*	rftn	*	1.6248e+03	1.5998e+03	1.5260e+03	1.4077e+03	1.2529e+03
3505	*	rftn	*	1.0720e+03	8.7746e+02	6.6000e+02	6.4402e+02	6.2886e+02
3506	*	rftn	*	6.4534e+02	6.4487e+02	6.4345e+02	6.4108e+02	6.3776e+02
3507	*	rftn	*	6.3346e+02	6.2818e+02	6.1381e+02	6.1319e+02	6.1261e+02
3508	*	rftn	*	e				
3509	*	rftn	*	1.2146e+03	1.2014e+03	1.1623e+03	1.0991e+03	1.0148e+03
3510	*	rftn	*	9.1321e+02	7.9872e+02	6.1724e+02	6.0658e+02	5.9649e+02
3511	*	rftn	*	2.1196e+03	2.0810e+03	1.9622e+03	1.7628e+03	1.4997e+03
3512	*	rftn	*	1.2012e+03	8.9831e+02	6.7102e+02	6.4748e+02	6.2503e+02
3513	*	rftn	*	2.3038e+03	2.2629e+03	2.1353e+03	1.9106e+03	1.5996e+03
3514	*	rftn	*	1.2480e+03	8.9913e+02	6.8121e+02	6.5452e+02	6.2920e+02
3515	*	rftn	*	2.2411e+03	2.2010e+03	2.0765e+03	1.8607e+03	1.5670e+03
3516	*	rftn	*	1.2345e+03	9.0187e+02	6.8083e+02	6.5542e+02	6.3115e+02
3517	*	rftn	*	1.4720e+03	1.4518e+03	1.3922e+03	1.2966e+03	1.1705e+03
3518	*	rftn	*	1.0216e+03	8.5844e+02	6.5308e+02	6.3926e+02	6.2617e+02
3519	*	rftn	*	6.3529e+02	6.3489e+02	6.3368e+02	6.3166e+02	6.2883e+02
3520	*	rftn	*	6.2517e+02	6.2066e+02	6.0816e+02	6.0763e+02	6.0713e+02
3521	*	rftn	*	e				
3522	*	rftn	*	7.5242e+02	7.4956e+02	7.4098e+02	7.2679e+02	7.0717e+02
3523	*	rftn	*	6.8233e+02	6.5250e+02	5.7758e+02	5.7414e+02	5.7089e+02
3524	*	rftn	*	1.0170e+03	1.0087e+03	9.8419e+02	9.4418e+02	8.9002e+02
3525	*	rftn	*	8.2345e+02	7.4650e+02	6.0050e+02	5.9276e+02	5.8545e+02
3526	*	rftn	*	1.0895e+03	1.0796e+03	1.0502e+03	1.0024e+03	9.3807e+02
3527	*	rftn	*	8.5954e+02	7.6957e+02	6.1079e+02	6.0205e+02	5.9380e+02
3528	*	rftn	*	1.0728e+03	1.0635e+03	1.0357e+03	9.9050e+02	9.2953e+02
3529	*	rftn	*	8.5490e+02	7.6911e+02	6.1653e+02	6.0822e+02	6.0037e+02
3530	*	rftn	*	8.3703e+02	8.3290e+02	8.2057e+02	8.0025e+02	7.7230e+02
3531	*	rftn	*	7.3718e+02	6.9542e+02	6.0200e+02	5.9751e+02	5.9328e+02
3532	*	rftn	*	5.9140e+02	5.9128e+02	5.9091e+02	5.9031e+02	5.8946e+02
3533	*	rftn	*	5.8836e+02	5.8700e+02	5.8289e+02	5.8272e+02	5.8256e+02
3534	*	rftn	*	e				
3535	*	rdpwr	*	9.5500e-01	9.6000e-01	9.6500e-01	9.7500e-01	9.9000e-01
3536	*	rdpwr	*	1.0160e+00	1.0600e+00r03	0.0000e+00e		
3537	*	cpowr	*	r04	1.4874e+00r04	1.1090e+00r04	7.2450e-01e	
3538	*	rpkf	*	r03	1.0757e+00	1.2426e+00	5.9870e-01e	
3539	*	zpwtb	*	1.0000e+00	5.9415e-01	1.3555e+00	1.5406e+00	1.4723e+00
3540	*	zpwtb	*	7.8850e-01	2.9708e-02e			
3541	*	rpwtb	*	0.0000e+00	4.7000e+07	1.0000e-01	4.2934e+07	2.0000e-01
3542	*	rpwtb	*	1.3075e+07	3.0000e-01	7.3013e-06	4.0000e-01	5.2826e+06
3543	*	rpwtb	*	5.0000e-01	4.3676e+06	6.0000e-01	3.9665e+06	8.0000e-01
3544	*	rpwtb	*	3.5062e+06	1.0000e+00	3.1164e-06	1.5000e+00	3.0359e+06
3545	*	rpwtb	*	2.0000e+00	2.8812e+06	3.0000e+00	2.7583e+06	5.0000e+00
3546	*	rpwtb	*	2.3870e+06	8.0000e+00	2.2150e+06	1.0000e+01	2.1451e+06
3547	*	rpwtb	*	1.5000e+01	2.0010e+06	2.0000e+01	1.9003e+06	3.0000e+01
3548	*	rpwtb	*	1.7615e+06	4.0000e+01	1.6645e+06	6.0000e+01	1.5293e+06
3549	*	rpwtb	*	2.0000e+02	1.1675e+06e			
3550	*	fpuo2	*	f	0.0000e+00e			
3551	*	ftd	*	f	9.3000e-01e			
3552	*	gmix	*	9.8101e-01	0.0000e+00	1.0103e-02	1.7830e-03	0.0000e+00
3553	*	gmix	*	7.0991e-03	0.0000e+00	9.8101e-01	0.0000e+00	1.0103e-02
3554	*	gmix	*	1.7830e-03	0.0000e+00	7.0991e-03	0.0000e+00	9.8101e-01
3555	*	gmix	*	0.0000e+00	1.0103e-02	1.7830e-03	0.0000e+00	7.0991e-03
3556	*	gmix	*	0.0000e+00	9.8101e-01	0.0000e+00	1.0103e-02	1.7830e-03
3557	*	gmix	*	0.0000e+00	7.0991e-03	0.0000e+00	9.8101e-01	0.0000e+00
3558	*	gmix	*	1.0103e-02	1.7830e-03	0.0000e+00	7.0991e-03	0.0000e+00
3559	*	gmix	*	9.8101e-01	0.0000e+00	1.0103e-02	1.7830e-03	0.0000e+00
3560	*	gmix	*	7.0991e-03	0.0000e+00	9.8101e-01	0.0000e+00	1.0103e-02
3561	*	gmix	*	1.7830e-03	0.0000e+00	7.0991e-03	0.0000e+00	9.8101e-01
3562	*	gmix	*	0.0000e+00	1.0103e-02	1.7830e-03	0.0000e+00	7.0991e-03
3563	*	gmix	*	0.0000e+00	9.8101e-01	0.0000e+00	1.0103e-02	1.7830e-03
3564	*	gmix	*	0.0000e+00	7.0991e-03	0.0000e+00	9.8101e-01	0.0000e+00
3565	*	gmix	*	1.0103e-02	1.7830e-03	0.0000e+00	7.0991e-03	0.0000e+00
3566	*	gmix	*	9.8101e-01	0.0000e+00	1.0103e-02	1.7830e-03	0.0000e+00
3567	*	gmix	*	7.0991e-03	0.0000e+00	9.8101e-01	0.0000e+00	1.0103e-02
3568	*	gmix	*	1.7830e-03	0.0000e+00	7.0991e-03	0.0000e+00e	
3569	*	gmles	*	f	1.0000e+00e			
3570	*	pgapt	*	f	2.4000e+06e			
3571	*	pivot	*	f	0.0000e+00e			
3572	*	pslen	*	f	0.0000e+00e			
3573	*	clemn	*	f	0.0000e+00e			
3574	*	burn	*	f	0.0000e+00e			
3575	*	burn	*	f	0.0000e+00e			
3576	*	burn	*	f	0.0000e+00e			
3577	*	burn	*	f	0.0000e+00e			
3578	*	burn	*	f	0.0000e+00e			
3579	*	burn	*	f	0.0000e+00e			
3580	*	burn	*	f	0.0000e+00e			
3581	*	burn	*	f	0.0000e+00e			
3582	*	burn	*	f	0.0000e+00e			
3583	*	burn	*	f	0.0000e+00e			

```

3584 * burn * f 0.0000e+00e
3585 * burn * f 0.0000e+00e
3586 * burn * f 0.0000e+00e
3587 * burn * f 0.0000e+00e
3588 * burn * f 0.0000e+00e
3589 * burn * f 0.0000e+00e
3590 * burn * f 0.0000e+00e
3591 *
3592 end
3593 *
3594 ****
3595 * time-step data *
3596 ****
3597 *
3598 *      dtmin      dtmax      tend      rtwfp
3599   1.0000e-05  1.0000e-02  1.0000e+00  1.0000e+01
3600 *      edint      gfint      dmpint      sedint
3601   1.0000e+00  2.0000e+00  5.0000e+00  2.0000e+00
3602 *
3603 ****
3604 * time-step data *
3605 ****
3606 *
3607 *      dtmin      dtmax      tend      rtwfp
3608   1.0000e-05  2.5000e-02  5.0000e+00  1.0000e+01
3609 *      edint      gfint      dmpint      sedint
3610   4.0000e+00  2.0000e+00  5.0000e+00  2.0000e+00
3611 *
3612 ****
3613 * time-step data *
3614 ****
3615 *
3616 *      dtmin      dtmax      tend      rtwfp
3617   1.0000e-05  1.0000e-01  2.0000e+01  5.0000e+01
3618 *      edint      gfint      dmpint      sedint
3619   2.0000e+01  2.0000e+00  2.0000e+01  5.0000e+00
3620 *
3621 ****
3622 * time-step data *
3623 ****
3624 *
3625 *      dtmin      dtmax      tend      rtwfp
3626   1.0000e-05  1.0000e-01  1.0000e+02  2.0000e+02
3627 *      edint      gfint      dmpint      sedint
3628   2.0000e+01  2.0000e+00  3.0000e+01  1.0000e+01
3629 *
3630 ****
3631 * time-step data *
3632 ****
3633 *
3634 *      dtmin      dtmax      tend      rtwfp
3635   1.0000e-05  1.5000e-01  2.0000e+02  2.0000e+02
3636 *      edint      gfint      dmpint      sedint
3637   5.0000e+01  2.0000e+00  4.0000e+01  2.0000e+01
3638 *
3639 ****
3640 * time-step data *
3641 ****
3642 *
3643 *      endflag
3644 -1.0000e+00

```

LOFT L2-6 TRANSIENT RESTART INPUT LISTING,
REFLOOD TRIP AT 1 S

```

1 free format
2 *
3 *****
4 * main data *
5 *****
6 *
7 *      numtcr      ieos      inopt      nmat
8      3          0          1          0
9 loft test lp-02-6 transient restart deck for trac-pf1/mod2
10 (for input without old stgen component)
11
12 *
13 *****
14 * namelist data *
15 *****
16 *
17   &inopts chm12=1.0, chm22=0.84, iadded=10, icflow=2, idiag=1,
18     igeom3=1, inlabb=0, iolab=1, ipowr=-1, newrfd=3,
19     nfrc1=2, nhtstr=39, noair=0, nrslv=1, tpowr=0.50,
20     iblaus=1,
21   &end
22 *
23 *      dstep      timet
24      -1          0.0
25 *      stdyst      transi      ncomp      njun      ipak
26      0          1          67          30          1
27 *      epso       epss
28      1.0000e-04  1.0000e-04
29 *      oitmax      sitmax      isolut      ncontr      nccfl
30      10          25          0          0          0
31 *      ntsv       ntcb      ntcf      ntrp      ntcp
32      28          22          114         8          2
33 *
34 *****
35 * component-number data *
36 *****
37 *
38 * iorder*      1          2          3          4          5
39 * iorder*      6          7          8          11         12
40 * iorder*      13         14         15         16         17
41 * iorder*      18         19         20         21         22
42 * iorder*      23         24         25         31         32
43 * iorder*      41         42         50         831        833
44 * iorder*      834        835        836        837        838
45 * iorder*      839        840        841        842        843
46 * iorder*      844        845        846        847        848
47 * iorder*      851        852        853        854        855
48 * iorder*      856        857        858        859        860
49 * iorder*      861        862        863        864        865
50 * iorder*      866        867        868        869        870
51 * iorder*      871s
52 * iorder*      991e
53 **
54 *****
55 * control-parameter data *
56 *****
57 *
58 * multi-pass control-parameter input
59 *
60 * cntr-p*      1          17         -1         -15s
61 * cntr-p*      1          102         19         61s
62 * cntr-p*      -16         -26         1          0e
63 *
64 * signal variables
65 *
66 * SV Parameter Component/Trip Location Referenced by
67 * 1 t lots
68 * 10 reactor power 991 CB -10
69 * 11 void fraction 20 ave/cells 1-5 CB -9
70 * 12 void fraction 22 ave/cells 1-6 CB -6
71 * 14 vapor mass flow 23 interface 6 CB -4
72 * 15 void fraction 22 cell 7 CB -6
73 * 16 void fraction 21 ave/cells 1-4 CB -7
74 * 17 void fraction 21 cell 5 CB -7
75 * 19 trip set status 100 CB -16
76 * 32 pressure    12 cell 1 FILL 16
77 * 33 pressure    13 cell 1 FILL 17
78 * 34 pressure    14 cell 3 trip 6
79 *
80 *      idsv      isvn      ilcn      icnl      icn2
81      1          0          0          0          0
82      0
83 *
84 * control blocks
85 *
86 * CB Refers to Referenced by Function

```

```

87 * -4 SV 14 CB -5 table lookup based on secondary steam flow
88 * -5 CB -4 CB -13 table lookup based on CB -5
89 * -6 SV 12, 15 CB -8 calc steam volume of comp. 22
90 * -7 SV 16, 17 CB -8 calc steam volume of comp. 21
91 * -8 CB -6, -7 CB -9 calc steam volume of comp. 21 and 22
92 * -9 SV 11/CB -8 CB -11 calc steam volume in comp 20, 21, and 22
93 * -10 SV 10 CB -12 table lookup based on reactor power
94 * -11 CB -9 CB -12 table lookup based on secondary steam volume
95 * -12 CB -10, -11 CB -13 sums and applies gain
96 * -13 CB -12, -5 CB -14 sums
97 * -14 CB -13, -15 CB -15 subtracts, gain, and limits
98 * -15 CB -14 CB -14, -17 integrator
99 * -16 SV 19 CB -17 integrates trip set status with gain/limits
100 * -17 CB -15, -16 CB -18 sums
101 * -18 CB -17 FILL 24 table lookup (provides the independent
102 * variable for the FILL table)
103 *
104 * idcb icbn icb1 icb2 icb3
105 0
106 *
107 * trips
108 *
109 * Trip References Referenced by Function
110 * 2 SV 1 (time) FILL 16 Controls the time at which HPIS starts
111 * 3 SV 1 (time) FILL 17 Controls the time at which LPIS starts
112 * 6 SV 34 (p) VALVE 14 Controls pressure at which accumulator
113 * injection starts
114 * 8 SV 1 (time) VALVE 23 Set status is always on forward so that
115 * FILL 24 the steam valve and feedwater operate
116 * during the steady state and transient
117 * 10 SV 1 (time) PUMP 4, 5 Controls time of pump trip
118 * 100 SV 1 (time) ROD 991 Core power trip
119 * 101 SV 1 (time) ROD 991 Fine mesh trip
120 * 102 SV 1 (time) ROD 991 New reflood heat transfer trip
121 *
122 * ntse ntct ntsf ntdp ntsd
123 0 0 0 0 .0
124 *
125 * idtp isrt iset itst idsg
126 102 2 0 1 1
127 * setp(1) setp(2)
128 0.0 1.0
129 * dtsp(1) dtsp(2)
130 0.0 0.0
131 * ifsp(1) ifsp(2)
132 0 0
133 *
134 * idtp isrt iset itst idsg
135 0
136 *
137 ****
138 * component data *
139 ****
140 *
141 ***** type num id ctitle
142 break 32 32 $32$ broken-hot-leg terminal
143 * jum1 ibty isat ioff
144 32 1 3 1
145 * ibtr ibsv nbtb nbsv nbrf
146 0 1 10 0 0
147 * dxin violin alpin tin pin
148 0.815976 0.0423948 0.0 615.3 150.1e+05
149 * pain concin rbmx poff belv
150 0.0 0.0 1.0e+20 0.0 0.0
151 * pscl tlscl tvscl pascl consol
152 1.0 1.0 1.0 1.0 1.0
153 * ptb * 0.0 150.1e+05s
154 * ptb * 0.0191 1.0e+05s
155 * ptb * 1.0 2.5e+05s
156 * ptb * 5.0 3.0e+05s
157 * ptb * 32.0 3.6e+05s
158 * ptb * 52.0 3.34e+05s
159 * ptb * 70.0 3.17e+05s
160 * ptb * 100.0 3.0e+05s
161 * ptb * 310.0 2.7e+05s
162 * ptb * 500.0 2.7e+05e
163 *
164 ***** type num id ctitle
165 break 42 42 $42$ broken-cold-leg terminal
166 * jum1 ibty isat ioff
167 42 1 3 1
168 * ibtr ibsv nbtb nbsv nbrf
169 0 1 10 0 0
170 * dxin violin alpin tin pin
171 1.0224006 0.0531200 0.0 615.5 150.4e+05
172 * pain concin rbmx poff belv
173 0.0 0.0 1.0e+20 0.0 0.0
174 * pscl tlscl tvscl pascl consol
175 1.0 1.0 1.0 1.0 1.0
176 * ptb * 0.0 150.4e+05s
177 * ptb * 0.0191 1.0e+05s
178 * ptb * 1.0 2.5e+05s

```

```

179 * ptb * 5.0 3.0e+05s
180 * ptb * 32.0 3.6e+05s
181 * ptb * 52.0 3.34e+05s
182 * ptb * 70.0 3.17e+05s
183 * ptb * 100.0 3.0e+05s
184 * ptb * 310.0 2.7e+05s
185 * ptb * 500.0 2.7e+05s
186 *
187 *
188 end
189 *
190 ****
191 * time-step data *
192 ****
193 *
194 * dtmin dtmax tend rtwfp
195 * 1.0000e-06 5.0000e-03 0.1 1.0
196 * edint gfint dmpint sedint
197 * 0.5 0.05 2.0 0.5
198 *
199 * dtmin dtmax tend rtwfp
200 * 1.0000e-06 1.0000e-02 2.0 1.0
201 * edint gfint dmpint sedint
202 * 0.5 0.05 2.0 0.5
203 *
204 * dtmin dtmax tend rtwfp
205 * 1.0000e-06 0.01 6.0 1.0
206 * edint gfint dmpint sedint
207 * 2.0 0.2 3.0 2.0
208 *
209 * dtmin dtmax tend rtwfp
210 * 1.0000e-06 0.01 20.0 1.0
211 * edint gfint dmpint sedint
212 * 5.0 0.5 5.0 5.0
213 *
214 * dtmin dtmax tend rtwfp
215 * 1.0000e-06 0.01 70.0 1.0
216 * edint gfint dmpint sedint
217 * 10.0 0.5 10.0 10.0
218 *
219 * dtmin dtmax tend rtwfp
220 * 1.0000e-06 0.02 90.0 1.0
221 * edint gfint dmpint sedint
222 * 10.0 0.5 10.0 10.0
223 *
224 * dtmin dtmax tend rtwfp
225 * 1.0000e-06 0.04 120.0 1.0
226 * edint gfint dmpint sedint
227 * 10.0 0.5 10.0 10.0
228 *
229 * endflag
230 -1.0000e+00

```

LOFT L2-6 TRANSIENT RESTART INPUT LISTING, REFLOOD TRIP AT 20 S

```

1 free format
2 *
3 *****
4 * main data *
5 *****
6 *
7 *      numctr      ieos      inopt      nmat
8      3           0           1           0
9 loft test lp-02-6 transient restart deck for trac-pf1/mod2
10 (for input without old stgen component)
11
12 *
13 *****
14 * namelist data *
15 *****
16 *
17   &inopts chm12=1.0, chm22=0.84, iadded=10, icflow=2, idiag=1,
18     igeom3=1, inilab=0, iolab=1, ipowr=-1, newrfd=3,
19     nfrc1=2, nhstr=39, noair=0, nrslv=1, tpowr=0.50,
20     iblaus=1,
21   &end
22 *
23 *      dstep      timet
24      -1          0.0
25 *      stdyst      transi      ncomp      njun      ipak
26      0           1           67          30          1
27 *      epso       epss
28      1.0000e-04  1.0000e-04
29 *      oitmax      sitmax      isolut      ncontr      nccfl
30      10          25          0           0           0
31 *      ntsv       ntcb      ntcf      ntrp      ntcp
32      28          22          114         8           2
33 *
34 *****
35 * component-number data *
36 *****
37 *
38 * iorder*      1          2          3          4          5
39 * iorder*      6          7          8          11         12
40 * iorder*      13         14         15         16         17
41 * iorder*      18         19         20         21         22
42 * iorder*      23         24         25         31         32
43 * iorder*      41         42         50         831        833
44 * iorder*      834        835        836        837        838
45 * iorder*      839        840        841        842        843
46 * iorder*      844        845        846        847        848
47 * iorder*      851        852        853        854        855
48 * iorder*      856        857        858        859        860
49 * iorder*      861        862        863        864        865
50 * iorder*      866        867        868        869        870
51 * iorder*      871s
52 * iorder*      991e
53 **
54 *****
55 * control-parameter data *
56 *****
57 *
58 * multi-pass control-parameter input
59 *
60 * cntr-p*      1          17         -1         -15s
61 * cntr-p*      1          102        19         61s
62 * cntr-p*      -16        -26         1          0e
63 *
64 * signal variables
65 *
66 * SV  Parameter Component/Trip  Location  Referenced by
67 * 1   t
68 * 10  reactor power    991
69 * 11  void fraction    20      ave/cells 1-5 CB -9
70 * 12  void fraction    22      ave/cells 1-6 CB -6
71 * 14  vapor mass flow  23      interface 6 CB -4
72 * 15  void fraction    22      cell 7   CB -6
73 * 16  void fraction    21      ave/cells 1-4 CB -7
74 * 17  void fraction    21      cell 5   CB -7
75 * 19  trip set status 100
76 * 32  pressure        12      cell 1   FILL 16
77 * 33  pressure        13      cell 1   FILL 17
78 * 34  pressure        14      cell 3   trip 6
79 *
80 *      idsv      isvn      ilcn      icn1      icn2
81 *      1           0           0           0           0
82 *
83 *
84 * control blocks
85 *

```

		Referenced by	Function		
86	*	CB Refers to			
87	*	-4 SV 14	CB -5 table lookup based on secondary steam flow		
88	*	-5 CB -4	CB -13 table lookup based on CB -5		
89	*	-6 SV 12, 15	CB -8 calc steam volume of comp. 22		
90	*	-7 SV 16, 17	CB -8 calc steam volume of comp. 21		
91	*	-8 CB -6, -7	CB -9 calc steam volume of comp. 21 and 22		
92	*	-9 SV 11/CB -8	CB -11 calc steam volume in comp. 20, 21, and 22		
93	*	-10 SV 10	CB -12 table lookup based on reactor power		
94	*	-11 CB -9	CB -12 table lookup based on secondary steam volume		
95	*	-12 CB -10, -11	CB -13 sums and applies gain		
96	*	-13 CB -12, -5	CB -14 sums		
97	*	-14 CB -13, -15	CB -15 subtracts, gain, and limits		
98	*	-15 CB -14	CB -14, -17 integrator		
99	*	-16 SV 19	CB -17 integrates trip set status with gain/limits		
100	*	-17 CB -15, -16	CB -18 sums		
101	*	-18 CB -17	FILL 24 table lookup (provides the independent variable for the FILL table)		
102	*				
103	*				
104	*	idcb	icbn		
105	*	0			
106	*		icb1		
107	*		icb2		
108	*		icb3		
109	*				
110	*	Trip References	Referenced by		
111	*	2 SV 1 (time)	FILL 16 Controls the time at which HPIS starts		
112	*	3 SV 1 (time)	FILL 17 Controls the time at which LPIS starts		
113	*	6 SV 34 (p)	VALVE 14 Controls pressure at which accumulator injection starts		
114	*	8 SV 1 (time)	VALVE 23 Set status is always on forward so that the steam valve and feedwater operate during the steady state and transient		
115	*		FILL 24 Controls time of pump trip		
116	*		ROD 991 Core power trip		
117	*	10 SV 1 (time)	PUMP 4, 5 Fine mesh trip		
118	*	100 SV 1 (time)	ROD 991 New reflood heat transfer trip		
119	*	101 SV 1 (time)	ROD 991		
120	*	102 SV 1 (time)	ROD 991		
121	*				
122	*	ntse	ntct		
123	*	0	0		
124	*		ntsf		
125	*	idtp	isrt		
126	*	102	2		
127	*	setp(1)	setp(2)		
128	*	0.0	20.0		
129	*	dtsp(1)	dtsp(2)		
130	*	0.0	0.0		
131	*	ifsp(1)	ifsp(2)		
132	*	0	0		
133	*				
134	*	idtp	isrt		
135	*	0			
136	*		iset		
137	*****		itst		
138	*	component data			
139	*****		idsg		
140	*				
141	*****	type	num	id	ctitle
142	break		32	32	\$32\$ broken-hot-leg terminal
143	*	jun1	ibty	isat	ioff
144	*	32	1	3	1
145	*	ibtr	ibsv	nbtb	nbsv
146	*	0	1	10	nbrf
147	*	dxin	volin	alpin	tin
148	0.815976	0.0423948	0.0	615.3	150.1e+05
149	*	pain	concin	rblmx	poff
150	*	0.0	0.0	1.0e+20	belv
151	*	pscl	tlscl	tvsc1	pascl
152	*	1.0	1.0		consol
153	*	ptb	*	1.0	1.0
154	*	ptb	*	0.0	150.1e+05s
155	*	ptb	*	0.0191	1.0e+05s
156	*	ptb	*	1.0	2.5e+05s
157	*	ptb	*	5.0	3.0e+05s
158	*	ptb	*	32.0	3.6e+05s
159	*	ptb	*	52.0	3.34e+05s
160	*	ptb	*	70.0	3.17e+05s
161	*	ptb	*	100.0	3.0e+05s
162	*	ptb	*	310.0	2.7e+05s
163	*	ptb	*	500.0	2.7e+05e
164	*****	type	num	id	ctitle
165	break		42	42	\$42\$ broken-cold-leg terminal
166	*	jun1	ibty	isat	ioff
167	*	42	1	3	1
168	*	ibtr	ibsv	nbtb	nbsv
169	*	0	1	10	nbrf
170	*	dxin	volin	alpin	tin
171	1.0224006	0.0531200	0.0	615.5	150.4e+05
172	*	pain	concin	rblmx	poff
173	*	0.0	0.0	1.0e+20	belv
174	*	pscl	tlscl	tvsc1	pascl
175	*	1.0	1.0		consol
176	*	ptb	*	0.0	150.4e+05s
177	*	ptb	*	0.0191	1.0e+05s

```

178 * ptb    *      1.0      2.5e+05s
179 * ptb    *      5.0      3.0e+05s
180 * ptb    *     32.0      3.6e+05s
181 * ptb    *     52.0      3.34e+05s
182 * ptb    *     70.0      3.17e+05s
183 * ptb    *    100.0      3.0e+05s
184 * ptb    *    310.0      2.7e+05s
185 * ptb    *    500.0      2.7e+05s
186 *
187 *
188 end
189 *
190 ****
191 * time-step data *
192 ****
193 *
194 *      dtmin      dtmax      tend      rtwfp
195   1.0000e-06  5.0000e-03    0.1      1.0
196 *      edint      gfint      dmpint      sedint
197   0.5      0.05      2.0      0.5
198 *
199 *      dtmin      dtmax      tend      rtwfp
200  1.0000e-06  1.0000e-02    2.0      1.0
201 *      edint      gfint      dmpint      sedint
202   0.5      0.05      2.0      0.5
203 *
204 *      dtmin      dtmax      tend      rtwfp
205  1.0000e-06  2.5000e-02    6.0      1.0
206 *      edint      gfint      dmpint      sedint
207   2.0      0.2      3.0      2.0
208 *
209 *      dtmin      dtmax      tend      rtwfp
210  1.0000e-06    0.05    20.0      1.0
211 *      edint      gfint      dmpint      sedint
212   5.0      0.5      5.0      5.0
213 *
214 *      dtmin      dtmax      tend      rtwfp
215  1.0000e-06    0.01    70.0      1.0
216 *      edint      gfint      dmpint      sedint
217   10.0      0.5     10.0     10.0
218 *
219 *      dtmin      dtmax      tend      rtwfp
220  1.0000e-06    0.02    90.0      1.0
221 *      edint      gfint      dmpint      sedint
222   10.0      0.5     10.0     10.0
223 *
224 *      dtmin      dtmax      tend      rtwfp
225  1.0000e-06    0.04   120.0      1.0
226 *      edint      gfint      dmpint      sedint
227   10.0      0.5     10.0     10.0
228 *
229 *      endflag
230 -1.0000e+00

```

APPENDIX P

CODE-DATA COMPARISON FOR LOFT L2-6 WITH NEWRFD=1

The calculation results for the reflood option newrfd=1 are presented in this appendix. The set of plots presented is the same as that 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 LOFT L2-6 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 LOFT L2-6 do not use the TRAC grid-spacer model (see Section 4.4.5 for details). For reference purposes, the figure numbers for the two reflood options are listed below.

20-s Trip Figures		1-s Trip Figures	
newrfd=1	newrfd=3	newrfd=1	newrfd=3
P-1	5.1-10	P-18	5.1-27
P-2	5.1-11	P-19	5.1-28
P-3	5.1-12	P-20	5.1-29
P-4	5.1-13	P-21	5.1-30
P-5	5.1-14	P-22	5.1-31
P-6	5.1-15	P-23	5.1-32
P-7	5.1-16	P-24	5.1-33
P-8	5.1-17	P-25	5.1-34
P-9	5.1-18	P-26	5.1-35
P-10	5.1-19	P-27	5.1-36
P-11	5.1-20	P-28	5.1-37
P-12	5.1-21	P-29	5.1-38
P-13	5.1-22	P-30	5.1-39
P-14	5.1-23	P-31	5.1-40
P-15	5.1-24	P-32	5.1-41
P-16	5.1-25	P-33	5.1-42
P-17	5.1-26	P-34	5.1-43

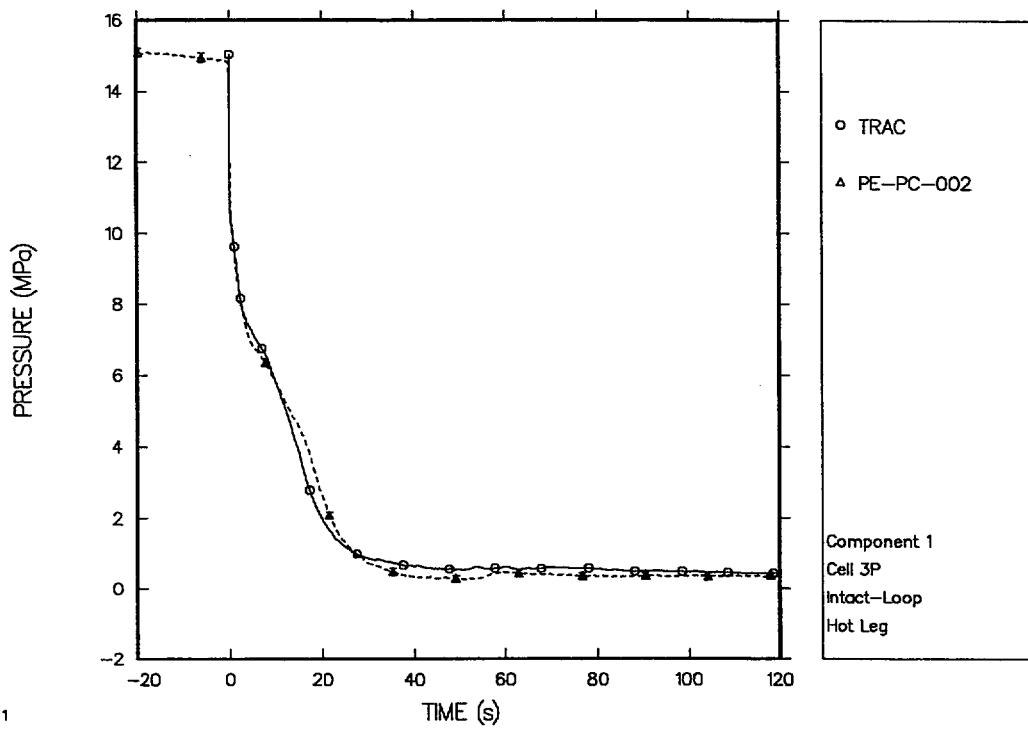


Fig. P-1. Intact-loop hot-leg pressure.

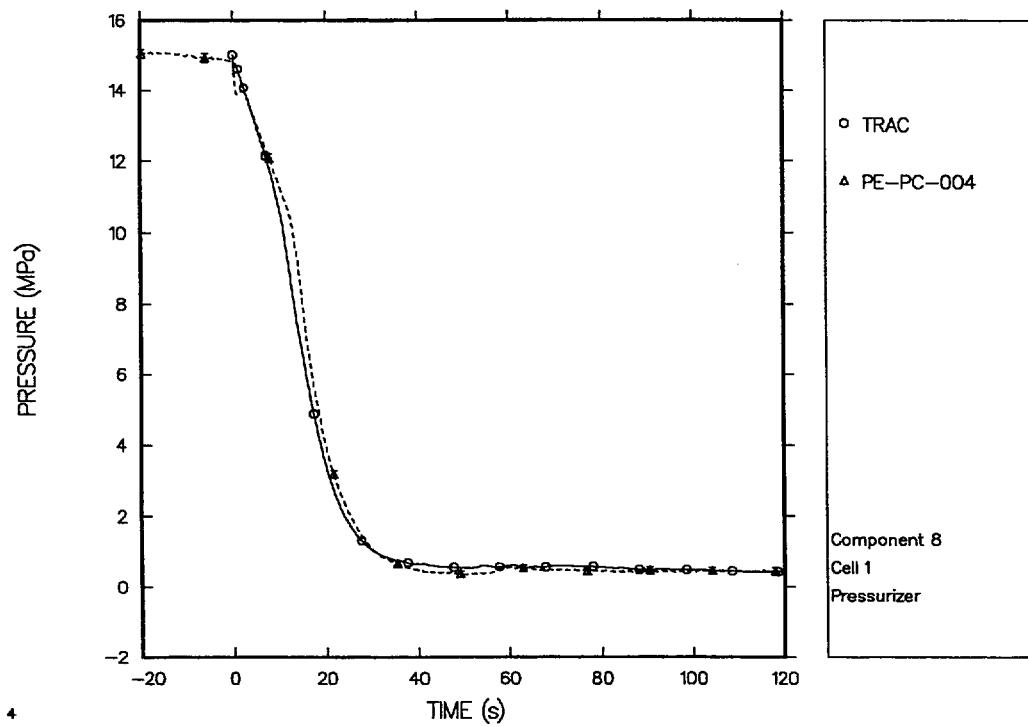
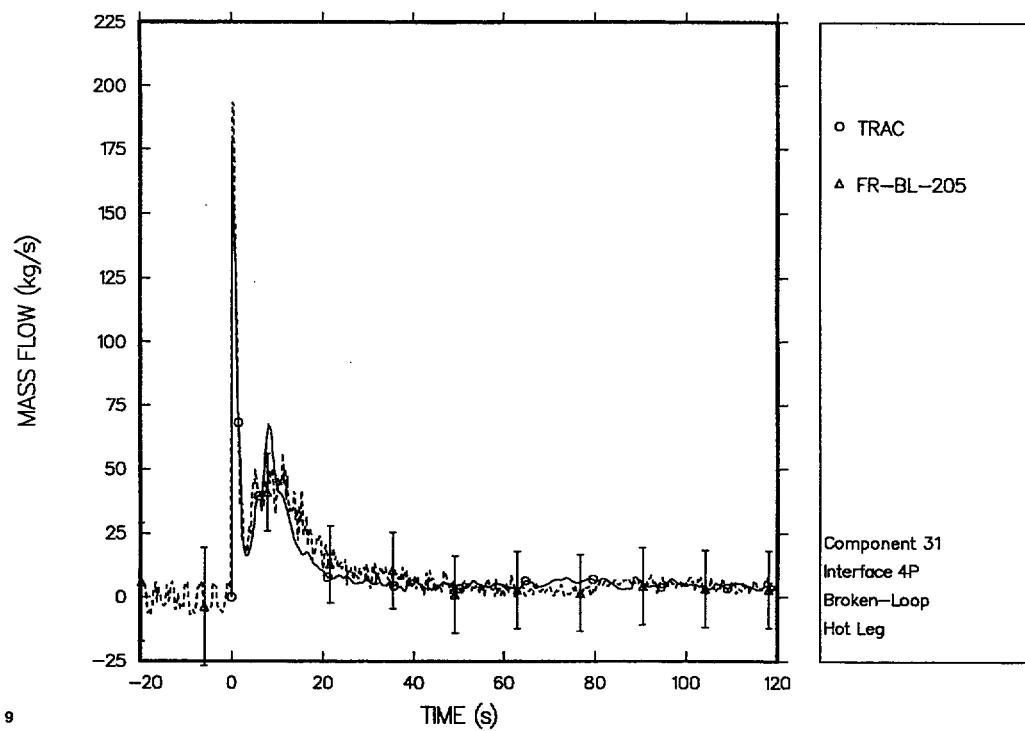
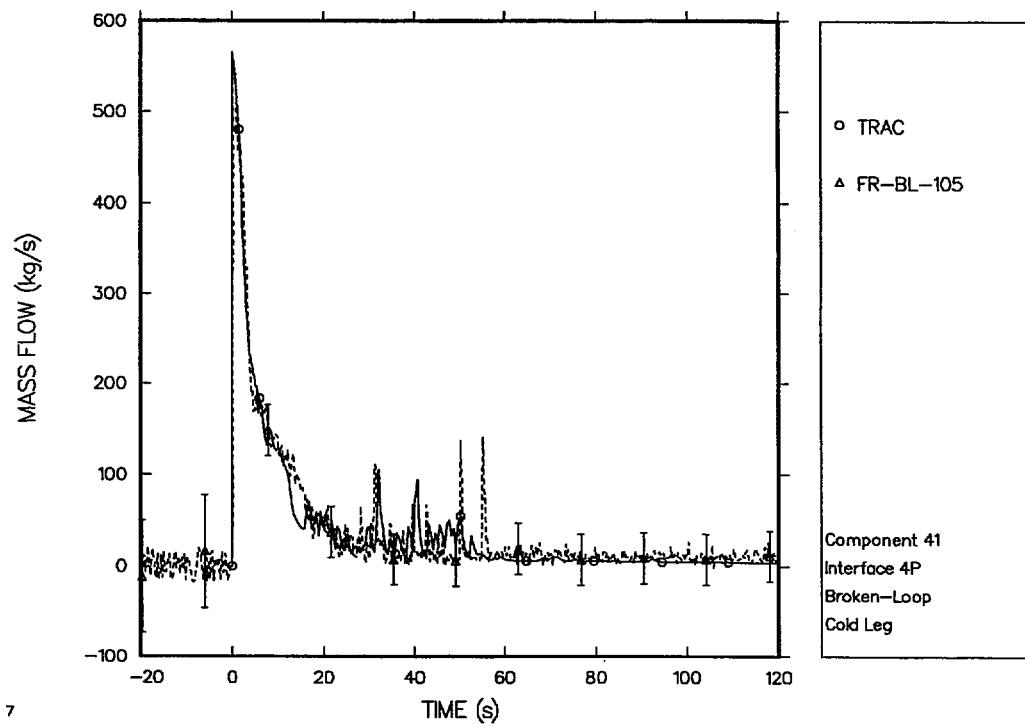


Fig. P-2. Pressurizer pressure.



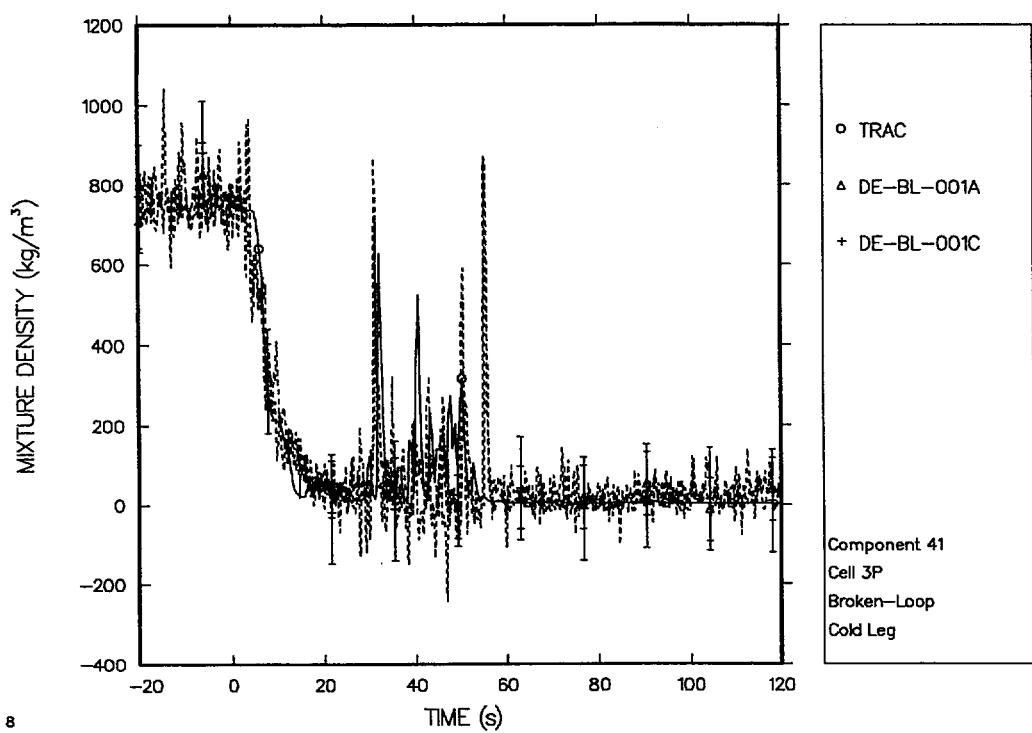
9

Fig. P-3. Broken-loop hot-leg mass flow.



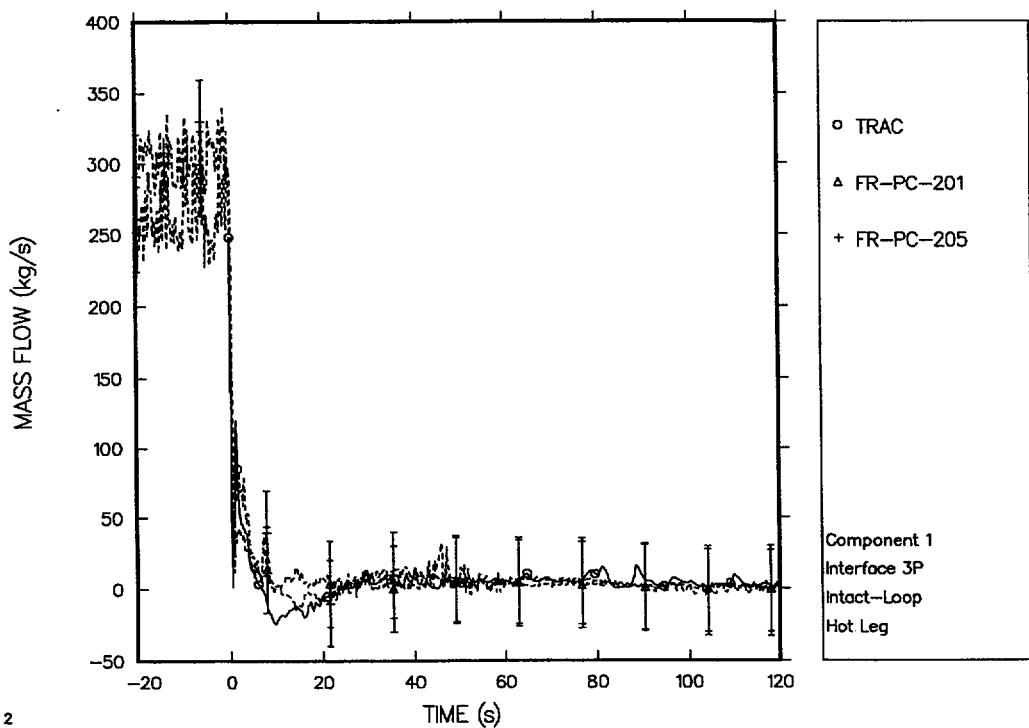
7

Fig. P-4. Broken-loop cold-leg mass flow.



8

Fig. P-5. Broken-loop cold-leg mixture density.



2

Fig. P-6. Intact-loop hot-leg mass flow.

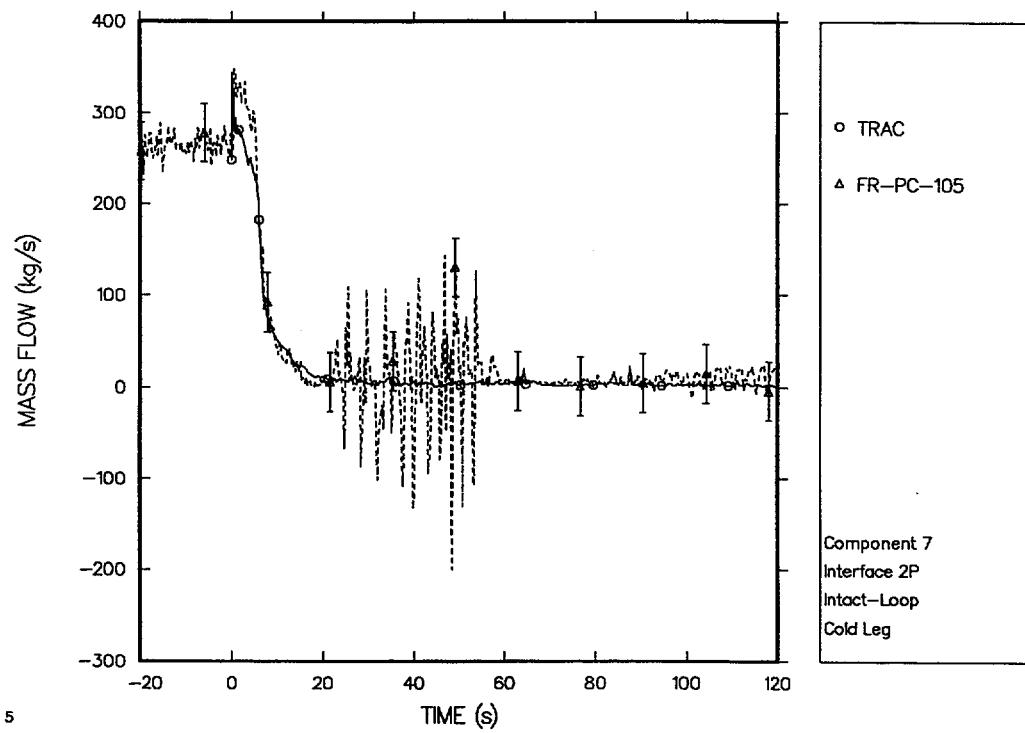


Fig. P-7. Intact-loop cold-leg mass flow.

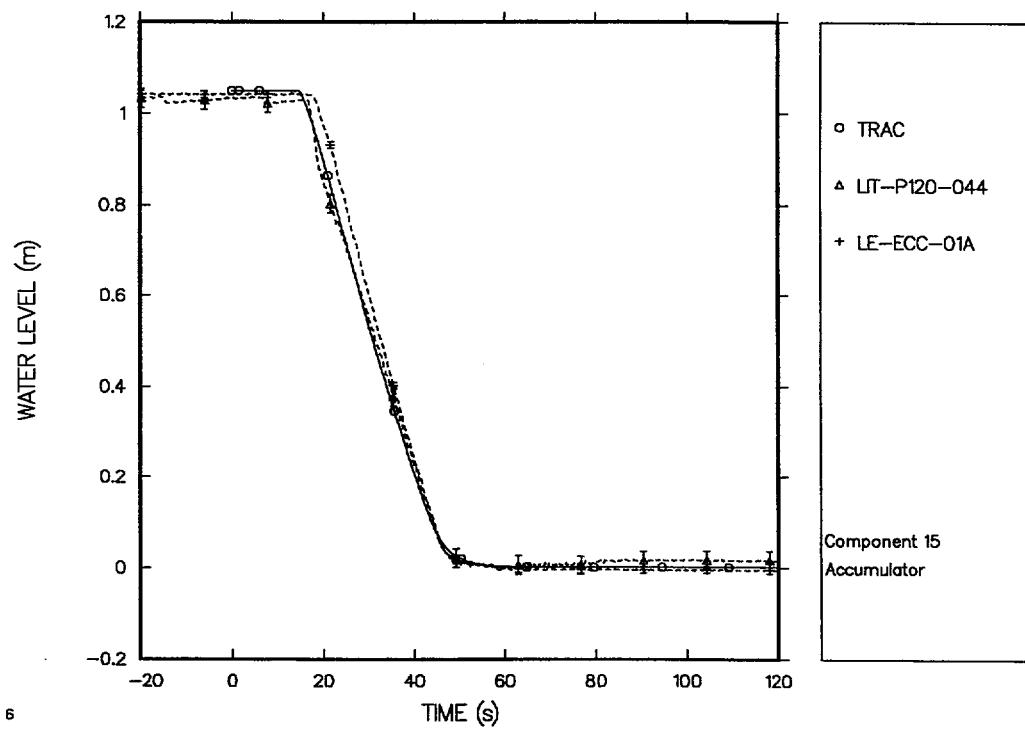


Fig. P-8. Accumulator level comparison.

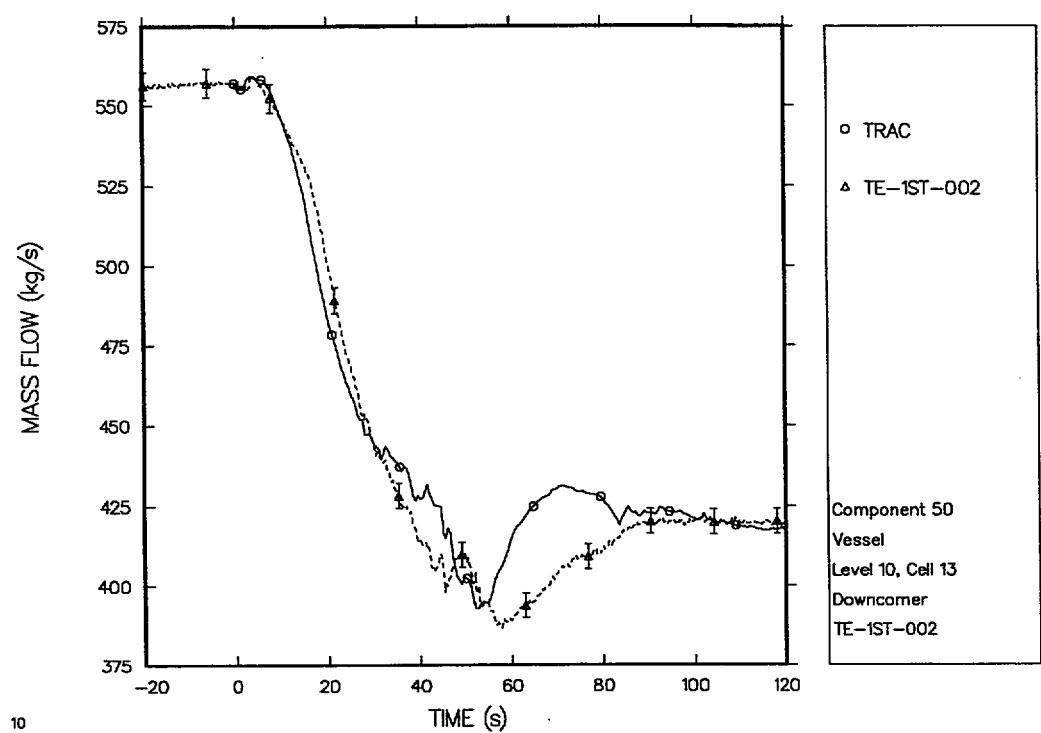


Fig. P-9. Downcomer liquid-temperature comparison

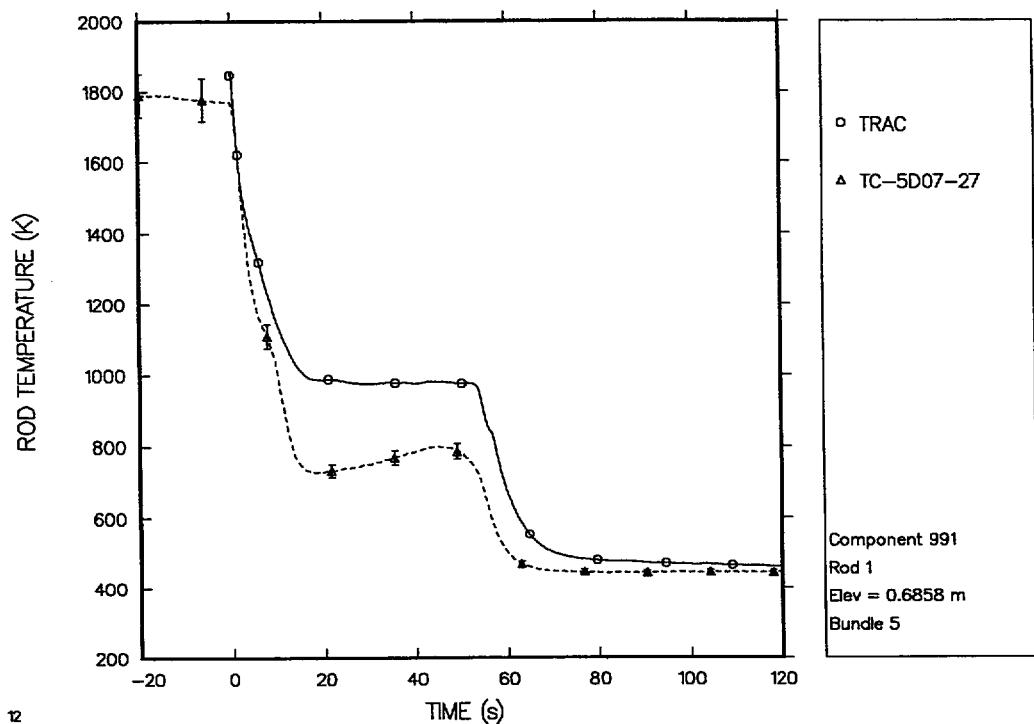


Fig. P-10. Centerline fuel, temperature; Rod 1 elevation = 0.6858 m.

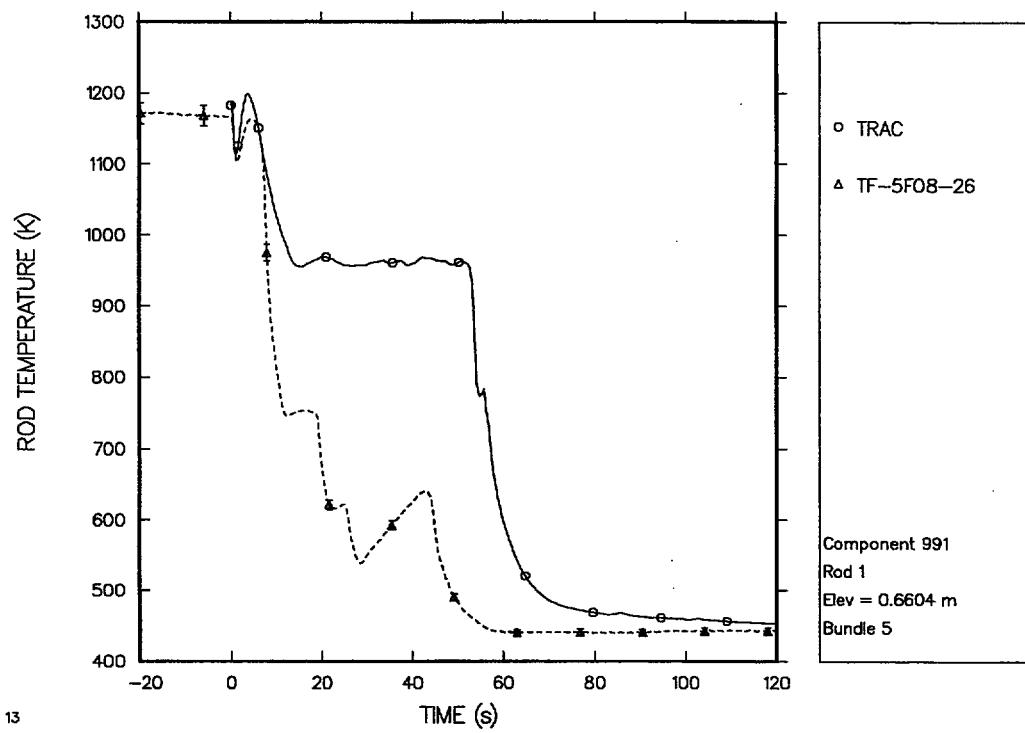


Fig. P-11. Pellet surface temperature; Rod 1 elevation = 0.6604 m.

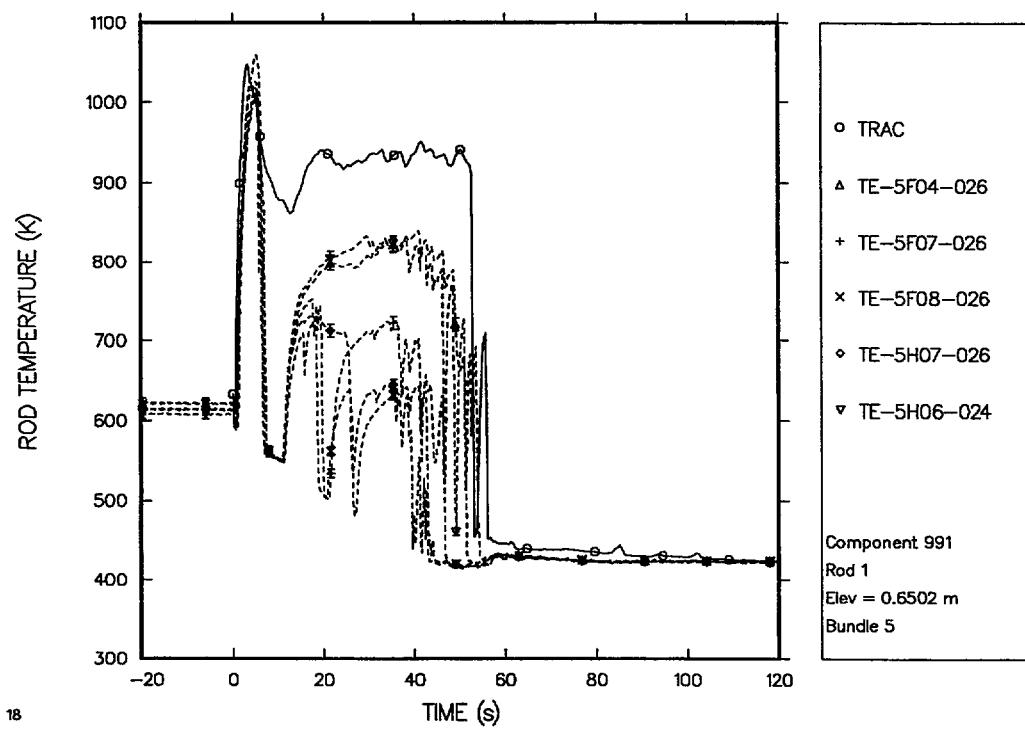
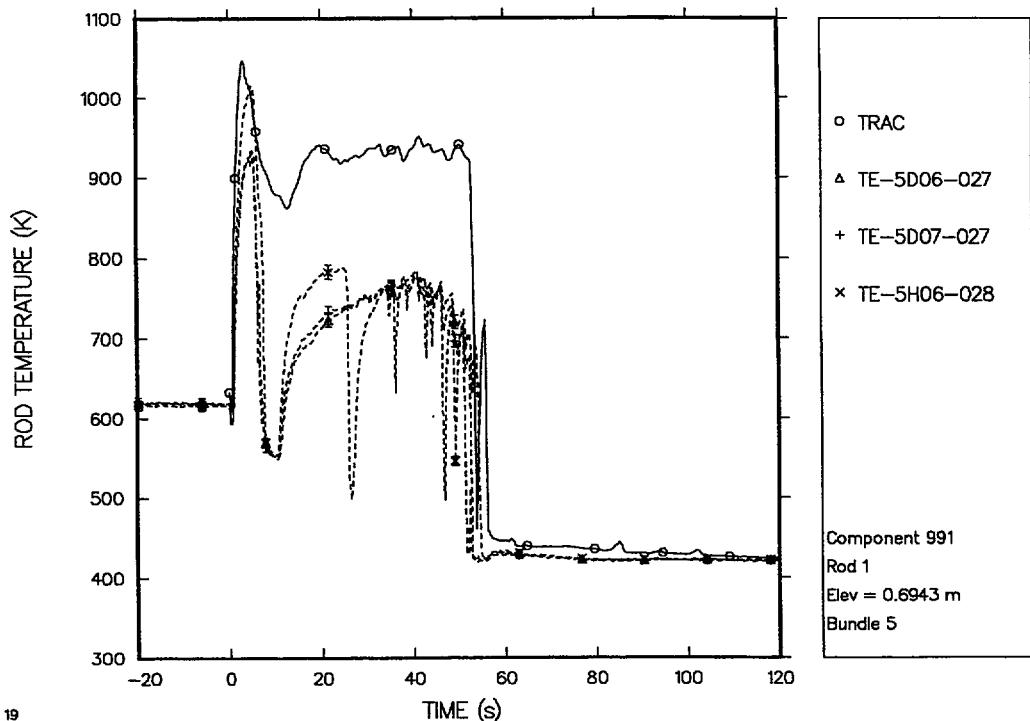
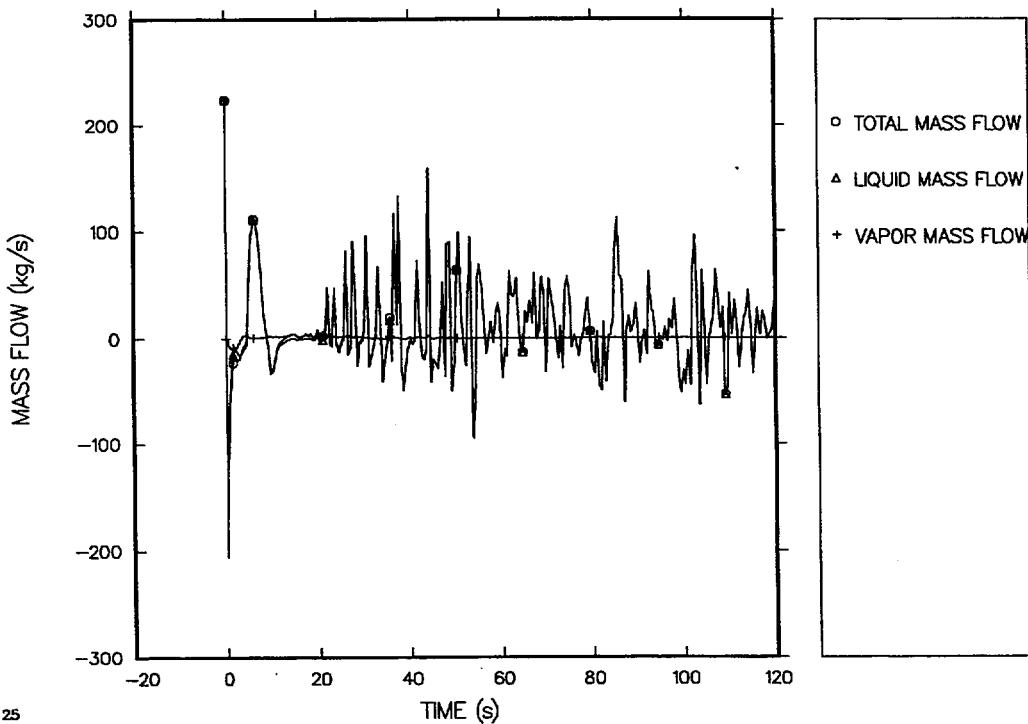


Fig. P-12. Cladding surface temperature; Rod 1 elevation = 0.6502 m.



19

Fig. P-13. Cladding surface temperature; Rod 1 elevation = 0.6943 m.



25

Fig. P-14. Calculated core-inlet mass flow.

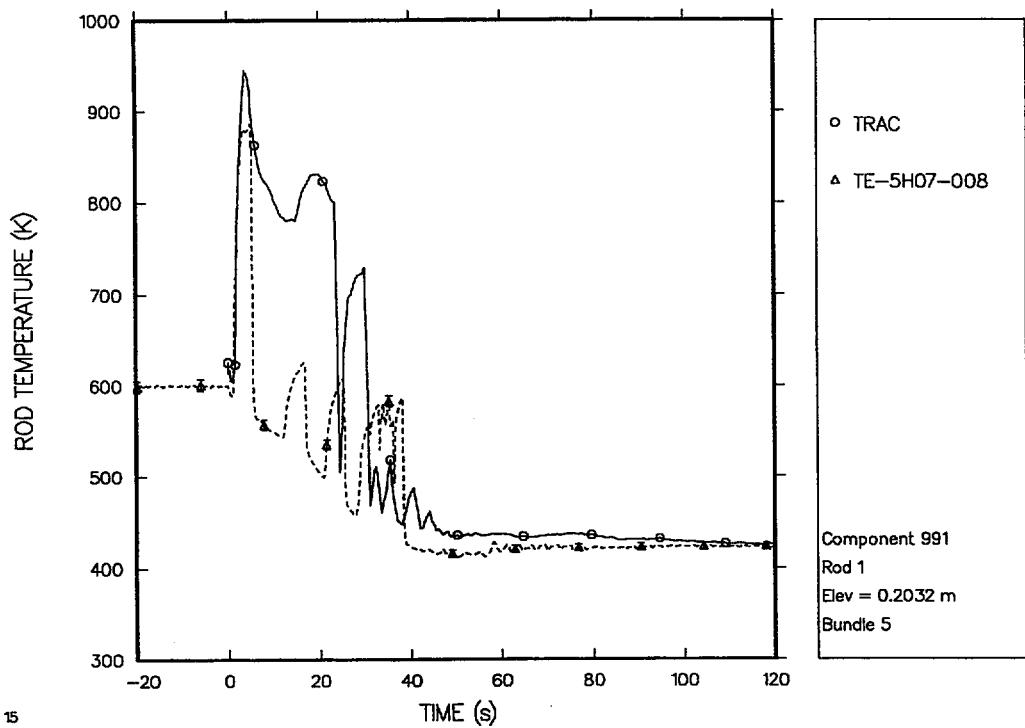


Fig. P-15. Cladding surface temperature; Rod 1 elevation = 0.2032 m.

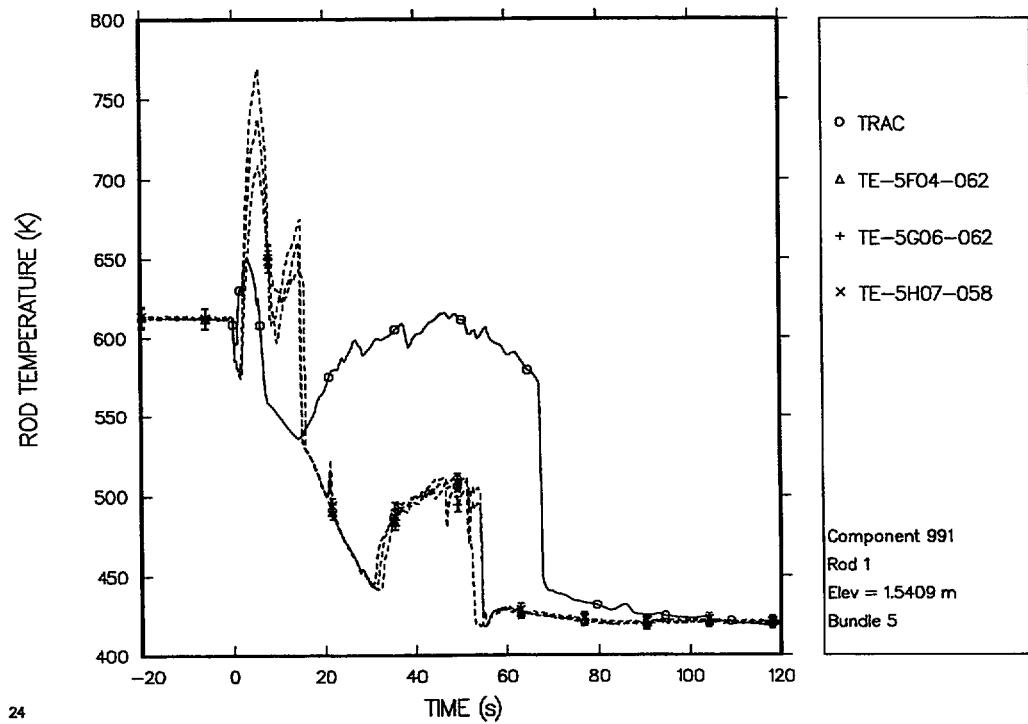
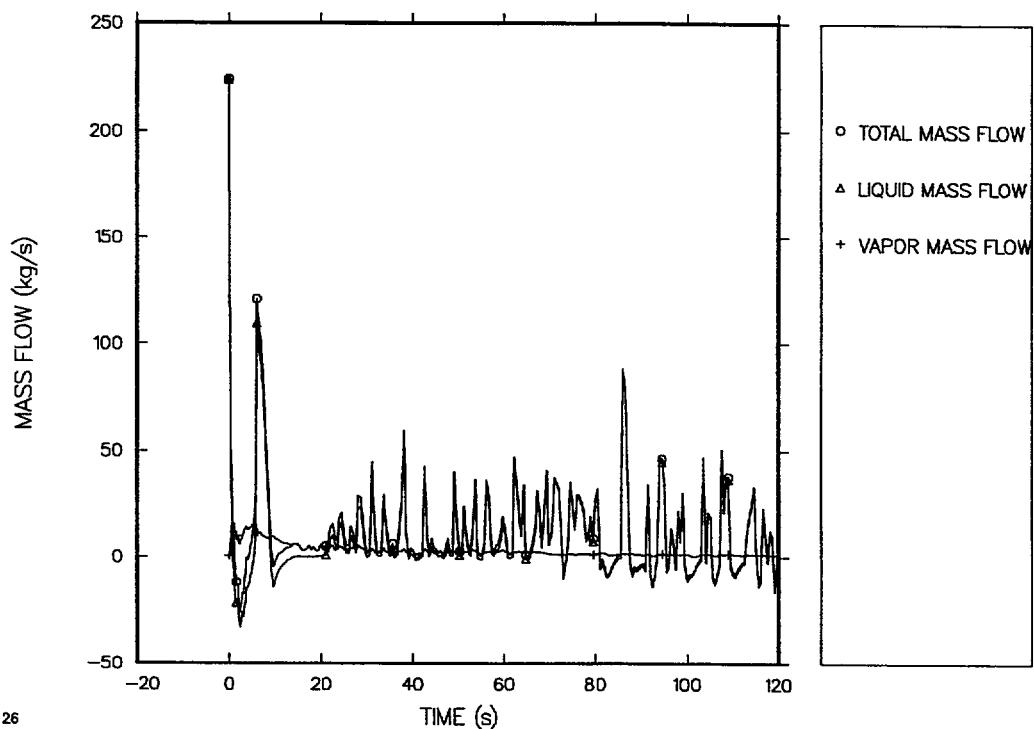


Fig. P-16. Cladding surface temperature; Rod 1 elevation = 1.5409 m.



26

Fig. P-17. Calculated core-outlet mass flow.

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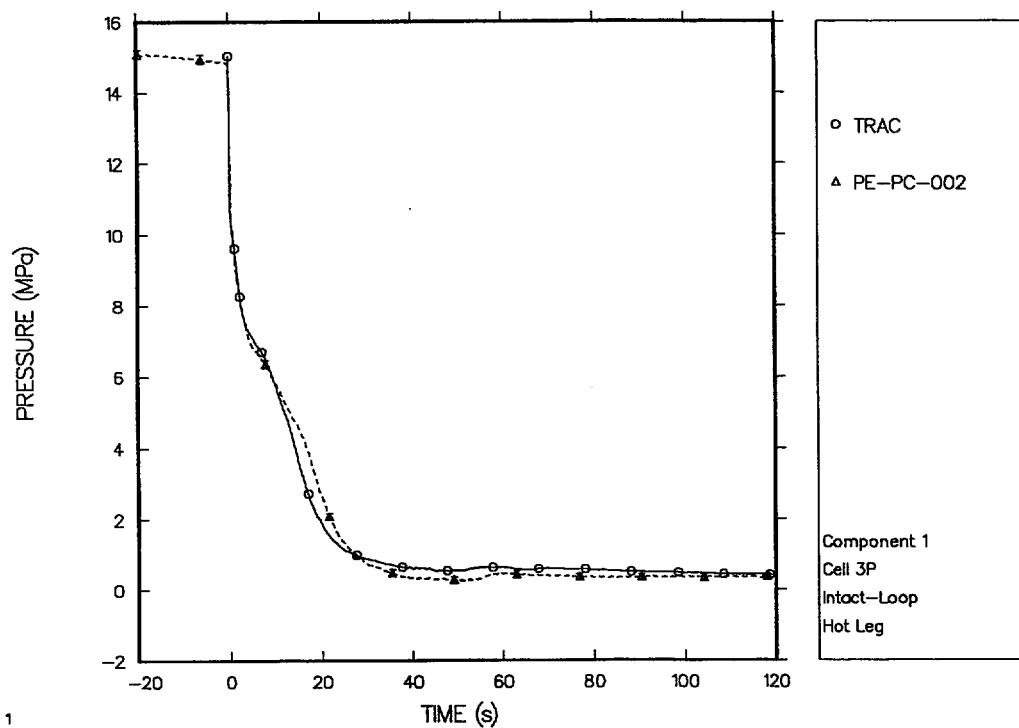


Fig. P-18. Intact-loop hot-leg pressure, reflood trip at 1 s.

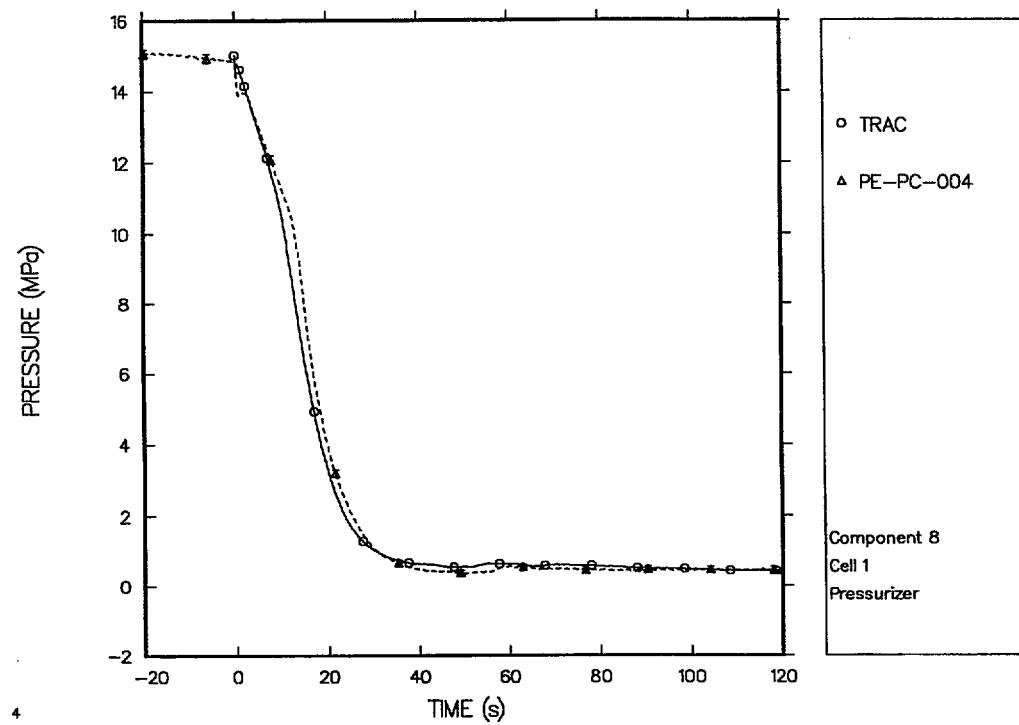


Fig. P-19. Pressurizer pressure, reflood trip at 1 s.

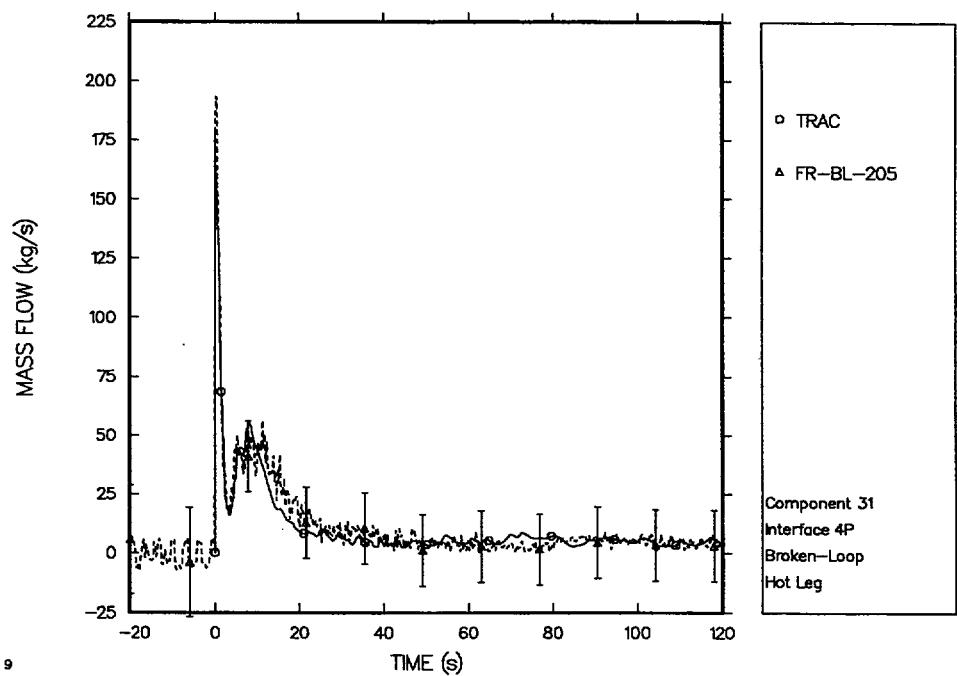


Fig. P-20. Broken-loop hot-leg mass flow, reflood trip at 1 s.

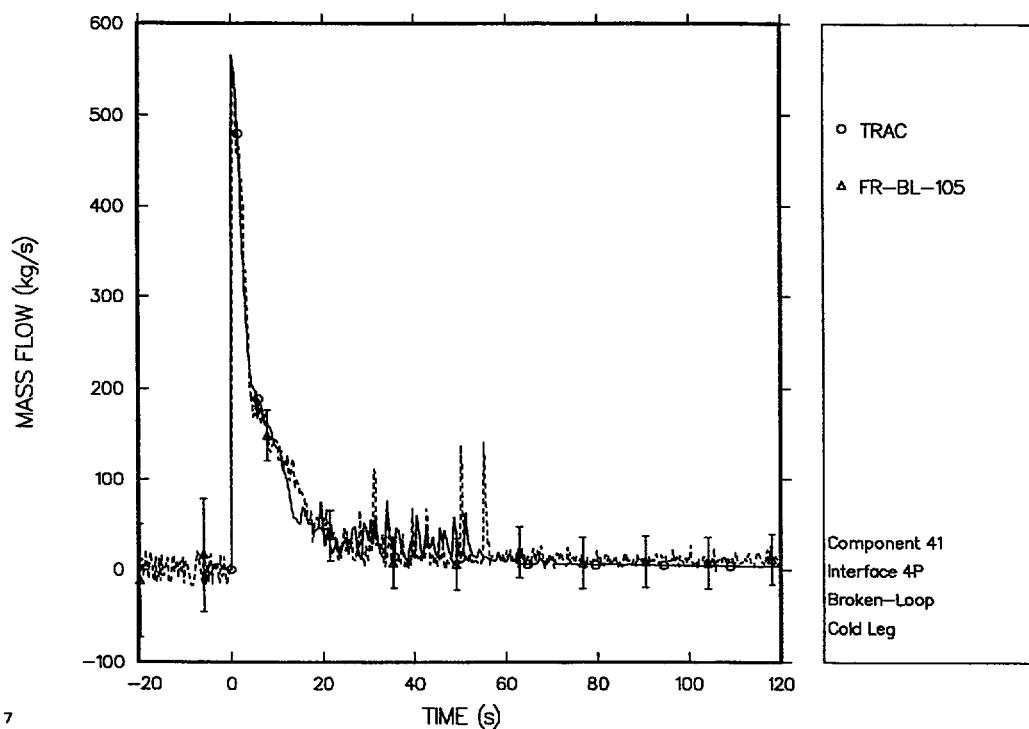


Fig. P-21. Broken-loop cold-leg mass flow, reflood trip at 1 s.

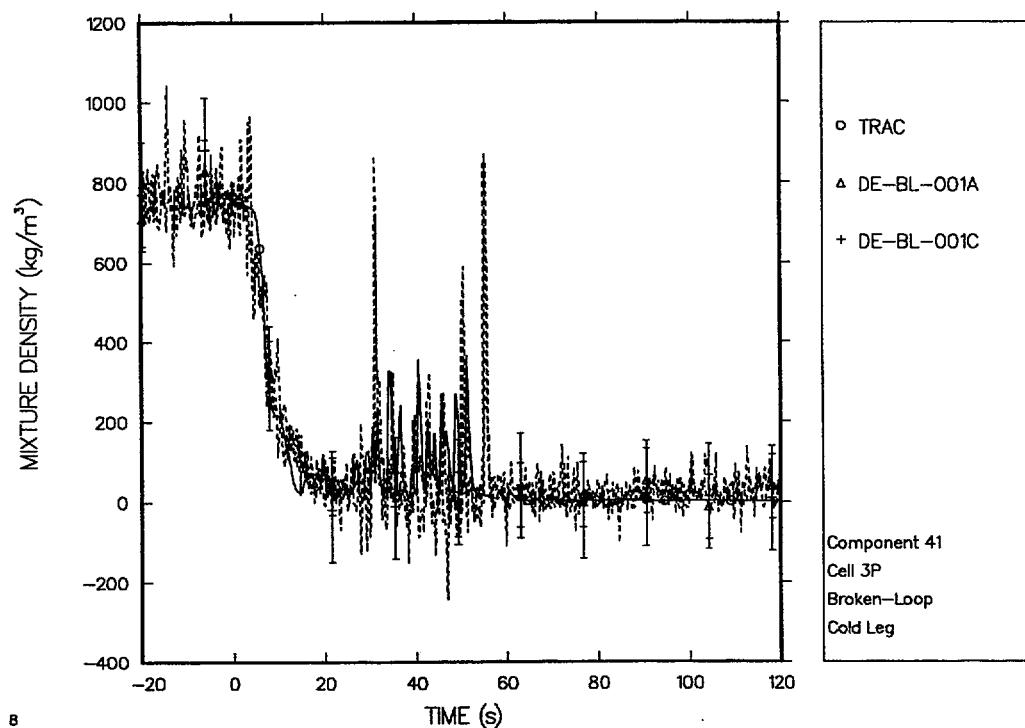


Fig. P-22. Broken-loop cold-leg mixture density, reflood trip at 1 s.

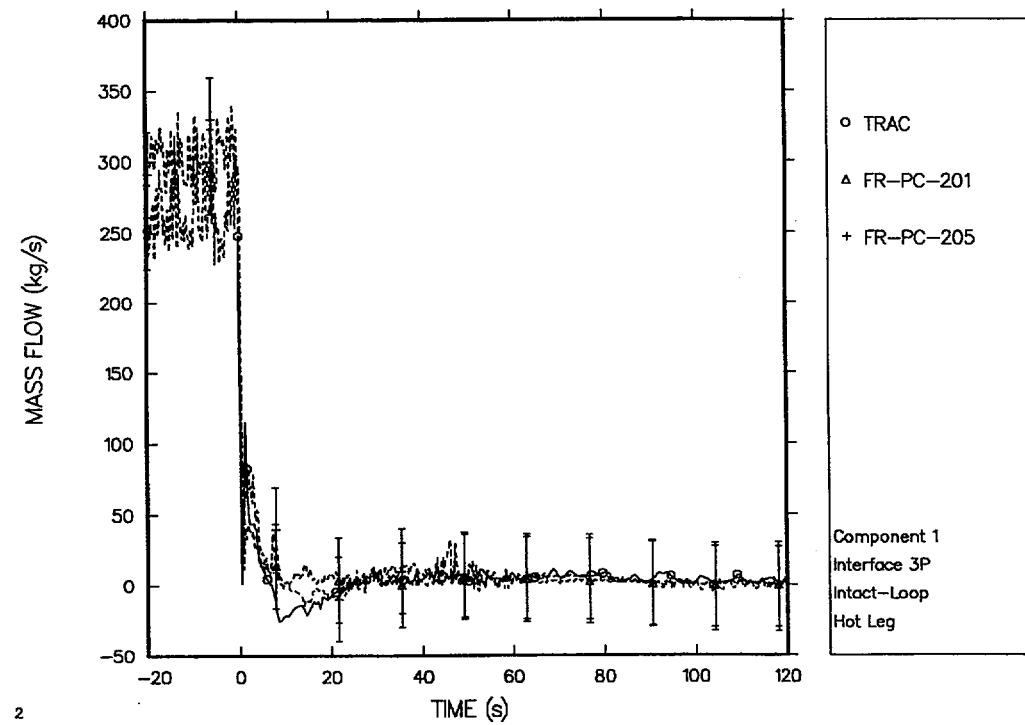


Fig. P-23. Intact-loop hot-leg mass flow, reflood trip at 1 s.

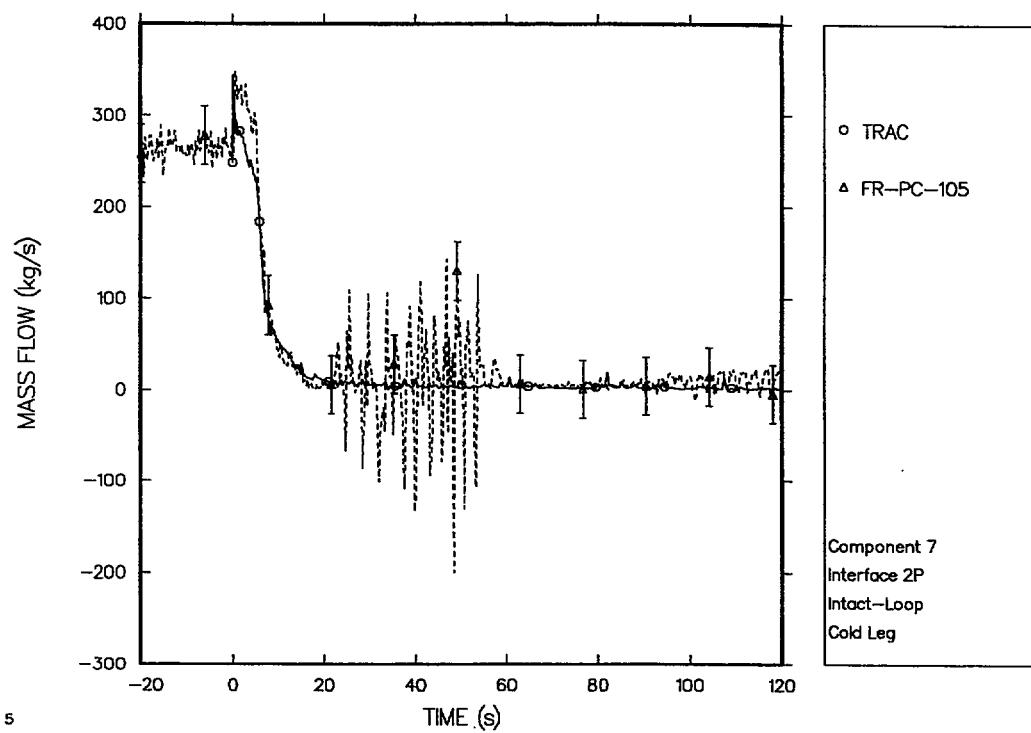


Fig. P-24. Intact-loop cold-leg mass flow, reflood trip at 1 s.

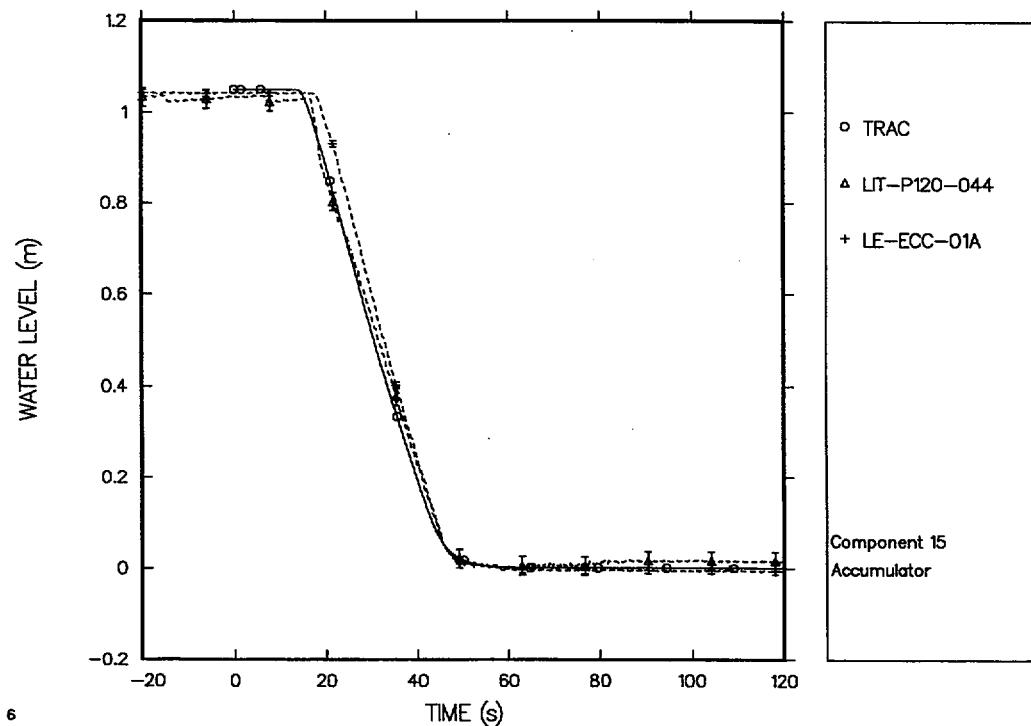


Fig. P-25. Accumulator level comparison, reflood trip at 1 s.

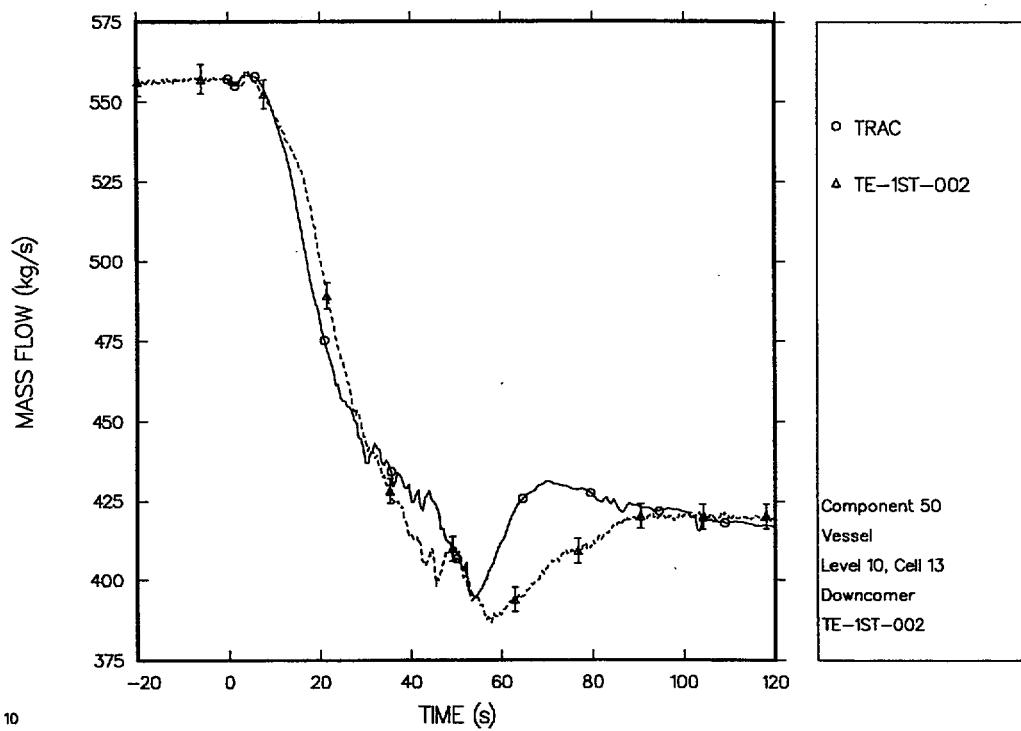


Fig. P-26. Downcomer liquid-temperature comparison, reflood trip at 1 s.

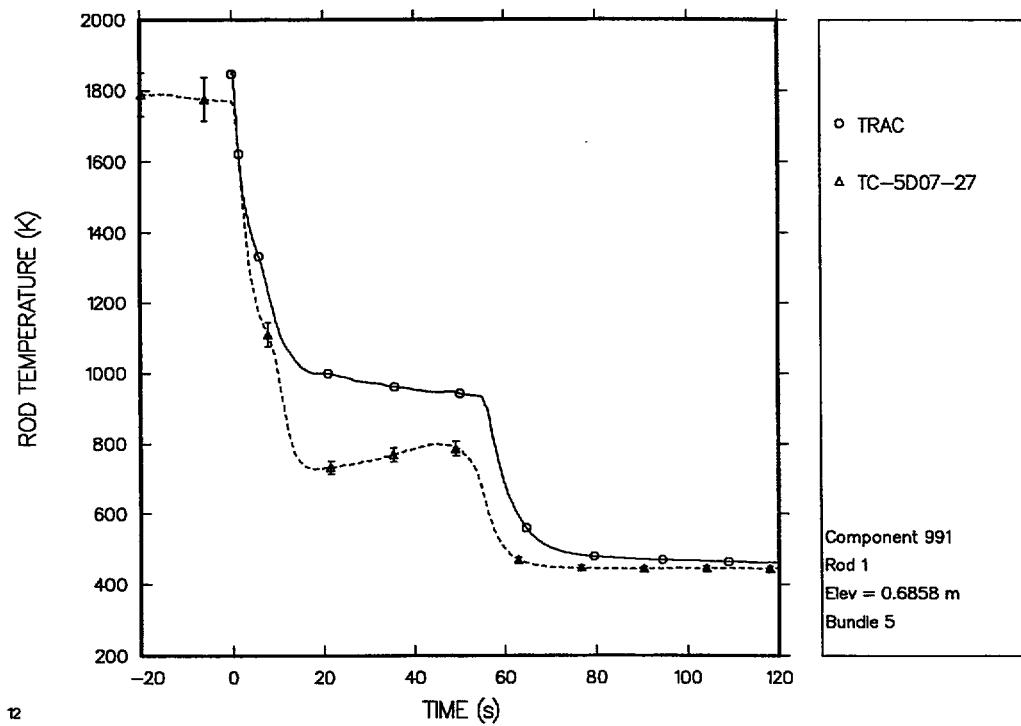


Fig. P-27. Centerline fuel, temperature; Rod 1 elevation = 0.6858 m, reflood trip at 1 s.

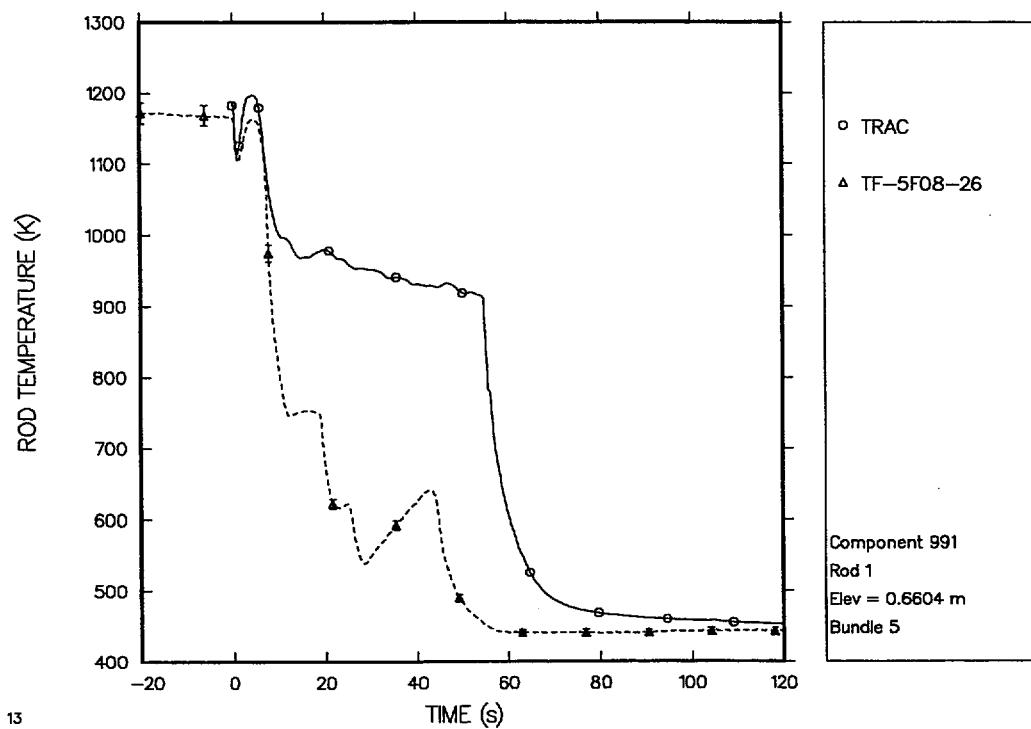


Fig. P-28. Pellet surface temperature; Rod 1 elevation = 0.6604 m, reflood trip at 1 s.

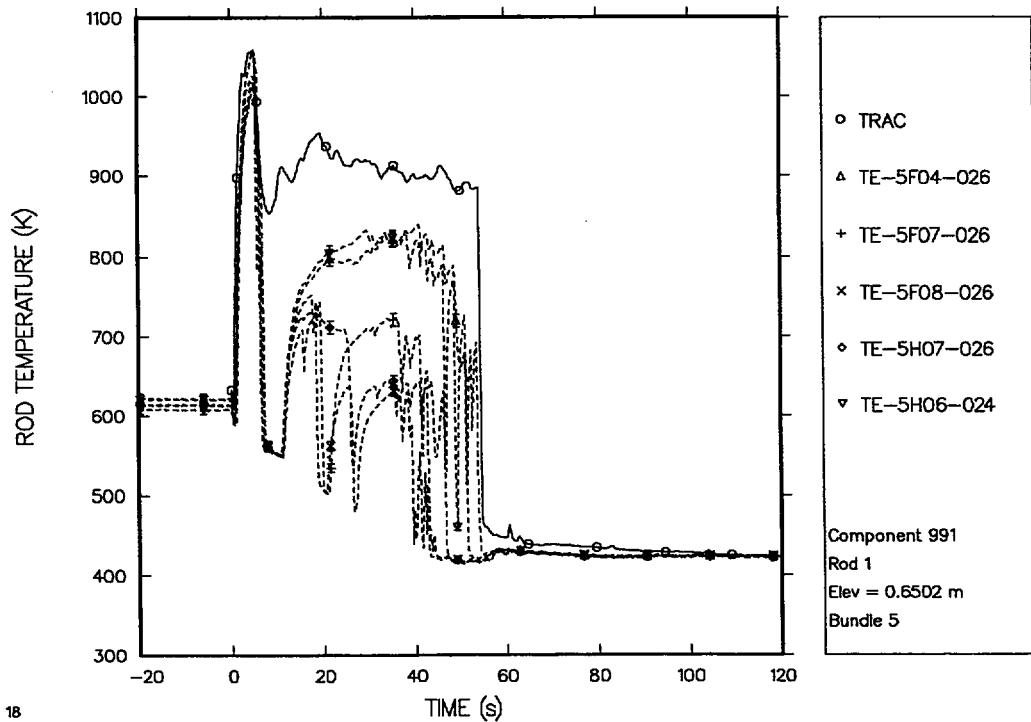


Fig. P-29. Cladding surface temperature; Rod 1 elevation = 0.6502 m, reflood trip at 1 s.

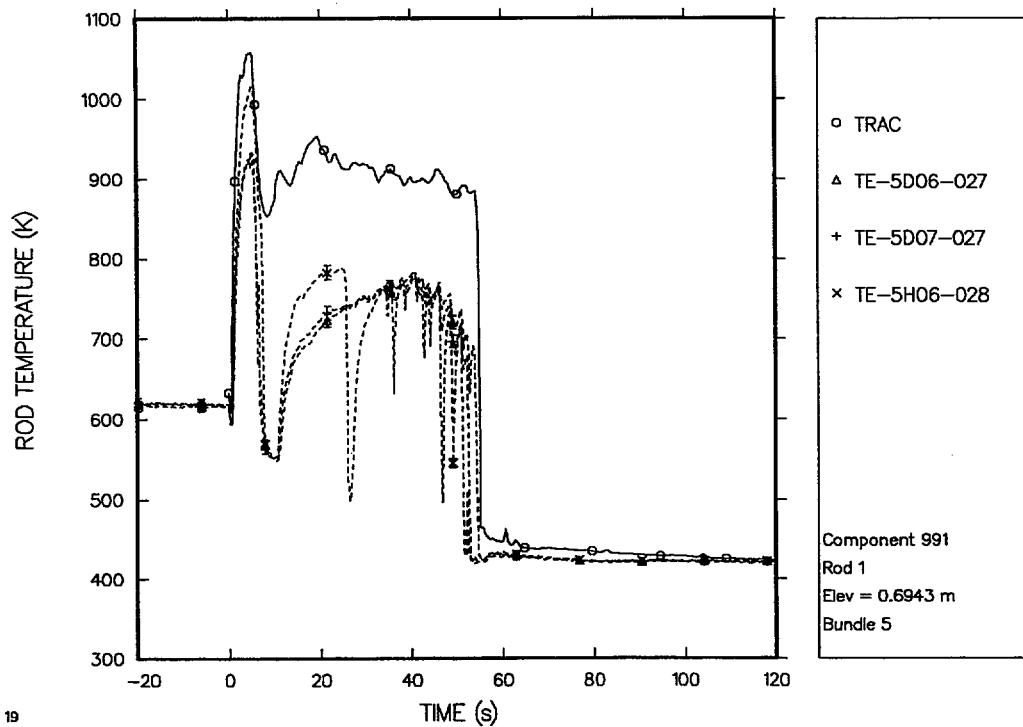


Fig. P-30. Cladding surface temperature; Rod 1 elevation = 0.6943 m, reflood trip at 1 s.

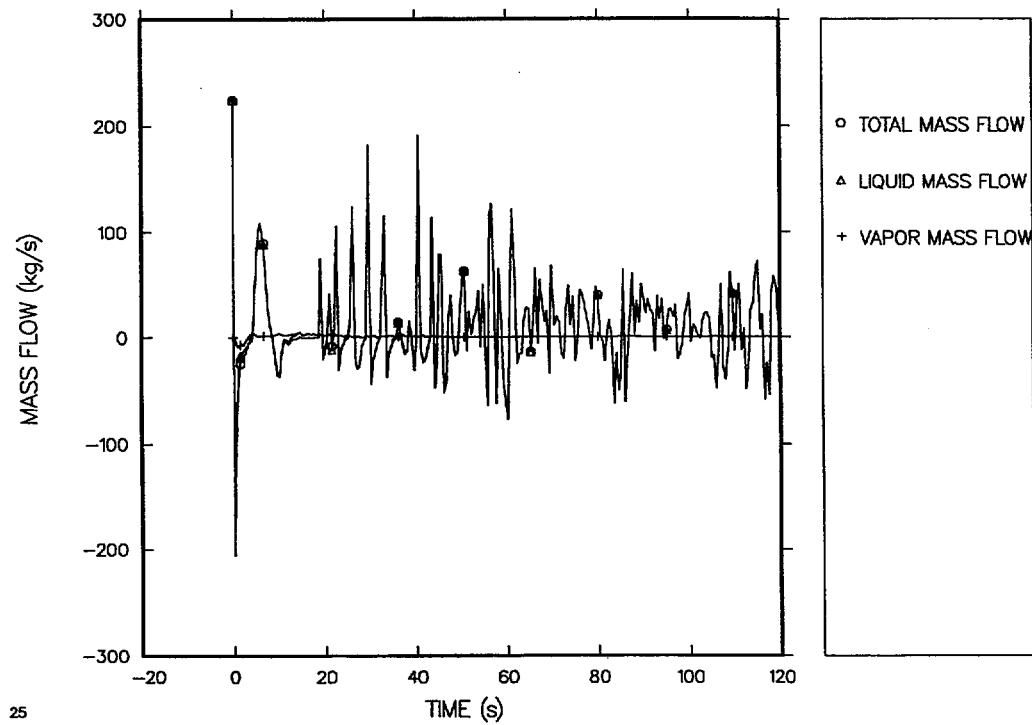


Fig. P-31. Calculated core-inlet mass flow, reflood trip at 1 s.

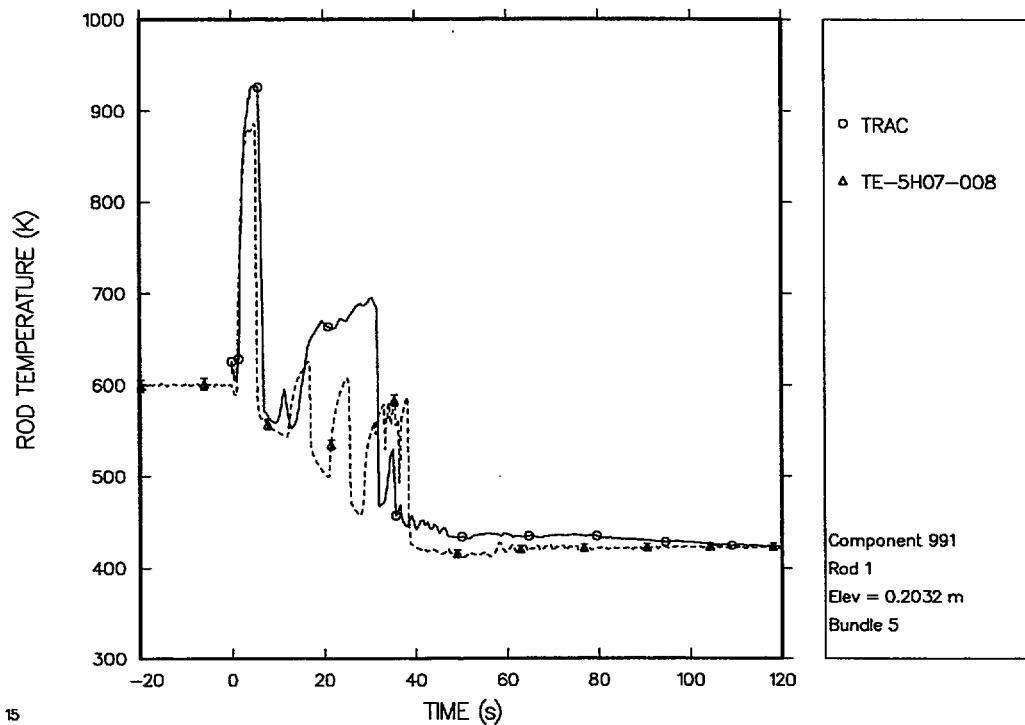


Fig. P-32. Cladding surface temperature; Rod 1 elevation = 0.2032 m, reflood trip at 1 s.

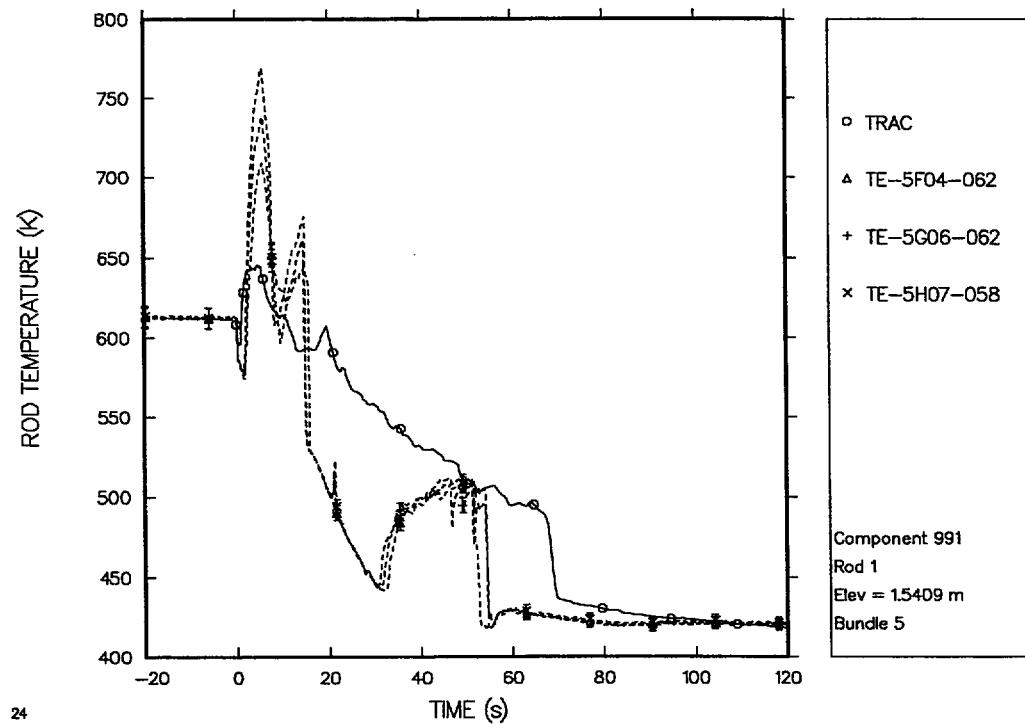
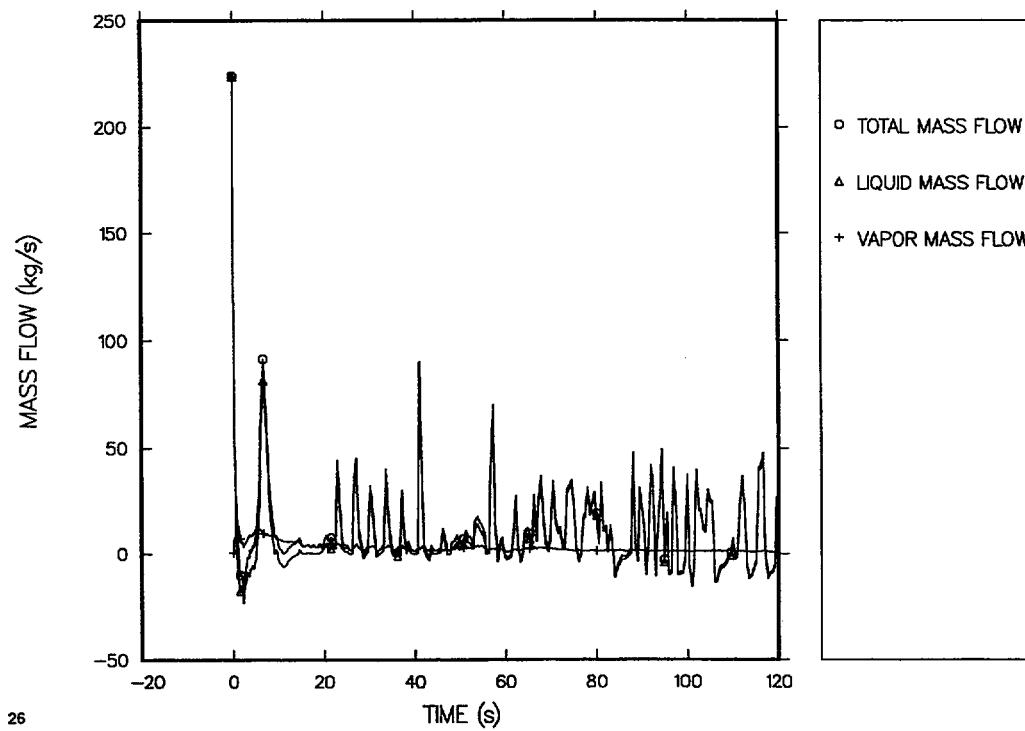


Fig. P-33. Cladding surface temperature; Rod 1 elevation = 1.5409 m, reflood trip at 1 s.



26

Fig. P-34. Calculated core-outlet mass flow, reflood trip at 1 s.

APPENDIX Q

LOFT L6-1 STEADY-STATE AND TRANSIENT INPUT LISTINGS FOR 1D VESSEL MODEL

This appendix contains the steady-state and transient-restart input listings for the LOFT L6-1 1D vessel model assessment problem as follows:

<u>Problem</u>	<u>Page</u>
1. LOFT L6-1 steady-state input listing for 1D vessel model	Q-2
2. LOFT L6-1 transient input listing for 1D vessel model	Q-39

LOFT L6-1 STEADY-STATE INPUT LISTING FOR 1D VESSEL MODEL

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1 free format
2 *      1       2       3       4       5       6       7       8
3 *234567890123456789012345678901234567890123456789012345678901234567890
4 *
5 ****
6 * main data *
7 ****
8 *
9 *      numctr      ieos      inopt      nmat
10 *      2          0          1          0
11 loft experiment 16-1 : posttest specifications modeled with a 1-d vessel
12 constrained steady-state calculation with nature of transient defined
13 *
14 * Test description problem: Pump 1 (component 5) is set for a CSS controlled
15 *      flow of 250 kg/s and Pump 2 (component 4) is set for 240 kg/s. This
16 *      difference needs to be confirmed from the data or otherwise resolved.
17 *
18 * modified by Thad Knight, 2/13/96
19 * deck from /devass/mod2-5.3.05/loft-16-1/dvess.s
20 *      Initial changes amount to converting STGEN component to 2 PIPEs, 2 TEES, and
21 *      2 heat structures. I have maintained the component numbering scheme. The
22 *      structural mass of the steam generator needs to be added later.
23 *      Renumbered the first array values for NHCOMO and NHCELLO in rod 99 to avoid
24 *      warning messages at the start of the run.
25 *      Added input [INOPTS, user-defined units-name data, and additional
26 *      control-block data cards (cards 2 and 4 as required)] to turn on
27 *      units labeling and conversion.
28 *      Changed heat structure component for the core to number 900.
29 *      Corrected some CTITLE information and modified others to be more
30 *      descriptive.
31 *      Renoded JCELLs in components 1, 3, 6, 7, 11, 21, 22, 29, 30, 31, 33, 34,
32 *      36, 40, 43, 73, 74, 83, 95, and 96 to resolve warning messages from
33 *      FEMOM about area changes in the vicinity of JCELL. In general, I changed
34 *      arrays DX, VOL, FA, FRIC, and GRAV for these components. I changed
35 *      other arrays as necessary to fill them. Also, I factored the changes
36 *      across junctions 1, 9, 29, 34, 37, 45, and 74 to maintain consistency
37 *      across junctions. I maintained the HDs on each interface of the JCELLs
38 *      because changing them would change the nonzero GRAVs at the first
39 *      interface of the side leg; I did this by duplicating HD(old JCELL) and
40 *      HD(old JCELL+1).
41 *      Changed NFF=-1 to +1 at the JCELL+1 interfaces in components 22, 30, and 33.
42 *      The changes avoid warning messages, and there are no longer area changes
43 *      at those interfaces). I set NFF to a -1 at the JCELL+2 interfaces
44 *      in those components to calculate the loss coefficient associated with the
45 *      area change.
46 *      I ran a null transient in which I replaced the two PRIZER components with
47 *      PIPEs and FILL 35 at the top of the vessel with a BREAK. I manually set
48 *      all void fractions to 0.0, pressures to 1.5 MPa, air partial pressures to
49 *      0.0, liquid and wall temperatures to 500.0 K, and velocities to 0.0. I
50 *      also set all powers to zero and pump speeds to zero and disabled the
51 *      constrained steady state controllers. The initial run revealed many
52 *      velocities > 0.1 m/s. I reevaluated all of the GRAVs and made the
53 *      following changes to resolve elevation errors:
54 *      Component 31: I changed the sign of all GRAVs in the main run of the
55 *      component to better represent the actual LOFT geometry. Then to
56 *      correct a -0.1567 m elevation difference down the pipe, I
57 *      changed GRAV(7) from +1.0 to +0.72818405 (forced JUN1 and JUN2
58 *      to the same elevation).
59 *      Component 73: I changed GRAV(2) in the main leg from +1.0 to
60 *      +0.98972962 to force the implied elevation difference between
61 *      hot and cold legs through the pump suction to 0.0 (error had the
62 *      Junction 66 0.0055 m lower than Junction 74).
63 *      Component 73: I changed GRAV(2) in the side leg from +0.25395 to
64 *      +0.06427634 to force the elevation difference between Junctions
65 *      45 and 74 to 0.0 as implied by the recirculation line from the
66 *      broken hot leg to the pump suction (error had Junction 74
67 *      0.9479 m lower than Junction 45).
68 *      Component 10: I increased the length of cells 1 and 2 from 0.56600 m
69 *      to 0.70537663 m to force the elevation difference between the
70 *      JCELLs of components 1 and 11 to 0.0 as implied by the
71 *      pressurizer spray line (the error had component 11 0.2788 m
72 *      higher than component 1). I changed the volumes of the two
73 *      cells from 8.2030e-4 m^3 to 1.0223e-03 m^3 to preserve the
74 *      VOL/DX.
75 *      Component 41: I changed GRAV(2) in the side leg from 0.1990 to
76 *      0.19899989 to force the JCELLs of components 41 and 31 to the
77 *      same elevation as implied by the reflood assist bypass line
78 *      (through Junction 43) (the error had component 41 4.6e-07 m
79 *      lower than component 31). This error appears to have been the
80 *      result of extracting the input from a TRCDMP file at some time
81 *      in the past.
82 *      Components 21 and 22: I changed GRAV(1) and GRAV(2) on the side leg
83 *      of component 21 and GRAV(1) in the main leg of component 22 from
84 *      -0.33763 to -0.33759606 to correct an elevation error of
85 *      -5.586e-05 m in the secondary loop defined by Junctions 24, 21,
86 *      23, and 24. This error appears to have been the result of
87 *      extracting the input from a TRCDMP file at some time in the past

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88 * and of remodelling JCELL of component 21 (described above).
 89 * Components 29 and 96: I changed GRAV(1) and GRAV(2) in the side leg
 90 * of component 29 and GRAV(1) in the main leg of component 96 to
 91 * -1.0 from the original values of -9.9985e-01, -0.99963215, and
 92 * -0.99963215 and DX(1) in the side leg of component 29 from 0.1 m
 93 * to 0.1006805 m to correct a 0.7765 mm elevation error between
 94 * the cold and hot legs implied by the path defined by Junctions
 95 * 40, 83, 38, 37, 95, 35, 96, and 34 (cold leg was low relative to
 96 * the hot leg). I also changed VOL(1) on the side leg of
 97 * component 29 from 1.4192e-02 m^3 to 0.01428858 m^3 to preserve
 98 * VOL/DX.
 99 * Component 96: I changed DX(1) in the side leg of component 96 from
 100 * 0.7955 m to 0.79549 m to correct a 5.0e-06 m elevation error
 101 * around the loop defined by Junctions 96, 35, 97, and 96. This
 102 * error was the result of remodelling JCELL in component 96
 103 * (described above). To the accuracy that the volumes are input
 104 * and the original ratio VOL/DX, the change in DX(1) has no impact
 105 * on VOL(1).
 106 * Component 83: I changed GRAV(1) in the side leg of component 83 from
 107 * 0.0 to -0.0017408 to correct a 0.79 mm elevation error around
 108 * the loop defined by Junctions 37, 38, 84, 86, and 37.
 109 * With these changes the null transient run to 1000 s yielded maximum
 110 * velocities of 2.012e-03 m/s in components 95 and 96. All other velocities
 111 * were less than 1.0e-03.
 112 * Remodelled components 20 and 22 so that there is a one-to-one correspondence in
 113 * cells to improve the connections of the heat structure between the
 114 * boiler/riser and the secondary downcomer. This change involved remodelling
 115 * cell 5 of component 20 and cells 1 and 5 of component 22. I reset GRAV(1)
 116 * and GRAV(2) of the component 21 side leg and GRAV(1) and new GRAV(2) of
 117 * component 22 main leg to preserve the elevation closure of the secondary
 118 * loop defined by Junctions 24, 21, 23, and 24. I reran the null transient,
 119 * and maximum velocity in this loop is 4.861e-04 m/s.
 120 * Added an additional 9 heat structures (903-911) to represent the structural
 121 * mass of the steam generator--secondary downcomer wall, secondary shell,
 122 * primary-side plenum baffle, inlet plenum wall, outlet plenum wall, inlet
 123 * side tube sheet, and outlet side tube sheet. The structures for the
 124 * secondary downcomer and secondary shell assume that the inside radii from
 125 * the old stgen component were correct and that a single complete (RDX=1.0)
 126 * structure is defined for each; the old areas were not checked and may not
 127 * be preserved. The structures associated with the primary-side plenums,
 128 * represented as SLABS, preserve the area and thickness from the stgen
 129 * component.
 130 * Modified as necessary the signal variables to assure that they pointed
 131 * correctly at the appropriate components.
 132 *
 133 * +++++++ +++++++
 134 * + valve+ + pipe +
 135 * 67+ 10 +68+ 9 +
 136 * +++++++ +++++++
 137 * 60
 138 * +++++++ +++++++
 139 * + break+ *prizer+
 140 * + 25 + + 13 +
 141 * +++++++ +++++++
 142 * 26 44 61
 143 * +++++++ +++++++ +++++++ +++++++
 144 * + valve+ + fill + + pipe + + pipe +
 145 * + 23 + + 24 + + 75 + + 12 +
 146 * +++++++ +++++++ +++++++ +++++++
 147 * 22 25 42 64
 148 * +++++++ +++++++ +++++++ +++++++
 149 * + tee + + tee + + valve+ *prizer+
 150 * + 21 +23+ 22 + rods + 78 + + 8 +
 151 * +++++++ +++++++ |901 +++++++ +++++++
 152 * 21 24 |902 78 10
 153 * +++++++ +++++++ +++++++ +++++++ +++++++ +++++++
 154 * stgen + pipe ==+ pipe + + tee + + tee + +vessel+ + tee +
 155 * sec 21+ 20 ==+ 2 + 2+ 74 +74+ 1 + 9+region+45+ 31 +32
 156 * +++++++ +++++++ +++++++ +++++++ +define+ +++++++
 157 * 3 + with + 36
 158 * +++++++ +++++++ + a 1-d+ +++++++
 159 * + valve+ + tee + + model+ + tee +
 160 * 32+ 77 +77+ 73 + + + 1+ 41 +44
 161 * +++++++ +++++++ + + + +++++++
 162 * 73 + + +
 163 * +++++++ + + + (isolated)
 164 * + tee + intact + + broken
 165 * 5+ 3 + loop + + + loop
 166 * +++++++ + + +
 167 * 5 4 + +
 168 * +++++++ +++++++ + +
 169 * + pump + + pump + + +
 170 * + 5 + + 4 + + +
 171 * +++++++ +++++++ + +
 172 * 7 6 + +
 173 * +++++++ +++++++ +++++++ + +
 174 * + tee + + tee + + tee + + +
 175 * 7+ 6 +66+ 11 + 8+ 7 +29+ +
 176 * +++++++ +++++++ +++++++ + +
 177 * 67 14 + +
 178 * +++++++ + +
 179 * + fill + + +


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272 * MSFCV reaches its closed position          104.4+-0.2 s
273 * MSFCV starts to open based on manual adjustment 312.6+-0.2 s
274 * MSFCV starts to close based on manual adjustment 326.0+-0.4 s
275 * MSFCV reaches its closed position          339.4+-0.4 s
276 * Pressurizer backup heater is set off       415.4+-0.1 s
277 * Experiment is ended                      700.0+-10. s
278 *
279 ****
280 * namelist data *
281 ****
282 *
283 *      SI/English units flags: 0--SI units/1--English units
284 *      iogrf: units flag for writing TRCGRF
285 *      ioinp: units flag for reading TRACIN
286 *      iolab: units flag for writing input to INLAB
287 *      iocout: units flag for writing TRCOUT and TRCMSG
288 *
289 *      iunlab: input user-defined units labels (0-no/>0-yes; default is 0)
290 *      iunout: write units to file TRCOUT (0-no/1-yes; default is 1)
291 *
292 $inopts iadded=10, icflow=2, nhtstr=12,
293           iogrf=0, ioinp=0, iolab=1, iocout=0, iunlab=1, iunout=1 $
294 *
295 *      dstep      timet
296 *      0          0.0
297 *      stdyst     transi    ncomp      njun      ipak
298 *      2          0          52         49         1
299 *      epso       epss
300 *      1.0000e-04 1.0000e-04
301 *      oitmax     sitmax    isolut     ncontr     nccfl
302 *      10         25         0          5          0
303 *      ntsv       ntcb      ntcf       ntrp       ntcp
304 *      21         13         46         20         2
305 *
306 ****
307 * component-number data *
308 ****
309 *
310 * iorder*   1      2      3      4      5
311 * iorder*   6      7      8      9      10
312 * iorder*  11     12     13     17     20
313 * iorder*  21     22    23s
314 * iorder*  24     25     29     30     31
315 * iorder*  33     34     35     36     37
316 * iorder*  40     41     43     73     74
317 * iorder*  75     77     78     83     86
318 * iorder*  95     96    900    901    902
319 * iorder* 903    904    905    906    907
320 * iorder* 908    909    910   911e
321 *
322 ****
323 * control-parameter data *
324 ****
325 *
326 * constrained steady-state controllers
327 *
328 *      numcss   amncss   amxcss   nmpcss   napcss
329 *      2  9.0000e-01  1.1000e+00  7002      2
330 * intact-loop steam-generator type-14 controller adjusts
331 *      the heat-transfer across the tubes (equivalent to old type 4)
332 *      901     0.5     1.5    7002     14
333 *      902     0.5     1.5    7002     14
334 * intact-loop pump 2 type-1 controller adjusts impeller rotational speed
335 *      4  2.0000e+02  5.0000e+02   -1      0
336 * intact-loop pump 1 type-1 controller adjusts impeller rotational speed
337 *      5  2.0000e+02  5.0000e+02   -1      0
338 * steam-flow control valve type-2 controller adjusts upstream pressure
339 *      23  0.0000e+00  1.0000e+00    1      0
340 *
341 * multipass control-parameter evaluations
342 *
343 * cp1sv *      1      16s
344 * cp1cb *      -1     -7s
345 * cp1tp *      1     -24s
346 * cp2sv *      17     21s
347 * cp2cb *      -8    -13s
348 * cp2tp *      1      0e
349 *
350 * signal variables
351 *
352 *      problem time
353 *      idsv  isvn   ilcn   icnl   icn2
354 *      1      0      0      0      0
355 *
356 *      hot-leg pressure
357 *      idsv  isvn   ilcn   icnl   icn2
358 *      2      21      1      1      0
359 *
360 *      hot-leg liquid temperature
361 *      idsv  isvn   ilcn   icnl   icn2
362 *      3      23      1      1      0
363 *

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364 *          hot-leg liquid mass flow
365 *          idsv      isvn      ilcn      icnl      icn2
366 *          4         32        1         3         0
367 *          4         32        1         5         0
368 *
369 *          pressurizer-dome pressure
370 *          idsv      isvn      ilcn      icnl      icn2
371 *          5         21        9         1         0
372 *          5         21       13         1         0
373 *
374 *          pressurizer top-section liquid level
375 *          idsv      isvn      ilcn      icnl      icn2
376 *          6         20       13         7         1
377 *
378 *          pressurizer middle-section liquid level
379 *          idsv      isvn      ilcn      icnl      icn2
380 *          7         20       12         1         1
381 *
382 *          pressurizer bottom-section liquid level
383 *          idsv      isvn      ilcn      icnl      icn2
384 *          8         20        8         1         1
385 *
386 *          cold-leg pressure at hpis connection
387 *          idsv      isvn      ilcn      icnl      icn2
388 *          9         21        7         4         0
389 *          9         21        7         5         0
390 *
391 *          reactor-core power
392 *          idsv      isvn      ilcn      icnl      icn2
393 *          10        18       90         0         0
394 *          10        18      900         0         0
395 *
396 *          stgen-sec pipe 20 volume-averaged alpha
397 *          idsv      isvn      ilcn      icnl      icn2
398 *          11        27       20         1        -5
399 *          11        27       20         1        -8
400 *
401 *          stgen-sec tee 21 main volume-averaged alpha
402 *          idsv      isvn      ilcn      icnl      icn2
403 *          12        27       21         1        -2
404 *          12        27       21         1        -4
405 *
406 *          stgen-sec tee 21 side alpha
407 *          idsv      isvn      ilcn      icnl      icn2
408 *          13        27       21         3         0
409 *          13        27       21         5         0
410 *
411 *          stgen-sec tee 22 main volume-averaged alpha
412 *          idsv      isvn      ilcn      icnl      icn2
413 *          14        27       22         1        -4
414 *          14        27       22         1        -9
415 *
416 *          stgen-sec tee 22 side alpha
417 *          idsv      isvn      ilcn      icnl      icn2
418 *          15        27       22         5         0
419 *          15        27       22        10         0
420 *
421 *          stgen-sec tee 21 pressure
422 *          idsv      isvn      ilcn      icnl      icn2
423 *          16        21       21         2         0
424 *          16        21       21         4         0
425 *
426 *          trip 8 iset
427 *          idsv      isvn      ilcn      icnl      icn2
428 *          17        56        8         0         0
429 *
430 *          trip 20 iset
431 *          idsv      isvn      ilcn      icnl      icn2
432 *          18        56       20         0         0
433 *
434 *          trip 22 iset
435 *          idsv      isvn      ilcn      icnl      icn2
436 *          19        56       22         0         0
437 *
438 *          trip 23 iset
439 *          idsv      isvn      ilcn      icnl      icn2
440 *          20        56       23         0         0
441 *
442 *          trip -24 signal
443 *          idsv      isvn      ilcn      icnl      icn2
444 *          21        55      -24         0         0
445 *
446 *
447 * user-defined units-name data
448 *
449 *          lulabel    lunitsi    luniteng    ufactor    ushift
450 *          lumdot/m   lu(kg/s)/m  lu(lbm/s)/ft  0.671968931  0.0
451 *
452 *
453 * control blocks
454 *
455 *          pressurizer liquid-level for plot

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456 *      idcb      icbn      icb1      icb2      icb3
457 *      -1        57        6         7        8
458 *      lugain    luxmin    luxmax    lucon1    lucon2
459 *      lunounit lulength  cbxmin   cbxmax   lunounit cbcon1
460 *      cbgain    cbxmin   cbxmax   cbcon1   cbcon2
461 *      1.0000e+00 0.0000e+00 1.7500e+00 0.0000e+00 0.0000e+00
462 *
463 *      idcb      icbn      icb1      icb2      icb3
464 *      -2        56        -1       0        0
465 *      lugain    luxmin    luxmax    lucon1    lucon2
466 *      lunounit lulength  lulength  lulength lunounit
467 *      cbgain    cbxmin   cbxmax   cbcon1   cbcon2
468 *      1.0000e+00 0.0000e+00 1.6400e+00 -1.1000e-01 0.0000e+00
469 *
470 *      stgen-sec downcomer liq-level for plot, cb -8, & trip 6
471 *      idcb      icbn      icb1      icb2      icb3
472 *      -3        56        11       0        0
473 *      lugain    luxmin    luxmax    lucon1    lucon2
474 *      luvolume  luvolume  luvolume  luvolume lunounit
475 *      cbgain    cbxmin   cbxmax   cbcon1   cbcon2
476 *      2.7721e+00 0.0000e+00 2.7721e+00 0.0000e+00 0.0000e+00
477 *
478 *      idcb      icbn      icb1      icb2      icb3
479 *      -4        59        12       13       0
480 *      lugain    luxmin    luxmax    lucon1    lucon2
481 *      lunounit luvolume  luvolume  luvolume luvolume
482 *      cbgain    cbxmin   cbxmax   cbcon1   cbcon2
483 *      1.0000e+00 0.0000e+00 2.6178e+00 2.2348e+00 3.8297e-01
484 *
485 *      idcb      icbn      icb1      icb2      icb3
486 *      -5        59        14       15       0
487 *      lugain    luxmin    luxmax    lucon1    lucon2
488 *      lunounit luvolume  luvolume  luvolume luvolume
489 *      cbgain    cbxmin   cbxmax   cbcon1   cbcon2
490 *      1.0000e+00 0.0000e+00 1.2803e+00 1.2641e+00 1.6215e-02
491 *
492 *      idcb      icbn      icb1      icb2      icb3
493 *      -6        57        -3      -4       -5
494 *      lugain    luxmin    luxmax    lucon1    lucon2
495 *      lunounit luvolume  luvolume  luvolume lunounit
496 *      cbgain    cbxmin   cbxmax   cbcon1   cbcon2
497 *      1.0000e+00 0.0000e+00 6.6702e+00 0.0000e+00 0.0000e+00
498 *
499 *      idcb      icbn      icb1      icb2      icb3
500 *      -7        101      -6       9        0
501 *      lugain    luxmin    luxmax    lucon1    lucon2
502 *      lunounit lulength  lulength  lulength lunounit
503 *      cbgain    cbxmin   cbxmax   cbcon1   cbcon2
504 *      1.0000e+00 0.0000e+00 5.6103e+00 0.0000e+00 0.0000e+00
505 *      luytab    luxtab(1)
506 *      lulength  luvolume
507 *
508 *      vapor vol      dc liq lev
509 *      (m3)          (m)
510 *      cbftb *      2.2660e+00 5.6103e+00s
511 *      cbftb *      2.5943e+00 4.6810e+00s
512 *      cbftb *      4.1502e+00 3.2004e+00s
513 *      cbftb *      4.4173e+00 2.9464e+00s
514 *      cbftb *      4.8360e+00 2.5440e+00s
515 *      cbftb *      5.0294e+00 2.3500e+00s
516 *      cbftb *      5.4051e+00 1.8860e+00s
517 *      cbftb *      5.8402e+00 1.2460e+00s
518 *      cbftb *      6.6702e+00 0.0000e+00e
519 *
520 *      stgen-sec feedwater-control controller for fill 24
521 *      idcb      icbn      icb1      icb2      icb3
522 *      -8        200      -7       0        0
523 *      lugain    luxmin    luxmax    lucon1    lucon2
524 *      lumdot/m  lumassfw  lumassfw  lulength  lumassfw
525 *      cbgain    cbxmin   cbxmax   cbcon1   cbcon2
526 *      7.0000e+00 1.0000e+01 3.0000e+01 3.1830e+00 2.0100e+01
527 *      cbdt      cbtau    cbwt
528 *      1.0000e+01 1.0000e+00 0.0000e+00
529 *
530 *      idcb      icbn      icb1      icb2      icb3
531 *      -9        101      1        2       0
532 *      lugain    luxmin    luxmax    lucon1    lucon2
533 *      lunounit lumassfw  lumassfw  lunounit lunounit
534 *      cbgain    cbxmin   cbxmax   cbcon1   cbcon2
535 *      1.0000e+00 0.0000e+00 2.0100e+01 0.0000e+00 0.0000e+00
536 *      luytab    luxtab(1)
537 *      lumassfw  lutime
538 *
539 *      time      mass flow
540 *      (s)       (kg/s)
541 *      cbftb *      1.0000e+00 2.0100e+01s
542 *      cbftb *      1.2000e+01 0.0000e+00e
543 *
544 *      idcb      icbn      icb1      icb2      icb3
545 *      -10       22       -9      -8       17
546 *      lugain    luxmin    luxmax    lucon1    lucon2
547 *      lunounit lumassfw  lumassfw  lunounit lunounit

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548 *      cbgain      cbxmin      cbxmax      cbcn1      cbcn2
549     1.0000e+00  0.0000e+00  1.0000e+02  0.0000e+00  0.0000e+00
550 *
551 *      stgen-sec steam-flow-control controller for valve 23
552 *      idcb      icbn      icbl      icb2      icb3
553     -11       22       19       18       20
554 *      lugain      luxmin      luxmax      luconl      lucon2
555     lurtimel      lurtimel      lurtimel      lunounit      lunounit
556 *      cbgain      cbxmin      cbxmax      cbcn1      cbcn2
557     5.0000e-02  -5.0000e-02  5.0000e-02  0.0000e+00  0.0000e+00
558 *
559 *      idcb      icbn      icbl      icb2      icb3
560     -12       23       -11       0       0
561 *      lugain      luxmin      luxmax      luconl      lucon2
562     lunounit      lunounit      lunounit      lunounit      lunounit
563 *      cbgain      cbxmin      cbxmax      cbcn1      cbcn2
564     1.0000e+00  0.0000e+00  1.0000e+00  0.0000e+00  6.3800e-01
565 *
566 *      idcb      icbn      icbl      icb2      icb3
567     -13       101      -12       12       0
568 *      lugain      luxmin      luxmax      luconl      lucon2
569     lunounit      lunounit      lunounit      lunounit      lunounit
570 *      cbgain      cbxmin      cbxmax      cbcn1      cbcn2
571     1.0000e+00  0.0000e+00  1.0000e+00  0.0000e+00  0.0000e+00
572 *      luytab      luxtab(1)
573     lunounit      lunounit
574 *
575 *      xpos      favlve
576 *      (-)      (-)
577 *      cbftb *    0.0000e+00  0.0000e+00s
578 *      cbftb *    1.0000e-01  7.3360e-02s
579 *      cbftb *    2.0000e-01  1.5334e-01s
580 *      cbftb *    3.0000e-01  2.4500e-01s
581 *      cbftb *    4.0000e-01  3.4000e-01s
582 *      cbftb *    5.0000e-01  4.4000e-01s
583 *      cbftb *    5.7500e-01  5.1733e-01s
584 *      cbftb *    6.0000e-01  5.4666e-01s
585 *      cbftb *    7.0000e-01  6.6000e-01s
586 *      cbftb *    8.0000e-01  7.7248e-01s
587 *      cbftb *    9.0000e-01  8.8665e-01s
588 *      cbftb *   1.0000e+00  1.0000e+00e
589 *
590 * trips
591 *
592 *      ntse      ntct      ntsf      ntap      ntsd
593     0          2          2          0          1
594 *
595 *      system low-pressure scram trip
596 *      idtp      isrt      iset      itst      idsg
597     1          1          0          1          2
598 *      setp(1)      setp(2)
599     1.4360e+07  1.4361e+07
600 *      dtsp(1)      dtsp(2)
601     0.0000e+00  0.0000e+00
602 *      ifsp(1)      ifsp(2)
603     0          0
604 *
605 *      system high-pressure scram trip
606 *      idtp      isrt      iset      itst      idsg
607     2          2          0          1          2
608 *      setp(1)      setp(2)
609     1.5769e+07  1.5770e+07
610 *      dtsp(1)      dtsp(2)
611     0.0000e+00  0.0000e+00
612 *      ifsp(1)      ifsp(2)
613     0          0
614 *
615 *      intact-loop hot-leg high-temperature scram trip
616 *      idtp      isrt      iset      itst      idsg
617     3          2          0          1          3
618 *      setp(1)      setp(2)
619     5.8320e+02  5.8330e+02
620 *      dtsp(1)      dtsp(2)
621     0.0000e+00  0.0000e+00
622 *      ifsp(1)      ifsp(2)
623     0          0
624 *
625 *      intact-loop low-mass-flow scram trip
626 *      idtp      isrt      iset      itst      idsg
627     4          1          0          1          4
628 *      setp(1)      setp(2)
629     4.3350e+02  4.3400e+02
630 *      dtsp(1)      dtsp(2)
631     2.0000e+00  0.0000e+00
632 *      ifsp(1)      ifsp(2)
633     0          0
634 *
635 *      high core-averaged-power scram trip
636 *      idtp      isrt      iset      itst      idsg
637     5          2          0          1          10
638 *      setp(1)      setp(2)
639     5.1000e+07  5.1500e+07

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640 *      dtsp(1)      dtsp(2)
641 *      0.0000e+00  0.0000e+00
642 *      ifsp(1)      ifsp(2)
643 *      0           0
644 *
645 *      stgen-sec downcomer low-liquid-level scram trip
646 *      idtp      isrt      iset      itst      idsg
647 *      6           1           0           1           -7
648 *      setp(1)      setp(2)
649 *      2.0000e+00  2.0100e+00
650 *      dtsp(1)      dtsp(2)
651 *      0.0000e+00  0.0000e+00
652 *      ifsp(1)      ifsp(2)
653 *      0           0
654 *
655 *      steady-state or transient flag trip
656 *      idtp      isrt      iset      itst      idsg
657 *      7           -1          -1           1           1
658 *      setp(1)      setp(2)
659 *      -2.0000e-05 -1.0000e-05
660 *      dtsp(1)      dtsp(2)
661 *      0.0000e+00  0.0000e+00
662 *      ifsp(1)      ifsp(2)
663 *      0           0
664 *
665 *      stgen-sec feedwater fill & steam-flow-control valve trip
666 *      idtp      isrt      iset      itst      idsg
667 *      8           2           0           1           1
668 *      setp(1)      setp(2)
669 *      -2.0000e-05 -1.0000e-05
670 *      dtsp(1)      dtsp(2)
671 *      0.0000e+00  0.0000e+00
672 *      ifsp(1)      ifsp(2)
673 *      0           0
674 *
675 *      warm-up-lines trip
676 *      idtp      isrt      iset      itst      idsg
677 *      9           2           0           1           1
678 *      setp(1)      setp(2)
679 *      -2.0000e-05 1.0000e+20
680 *      dtsp(1)      dtsp(2)
681 *      0.0000e+00  0.0000e+00
682 *      ifsp(1)      ifsp(2)
683 *      0           0
684 *
685 *      intact-loop pump-shutdown trip
686 *      idtp      isrt      iset      itst      idsg
687 *      10          2           0           1           1
688 *      setp(1)      setp(2)
689 *      -2.0000e-05 1.0000e+20
690 *      dtsp(1)      dtsp(2)
691 *      0.0000e+00  0.0000e+00
692 *      ifsp(1)      ifsp(2)
693 *      0           0
694 *
695 *      pressurizer power-operated-relief-valve trip
696 *      idtp      isrt      iset      itst      idsg
697 *      11          -3          0           1           5
698 *      setp(1)      setp(2)      setp(3)      setp(4)
699 *      1.6560e+07  1.6570e+07  1.6690e+07  1.6700e+07
700 *      dtsp(1)      dtsp(2)      dtsp(3)      dtsp(4)
701 *      0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
702 *      ifsp(1)      ifsp(2)      ifsp(3)      ifsp(4)
703 *      0           0           0           0
704 *
705 *      pressurizer spray-valve trip
706 *      idtp      isrt      iset      itst      idsg
707 *      12          -3          0           1           5
708 *      setp(1)      setp(2)      setp(3)      setp(4)
709 *      1.4900e+07  1.5000e+07  1.5140e+07  1.5240e+07
710 *      dtsp(1)      dtsp(2)      dtsp(3)      dtsp(4)
711 *      0.0000e+00  1.0000e+04  1.0000e+04  0.0000e+00
712 *      ifsp(1)      ifsp(2)      ifsp(3)      ifsp(4)
713 *      0           0           0           0
714 *
715 *      pressurizer cycling-heaters trip flag
716 *      idtp      isrt      iset      itst      idsg
717 *      13          1           1           1           5
718 *      setp(1)      setp(2)
719 *      1.4750e+07  1.4930e+07
720 *      dtsp(1)      dtsp(2)
721 *      0.0000e+00  0.0000e+00
722 *      ifsp(1)      ifsp(2)
723 *      0           0
724 *
725 *      pressurizer backup-heaters trip flag
726 *      idtp      isrt      iset      itst      idsg
727 *      14          1           0           1           5
728 *      setp(1)      setp(2)
729 *      1.4620e+07  1.4800e+07
730 *      dtsp(1)      dtsp(2)
731 *      0.0000e+00  0.0000e+00

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732 *      ifsp(1)      ifsp(2)
733      0          0
734 *
735 *      steady state and transient ON trip
736 *      idtp      isrt      iset      itst      idsg
737      15         2         1         1         1
738 *      setp(1)      setp(2)
739      -2.0000e-05   -1.0000e-05
740 *      dtsp(1)      dtsp(2)
741      0.0000e+00   0.0000e+00
742 *      ifsp(1)      ifsp(2)
743      0          0
744 *
745 *      emergency-core-coolant low-pressure hpis trip
746 *      idtp      isrt      iset      itst      idsg
747      17         1         0         1         2
748 *      setp(1)      setp(2)
749      1.3297e+07   1.5500e+07
750 *      dtsp(1)      dtsp(2)
751      0.0000e+00   0.0000e+00
752 *      ifsp(1)      ifsp(2)
753      0          0
754 *
755 *      stgen-sec steam-flow-control valve closure trip
756 *      forced closure at 2 s into the 16-1 transient
757 *      idtp      isrt      iset      itst      idsg
758      20         -2        0         1         1
759 *      setp(1)      setp(2)
760      -2.0000e-05   -1.0000e-05
761 *      dtsp(1)      dtsp(2)
762      0.0000e+00   2.0000e+00
763 *      ifsp(1)      ifsp(2)
764      0          0
765 *
766 *      stgen-sec pressure-regulator trip after reactor scram
767 *      idtp      isrt      iset      itst      idsg
768      22         -3        0         1         16
769 *      setp(1)      setp(2)      setp(3)      setp(4)
770      6.7500e+06   6.8800e+06   6.8900e+06   6.9900e+06
771 *      dtsp(1)      dtsp(2)      dtsp(3)      dtsp(4)
772      3.5000e-01   1.0000e+04   1.0000e+04   2.0000e+00
773 *      ifsp(1)      ifsp(2)      ifsp(3)      ifsp(4)
774      1          1          2          2
775 *
776 *      coincidence scram trip
777 *      idtp      isrt      iset      itst      idsg
778      23         2          0          3          1
779 *      setp(1)      setp(2)
780      4.0000e-01   6.0000e-01
781 *      dtsp(1)      dtsp(2)
782      1.0000e+04   0.0000e+00
783 *      ifsp(1)      ifsp(2)
784      0          0
785 *
786 *      trip-controlled trip for pressurizer heaters
787 *      idtp      isrt      iset      itst      idsg
788      -24        -3        -1        -3         2
789 *      setp(1)      setp(2)      setp(3)      setp(4)
790      -6.0000e-01  -4.0000e-01  4.0000e-01   6.0000e-01
791 *      dtsp(1)      dtsp(2)      dtsp(3)      dtsp(4)
792      0.0000e+00   0.0000e+00   0.0000e+00   0.0000e+00
793 *      ifsp(1)      ifsp(2)      ifsp(3)      ifsp(4)
794      0          0          0          0
795 *
796 *      trip-controlled trip 23 signal (coincidence trip)
797 *      idtn      intn
798      1          6
799 *      itn(1)      itn(2)      itn(3)      itn(4)      itn(5)
800      1          2          3          4          5
801 *      itn(6)
802      6
803 *
804 *      trip-controlled trip 24 signal (pressurizer heaters)
805 *      idtn      intn
806      2          4
807 *      itn(1)      itn(2)      itn(3)      itn(4)
808      13         14         7          7
809 *
810 *      trip set-point-factor table for trip 22
811 *      idft      idsg      inf
812      1          1          6
813 *      ftx()      fty()
814      0.0000e+00   1.0000e+00   7.5000e+01   1.0000e+00   7.5100e+01
815      9.8519e-01   2.0000e+02   9.8519e-01   2.0010e+02   9.7778e-01
816      7.0000e+02   9.7778e-01
817 *
818 *      trip set-point-factor table for trip 22
819 *      idft      idsg      inf
820      2          1          6
821 *      ftx()      fty()
822      0.0000e+00   1.0000e+00   7.5000e+01   1.0000e+00   7.5100e+01
823      9.9805e-01   2.0000e+02   9.9805e-01   2.0010e+02   9.9376e-01

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824      7.0000e+02   9.9376e-01
825 *
826 *          trip 22 initiated time-step data
827 *          ndid      ntid
828 *          1          1
829 *          itid(1)
830          22
831 *          dtmin     dtmax     dtend     dtsof
832 *          1.0000e-03  1.0000e+00  3.0000e+00  1.0000e+00
833 *          editint   gflint    cmpit     sedint
834 *          4.0000e+00  5.0000e-01   4.0000e+00  4.0000e+00
835 *
836 ****
837 * component data *
838 ****
839 *
840 ***** type      num      id      ctitle
841 tee        1          1      $1$ intact-loop hot leg
842 *          jcell     nodes    ichf      cost      epsw
843 *          3          4          1      0.0000e+00  1.0000e-05
844 *          iconcl    ncell1   jun1      jun2      ipowl
845 *          0          4          9      74       0
846 *          iqptr1    iqpsv1   ngptbl   nqpsv1   nqprf1
847 *          0          0          0      0       0
848 *          radin1   th1      houtl1   houtv1   toutl1
849 *          1.4209e-01  3.5710e-02  0.0000e+00  1.2270e+01  3.0537e+02
850 *          toutv1
851          3.0537e+02
852 *          qpin1    qpooff1  rgpmx1   qpsc11
853 *          0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
854 *          iconc2    ncell2   jun3      ipow2
855 *          0          3          10      0
856 *          iqptr2    iqpsv2   ngptb2   nqpsv2   nqprf2
857 *          0          0          0      0       0
858 *          radin2   th2      houtl2   houtv2   toutl2
859 *          2.3300e-02  8.6968e-03  0.0000e+00  1.2270e+01  3.0537e+02
860 *          toutv2
861          3.0537e+02
862 *          qpin2    qpooff2  rgpmx2   qpsc12
863 *          0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
864 *
865 * dx      +      1.8415e+00  1.0795e+00e
866 * dx      *      1.8415e+00  3.5983E-01   3.5983E-01e
867 * vol     +      1.1667e-01  6.8527e-02e
868 * vol     *      1.1667e-01  2.2842E-02   2.2842E-02e
869 * fa      + f    6.3425e-02e
870 * fa      * r 2  6.3425e-02  6.3480E-02   6.3480E-02   6.3425E-02e
871 * fric    + f    3.7203e-02  1.1170e-02   2.0282e-02e
872 * fric    * f    3.8186E-02  1.4822E-02   0.0      0.0   3.0891E-02
873 * fric    * e
874 * grav    * f    0.0000e+00e
875 * hd      * f    2.8417e-01e
876 * icflg   * f    0e
877 * nff     * f    1e
878 * alp     * f    0.0000e+00e
879 * vl      * f    0.0000e+00e
880 * vv      * f    0.0000e+00e
881 * tl      * f    5.6750e+02e
882 * tv      * f    5.6750e+02e
883 * p       * f    1.4780e+07e
884 * pa      * f    0.0000e+00e
885 * qppp   * f    0.0000e+00e
886 * matid   * f    7e
887 * tw      * f    5.6750e+02e
888 *
889 * dx      *      2.1499e+00  2.1213e+00  2.2217e+00e
890 * vol     *      3.1149e-03  3.0744e-03  5.7059e-03e
891 * fa      * r03  1.4493e-03  5.7321e-03e
892 * fric    *      1.0000e-04  5.5032e-03r02  0.0000e+00e
893 * grav    *      5.4510e-01r02 0.0000e+00  6.0410e-01e
894 * hd      * r03  4.2957e-02  8.5430e-02e
895 * icflg   * f    0e
896 * nff     * r02  1r02      -1e
897 * alp     * f    0.0000e+00e
898 * vl      * f    0.0000e+00e
899 * vv      * f    0.0000e+00e
900 * tl      * f    6.1411e+02e
901 * tv      * f    6.1411e+02e
902 * p       * f    1.4780e+07e
903 * pa      * f    0.0000e+00e
904 * qppp   * f    0.0000e+00e
905 * matid   * f    7e
906 * tw      * f    6.1411e+02e
907 *
908 * the old STGEN component 2 has been converted into the following:
909 *          PIPE component 2
910 *          PIPE component 20
911 *          TEE component 21
912 *          TEE component 22
913 *          ROD component 901 (placed before time-step data)
914 *          ROD component 902 (placed before time-step data)
915 ***** type      num      id      ctitle

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916 pipe      2      2 $2$ steam generator primary
917 * ncells   nodes    jun1     jun2     epsw
918 *          10       0        2        3      1.0e-5
919 *      ichf  iconc    iacc     ipow
920 *          1       0        0        0
921 *      radin  th      houtl    houtv    toutl
922 *      5.1069e-03 1.2431e-03 0.0        0.0      305.67
923 *      toutv  powin   powoff   rpwmxx  pwscl
924 *      305.67  0.0      0.0      0.0      1.0
925 *
926 * dx      * 3.7061e-01r03 5.6895e-01r02 5.6899e-01r03 5.6895e-01 3.7061e-01
927 * dx      * e
928 * vol     * 3.3541e-01r03 8.6009e-02r02 8.6015e-02r03 8.6009e-02 3.3541e-01
929 * vol     * e
930 * fa      * 8.8959e-02r09 1.5117e-01 8.8959e-02e
931 * fric    * 2.0941e-01 3.5994e-03r07 0.0000e+00 5.9416e-03 1.5112e-01
932 * fric    * e
933 * grav   * 6.1566e-01r04 1.0000e+00 0.0000e+00r04-1.0000e+00 -6.1566e-01
934 * grav   * e
935 * hd      * 3.3655e-01r09 1.0214e-02 3.3655e-01e
936 * icflg   * f 0e
937 * nff     * f 1e
938 * alp     * f 0.0000e+00e
939 * vl      * f 0.0000e+00e
940 * vv      * f 0.0000e+00e
941 * tl      * 5.6750e+02 5.6587e+02 5.6423e+02 5.6260e+02 5.6097e+02
942 * tl      * 5.5933e+02 5.5770e+02 5.5607e+02 5.5443e+02 5.5280e+02
943 * tl      * e
944 * tv      * 5.6750e+02 5.6587e+02 5.6423e+02 5.6260e+02 5.6097e+02
945 * tv      * 5.5933e+02 5.5770e+02 5.5607e+02 5.5443e+02 5.5280e+02
946 * tv      * e
947 * p       * f 1.4780e+07e
948 * pa     * f 0.0000e+00e
949 *
950 ***** type num id ctitle
951 pipe      20 20 $20$ steam generator boiler
952 * ncells   nodes    jun1     jun2     epsw
953 *          8       0        24       21      1.0e-5
954 *      ichf  iconc    iacc     ipow
955 *          1       0        0        0
956 *      radin  th      houtl    houtv    toutl
957 *      5.1069e-03 1.2431e-03 0.0        0.0      305.67
958 *      toutv  powin   powoff   rpwmxx  pwscl
959 *      305.67  0.0      0.0      0.0      1.0
960 *
961 * dx      + r04 5.6895e-01 1.1115e+00e
962 * dx      + r04 5.6895e-01r03 2.4700E-01 3.7050E-01e
963 * vol     + r04 4.4356e-01 9.9786e-01e
964 * vol     + r04 4.4356e-01r03 0.22174667 0.33262e
965 * fa      + 2.1890e-01r03 7.7961e-01r02 8.9776e-01e
966 * fa      + 2.1890e-01r03 7.7961e-01r05 8.9776e-01e
967 * fric    + 2.0000e-02r05 0.0000e+00e
968 * fric    + 2.0000e-02r08 0.0000e+00e
969 * grav   + 0.0000e+00r05 1.0000e+00e
970 * grav   + 0.0000e+00r08 1.0000e+00e
971 * hd      + r05 6.3500e-03 1.0691e+00e
972 * hd      + r05 6.3500e-03r04 1.0691e+00e
973 * icflg   * f 0e
974 * nff     * f 1e
975 * alp     + r03 0.0000e+00 3.5000e-01 1.0000e+00e
976 * alp     + r03 0.0000e+00 3.5000e-01r04 1.0000e+00e
977 * vl      * f 0.0000e+00e
978 * vv      * f 0.0000e+00e
979 * tl      * f 5.4157e+02e
980 * tv      * f 5.4157e+02e
981 * p       * f 5.3700e+06e
982 * pa     * f 0.0000e+00e
983 *
984 ***** type num id ctitle
985 tee      21 21 $21$ steam generator steam dome
986 * jcell   nodes  ichf    cost     epsw
987 *          2       0        1        0.0      1.0e-5
988 *      iconc1 ncell1 jun1     jun2     ipowl
989 *          0       4        21       22      0
990 *      radin1 th1   houtl1  houtv1  toutl1
991 *      0.53455 0.05     0.0      0.0      305.67
992 *      toutv1 pwin1  pwoff1  rpwmxx1 pwscl1
993 *      305.67  0.0      0.0      0.0      1.0
994 *      iconc2 ncell2 jun3     ipow2
995 *          0       1        23       0
996 *      radin2 th2   houtl2  houtv2  toutl2
997 *      0.53455 0.05     0.0      0.0      305.67
998 *      toutv2 pwin2  pwoff2  rpwmxx2 pwscl2
999 *      305.67  0.0      0.0      0.0      1.0
1000 *
1001 * dx      + f 1.1115e+00e
1002 * dx      + f 3.7050E-01 3.7050E-01 3.7050E-01 1.1115e+00e
1003 * vol     + f 9.9786e-01 1.2370e+00e
1004 * vol     + f 3.3262E-01 3.3262E-01 3.3262E-01 1.2370e+00e
1005 * fa      + f 8.9776e-01 1.1129e+00 4.6329e-02e
1006 * fa      + f 8.9776e-01 8.9776e-01 8.9776e-01 1.1129e+00 4.6329e-02
1007 * fa      * e

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1008 * fric + 0.0000e+00 1.0000e+30 2.4460e-01e
1009 * fric * 0.0000e+00 0.0 1.0000e+30 0.0 2.4460e-01
1010 * fric * e
1011 * grav * f 1.0000e+00e
1012 * hd + r02 1.0691e+00 2.4290e-01e
1013 * hd * r04 1.0691e+00 2.4290e-01e
1014 * icflg * f 0e
1015 * nff * f 1e
1016 * alp * f 1.0000e+00e
1017 * vl * f 0.0000e+00e
1018 * vv * f 0.0000e+00e
1019 * tl * f 5.4157e+02e
1020 * tv * f 5.4157e+02e
1021 * p * f 5.3700e+06e
1022 * pa * f 0.0000e+00e
1023 *
1024 * dx * 7.4100e-01e
1025 * vol * 3.8297e-01e
1026 * fa * f 5.1683e-01e
1027 * fric * 1.0000e-04 0.0000e+00e
1028 * grav + f -3.3763e-01e
1029 * grav + f -0.33759606e
1030 * grav * f -0.40463059e
1031 * hd * f 2.5400e-01e
1032 * icflg * f 0e
1033 * nff * f 1e
1034 * alp * 1.0000e+00e
1035 * vl * f 0.0000e+00e
1036 * vv * f 0.0000e+00e
1037 * tl * 5.4157e+02e
1038 * tv * 5.4157e+02e
1039 * p * 5.3700e+06e
1040 * pa * 0.0000e+00e
1041 *
1042 ***** type num id ctitle
1043 tee 22 22 $22$ steam generator downcomer
1044 * jcell nodes ichf cost epsw
1045 4 0 1 0.0 1.0e-5
1046 * iconcl1 ncell1 jun1 jun2 ipow1
1047 0 9 23 24 0
1048 * radin1 th1 hout11 houtv1 tout11
1049 0.53455 0.05 0.0 0.0 305.67
1050 * toutv1 pwin1 pwoff1 rpwmx1 pwscl1
1051 305.67 0.0 0.0 0.0 1.0
1052 * iconc2 ncell2 jun3 ipow2
1053 0 1 25 0
1054 * radin2 th2 hout12 houtv2 tout12
1055 0.0508 0.02 0.0 0.0 305.67
1056 * toutv2 pwin2 pwoff2 rpwmx2 pwscl2
1057 305.67 0.0 0.0 0.0 1.0
1058 *
1059 * dx + r02 7.4100e-01 1.7069e+00 5.6895e-01e
1060 * dx + 7.4100e-01r03 2.4700E-01 1.7069e+00 5.6895e-01e
1061 * dx * r02 3.7050E-01r03 2.4700E-01r03 5.6895E-01 5.6895e-01e
1062 * vol + r02 3.8297e-01 3.7363e-01 1.2454e-01e
1063 * vol + 3.8297e-01r03 1.2766E-01 3.7363e-01 1.2454e-01e
1064 * vol * r02 1.9149E-01r03 1.2766E-01r03 1.2454E-01 1.2454e-01e
1065 * fa + r02 5.1683e-01r03 2.1890e-01e
1066 * fa + r02 5.1683e-01 5.1683e-01 5.1683E-01r03 2.1890e-01e
1067 * fa * r05 5.1683e-01r05 2.1890e-01e
1068 * fric + r04 0.0000e+00 2.0000e-02e
1069 * fric + r06 0.0000e+00 2.0000e-02e
1070 * fric * r09 0.0000e+00 2.0000e-02e
1071 * grav + -3.3763e-01r03-1.0000e+00 0.0000e+00e
1072 * grav + -0.33759606r05-1.0000e+00 0.0000e+00e
1073 * grav * r02-0.40463059r07-1.0000e+00 0.0000e+00e
1074 * hd + r02 2.5400e-01r02 1.0160e-01 6.3500e-03e
1075 * hd + r03 2.5400e-01r03 1.0160e-01 6.3500e-03e
1076 * hd + r04 2.5400e-01r05 1.0160e-01 6.3500e-03e
1077 * icflg * f 0e
1078 * nff + r02 1 -1r02 1e
1079 * nff + r04 1 -1r02 1e
1080 * nff * r05 1 -1r04 1e
1081 * alp + 1.0000e+00r03 0.0000e+00e
1082 * alp + 1.0000e+00r05 0.0000e+00e
1083 * alp * r02 1.0000e+00r07 0.0000e+00e
1084 * vl * f 0.0000e+00e
1085 * vv * f 0.0000e+00e
1086 * tl + 5.4157e+02r03 5.2500e+02e
1087 * tl + 5.4157e+02r05 5.2500e+02e
1088 * tl * r02 5.4157e+02r07 5.2500e+02e
1089 * tv * f 5.4157e+02e
1090 * p * f 5.3700e+06e
1091 * pa * f 0.0000e+00e
1092 *
1093 * dx * 2.0000e+00e
1094 * vol * 1.6215e-02e
1095 * fa * f 8.1073e-03e
1096 * fric * 1.0000e-04 0.0000e+00e
1097 * grav * f 0.0000e+00e
1098 * hd * f 1.0160e-01e
1099 * icflg * f 0e

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1100 * nff * f 1e
1101 * alp * 0.0000e+00e
1102 * vl * f 0.0000e+00e
1103 * vv * f 0.0000e+00e
1104 * tl * 5.0000e+02e
1105 * tv * 5.0000e+02e
1106 * p * 5.3700e+06e
1107 * pa * 0.0000e+00e
1108 *
1109 ***** type num id ctitle
1110 tee 3 3 $3$ pump suction
1111 * jcell nodes ichf cost epsw
1112 5 4 1 0.0000e+00 1.0000e-05
1113 * iconcl ncell1 jun1 jun2 ipow1
1114 0 9 4 5 0
1115 * iqptr1 iqpsv1 npptbl npqpsv1 npqrfl
1116 0 0 0 0 0
1117 * radin1 th1 houtl1 houtv1 toutl1
1118 1.4209e-01 3.5710e-02 0.0000e+00 1.2270e+01 3.0537e+02
1119 * toutv1
1120 3.0537e+02
1121 * qpin1 qpoff1 rqpmx1 qpsc11
1122 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
1123 * iconc2 ncell2 jun3 ipow2
1124 0 1 73 0
1125 * iqptr2 iqpsv2 npptb2 npqpsv2 npqrfl2
1126 0 0 0 0 0
1127 * radin2 th2 houtl2 houtv2 toutl2
1128 1.4209e-01 3.5710e-02 0.0000e+00 1.2270e+01 3.0537e+02
1129 * toutv2
1130 3.0537e+02
1131 * qpin2 qpoff2 rqpmx2 qpsc12
1132 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
1133 *
1134 * dx + 3.0480e-01 3.3020e-01 5.5880e-01 6.8580e-01 5.5880e-01
1135 * dx * 3.0480e-01 3.3020e-01 5.5880e-01 2.0081E-01 2.8417E-01
1136 * dx * 2.0081E-01 5.5880e-01s
1137 * dx * 3.3020e-01 3.0480e-01e
1138 * vol + 1.1044e-02 1.6424e-02 3.5396e-02 4.3497e-02 3.5396e-02
1139 * vol * 1.1044e-02 1.6424e-02 3.5396e-02 1.2737E-02 1.8024E-02
1140 * vol * 1.2737E-02 3.5396e-02s
1141 * vol * 1.6424e-02 1.1044e-02e
1142 * fa + r02 3.6613e-02r04 6.3425e-02r02 3.6613e-02e
1143 * fa * r02 3.6613e-02r02 6.3425e-02 6.3425B-02 6.3425E-02r02 6.3425E-02
1144 * fa * r02 3.6613e-02e
1145 * fric + 2.8678e-02 3.6439e-02 2.1983e-03 1.1068e-01 1.1068e-01
1146 * fric * 2.8678e-02 3.6439e-02 2.1983e-03 1.8135E-01 0.0
1147 * fric * 0.0 1.8135E-01s
1148 * fric * 2.1993e-03 3.6439e-02 2.8678e-02e
1149 * grav + -6.2659e-01r02-1.0000e+00r02 0.0000e+00r02 1.0000e+00 6.2659e-01
1150 * grav * -6.2659e-01r02-1.0000e+00r04 0.0000e+00r02 1.0000e+00 6.2659e-01
1151 * grav * e
1152 * hd + r02 2.1591e-01r04 2.8417e-01r02 2.1591e-01e
1153 * hd * r02 2.1591e-01r06 2.8417e-01r02 2.1591e-01e
1154 * icflg * f 0e
1155 * nff * f 1e
1156 * alp * f 0.0000e+00e
1157 * vl * f 0.0000e+00e
1158 * vv * f 0.0000e+00e
1159 * tl * f 5.5280e+02e
1160 * tv * f 5.5280e+02e
1161 * p * f 1.4780e+07e
1162 * pa * f 0.0000e+00e
1163 * qppp * f 0.0000e+00e
1164 * matid * f 7e
1165 * tw * f 5.5280e+02e
1166 *
1167 * dx * 7.3120e-01e
1168 * vol * 4.6268e-02e
1169 * fa * f 6.3425e-02e
1170 * fric * 1.6244e-01 0.0000e+00e
1171 * grav * f 0.0000e+00e
1172 * hd * f 2.8417e-01e
1173 * icflg * f 0e
1174 * nff * f 1e
1175 * alp * 0.0000e+00e
1176 * vl * f 0.0000e+00e
1177 * vv * f 0.0000e+00e
1178 * tl * 5.5280e+02e
1179 * tv * 5.5280e+02e
1180 * p * 1.4780e+07e
1181 * pa * 0.0000e+00e
1182 * qppp * f 0.0000e+00e
1183 * matid * f 7e
1184 * tw * f 5.5280e+02e
1185 *
1186 ***** type num id ctitle
1187 pump 4 4 $4$ pump 2
1188 * ncells nodes jun1 jun2 epsw
1189 2 4 4 6 1.0000e-05
1190 * ichf iconc ipmpty ipr ipm
1191 1 0 1 1

```

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1192 *      ipmptr      ipmpsv      npmptb      npmpsv      npmprf
1193     10          1           -10          0           0
1194 *      iqp3tr      iqp3sv      nqp3tb      nqp3sv      nqp3rf
1195     0           0           0           0           0
1196 *      radin       th          houtl      houtv      toutl
1197     1.0795e-01   2.8580e-02   0.0000e+00   1.2270e+01   3.0537e+02
1198 *      toutv       effmi
1199     3.0537e+02   3.1744e+02
1200 *      tfr0        tfr1       tfr2        tfr3        tfrb
1201     3.6813e+00   0.0000e+00   2.3119e+02   0.0000e+00   0.0000e+00
1202 *      tfr10       tfr11      tfr12       tfr13
1203     3.6813e+00   0.0000e+00   2.3119e+02   0.0000e+00
1204 *      rhead       rtork      rflow      rrho      romeaga
1205     9.4154e+02   5.0000e+02   3.1500e-01   6.1400e+02   3.6966e+02
1206 *      omega       omgoff     romgmx     omgscl     npmpsd
1207     3.6966e+02   -1.0000e+00  1.0000e+20   3.6966e+02   0
1208 *      qp3in      qp3off     rqp3mx     qp3sc1
1209     0.0000e+00   0.0000e+00   1.0000e+20   1.0000e+00
1210 *      option      2
1211
1212 *
1213 * dx  * f  1.3521e+00e
1214 * vol * f  4.9555e-02e
1215 * fa  * f  3.6613e-02e
1216 * fric * f  2.8678e-02r02 0.0000e+00e
1217 * grav * f  6.2659e-01r02 0.0000e+00e
1218 * hd  * f  2.1591e-01e
1219 * icflg * f  0e
1220 * nff  * f  1e
1221 * alp * f  0.0000e+00e
1222 * ml  * f  0.0000e+00  2.4000e+02   0.0000e+00e
1223 * mv  * f  0.0000e+00e
1224 * tl  * f  5.5280e+02e
1225 * tv  * f  5.5280e+02e
1226 * p   * f  1.4780e+07e
1227 * pa  * f  0.0000e+00e
1228 * qppp * f  0.0000e+00e
1229 * matid * f  7e
1230 * tw  * f  5.5280e+02e
1231 *
1232 * pmptb *  0.0000e+00  1.0000e+00  5.0000e+00  6.4516e-01  1.0000e+01
1233 * pmptb *  4.3548e-01  1.8000e+01  2.2581e-01  2.0000e+01  1.2903e-01
1234 * pmptb *  2.5000e+01  6.4516e-02  3.0000e+01  4.4355e-02  4.0000e+01
1235 * pmptb *  2.4806e-02  4.4000e+01  1.9355e-02  4.6500e+01  0.0000e+00
1236 * pmptb * e
1237 *
1238 ***** type      num      id      ctitle
1239 pump      5           5 $5$ pump 1
1240 *      ncells      nodes      jun1      jun2      epsw
1241     2           4           5           7           1.0000e-05
1242 *      ichf       iconc      ipmpty      irp      ipm
1243     1           0           1           1           1
1244 *      ipmptr      ipmpsv      npmptb      npmpsv      npmprf
1245     10          1           -10          0           0
1246 *      iqp3tr      iqp3sv      nqp3tb      nqp3sv      nqp3rf
1247     0           0           0           0           0
1248 *      radin       th          houtl      houtv      toutl
1249     1.0795e-01   2.8580e-02   0.0000e+00   1.2270e+01   3.0537e+02
1250 *      toutv       effmi
1251     3.0537e+02   3.1744e+02
1252 *      tfr0        tfr1       tfr2        tfr3        tfrb
1253     3.6813e+00   0.0000e+00   2.3119e+02   0.0000e+00   0.0000e+00
1254 *      tfr10       tfr11      tfr12       tfr13
1255     3.6813e+00   0.0000e+00   2.3119e+02   0.0000e+00
1256 *      rhead       rtork      rflow      rrho      romeaga
1257     9.4154e+02   5.0000e+02   3.1500e-01   6.1400e+02   3.6966e+02
1258 *      omega       omgoff     romgmx     omgscl     npmpsd
1259     3.6966e+02   -1.0000e+00  1.0000e+20   3.6966e+02
1260 *      qp3in      qp3off     rqp3mx     qp3sc1
1261     0.0000e+00   0.0000e+00   1.0000e+20   1.0000e+00
1262 *      option      2
1263
1264 *
1265 * dx  * f  1.3521e+00e
1266 * vol * f  4.9555e-02e
1267 * fa  * f  3.6613e-02e
1268 * fric * f  2.8678e-02r02 0.0000e+00e
1269 * grav * f  6.2659e-01r02 0.0000e+00e
1270 * hd  * f  2.1591e-01e
1271 * icflg * f  0e
1272 * nff  * f  1e
1273 * alp * f  0.0000e+00e
1274 * ml  * f  0.0000e+00  2.5000e+02   0.0000e+00e
1275 * mv  * f  0.0000e+00e
1276 * tl  * f  5.5280e+02e
1277 * tv  * f  5.5280e+02e
1278 * p   * f  1.4780e+07e
1279 * pa  * f  0.0000e+00e
1280 * qppp * f  0.0000e+00e
1281 * matid * f  7e
1282 * tw  * f  5.5280e+02e
1283 *

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1284 * pmpptb * 0.0000e+00 1.0000e+00 5.0000e+00 6.4516e-01 1.0000e+01
1285 * pmpptb * 4.3548e-01 1.8000e+01 2.2581e-01 2.0000e+01 1.2903e-01
1286 * pmpptb * 2.5000e+01 6.4516e-02 3.0000e+01 4.4355e-02 4.0000e+01
1287 * pmpptb * 2.4806e-02 4.4000e+01 1.9355e-02 4.6500e+01 0.0000e+00
1288 * pmpptb * e
1289 *
1290 ***** type num id ctitle
1291 tee 6 6 $6$ pump discharge
1292 * jcell nodes ichf cost epsw
1293 4 4 1 0.0000e+00 1.0000e-05
1294 * iconcl ncell1 jun1 jun2 ipowl
1295 0 5 7 . 66 0
1296 * iqptr1 iqpsv1 nqptb1 nqpsv1 nqprf1
1297 0 0 0 0 0
1298 * radini th1 hout1 houtv1 tout11
1299 1.0795e-01 2.8580e-02 0.0000e+00 1.2270e+01 3.0537e+02
1300 * toutv1
1301 3.0537e+02
1302 * qpin1 qpooff1 rqpmx1 qpsc11
1303 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
1304 * iconc2 ncell2 jun3 ipow2
1305 0 1 6 0
1306 * iqptr2 iqpsv2 nqptb2 nqpsv2 nqprf2
1307 0 0 0 0 0
1308 * radin2 th2 hout12 houtv2 tout12
1309 1.0795e-01 2.8580e-02 0.0000e+00 1.2270e+01 3.0537e+02
1310 * toutv2
1311 3.0537e+02
1312 * qpin2 qpooff2 rqpmx2 qpsc12
1313 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
1314 *
1315 * dx + 1.3081e+00 3.3020e-01 8.1280e-01e
1316 * dx * 1.3081e+00 3.3020e-01 2.7093E-01 2.7093E-01 2.7093E-01
1317 * dx * e
1318 * vol + 4.7856e-02 1.6424e-02 5.1552e-02e
1319 * vol * 4.7856e-02 1.6424e-02 1.7184E-02 1.7184E-02 1.7184E-02
1320 * vol * e
1321 * fa + r02 3.6613e-02r02 6.3425e-02e
1322 * fa * r02 3.6613e-02 6.3425e-02 6.3425E-02 6.3425E-02
1323 * fa * e
1324 * fric + 0.0000e+00 2.3841e-02 6.7127e-02 5.2244e-02e
1325 * fric * 0.0000e+00 2.3841e-02 1.2764E-01 0.0 0.0
1326 * fric * 1.5673E-01e
1327 * grav * f 0.0000e+00e
1328 * hd + r02 2.1591e-01r02 2.8417e-01e
1329 * hd * r02 2.1591e-01r04 2.8417e-01e
1330 * icflg * f 0e
1331 * nff * f 1e
1332 * alp * f 0.0000e+00e
1333 * vl * f 0.0000e+00e
1334 * vv * f 0.0000e+00e
1335 * tl * f 5.5280e+02e
1336 * tv * f 5.5280e+02e
1337 * p * f 1.4780e+07e
1338 * pa * f 0.0000e+00e
1339 * qppp * f 0.0000e+00e
1340 * matid * f 7e
1341 * tw * f 5.5280e+02e
1342 *
1343 * dx * 3.9370e-01e
1344 * vol * 1.4442e-02e
1345 * fa * f 3.6613e-02e
1346 * fric * 3.5099e-01 0.0000e+00e
1347 * grav * f 0.0000e+00e
1348 * hd * f 2.1591e-01e
1349 * icflg * f 0e
1350 * nff * f 1e
1351 * alp * 0.0000e+00e
1352 * vl * f 0.0000e+00e
1353 * vv * f 0.0000e+00e
1354 * tl * 5.5280e+02e
1355 * tv * 5.5280e+02e
1356 * p * 1.4780e+07e
1357 * pa * 0.0000e+00e
1358 * qppp * f 0.0000e+00e
1359 * matid * f 7e
1360 * tw * f 5.5280e+02e
1361 *
1362 ***** type num id ctitle
1363 tee 7 7 $7$ intact-loop cold leg
1364 * jcell nodes ichf cost epsw
1365 2 4 1 0.0000e+00 1.0000e-05
1366 * iconcl ncell1 jun1 jun2 ipowl
1367 0 4 8 29 0
1368 * iqptr1 iqpsv1 nqptb1 nqpsv1 nqprf1
1369 0 0 0 0 0
1370 * radini th1 hout1 houtv1 tout11
1371 1.4209e-01 3.5710e-02 0.0000e+00 1.2270e+01 3.0537e+02
1372 * toutv1
1373 3.0537e+02
1374 * qpin1 qpooff1 rqpmx1 qpsc11
1375 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00

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1376 *      iconc2      ncell2      jun3      ipow2
1377     0           1           14          0
1378 *      iqptr2      iqpsv2      nqptb2      nqpsv2      nqprf2
1379     0           0           0           0           0
1380 *      radin2      th2      houtl2      houtv2      toutl2
1381     4.3663e-02  1.3487e-02  0.0000e+00  0.0000e+00  3.0537e+02
1382 *      toutv2
1383     3.0537e+02
1384 *      qpin2      qpoff2      rqpmax2      qpsec2
1385     0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
1386 *
1387 * dx    +    7.0874e-01  1.3970e+00e
1388 * dx    *    2.3625E-01  2.3625E-01  2.3625E-01  1.3970e+00e
1389 * vol   +    4.4741e-02  8.8603e-02e
1390 * vol   *    1.4914E-02  1.4914E-02  1.4914E-02  8.8603e-02e
1391 * fa    + f   6.3425e-02e
1392 * fa    * f   6.3425E-02  6.3128E-02  6.3128E-02r02 6.3425e-02e
1393 * fric  + r02  0.0000e+00  2.0000e-02e
1394 * fric  * r04  0.0000e+00  1.8719E-02e
1395 * grav  * f   0.0000e+00e
1396 * hd    + f   2.8417e-01e
1397 * hd    * r04  2.8417E-01  2.8418E-01e
1398 * icflg  * f   0e
1399 * nff   * f   1e
1400 * alp   * f   0.0000e+00e
1401 * vl    * f   0.0000e+00e
1402 * vv    * f   0.0000e+00e
1403 * tl    * f   5.5280e+02e
1404 * tv    * f   5.5280e+02e
1405 * p     * f   1.4780e+07e
1406 * pa    * f   0.0000e+00e
1407 * qppp  * f   0.0000e+00e
1408 * matid * f   7e
1409 * tw    * f   5.5280e+02e
1410 *
1411 * dx    *    1.5000e+00e
1412 * vol   *    8.9838e-03e
1413 * fa    * f   5.9892e-03e
1414 * fric  * f   1.0000e-04  3.3380e-01e
1415 * grav  * f   -1.0000e+00  0.0000e+00e
1416 * hd    * f   8.7325e-02e
1417 * icflg  * f   0e
1418 * nff   * f   1e
1419 * alp   *    0.0000e+00e
1420 * vl    * f   0.0000e+00e
1421 * vv    * f   0.0000e+00e
1422 * tl    * f   5.0000e+02e
1423 * tv    * f   5.0000e+02e
1424 * p     * f   1.4780e+07e
1425 * pa    * f   0.0000e+00e
1426 * qppp  * f   0.0000e+00e
1427 * matid * f   7e
1428 * tw    * f   5.0000e+02e
1429 *
1430 ***** type      num      id      ctitle
1431 prizer      8           8 $8$ pressurizer bottom
1432 *      ncells      nodes      jun1      jun2
1433     1           4           64          10
1434 *      ichf       iconc      qp3in
1435     1           0           0.0000e+00
1436 *      radin      th      houtl      houtv      toutl
1437     4.2418e-01  7.4930e-02  0.0000e+00  2.7411e+00  3.0537e+02
1438 *      toutv      qheat      pset      dpmax      zhtr
1439     3.0537e+02  0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
1440 *
1441 * dx    *    2.0000e-01e
1442 * vol   *    1.2770e-02e
1443 * fa    * f   5.6526e-01  5.7321e-03e
1444 * fric  * f   0.0000e+00e
1445 * grav  * f   -1.0000e+00  -6.0410e-01e
1446 * hd    * f   8.4836e-01  8.5430e-02e
1447 * icflg  * f   0e
1448 * nff   * f   -1e
1449 * alp   *    0.0000e+00e
1450 * vl    * f   0.0000e+00e
1451 * vv    * f   0.0000e+00e
1452 * tl    * f   6.1411e+02e
1453 * tv    * f   6.1411e+02e
1454 * p     * f   1.4780e+07e
1455 * pa    * f   0.0000e+00e
1456 * qppp  * f   0.0000e+00e
1457 * matid * f   9e
1458 * tw    * f   6.1411e+02e
1459 *
1460 ***** type      num      id      ctitle
1461 pipe       9           9 $9$ prizer top and prizer spray
1462 *      ncells      nodes      jun1      jun2      epsw
1463     1           4           60          68          1.0000e-05
1464 *      ichf       iconc      iacc      ipow      1
1465     1           0           0           1
1466 *      ipowtr      ipowsv      npowtb      npowsv      npowrf
1467     7           1           2           0           0

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1468 * iqptr2 iqpsv2 nqptb2 nqpsv2 nqprf2
1469 * 0 0 0 0 0
1470 * radin2 th2 hout12 houtv2 toutl2
1471 * 2.3300e-02 8.7970e-03 0.0000e+00 1.2270e+01 3.0537e+02
1472 * toutv2 pwin2 pwoff2 rpwmx2 pwsc12
1473 * 3.0537e+02 0.0000e+00 0.0000e+00 1.0000e+20 5.0000e+03
1474 * qpin2 qpooff2 rqpmx2 qpsc12
1475 * 0.0000e+00 0.0000e+00 0.0000e+00 1.0000e+00 1.0000e+00
1476 *
1477 * dx * 4.6022e-02e
1478 * vol * 6.6699e-05e
1479 * fa * 1.4493e-04 1.4493e-03e
1480 * fric * f 0.0000e+00e
1481 * grav * f -1.0000e+00e
1482 * hd * f 4.2957e-02e
1483 * icflg * f 0e
1484 * nff * -1 1e
1485 * alp * 0.0000e+00e
1486 * vl * f 0.0000e+00e
1487 * vv * f 0.0000e+00e
1488 * tl * 4.5000e+02e
1489 * tv * 4.5000e+02e
1490 * p * 1.4780e+07e
1491 * pa * 0.0000e+00e
1492 * qppp * f 0.0000e+00e
1493 * matid * f 6e
1494 * tw * f 4.5000e+02e
1495 *
1496 * powtb2* r02 0.0000e+00 2.0000e+01 1.0000e+00e
1497 *
1498 ***** type num id ctitle
1499 valve 10 10 $10$ prizer spray control valve
1500 * ncells nodes jun1 jun2 epsw
1501 * 3 4 67 68 1.0000e-05
1502 * ichf iconc ivty ivps nvtb2
1503 * 1 0 3 2 0
1504 * ivtr ivsv nvtb1 nvsv nvrf
1505 * 12 1 -2 0 0
1506 * iqptr3 iqptr3sv nqptr3tb nqptr3sv nqptr3rf
1507 * 0 0 0 0 0
1508 * ivtroyv ivtroyv
1509 * 0 0
1510 * rvmx rvov fminov fmaxov
1511 * 1.0000e+20 0.0000e+00 0.0000e+00 1.0000e+00
1512 * radin th hout1 houtv toutl
1513 * 3.3000e-02 8.6970e-03 0.0000e+00 1.2270e+01 3.0537e+02
1514 * toutv avlve hvlive favlive xpos
1515 * 3.0537e+02 1.4490e-03 4.2957e-02 6.8600e-03 -1.0000e+00
1516 * qp3in qp3off rqp3mx qp3scl
1517 * 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
1518 *
1519 * dx + r02 5.6600e-01 7.0000e-01e
1520 * dx * r02 0.70537663 7.0000e-01e
1521 * vol + r02 8.2030e-04 1.0145e-03e
1522 * vol * r02 1.0223e-03 1.0145e-03e
1523 * fa * f 1.4493e-03e
1524 * fric * 0.0000e+00 1.0500e+01r02 0.0000e+00e
1525 * grav * f 1.0000e+00e
1526 * hd * f 4.2957e-02e
1527 * icflg * f 0e
1528 * nff * f 1e
1529 * alp * f 0.0000e+00e
1530 * vl * f 0.0000e+00e
1531 * vv * f 0.0000e+00e
1532 * tl * f 4.5000e+02e
1533 * tv * f 4.5000e+02e
1534 * p * f 1.4780e+07e
1535 * pa * f 0.0000e+00e
1536 * qppp * f 0.0000e+00e
1537 * matid * f 7e
1538 * tw * f 4.5000e+02e
1539 *
1540 * vtbl * 0.0000e+00 6.8600e-03 1.0000e-01 1.0000e+00e
1541 *
1542 ***** type num id ctitle
1543 tee 11 11 $11$ prizer spray source
1544 * jcell nodes ichf cost epsw
1545 * 2 4 1 0.0000e+00 1.0000e-05
1546 * iconcl ncell1 jun1 jun2 ipow1
1547 * 0 3 66 8 0
1548 * iqptr1 iqptr1 nqptr1 nqptr1 nqptrf1
1549 * 0 0 0 0 0
1550 * radin1 th1 hout1 houtv1 toutl1
1551 * 1.4209e-01 3.5710e-02 0.0000e+00 1.2270e+01 3.0537e+02
1552 * toutv1
1553 * 3.0537e+02
1554 * qpin1 qpooff1 rqpmx1 qpsc11
1555 * 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
1556 * iconc2 ncell2 jun3 ipow2
1557 * 0 1 67 0
1558 * iqptr2 iqptr2 nqptr2 nqptr2 nqptrf2
1559 * 0 0 0 0 0

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```

1560 *      radin2          th2        houtl2       houtv2       toutl2
1561 *      2.3300e-02     8.6970e-03    0.0000e+00    1.2270e+01    3.0537e+02
1562 *      touttv2
1563 *      3.0537e+02
1564 *      qpin2          qpoff2      rqpmax2      qpsc12
1565 *      0.0000e+00     0.0000e+00    1.0000e+20    1.0000e+00
1566 *
1567 *      dx   +   1.1684e+00e
1568 *      dx   *   3.8947E-01    3.8947E-01    3.8947E-01e
1569 *      vol  +   7.4190e-02e
1570 *      vol  *   2.4730E-02    2.4730E-02    2.4730E-02e
1571 *      fa   + f   6.3425e-02e
1572 *      fa   * f   6.3425e-02    6.3497E-02    6.3497E-02    6.3425E-02e
1573 *      fric  + f   5.2244e-02    0.0000e+00e
1574 *      fric  * f   1.5673E-01    0.0          0.0          0.0000e+00e
1575 *      grav  * f   0.0000e+00e
1576 *      hd   * f   2.8417e-01e
1577 *      icflg  * f   0e
1578 *      nff  * f   1e
1579 *      alp  * f   0.0000e+00e
1580 *      vl   * f   0.0000e+00e
1581 *      vv   * f   0.0000e+00e
1582 *      tl   * f   5.5280e-02e
1583 *      tv   * f   5.5280e-02e
1584 *      p    * f   1.4780e+07e
1585 *      pa   * f   0.0000e+00e
1586 *      qppp  * f   0.0000e+00e
1587 *      matid * f   7e
1588 *      tw   * f   5.5280e+02e
1589 *
1590 *      dx   *   7.4602e-01e
1591 *      vol  *   1.0812e-03e
1592 *      fa   * f   1.4493e-03e
1593 *      fric  * f   1.0000e-04    0.0000e+00e
1594 *      grav  * f   1.0000e+00e
1595 *      hd   * f   4.2957e-02e
1596 *      icflg  * f   0e
1597 *      nff  * f   1e
1598 *      alp  * f   0.0000e+00e
1599 *      vl   * f   0.0000e+00e
1600 *      vv   * f   0.0000e+00e
1601 *      tl   * f   4.5000e+02e
1602 *      tv   * f   4.5000e+02e
1603 *      p    * f   1.4780e+07e
1604 *      pa   * f   0.0000e+00e
1605 *      qppp  * f   0.0000e+00e
1606 *      matid * f   7e
1607 *      tw   * f   4.5000e+02e
1608 *
1609 ***** type      num      id      ctitle
1610 pipe          12      12 $12$ pressurizer lower middle
1611 *      ncells      nodes      jun1      jun2      epsw
1612 *      1           4          61          64      1.0000e-05
1613 *      ichf       iconc      iacc      ipow
1614 *      1           0          0          1
1615 *      ipowtr      ipowsv      npowtb      npowsv      npowrf
1616 *      -24          21          8          0          0
1617 *      iq3ptr      iq3psv      nq3tb      nq3sv      nq3rf
1618 *      0           0          0          0          0
1619 *      radin      th       houtl      houtv      toutl
1620 *      4.2418e-01    7.4930e-02    0.0000e+00    2.7411e+00    3.0537e+02
1621 *      touttv      powin      powoff      rpowmx      powscl
1622 *      3.0537e+02    0.0000e+00    0.0000e+00    1.0000e+20    1.0000e+00
1623 *      qp3in      qp3off      rqp3mx      qp3sc1
1624 *      0.0000e+00    0.0000e+00    1.0000e+20    1.0000e+00
1625 *
1626 *      dx   *   1.5000e-01e
1627 *      vol  *   8.4789e-02e
1628 *      fa   * f   5.6526e-01e
1629 *      fric  * f   0.0000e+00e
1630 *      grav  * f   -1.0000e+00e
1631 *      hd   * f   8.4836e-01e
1632 *      icflg  * f   0e
1633 *      nff  * f   1          -1e
1634 *      alp  *   0.0000e+00e
1635 *      vl   * f   0.0000e+00e
1636 *      vv   * f   0.0000e+00e
1637 *      tl   * f   6.1411e+02e
1638 *      tv   * f   6.1411e+02e
1639 *      p    * f   1.4780e+07e
1640 *      pa   * f   0.0000e+00e
1641 *      qppp  * f   0.0000e+00e
1642 *      matid * f   9e
1643 *      tw   * f   6.1411e+02e
1644 *
1645 *      powtb *   -1.2500e+00    3.9800e+02    -7.5000e-01    3.9800e+02    -5.0000e-01
1646 *      powtb *   0.0000e+00    5.0000e-01    0.0000e+00    7.5000e-01    3.6000e+04
1647 *      powtb *   1.2500e+00    3.6000e+04    1.7500e+00    4.8000e+04    2.2500e+00
1648 *      powtb *   4.8000e+04e
1649 *
1650 ***** type      num      id      ctitle
1651 prizer        13      13 $13$ pressurizer upper middle

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1652 *      ncells       nodes       jun1       jun2
1653 *          7           4          60          61
1654 *      ichf      iconc      gp3in
1655 *          1           0  0.0000e+00
1656 *      radin      th      houtl      houtv      toutl
1657 *  4.2418e-01  7.4930e-02  0.0000e+00  2.7411e+00  3.0537e+02
1658 *      toutv      gheat      pset      dmax      zhtr
1659 *  3.0537e+02  0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
1660 *
1661 *      dx      *  1.3073e-01  4.0000e-01r05  2.0000e-01e
1662 *      vol      *  6.7133e-02  2.0259e-01r05  1.1305e-01e
1663 *      fa      *  1.4493e-04  5.0647e-01r06  5.6526e-01e
1664 *      fric      * f  0.0000e+00e
1665 *      grav      * f  1.0000e+00r07-1.0000e+00e
1666 *      hd      *  4.2957e-02r07  8.4836e-01e
1667 *      icflg      * f  0e
1668 *      nff      *  -1r07      1e
1669 *      alp      * r02  1.0000e+00  2.9032e-01r04  0.0000e+00e
1670 *      vl      * f  0.0000e+00e
1671 *      vv      * f  0.0000e+00e
1672 *      tl      * f  6.1411e+02e
1673 *      tv      * f  6.1411e+02e
1674 *      p      * f  1.4780e+07e
1675 *      pa      * f  0.0000e+00e
1676 *      gppp      * f  0.0000e+00e
1677 *      matid      * f  9e
1678 *      tw      * f  6.1411e+02e
1679 *
1680 ***** type      num      id      ctitle
1681 fill      17      17 $17$ hpis injection
1682 *      jun1      ifty      ioff
1683 *          14           8          1
1684 *      iftr      ifsv      nftb      nfsv      nfrf
1685 *          17           1         -12          0          0
1686 *      twtold      rfmx      concin      felv
1687 *  0.0000e+00  1.0000e+20  0.0000e+00  0.0000e+00
1688 *      dxin      violin      alpin      violin      tlin
1689 *  1.5000e+00  8.9838e-03  0.0000e+00  0.0000e+00  3.7500e+02
1690 *      pin      pain      flowin      vvin      tvin
1691 *  1.4780e+07  0.0000e+00  0.0000e+00  0.0000e+00  3.7500e+02
1692 *      vmscl      vvscl
1693 *  1.0000e+00  1.0000e+00
1694 *
1695 *      vmtb      * r02  0.0000e+00  2.0000e-01  2.4375e-01  1.6000e+00  3.8875e+00
1696 *      vmtb      *  2.0600e+01  3.8937e+00  2.1600e+01  1.4750e+00  2.2600e+01
1697 *      vmtb      *  3.7500e-01  2.3600e+01  2.5000e-01  2.6600e+01  1.5937e-01
1698 *      vmtb      *  3.3600e+01  1.2500e-01  3.9600e-01  1.2500e-01  4.0100e+01
1699 *      vmtb      *  0.0000e+00  1.0000e+04  0.0000e+00e
1700 *
1701 ***** type      num      id      ctitle
1702 valve     23      23 $23$ steam line valve
1703 *      ncells       nodes       jun1       jun2      epsw
1704 *          6           0          22          26  1.0000e-05
1705 *      ichf      iconc      ivty      ivps      nvtb2
1706 *          1           0          3           6          0
1707 *      ivtr      ivsv      nvtbl      nvsv      nvrf
1708 *          8           -13          0           0           0
1709 *      ivtrov      ivtyov
1710 *          0           0
1711 *      rvmx      rvov      fminov      fmaxov
1712 *  1.0000e+20  0.0000e+00  0.0000e+00  1.0000e+00
1713 *      radin      th      houtl      houtv      toutl
1714 *  1.2140e-01  1.5100e-02  0.0000e+00  0.0000e+00  3.0537e+02
1715 *      toutv      avlve      hvlve      favlive      xpos
1716 *  3.0537e+02  3.7580e-02  2.1870e-01  5.8973e-01  6.3800e-01
1717 *
1718 *      dx      * f  5.0119e+00e
1719 *      vol      * f  2.3220e-01e
1720 *      fa      * f  4.6329e-02e
1721 *      fric      * f  2.4460e-01r04  0.0000e+00  6.4900e+00  0.0000e+00e
1722 *      grav      * f  1.0000e+00r06  0.0000e+00e
1723 *      hd      * f  2.4290e-01e
1724 *      icflg      * r05      0           1           0e
1725 *      nff      * r06      1           -1e
1726 *      alp      * f  1.0000e+00e
1727 *      vl      * f  0.0000e+00e
1728 *      vv      * f  0.0000e+00e
1729 *      tl      * f  5.4157e+02e
1730 *      tv      * f  5.4157e+02e
1731 *      p      *  5.3700e+06  5.3628e+06  5.3556e+06  5.3483e+06  5.3411e+06
1732 *      p      *  2.1500e+06e
1733 *      pa      * f  0.0000e+00e
1734 *
1735 ***** type      num      id      ctitle
1736 fill      24      24 $24$ steam generator feedwater
1737 *      jun1      ifty      ioff
1738 *          25           8           0
1739 *      iftr      ifsv      nftb      nfsv      nfrf
1740 *          15           -10          0           0           0
1741 *      twtold      rfmx      concin      felv
1742 *  0.0000e+00  1.0000e+20  0.0000e+00  0.0000e+00
1743 *      dxin      violin      alpin      violin      tlin

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1744    2.0000e+00  1.6215e-02  0.0000e+00  0.0000e+00  4.7900e+02
1745 *      pin      pain     flowin     vvin     tvin
1746    5.3700e+06  0.0000e+00  2.0100e+01  0.0000e+00  4.7900e+02
1747 *
1748 ***** type      num      id      ctitle
1749 break      25      25 $25$ stm gen sec brk
1750 *      jun1     ibty     isat     ioff
1751      26      0      3      0
1752 *      dixin     violin    alpin     tin      pin
1753    5.0119e+00  2.3220e+01  1.0000e+00  4.8800e+02  2.1500e+06
1754 *      pain      concin    rlmx     poff     belv
1755    0.0000e+00  0.0000e+00  0.0000e+00  2.1500e+06  0.0000e+00
1756 *
1757 ***** type      num      id      ctitle
1758 tee      29      29 $29$ inlet annulus and downcomer
1759 *      jcell     nodes    ichf     cost     epsw
1760      1      10      1 0.0000e+00  1.0000e-05
1761 *      iconcl     ncell1   jun1     jun2     ipow1
1762      0      2      46      1      0
1763 *      iqptr1     iqpsv1   npptbl   nppsv1   npqrfl
1764      0      0      0      0      0
1765 *      radin1     th1      houtl1   houtv1   toutl1
1766    1.4209e-01  1.5907e-01  0.0000e+00  0.0000e+00  3.0537e+02
1767 *      toutv1
1768    3.0537e+02
1769 *      qpin1     qpooff1   rqpmx1   qpsc11
1770    0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
1771 *      iconc2     ncell2   jun3     ipow2
1772      0      1      34      0
1773 *      iqptr2     iqpsv2   npptb2   nppsv2   npqrfl
1774      0      0      0      0      0
1775 *      radin2     th2      houtl2   houtv2   toutl2
1776    9.2000e-01  1.3600e-01  0.0000e+00  0.0000e+00  3.0537e+02
1777 *      toutv2
1778    3.0537e+02
1779 *      qpin2     qpooff2   rqpmx2   qpsc12
1780    0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
1781 *
1782 * remodelling of this component was done in conjunction with component 40
1783 * dx      + 7.0974e-01e
1784 * dx      * 2.0244E-01  2.0244E-01e
1785 * vol     + 1.0073e-01e
1786 * vol     * 2.7252E-02  2.7252E-02e
1787 * fa      + 1.4192e-01  6.3425e-02e
1788 * fa      * 1.3462E-01  1.3462E-01  6.3425e-02e
1789 * fric    + 0.0000e+00  2.0000e-02e
1790 * fric    * 0.0      0.0  2.7309E-02e
1791 * grav    * f 0.0000e+00e
1792 * hd      * f 2.8418e-01e
1793 * icflg   * f 0e
1794 * nff     * f 1e
1795 * alp     * f 0.0000e+00e
1796 * vl      * f 0.0000e+00e
1797 * vv      * f 0.0000e+00e
1798 * tl      * f 5.5280e+02e
1799 * tv      * f 5.5280e+02e
1800 * p       * f 1.4780e+07e
1801 * pa      * f 0.0000e+00e
1802 * qppp   * f 0.0000e+00e
1803 * matid   * f 6e
1804 * tw      * f 5.5280e+02e
1805 *
1806 * dx      + 1.0000e-01e
1807 * dx      * 0.1006805e
1808 * vol     + 1.4192e-02e
1809 * vol     * 0.01428858e
1810 * fa      * f 1.4192e-01e
1811 * fric    * 1.0000e-04  0.0000e+00e
1812 * grav    + f -9.9985e-01e
1813 * grav    + -9.9985e-01 -0.99963215e
1814 * grav    * f -1.0e
1815 * hd      * f 1.0000e-01e
1816 * icflg   * f 0e
1817 * nff     * f 1e
1818 * alp     * 0.0000e+00e
1819 * vl      * f 0.0000e+00e
1820 * vv      * f 0.0000e+00e
1821 * tl      * 5.5280e+02e
1822 * tv      * 5.5280e+02e
1823 * p       * 1.4780e+07e
1824 * pa      * 0.0000e+00e
1825 * qppp   * f 0.0000e+00e
1826 * matid   * f 6e
1827 * tw      * f 5.5280e+02e
1828 *
1829 ***** type      num      id      ctitle
1830 tee      30      30 $30$ vessel lower plenum outside
1831 *      jcell     nodes    ichf     cost     epsw
1832      2      10      1 0.0000e+00  1.0000e-05
1833 *      iconcl     ncell1   jun1     jun2     ipow1
1834      0      4      96      35      0
1835 *      iqptr1     iqpsv1   npptbl   nppsv1   npqrfl

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```

1836          0          0          0          0          0
1837 *      radin1      th1      hout11      houtv1      tout11
1838   9.4000e-01  1.3600e-01  0.0000e+00  0.0000e+00  3.0537e+02
1839 *
1840   3.0537e+02
1841 *      qpin1      qpoff1      rqpmax1      qpsc11
1842   0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
1843 *      iconc2      ncell12      jun3      ipow2
1844   0          1          36          0
1845 *      iqptr2      iqpsv2      nqptb2      nqpsv2      nqprf2
1846   0          0          0          0          0
1847 *      radin2      th2      hout12      houtv2      tout12
1848   5.0000e-02  5.0000e-02  0.0000e+00  0.0000e+00  3.0537e+02
1849 *
1850   3.0537e+02
1851 *      qpin2      qpoff2      rqpmax2      qpsc12
1852   0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
1853 *
1854 * dx + 8.4700e-01  4.3200e-01e
1855 * dx * 2.8233E-01  2.8233E-01  2.8233E-01  4.3200e-01e
1856 * vol + 1.2021e-01  1.5429e-01e
1857 * vol * 4.0070E-02  4.0070E-02  4.0070E-02  1.5429e-01e
1858 * fa + r02 1.4192e-01  3.4005e-01e
1859 * fa * r04 1.4192e-01  3.4005e-01e
1860 * fric * f 0.0000e+00e
1861 * grav + r02-1.0000e+00  0.0000e+00e
1862 * grav * r04-1.0000e+00  0.0000e+00e
1863 * hd * f 1.0000e-01e
1864 * icflg * f 0e
1865 * nff + 1 -1 1e
1866 * nff * r03 1 -1 1e
1867 * alp * f 0.0000e+00e
1868 * vl * f 0.0000e+00e
1869 * vv * f 0.0000e+00e
1870 * tl * f 5.5280e+02e
1871 * tv * f 5.5280e+02e
1872 * p * f 1.4780e+07e
1873 * pa * f 0.0000e+00e
1874 * qppp * f 0.0000e+00e
1875 * matid * f 6e
1876 * tw * f 5.5280e+02e
1877 *
1878 * dx * 1.0000e-01e
1879 * vol * 4.1321e-02e
1880 * fa * f 4.1321e-01e
1881 * fric * f 1.0000e-04  0.0000e+00e
1882 * grav * f 0.0000e+00e
1883 * hd * f 1.0000e-01e
1884 * icflg * f 0e
1885 * nff * f 1e
1886 * alp * f 0.0000e+00e
1887 * vl * f 0.0000e+00e
1888 * vv * f 0.0000e+00e
1889 * tl * f 5.5280e+02e
1890 * tv * f 5.5280e+02e
1891 * p * f 1.4780e+07e
1892 * pa * f 0.0000e+00e
1893 * qppp * f 0.0000e+00e
1894 * matid * f 6e
1895 * tw * f 5.5280e+02e
1896 *
1897 ***** type num id ctitle
1898 tee      31      31 $31$ broken loop hot leg
1899 *      jcell      nodes ichf cost epsw
1900   3          4          1  0.0000e+00  1.0000e-05
1901 *      iconcl      ncell11 jun1 jun2 ipow1
1902   0          20         45         32          0
1903 *      iqptr1      iqpsv1 nqptb1 nqpsv1 nqprf1
1904   0          0          0          0          0
1905 *      radin1      th1      hout11      houtv1      tout11
1906   1.4209e-01  3.5710e-02  0.0000e+00  1.2270e+01  3.0537e+02
1907 *      toutv1
1908   3.0537e+02
1909 *      qpin1      qpoff1      rqpmax1      qpsc11
1910   0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
1911 *      iconc2      ncell12      jun3      ipow2
1912   0          3          43          0
1913 *      iqptr2      iqpsv2      nqptb2      nqpsv2      nqprf2
1914   0          0          0          0          0
1915 *      radin2      th2      hout12      houtv2      tout12
1916   1.0795e-01  2.8580e-02  0.0000e+00  1.2270e+01  3.0537e+02
1917 *      toutv2
1918   3.0537e+02
1919 *      qpin2      qpoff2      rqpmax2      qpsc12
1920   0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
1921 *
1922 * dx + 9.2939e-01  5.5880e-01  1.3890e+00  2.9921e-01  8.5396e-01
1923 * dx * 9.2939e-01  1.6825E-01  2.2230E-01  1.6825E-01  1.3890e+00
1924 * dx * 2.9921e-01  8.5396e-01s
1925 * dx * 1.6921e+00  1.0772e+00  2.6314e-01  1.0772e+00  1.6921e+00
1926 * dx * 1.5080e+00  3.3020e-01  2.7940e-01  4.9530e-01  2.9921e-01
1927 * dx * 8.3185e-01  2.9921e-01  5.0000e-01e

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1928	* vol	+	5.8701e-02	3.5442e-02	5.0618e-02	2.4919e-03	3.8990e-02
1929	* vol	*	5.8701e-02	1.0671E-02	1.4099E-02	1.0671E-02	5.0618e-02
1930	* vol	*	2.4919e-03	3.8990e-02s			
1931	* vol	*	1.7868e-01	1.1383e-01	2.7779e-02	1.1383e-01	1.7868e-01
1932	* vol	*	4.3550e-02	2.0105e-03	1.7726e-02	1.9441e-02	2.4919e-03
1933	* vol	*	6.9660e-03	2.4919e-03	2.4542e-03e		
1934	* fa	+	r03 6.3425e-02r02	8.3677e-03r06	1.0562e-01	8.3677e-03r02	6.3425e-02
1935	* fa	*	r05 6.3425e-02r02	8.3677e-03r06	1.0562e-01	8.3677e-03r02	6.3425e-02
1936	* fa	*	r04 8.3677e-03	2.0694e-02e			
1937	* fric	+	7.0547e-02	5.1558e-02	5.9983e-02	3.7870e-02	3.7944e-02
1938	* fric	*	7.4149E-02	6.9903E-02	0.0	0.0	7.5026E-02
1939	* fric	*	3.7870e-02	3.7944e-02s			
1940	* fric	*	6.1057e-02	1.9809e-01	0.0000e+00	1.7157e-02	0.0000e+00
1941	* fric	*	2.1500e-01	2.6383e-01	4.8453e-01	5.8143e-02	1.1840e-01
1942	* fric	*	0.0000e+00	2.5031e-02	6.2037e-03	5.0970e-01e	
1943	* grav	+	r04 0.0000e+00r03-1.0000e+00r02	0.0000e+00r04	1.0000e+00r02	0.0000e+00	
1944	* grav	+	r02-1.0000e+00r02	0.0000e+00e			
1945	* grav	*	r06 0.0000e+00	0.72818405r02+1.0000e+00r02	0.0000e+00r04-1.0000e+00		
1946	* grav	*	r02 0.0000e+00r02+1.0000e+00r02	0.0000e+00e			
1947	* hd	+	r03 2.8418e-01r02	1.0322e-01r06	3.6671e-01	1.0322e-01r02	2.8418e-01
1948	* hd	*	r05 2.8418e-01r02	1.0322e-01r06	3.6671e-01	1.0322e-01r02	2.8418e-01
1949	* hd	*	r04 1.0322e-01	2.5720e-01e			
1950	* icflg	*	f 0e				
1951	* nff	*	f 1e				
1952	* alp	*	f 0.0000e+00e				
1953	* vl	*	f 0.0000e+00e				
1954	* vv	*	f 0.0000e+00e				
1955	* tl	*	f 5.6750e+02e				
1956	* tv	*	f 5.6750e+02e				
1957	* p	*	f 1.4780e+07e				
1958	* pa	*	f 0.0000e+00e				
1959	* qppp	*	f 0.0000e+00e				
1960	* matid	*	f 7e				
1961	* tw	*	f 5.6750e+02e				
1962	*						
1963	* dx	*	1.3890e+00	8.1400e-01	5.1044e+00e		
1964	* vol	*	5.4000e-02	3.1400e-02	1.9860e-01e		
1965	* fa	*	r03 3.8800e-02e				
1966	* fric	*	1.1160e-01r03	0.0000e+00e			
1967	* grav	*	0.0000e+00	2.2420e-01	1.9120e-01	0.0000e+00e	
1968	* hd	*	r03 2.2230e-01	1.4100e-03e			
1969	* icflg	*	f 0e				
1970	* nff	*	f 1e				
1971	* alp	*	f 0.0000e+00e				
1972	* vl	*	f 0.0000e+00e				
1973	* vv	*	f 0.0000e+00e				
1974	* tl	*	f 5.5280e+02e				
1975	* tv	*	f 5.5280e+02e				
1976	* p	*	f 1.4780e+07e				
1977	* pa	*	f 0.0000e+00e				
1978	* qppp	*	f 0.0000e+00e				
1979	* matid	*	f 7e				
1980	* tw	*	f 5.5280e+02e				
1981	*						
1982	*****	type	num	id	ctitle		
1983	tee		33	33 \$33\$	vessel upper plenum		
1984	*	jcell	nodes	ichf	cost	epsw	
1985	*	2	4	1	0.0000e+00	1.0000e-05	
1986	*	iconcl	ncell1	jun1	jun2	ipow1	
1987	*	0	4	83	39	0	
1988	*	iqptr1	iqpsv1	nqptbl	nqpsv1	nqprf1	
1989	*	0	0	0	0	0	
1990	*	radin1	th1	houtl1	houtv1	toutl1	
1991	*	3.3197e-01	4.9029e-02	0.0000e+00	0.0000e+00	3.0537e+02	
1992	*	toutv1					
1993	*	3.0537e+02					
1994	*	qpin1	qpoff1	rqpmax1	qpsc11		
1995	*	0.0000e+00	0.0000e+00	1.0000e+20	1.0000e+00		
1996	*	iconc2	ncell2	jun3	ipow2		
1997	*	0	1	40	0		
1998	*	iqptr2	iqpsv2	nqptb2	nqpsv2	nqprf2	
1999	*	0	0	0	0	0	
2000	*	radin2	th2	houtl2	houtv2	toutl2	
2001	*	1.4209e-01	4.9029e-02	0.0000e+00	0.0000e+00	3.0537e+02	
2002	*	toutv2					
2003	*	3.0537e+02					
2004	*	qpin2	qpoff2	rqpmax2	qpsc12		
2005	*	0.0000e+00	0.0000e+00	1.0000e+20	1.0000e+00		
2006	*						
2007	* dx	+	2.8418e-01	7.7000e-01e			
2008	* dx	*	9.4727E-02	9.4727E-02	9.4727E-02	7.7000e-01e	
2009	* vol	+	3.5298e-02	2.5817e-01e			
2010	* vol	*	1.1766E-02	1.1766E-02	1.1766E-02	2.5817e-01e	
2011	* fa	+	1.2412e-01r02	1.2446e-01e			
2012	* fa	*	1.2412e-01	1.2421E-01	1.2421E-01r02	1.2446e-01e	
2013	* fric	+	5.0000e-03r02	0.0000e+00e			
2014	* fric	*	1.5000E-02	0.0		0.0r02	0.0000e+00e
2015	* grav	*	f 1.0000e+00e				
2016	* hd	*	f 1.2200e-02e				
2017	* icflg	*	f 0e				
2018	* nff	+	1	-1	1e		
2019	* nff	*	r03 1	-1	1e		

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2020 * alp * f 0.0000e+00e
2021 * vl * f 0.0000e+00e
2022 * vv * f 0.0000e+00e
2023 * tl * f 5.6750e+02e
2024 * tv * f 5.6750e+02e
2025 * p * f 1.4780e+07e
2026 * pa * f 0.0000e+00e
2027 * qppp * f 0.0000e+00e
2028 * matid * f 6e
2029 * tw * f 5.6750e+02e
2030 *
2031 * dx * 1.0974e-01e
2032 * vol * 1.3658e-02e
2033 * fa * f 1.2446e-01e
2034 * fric * 1.0000e-04 0.0000e+00e
2035 * grav * f 0.0000e+00e
2036 * hd * f 2.8418e-01e
2037 * icflg * f 0e
2038 * nff * f 1e
2039 * alp * 0.0000e+00e
2040 * vl * f 0.0000e+00e
2041 * vv * f 0.0000e+00e
2042 * tl * 5.6750e+02e
2043 * tv * 5.6750e+02e
2044 * p * 1.4780e+07e
2045 * pa * 0.0000e+00e
2046 * qppp * f 0.0000e+00e
2047 * matid * f 6e
2048 * tw * f 5.6750e+02e
2049 *
2050 ***** type num id ctitle
2051 tee 34 34 $34$ upper plenum and hot legs
2052 * jcell nodes ichf cost epsw
2053 1 0 1 0.0000e+00 0.0000e+00
2054 * iconc1 ncell1 jun1 jun2 ipow1
2055 0 2 48 45 0
2056 * radin1 th1 hout11 houtv1 tout11
2057 1.4209e-01 4.9029e-02 0.0000e+00 0.0000e+00 3.0537e+02
2058 * toutv1
2059 3.0537e+02
2060 * iconc2 ncell2 jun3 ipow2
2061 0 1 40 0
2062 * radin2 th2 hout12 houtv2 tout12
2063 1.4209e-01 4.9029e-02 0.0000e+00 0.0000e+00 3.0537e+02
2064 * toutv2
2065 3.0537e+02
2066 *
2067 * renodding of this component was done in conjunction with component 43
2068 * dx + 1.0000e-01e
2069 * dx * 5.0000E-02 5.0000E-02e
2070 * vol + 6.5218e-03e
2071 * vol * 3.2609E-03 3.2609E-03e
2072 * fa + f 6.3425e-02e
2073 * fa * 6.5218E-02 6.5218E-02 6.3425e-02e
2074 * fric + 0.0000e+00 7.0547e-02e
2075 * fric * 0.0 0.0 7.4149E-02e
2076 * grav * f 0.0000e+00e
2077 * hd * f 2.8418e-01e
2078 * icflg * f 0e
2079 * nff * f 1e
2080 * alp * f 0.0000e+00e
2081 * vl * f 0.0000e+00e
2082 * vv * f 0.0000e+00e
2083 * tl * f 5.6750e+02e
2084 * tv * f 5.6750e+02e
2085 * p * f 1.4780e+07e
2086 * pa * f 0.0000e+00e
2087 *
2088 * dx * 1.0974e-01e
2089 * vol * 1.3658e-02e
2090 * fa * f 1.2446e-01e
2091 * fric * 1.0000e-04 0.0000e+00e
2092 * grav * f 0.0000e+00e
2093 * hd * f 2.8418e-01e
2094 * icflg * f 0e
2095 * nff * f 1e
2096 * alp * 0.0000e+00e
2097 * vl * f 0.0000e+00e
2098 * vv * f 0.0000e+00e
2099 * tl * 5.6750e+02e
2100 * tv * 5.6750e+02e
2101 * p * 1.4780e+07e
2102 * pa * 0.0000e+00e
2103 *
2104 ***** type num id ctitle
2105 fill 35 35 $35$ vessel head
2106 * jun1 fifty ioff
2107 39 1 0
2108 * twtold rfmx concin felv
2109 0.0000e+00 1.0000e+20 0.0000e+00 0.0000e+00
2110 * dxin volin alpin vlin tlin
2111 7.7000e-01 2.5817e-01 0.0000e+00 0.0000e+00 5.6750e+02

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2112 *      pin      pain     flowin      vvin      tvin
2113   1.4780e+07  0.0000e+00  0.0000e+00  0.0000e+00  5.6750e+02
2114 *
2115 ***** type      num      id      ctitle
2116 tee      jcell      nodes      36      36 $36$ vessel lower plenum inside
2117 *      jcell      nodes      3       0      ichf      cost      epsw
2118 *      jcell      nodes      3       0      1      0.0000e+00  1.0000e-05
2119 *      iconcl      ncell1      jun1      jun2      ipow1
2120 *      radin1      th1      95      hout11      houtv1      tout11
2121 *      radin1      th1      95      hout11      houtv1      tout11
2122   3.3197e-01  4.9029e-02  0.0000e+00  0.0000e+00  3.0537e+02
2123 *      toutv1
2124   3.0537e+02
2125 *      iconc2      ncell2      jun3      ipow2
2126 *      iconc2      ncell2      jun3      86      0
2127 *      radin2      th2      hout12      houtv2      tout12
2128   5.0000e-02  5.0000e-02  0.0000e+00  0.0000e+00  3.0537e+02
2129 *      toutv2
2130   3.0537e+02
2131 *
2132 * dx      +      4.3200e-01  8.4700e-01e
2133 * dx      +      4.3200e-01  2.8233E-01  2.8233E-01e
2134 * vol      +      1.4696e-01  2.3172e-01e
2135 * vol      *      1.4696e-01  7.7240E-02  7.7240E-02e
2136 * fa      + r02  3.4005e-01  1.6356e-01e
2137 * fa      * r02  3.4005e-01  2.73588e-01  2.7358E-01  1.6356e-01e
2138 * fric      + r02  0.0000e+00  2.4437e-02e
2139 * fric      * r02  0.0000e+00  0.0      0.0      4.5239E-02e
2140 * grav      + 0.0000e+00r02  1.0000e+00e
2141 * grav      * 0.0000e+00r04  1.0000e+00e
2142 * hd      + r02  1.0000e-01  1.2200e-02e
2143 * hd      * r03  1.0000e-01r02  1.2200e-02e
2144 * icflg      * f      0e
2145 * nff      * f      1e
2146 * alp      * f      0.0000e+00e
2147 * vl      * f      0.0000e+00e
2148 * vv      * f      0.0000e+00e
2149 * tl      * f      5.5280e+02e
2150 * tv      * f      5.5280e+02e
2151 * p      * f      1.4780e+07e
2152 * pa      * f      0.0000e+00e
2153 *
2154 * dx      * 5.0000e-02e
2155 * vol      * 2.0660e-02e
2156 * fa      * f      4.1321e-01e
2157 * fric      * f      1.0000e-04  0.0000e+00e
2158 * grav      * f      0.0000e+00e
2159 * hd      * f      1.0000e-01e
2160 * icflg      * f      0e
2161 * nff      * f      1e
2162 * alp      * f      0.0000e+00e
2163 * vl      * f      0.0000e+00e
2164 * vv      * f      0.0000e+00e
2165 * tl      * f      5.5280e+02e
2166 * tv      * f      5.5280e+02e
2167 * p      * 1.4780e+07e
2168 * pa      * 0.0000e+00e
2169 *
2170 ***** type      num      id      ctitle
2171 pipe      ncells      nodes      37      37 $37$ nuclear reactor core pipe
2172 *      ncells      nodes      4       4      jun1      jun2      epsw
2173 *      ncells      nodes      4       4      37      38      1.0000e-05
2174 *      ichf      iconc      iacc      ipow
2175 *      ichf      iconc      iacc      ipow
2176 *      iq3tr      iq3sv      iq3tb      iq3sv      iq3rf
2177 *      iq3tr      iq3sv      iq3tb      iq3sv      iq3rf
2178 *      radin      th      hout1      houtv      tout1
2179   3.3197e-01  1.6343e-02  0.0000e+00  0.0000e+00  3.0537e+02
2180 *      toutv      powin      powoff      rpowmx      powscl
2181   3.0537e+02  0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
2182 *      qp3in      qp3off      rqp3mx      qp3scl
2183   0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
2184 *
2185 * dx      * 3.8100e-01  2.9100e-01  4.7100e-01  5.3380e-01e
2186 * vol      * 7.8656e-02  6.0075e-02  9.7236e-02  1.1003e-01e
2187 * fa      * f      1.6356e-01e
2188 * fric      + r03  2.4437e-02r03  0.0000e+00  1.0000e-02e
2189 * fric      * r03  4.5239E-02r03  0.0000e+00  1.0000e-02e
2190 * grav      * f      1.0000e+00e
2191 * hd      * f      1.2200e-02e
2192 * icflg      * f      0e
2193 * nff      * f      1e
2194 * alp      * f      0.0000e+00e
2195 * vl      * f      0.0000e+00e
2196 * vv      * f      0.0000e+00e
2197 * tl      * f      5.5460e+02  5.5820e+02  5.6210e+02  5.6570e+02e
2198 * tv      * f      5.5460e+02  5.5820e+02  5.6210e+02  5.6570e+02e
2199 * p      * f      1.4780e+07e
2200 * pa      * f      0.0000e+00e
2201 * qppp      * f      0.0000e+00e
2202 * matid      * f      6e
2203 * tw      * r04  5.5280e+02r04  5.5770e+02r04  5.6260e+02r04  5.6750e+02e

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2204 *
2205 ***** type num id ctitle
2206 tee jcell nodes 40 40 $40$ inlet annulus nozzle penetration
2207 * 2
2208 * 4
2209 * iconcl ncell1 1 0.0000e+00 1.0000e-05
2210 * 0 jun1 jun2 ipow1
2211 * 2 29 46 0
2212 * iqptr1 iqpsv1 npptbl nqpsv1 npqrfl
2213 * 0 0 0 0
2214 * radin1 th1 hout1 houtv1 toutl1
2215 * 1.4209e-01 1.5907e-01 0.0000e+00 0.0000e+00 3.0537e+02
2216 * toutv1
2217 * 3.0537e+02
2218 * qpin1 qpoff1 rqpmax1 qpsc11
2219 * 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
2220 * iconc2 ncell2 jun3 ipow2
2221 * 0 1 47 0
2222 * iqptr2 iqpsv2 npptb2 nqpsv2 npqrfl2
2223 * 0 0 0 0
2224 * radin2 th2 houtl2 houtv2 toutl2
2225 * 5.0000e-02 5.0000e-02 0.0000e+00 0.0000e+00 3.0537e+02
2226 * toutv2
2227 * 3.0537e+02
2228 * qpin2 qpoff2 rqpmax2 qpsc12
2229 * 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
2230 * renoding of this component was done in conjunction with component 29
2231 * dx + 1.0000e-01e
2232 * dx * 2.0244E-01 2.0244E-01e
2233 * vol + 8.2790e-03e
2234 * vol * 2.7252E-02 2.7252E-02e
2235 * fa + 6.3425e-02 1.4192e-01e
2236 * fa * 6.3425e-02 1.3462E-01 1.3462E-01e
2237 * fric + 2.0000e-02 0.0000e+00e
2238 * fric * 1.8719E-02 0.0 0.0000E+00e
2239 * grav * f 0.0000e+00e
2240 * hd * f 2.8418e-01e
2241 * icflg * f 0e
2242 * nff * f 1e
2243 * alp * f 0.0000e+00e
2244 * vl * f 0.0000e+00e
2245 * vv * f 0.0000e+00e
2246 * tl * f 5.5280e+02e
2247 * tv * f 5.5280e+02e
2248 * p * f 1.4780e+07e
2249 * pa * f 0.0000e+00e
2250 * qppp * f 0.0000e+00e
2251 * matid * f 6e
2252 * tw * f 5.5280e+02e
2253 *
2254 * dx * 1.0000e-01e
2255 * vol * 7.8540e-04e
2256 * fa * f 7.8540e-03e
2257 * fric * 1.0000e-04 0.0000e+00e
2258 * grav * f 0.0000e+00e
2259 * hd * 1.0000e-01 2.5150e-04e
2260 * icflg * f 0e
2261 * nff * f 1e
2262 * alp * 0.0000e+00e
2263 * vl * f 0.0000e+00e
2264 * vv * f 0.0000e+00e
2265 * tl * 5.5280e+02e
2266 * tv * 5.5280e+02e
2267 * p * 1.4780e+07e
2268 * pa * 0.0000e+00e
2269 * qppp * f 0.0000e+00e
2270 * matid * f 6e
2271 * tw * f 5.5280e+02e
2272 *
2273 ***** type num id ctitle
2274 tee jcell nodes 41 41 $41$ broken loop cold leg
2275 * 2
2276 * 4
2277 * iconcl ncell1 1 0.0000e+00 1.0000e-05
2278 * 0 jun1 jun2 ipow1
2279 * 2 1 44 0
2280 * iqptr1 iqpsv1 npptbl nqpsv1 npqrfl
2281 * 0 0 0 0
2282 * radin1 th1 hout1 houtv1 toutl1
2283 * 1.4209e-01 3.5710e-02 0.0000e+00 1.2270e+01 3.0537e+02
2284 * toutv1
2285 * 3.0537e+02
2286 * qpin1 qpoff1 rqpmax1 qpsc11
2287 * 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
2288 * iconc2 ncell2 jun3 ipow2
2289 * 0 2 43 0
2290 * iqptr2 iqpsv2 npptb2 nqpsv2 npqrfl2
2291 * 0 0 0 0
2292 * radin2 th2 houtl2 houtv2 toutl2
2293 * 1.0795e-01 2.8580e-02 0.0000e+00 1.2270e+01 3.0537e+02
2294 * toutv2
2295 * 3.0537e+02
2296 * qpin2 qpoff2 rqpmax2 qpsc12

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```

2296      0.0000e+00    0.0000e+00    1.0000e+20    1.0000e+00
2297 *
2298 * dx   * f   1.1858e+00e
2299 * vol  * f   7.5209e-02e
2300 * fa   * f   6.3425e-02e
2301 * fric + 2.0000e-02    1.0990e-01    1.7900e-02e
2302 * fric * 2.7309E-02    1.0990e-01    1.7900e-02e
2303 * grav * f   0.0000e+00e
2304 * hd   * f   2.8418e-01e
2305 * icflg * f   0e
2306 * nff  * f   1e
2307 * alp  * f   0.0000e+00e
2308 * vl   * f   0.0000e+00e
2309 * vv   * f   0.0000e+00e
2310 * tl   * f   5.5280e+02e
2311 * tv   * f   5.5280e+02e
2312 * p    * f   1.4780e+07e
2313 * pa   * f   0.0000e+00e
2314 * qppp * f   0.0000e+00e
2315 * matid * f   7e
2316 * tw   * f   5.5280e+02e
2317 *
2318 * dx   * 8.8500e-01    7.2834e+00e
2319 * vol  * 3.4338e-02    2.8260e-01e
2320 * fa   * f   3.8800e-02e
2321 * fric + 1.0000e-04r02 0.0000e+00e
2322 * grav + 0.0000e+00    1.9900e-01    0.0000e+00e
2323 * grav * 0.0000e+00    0.19899989  0.0000e+00e
2324 * hd   * r02 2.2230e-01    1.4100e-03e
2325 * icflg * f   0e
2326 * nff  * f   1e
2327 * alp  * f   0.0000e+00e
2328 * vl   * f   0.0000e+00e
2329 * vv   * f   0.0000e+00e
2330 * tl   * f   5.5280e+02e
2331 * tv   * f   5.5280e+02e
2332 * p    * f   1.4780e+07e
2333 * pa   * f   0.0000e+00e
2334 * qppp * f   0.0000e+00e
2335 * matid * f   7e
2336 * tw   * f   5.5280e+02e
2337 *
2338 ***** type num id ctitle
2339 tee          43 43 $43$ upper plenum nozzle penetration
2340 * jcell       nodes ichf cost epsw
2341   1           4   1 0.0000e+00 1.0000e-05
2342 * iconcl     ncelli jun1 jun2 ipow1
2343   0           2   48 9 0
2344 * iqptr1     iqpsv1 ngptb1 ngpsv1 ngprf1
2345   0           0   0 0 0
2346 * radin1     th1 hout11 houtv1 toutl1
2347 1.4209e-01 4.9029e-02 0.0000e+00 0.0000e+00 3.0537e+02
2348 * toutv1
2349 3.0537e+02
2350 * qpin1      qpoff1 rqpmx1 qpsc11
2351 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
2352 * iconc2     ncell2 jun3 ipow2
2353   0           1   47 0
2354 * iqptr2     iqpsv2 ngptb2 ngpsv2 ngprf2
2355   0           0   0 0 0
2356 * radin2     th2 hout12 houtv2 toutl2
2357 5.0000e-02 5.0000e-02 0.0000e+00 0.0000e+00 3.0537e+02
2358 * toutv2
2359 3.0537e+02
2360 * qpin2      qpoff2 rqpmx2 qpsc12
2361 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
2362 *
2363 * renoding of this component was done in conjunction with component 34
2364 * dx + 1.0000e-01e
2365 * dx * 5.0000E-02 5.0000E-02e
2366 * vol + 6.5218e-03e
2367 * vol * 3.2609E-03 3.2609E-03e
2368 * fa + f 6.3425e-02e
2369 * fa * 6.5218E-02 6.5218E-02 6.3425e-02e
2370 * fric + 0.0000e+00 3.7203e-02e 0.0 3.8186E-02e
2371 * fric * 0.0 0.0
2372 * grav * f 0.0000e+00e
2373 * hd   * f 2.8418e-01e
2374 * icflg * f 0e
2375 * nff  * f 1e
2376 * alp  * f 0.0000e+00e
2377 * vl   * f 0.0000e+00e
2378 * vv   * f 0.0000e+00e
2379 * tl   * f 5.6750e+02e
2380 * tv   * f 5.6750e+02e
2381 * p    * f 1.4780e+07e
2382 * pa   * f 0.0000e+00e
2383 * qppp * f 0.0000e+00e
2384 * matid * f 6e
2385 * tw   * f 5.6750e+02e
2386 *
2387 * dx   * 1.0000e-01e

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```

2388 * vol    *    7.8540e-04e
2389 * fa     * f   7.8540e-03e
2390 * fric   * f   1.0000e-04   0.0000e+00e
2391 * grav   * f   0.0000e+00e
2392 * hd     * f   1.0000e-01   2.5150e-04e
2393 * icflg  * f   0e
2394 * nff    * f   1e
2395 * alp    * f   0.0000e+00e
2396 * vl     * f   0.0000e+00e
2397 * vv     * f   0.0000e+00e
2398 * tl     * f   5.5280e-02e
2399 * tv     * f   5.5280e+02e
2400 * p      * f   1.4780e+07e
2401 * pa     * f   0.0000e+00e
2402 * qppp   * f   0.0000e+00e
2403 * matid  * f   6e
2404 * tw     * f   5.5280e+02e
2405 *
2406 ***** type      num      id      ctitle
2407 tee       jcell      nodes      73      73 $73$ recir line from blhl to ilps
2408 *          jcell      nodes      4      4
2409 *          iconcl      ncell1      1      0.0000e+00   1.0000e-05
2410 *          iconcl      ncell1      0      6      jun1      jun2      ipow1
2411 *          0           6      73      3      0
2412 *          iqptr1      iqpsvl      nqptbl      nqpsvl      nqprf1
2413 *          0           0      0      0      0
2414 *          radin1      th1      hout11      houtvl      toutll
2415 *          1.4209e-01   3.5710e-02   0.0000e+00   1.2270e+01   3.0537e+02
2416 *          toutv1      3.0537e+02
2417 *          qpin1      qpooff1      rqpmx1      qpsc11
2418 *          0.0000e+00   0.0000e+00   1.0000e+20   1.0000e+00
2419 *          iconc2      ncell2      jun3      ipow2
2420 *          0           2      77      0
2421 *          0           0      0      0      0
2422 *          iqptr2      iqpsv2      nqptb2      nqpsv2      nqprf2
2423 *          0           0      0      0      0
2424 *          radin2      th2      hout12      houtv2      toutl2
2425 *          2.3300e-02   8.6970e-03   0.0000e+00   0.0000e+00   3.0537e+02
2426 *          toutv2      3.0537e+02
2427 *          qpin2      qpooff2      rqpmx2      qpsc12
2428 *          0.0000e+00   0.0000e+00   1.0000e+20   1.0000e+00
2429 *          0           0
2430 *
2431 *          dx      +    5.5880e-01   5.0800e-01   3.5560e-01   3.8100e-01e
2432 *          dx      *    5.5880e-01   5.0800e-01   1.1853E-01   1.1853E-01   1.1853E-01
2433 *          dx      *    3.8100e-01e
2434 *          vol     +    3.5396e-02   3.2281e-02   2.6052e-02   3.1715e-02e
2435 *          vol     *    3.5396e-02   3.2281e-02   8.6840E-03   8.6840E-03   8.6840E-03
2436 *          vol     *    3.1715e-02e
2437 *          fa     + r03  6.3425e-02   8.3195e-02   8.8959e-02e
2438 *          fa     * r03  6.3425e-02   7.3262E-02   7.3262E-02   8.3195e-02   8.8959e-02
2439 *          fa     * e
2440 *          fric   +    0.0000e+00   6.4676e-02   0.0000e+00   8.4551e-04   1.5112e-01
2441 *          fric   *    0.0000e+00   6.4676e-02   0.0000E+00   0.0           0.0
2442 *          fric   *    1.2468E-03   1.5112e-01e
2443 *          grav   +    0.0000e+00r03 1.0000e+00   6.1566e-01e
2444 *          grav   *    0.0000e+00   0.98972962r04 1.0000e+00   6.1566e-01e
2445 *          hd     + r03  2.8417e-01   3.2546e-01   3.3655e-01e
2446 *          hd     * r04  2.8417e-01r02 3.2546e-01   3.3655e-01e
2447 *          icflg  * f   0e
2448 *          nff   * f   1e
2449 *          alp   * f   0.0000e+00e
2450 *          vl    * f   0.0000e+00e
2451 *          vv    * f   0.0000e+00e
2452 *          tl    * f   5.5280e-02e
2453 *          tv    * f   5.5280e+02e
2454 *          p     * f   1.4780e+07e
2455 *          pa    * f   0.0000e+00e
2456 *          qppp  * f   0.0000e+00e
2457 *          matid * f   7e
2458 *          tw    * f   5.5280e+02e
2459 *
2460 *          dx      * f   5.0000e+00e
2461 *          vol    * f   7.2465e-03e
2462 *          fa     * f   1.4493e-03e
2463 *          fric   *    1.0000e-04r02 0.0000e+00e
2464 *          grav   +    0.0000e+00   2.5395e-01   0.0000e+00e
2465 *          grav   *    0.0000e+00   0.06427634   0.0000e+00e
2466 *          hd     * f   4.2960e-02e
2467 *          icflg  * f   0e
2468 *          nff   * f   1e
2469 *          alp   * f   0.0000e+00e
2470 *          vl    * f   0.0000e+00e
2471 *          vv    * f   0.0000e+00e
2472 *          tl    * f   5.6750e-02e
2473 *          tv    * f   5.6750e+02e
2474 *          p     * f   1.4780e+07e
2475 *          pa    * f   0.0000e+00e
2476 *          qppp  * f   0.0000e+00e
2477 *          matid * f   7e
2478 *          tw    * f   5.6750e+02e
2479 *

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```

2480 ***** type num id ctitle
2481 tee jcell 74 74 $74$ recir line from blcl to ilhl
2482 * nodes 4 4 ichf cost epsw
2483 * 4 1 0.0000e+00 1.0000e-05
2484 * iconcl ncell1 jun1 jun2 ipow1
2485 * 0 7 74 2 0
2486 * iqptr1 iqpsvl nqptb1 iqpsvl nqprf1
2487 * 0 0 0 0 0
2488 * radin1 th1 hout1 houtv1 toutl1
2489 * 1.4209e-01 3.5710e-02 0.0000e+00 1.2270e+01 3.0537e+02
2490 * toutv1
2491 * 3.0537e+02
2492 * qpin1 qpoff1 rqpmax1 qpcls1
2493 * 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
2494 * iconc2 ncell2 jun3 ipow2
2495 * 0 2 78 0
2496 * iqptr2 iqpsv2 nqptb2 iqpsv2 nqprf2
2497 * 0 0 0 0 0
2498 * radin2 th2 hout12 houtv2 toutl2
2499 * 2.3300e-02 8.7970e-03 0.0000e+00 0.0000e+00 3.0537e+02
2500 * toutv2
2501 * 3.0537e+02
2502 * qpin2 qpoff2 rqpmax2 qpcls2
2503 * 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
2504 *
2505 * dx + 1.0160e+00 5.5880e-01 1.7780e-01 3.5560e-01 5.3340e-01
2506 * dx * 1.0160e+00 5.5880e-01 5.9267E-02 5.9267E-02 5.9267E-02
2507 * dx * 3.5560e-01 5.3340e-01e
2508 * vol + 4.9555e-02 3.5396e-02 1.1327e-02 2.6052e-02 4.3325e-02
2509 * vol * 4.9555e-02 3.5396e-02 3.7757E-03 3.7757E-03 3.7757E-03
2510 * vol * 2.6052e-02 4.3325e-02e
2511 * fa + r05 6.3425e-02 8.8959e-02e
2512 * fa * r03 6.3425e-02 6.3706E-02 6.3706E-02r02 6.3425E-02 8.8959e-02
2513 * fa * e
2514 * fric + 2.0282e-02 3.8262e-02 1.0416e-01 4.5334e-03 3.6089e-02
2515 * fric * 3.0891E-02 3.8262e-02 1.2414E-01 0.0 0.0
2516 * fric * 5.8287E-03 3.6089e-02s
2517 * fric * 2.0941e-01e
2518 * grav + r05 0.0000e+00 6.1566e-01e
2519 * grav * r07 0.0000e+00 6.1566e-01e
2520 * hd + r04 2.8417e-01 3.2546e-01 3.3655e-01e
2521 * hd * r06 2.8417e-01 3.2546e-01 3.3655e-01e
2522 * icflg * f 0e
2523 * nff * f 1e
2524 * alp * f 0.0000e+00e
2525 * vl * f 0.0000e+00e
2526 * vv * f 0.0000e+00e
2527 * tl * f 5.6750e+02e
2528 * tv * f 5.6750e+02e
2529 * p * f 1.4780e+07e
2530 * pa * f 0.0000e+00e
2531 * qppp * f 0.0000e+00e
2532 * matid * f 7e
2533 * tw * f 5.6750e+02e
2534 *
2535 * dx * 4.4785e+00 5.0000e+00e
2536 * vol * 6.4907e-03 7.2465e-03e
2537 * fa * f 1.4493e-03e
2538 * fric * 1.0000e-04r02 0.0000e+00e
2539 * grav * f 0.0000e+00e
2540 * hd - 4.2960e-02e
2541 * icflg * f 0e
2542 * nff * f 1e
2543 * alp * f 0.0000e+00e
2544 * vl * f 0.0000e+00e
2545 * vv * f 0.0000e+00e
2546 * tl * f 5.5280e+02e
2547 * tv * f 5.5280e+02e
2548 * p * f 1.4780e+07e
2549 * pa * f 0.0000e+00e
2550 * qppp * f 0.0000e+00e
2551 * matid * f 7e
2552 * tw * f 5.5280e+02e
2553 *
2554 ***** type num id ctitle
2555 pipe 75 75 $75$ blcl outlet pipe
2556 * ncells nodes jun1 jun2 epsw
2557 * 1 0 44 42 1.0000e-05
2558 * ichf iconc iacc ipow
2559 * 1 0 0 0
2560 * radin th hout1 houtv toutl
2561 * 9.5880e-01 1.5992e-01 0.0000e+00 0.0000e+00 3.0537e+02
2562 * toutv
2563 * 3.0537e+02
2564 *
2565 * dx * 5.0000e-01e
2566 * vol * 3.1714e-02e
2567 * fa * 6.3427e-02 1.2858e-05e
2568 * fric * 1.7900e-02 6.5246e-03e
2569 * grav * f 0.0000e+00e
2570 * hd * 2.8418e-01 4.0462e-03e
2571 * icflg * f 0e

```

```

2572 * nff * f 1e
2573 * alp * 0.0000e+00e
2574 * vl * f 0.0000e+00e
2575 * vv * f 0.0000e+00e
2576 * tl * 5.5280e+02e
2577 * tv * 5.5280e+02e
2578 * p * 1.4780e+07e
2579 * pa * 0.0000e+00e
2580 *
2581 ***** type num id ctitle
2582 valve 77 77 $77$ recirc vlive (blhl to ilps)
2583 * ncells nodes jun1 jun2 epsw
2584 2 0 77 32 1.0000e-05
2585 * ichf iconc ivty ivps nvth2
2586 1 0 3 2 0
2587 * ivtr ivsv nvtb1 nvsv nvrf
2588 9 1 -2 0 0
2589 * ivtrot ivtyov
2590 0 0
2591 * rvmx rvov fminov fmaxov
2592 1.0000e+20 0.0000e+00 0.0000e+00 1.0000e+00
2593 * radin th houtl houtv toutl
2594 3.3000e-02 8.6970e-03 0.0000e+00 0.0000e+00 3.0537e+02
2595 * toutv avlve hvlive favlive xpos
2596 3.0537e+02 1.4490e-03 4.2957e-02 1.0000e+00 1.0000e+00
2597 *
2598 * dx * f 5.0000e-01e
2599 * vol * 7.2465e-04 1.0347e-02e
2600 * fa * r02 1.4493e-03 2.0694e-02e
2601 * fric * r02 0.0000e+00 5.0970e-01e
2602 * grav * f 0.0000e+00e
2603 * hd * r02 4.2960e-02 2.5720e-01e
2604 * icflg * f 0e
2605 * nff * 1 -1 1e
2606 * alp * f 0.0000e+00e
2607 * vl * f 0.0000e+00e
2608 * vv * f 0.0000e+00e
2609 * tl * f 5.6750e+02e
2610 * tv * f 5.6750e+02e
2611 * p * f 1.4780e+07e
2612 * pa * f 0.0000e+00e
2613 *
2614 * vtbl * 0.0000e+00 1.0000e+00 5.0000e-01 0.0000e+00e
2615 *
2616 ***** type num id ctitle
2617 valve 78 78 $78$ recirc vlive (blcl to ilhl)
2618 * ncells nodes jun1 jun2 epsw
2619 2 0 78 42 1.0000e-05
2620 * ichf iconc ivty ivps nvth2
2621 1 0 3 2 0
2622 * ivtr ivsv nvtb1 nvsv nvrf
2623 9 1 -2 0 0
2624 * ivtrot ivtyov
2625 0 0
2626 * rvmx rvov fminov fmaxov
2627 1.0000e+20 0.0000e+00 0.0000e+00 1.0000e+00
2628 * radin th houtl houtv toutl
2629 3.3000e-02 8.6970e-03 0.0000e+00 0.0000e+00 3.0537e+02
2630 * toutv avlve hvlive favlive xpos
2631 3.0537e+02 1.4490e-03 4.2957e-02 1.0000e+00 1.0000e+00
2632 *
2633 * dx * f 5.0000e-01e
2634 * vol * 7.2465e-04 2.6644e-04e
2635 * fa * r02 1.4493e-03 1.2858e-05e
2636 * fric * r02 0.0000e+00 6.5246e-03e
2637 * grav * f 0.0000e+00e
2638 * hd * r02 4.2960e-02 4.0462e-03e
2639 * icflg * f 0e
2640 * nff * 1 -1 1e
2641 * alp * f 0.0000e+00e
2642 * vl * f 0.0000e+00e
2643 * vv * f 0.0000e+00e
2644 * tl * f 5.5280e+02e
2645 * tv * f 5.5280e+02e
2646 * p * f 1.4780e+07e
2647 * pa * f 0.0000e+00e
2648 *
2649 * vtbl * 0.0000e+00 1.0000e+00 5.0000e-01 0.0000e+00e
2650 *
2651 ***** type num id ctitle
2652 tee 83 83 $83$ upper plenum and core bypass
2653 * jcell nodes ichf cost epsw
2654 3 4 1 0.0000e+00 1.0000e-05
2655 * iconcl ncell1 jun1 jun2 ipow1
2656 0 4 38 83 0
2657 * iqptr1 iqpsv1 nqptb1 nqpsv1 nqprf1
2658 0 0 0 0 0
2659 * radin1 th1 houtl1 houtv1 toutl1
2660 3.3197e-01 1.6343e-02 0.0000e+00 0.0000e+00 3.0537e+02
2661 * toutv1
2662 3.0537e+02
2663 * qpin1 qpoff1 rqpmx1 qpsc1

```

```

2664      0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
2665 *     iconc2      ncell2      jun3      ipow2
2666      0          2          84          0
2667 *     iqptr2      iqpsv2      npptb2      nppsv2      npfrf2
2668      0          0          0          0          0
2669 *     radin2      th2      houtl2      houtv2      toutl2
2670      1.5494e+00  1.6343e-02  0.0000e+00  0.0000e+00  3.0537e+02
2671 *     toutv2      3.0537e+02
2672      0          0
2673 *     qpin2      qpooff2      rqpmax2      qpsc12
2674      0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
2675 *
2676 *     dx      + f  8.9545e-01e
2677 *     dx      * f  8.9545e-01   2.9848E-01   2.9848E-01
2678 *     vol      + f  3.0025e-01e
2679 *     vol      * f  3.0025e-01   1.0008E-01   1.0008E-01
2680 *     fa      + f  1.6356e-01r02 1.2412e-01e
2681 *     fa      * f  1.6356e-01   1.2412e-01   3.3531E-01   3.3531E-01   1.2412E-01
2682 *     fa      * e
2683 *     fric      + f  1.0000e-02r02 5.0000e-03e
2684 *     fric      * f  1.0000e-02   7.5000E-03           0.0           0.0   1.5000E-02
2685 *     fric      * e
2686 *     grav      * f  1.0000e+00e
2687 *     hd      * f  1.2200e-02e
2688 *     icflg      * f          0e
2689 *     nff      * f          1e
2690 *     alp      * f  0.0000e+00e
2691 *     vl      * f  0.0000e+00e
2692 *     vv      * f  0.0000e+00e
2693 *     tl      * f  5.6750e+02e
2694 *     tv      * f  5.6750e+02e
2695 *     p      * f  1.4780e+07e
2696 *     pa      * f  0.0000e+00e
2697 *     qppp      * f  0.0000e+00e
2698 *     matid      * f          6e
2699 *     tw      * f  5.6750e+02e
2700 *
2701 *     dx      * f  8.9545e-01e
2702 *     vol      * f  1.1114e-02e
2703 *     fa      * f  1.2412e-02e
2704 *     fric      * f  1.0000e-04r02 0.0000e+00e
2705 *     grav      + f  0.0000e+00r02-1.0000e+00e
2706 *     grav      * f  -0.0017408r02-1.0000e+00e
2707 *     hd      * f  3.5000e-03e
2708 *     icflg      * f          0e
2709 *     nff      * f          1e
2710 *     alp      * f  0.0000e+00e
2711 *     vl      * f  0.0000e+00e
2712 *     vv      * f  0.0000e+00e
2713 *     tl      * f  5.5280e+02e
2714 *     tv      * f  5.5280e+02e
2715 *     p      * f  1.4780e+07e
2716 *     pa      * f  0.0000e+00e
2717 *     qppp      * f  0.0000e+00e
2718 *     matid      * f          6e
2719 *     tw      * f  5.5280e+02e
2720 *
2721 ***** type      num      id      ctitle
2722 tee          86      86 $86$ core bypass
2723 *     jcell      nodes      ichf      cost      epsw
2724      1          4          1          0.0000e+00  1.0000e-05
2725 *     iconcl      ncell1      jun1      jun2      ipow1
2726      0          1          86          36          0
2727 *     iqptr1      iqpsv1      npptbl      nppsv1      npfrf1
2728      0          0          0          0          0
2729 *     radin1      th1      houtl1      houtv1      toutl1
2730      3.3197e-01  1.6343e-02  0.0000e+00  0.0000e+00  3.0537e+02
2731 *     toutv1      3.0537e+02
2732      0          0
2733 *     qpin1      qpooff1      rqpmax1      qpsc11
2734      0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
2735 *     iconc2      ncell2      jun3      ipow2
2736      0          1          84          0
2737 *     iqptr2      iqpsv2      npptb2      nppsv2      npfrf2
2738      0          0          0          0          0
2739 *     radin2      th2      houtl2      houtv2      toutl2
2740      1.5494e+00  1.6343e-02  0.0000e+00  0.0000e+00  3.0537e+02
2741 *     toutv2      3.0537e+02
2742      0          0
2743 *     qpin2      qpooff2      rqpmax2      qpsc12
2744      0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
2745 *
2746 *     dx      *      5.0000e-02e
2747 *     vol      *      2.0660e-02e
2748 *     fa      * f  4.1321e-01e
2749 *     fric      * f  0.0000e+00e
2750 *     grav      * f  0.0000e+00e
2751 *     hd      * f  1.0000e-01e
2752 *     icflg      * f          0e
2753 *     nff      * f          1e
2754 *     alp      * f  0.0000e+00e
2755 *     vl      * f  0.0000e+00e

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2756 * vv * f 0.0000e+00e
2757 * tl * 5.5280e+02e
2758 * tv * 5.5280e+02e
2759 * p * 1.4780e+07e
2760 * pa * 0.0000e+00e
2761 * qppp * f 0.0000e+00e
2762 * matid * f 6e
2763 * tw * f 5.5280e+02e
2764 *
2765 * dx * 2.0495e+00e
2766 * vol * 2.5438e-02e
2767 * fa * f 1.2412e-02e
2768 * fric * 1.0000e-04 0.0000e+00e
2769 * grav * f 1.0000e+00e
2770 * hd * f 3.5000e-03e
2771 * icflg * f 0e
2772 * nff * f 1e
2773 * alp * 0.0000e+00e
2774 * vl * f 0.0000e+00e
2775 * vv * f 0.0000e+00e
2776 * tl * 5.5280e+02e
2777 * tv * 5.5280e+02e
2778 * p * 1.4780e+07e
2779 * pa * 0.0000e+00e
2780 * qppp * f 0.0000e+00e
2781 * matid * f 6e
2782 * tw * f 5.5280e+02e
2783 *
2784 ***** type num id ctitle
2785 tee 95 95 $95$ vssl mid lp and dncmr bypass
2786 * jcell nodes ichf cost epsw
2787 2 10 1 0.0000e+00 1.0000e-05
2788 * iconcl ncell1 jun1 jun2 ipowl
2789 0 3 35 95 0
2790 * iqptr1 iqpsv1 npptbl npqsv1 npqrfl
2791 0 0 0 0 0
2792 * radin1 th1 hout11 houtv1 tout11
2793 9.4000e-01 1.3600e-01 0.0000e+00 0.0000e+00 3.0537e+02
2794 * toutv1
2795 3.0537e+02
2796 * qpin1 qpoff1 rqpmx1 qpsc11
2797 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
2798 * iconc2 ncell2 jun3 ipow2
2799 0 2 97 0
2800 * iqptr2 iqpsv2 npptb2 npqsv2 npqrfl
2801 0 0 0 0 0
2802 * radin2 th2 hout12 houtv2 tout12
2803 1.4800e+00 1.2700e-01 0.0000e+00 0.0000e+00 3.0537e+02
2804 * toutv2
2805 3.0537e+02
2806 * qpin2 qpoff2 rqpmx2 qpsc12
2807 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
2808 *
2809 * dx + 1.0000e-01e
2810 * dx * 3.3333E-02 3.3333E-02 3.3333E-02e
2811 * vol + 3.4005e-02e
2812 * vol * 1.1335E-02 1.1335E-02 1.1335E-02e
2813 * fa * f 3.4005e-01e
2814 * fric * f 0.0000e+00e
2815 * grav * f 0.0000e+00e
2816 * hd * f 1.0000e-01e
2817 * icflg * f 0e
2818 * nff * f 1e
2819 * alp * f 0.0000e+00e
2820 * vl * f 0.0000e+00e
2821 * vv * f 0.0000e+00e
2822 * tl * f 5.5280e+02e
2823 * tv * f 5.5280e+02e
2824 * p * f 1.4780e+07e
2825 * pa * f 0.0000e+00e
2826 * qppp * f 0.0000e+00e
2827 * matid * f 6e
2828 * tw * f 5.5280e+02e
2829 *
2830 * dx * 4.3200e-01 8.4700e-01e
2831 * vol * 6.3763e-03 1.2502e-02e
2832 * fa * f 1.4760e-02e
2833 * fric * 1.0000e-04e02 0.0000e+00e
2834 * grav * 0.0000e+00r02 1.0000e+00e
2835 * hd * f 6.3500e-02e
2836 * icflg * f 0e
2837 * nff * f 1e
2838 * alp * f 0.0000e+00e
2839 * vl * f 0.0000e+00e
2840 * vv * f 0.0000e+00e
2841 * tl * f 5.5280e+02e
2842 * tv * f 5.5280e+02e
2843 * p * f 1.4780e+07e
2844 * pa * f 0.0000e+00e
2845 * qppp * f 0.0000e+00e
2846 * matid * f 6e
2847 * tw * f 5.5280e+02e

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```

2848 *
2849 ***** type num id ctitle
2850 tee nodes 96 96 $96$ vssl dncmr and dncmr bypass
2851 * jcell nodes ichf cost epsw
2852 2 10 1 0.0000e+00 1.0000e-05
2853 * iconcl ncell1 jun1 jun2 ipow1
2854 0 8 34 96 0
2855 * igptrl igpsvl ngptbl nqpsvl nqprfl
2856 0 0 0 0 0
2857 * radin1 th1 hout11 houtv1 tout11
2858 9.4000e-01 1.3600e-01 0.0000e+00 0.0000e+00 3.0537e+02
2859 * toutvl
2860 3.0537e+02
2861 * qpin1 qpooff1 rqpmx1 qpsc11
2862 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
2863 * iconc2 ncell2 jun3 ipow2
2864 0 6 97 0
2865 * igptr2 igpsv2 ngptb2 nqpsv2 nqprf2
2866 0 0 0 0 0
2867 * radin2 th2 hout12 houtv2 tout12
2868 1.4800e+00 1.2700e-01 0.0000e+00 0.0000e+00 3.0537e+02
2869 * toutv2
2870 3.0537e+02
2871 * qpin2 qpooff2 rqpmx2 qpsc12
2872 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
2873 *
2874 * dx + 7.9550e-01 8.9550e-01 5.3300e-01 3.3000e-01 4.3200e-01
2875 * dx * 2.6517E-01 2.6517E-01 2.6517E-01 8.9550e-01 5.3300e-01
2876 * dx * 3.3000e-01 4.3200e-01s
2877 * dx * 3.8100e-01e
2878 * vol + 1.1785e-01 1.3204e-01 7.5643e-02 4.6834e-02 6.1310e-02
2879 * vol * 3.9283E-02 3.9283E-02 3.9283E-02 1.3204e-01 7.5643e-02
2880 * vol * 4.6834e-02 6.1310e-02s
2881 * vol * 5.4072e-02e
2882 * fa + f 1.4192e-01e
2883 * fa * f 1.4192E-01 1.4815E-01 1.4815E-01r06 1.4192e-01e
2884 * fric * f 0.0000e+00e
2885 * grav + -9.9985e-01r06-1.0000e+00e
2886 * grav + -0.99963215r08-1.0000e+00e
2887 * grav * -1.0r08-1.0000e+00e
2888 * hd * f 1.0000e-01e
2889 * icflg * f 0e
2890 * nff * f 1e
2891 * alp * f 0.0000e+00e
2892 * vl * f 0.0000e+00e
2893 * vv * f 0.0000e+00e
2894 * tl * f 5.5280e+02e
2895 * tv * f 5.5280e+02e
2896 * p * f 1.4780e+07e
2897 * pa * f 0.0000e+00e
2898 * qppp * f 0.0000e+00e
2899 * matid * f 6e
2900 * tw * f 5.5280e+02e
2901 *
2902 * dx + 7.9550e-01 8.9550e-01 5.3300e-01 3.3000e-01 4.3200e-01
2903 * dx * 7.9549e-01 8.9550e-01 5.3300e-01 3.3000e-01 4.3200e-01
2904 * dx * 3.8100e-01e
2905 * vol + 1.1742e-02 1.3218e-02 7.8671e-03 4.8708e-03 6.3763e-03
2906 * vol * 1.1742e-02 1.3218e-02 7.8671e-03 4.8708e-03 6.3763e-03
2907 * vol * 5.6236e-03e
2908 * fa * f 1.4760e-02e
2909 * fric * 1.0000e-04r06 0.0000e+00e
2910 * grav * 0.0000e+00r06-1.0000e+00e
2911 * hd * f 6.3500e-02e
2912 * icflg * f 0e
2913 * nff * f 1e
2914 * alp * f 0.0000e+00e
2915 * vl * f 0.0000e+00e
2916 * vv * f 0.0000e+00e
2917 * tl * f 5.5280e+02e
2918 * tv * f 5.5280e+02e
2919 * p * f 1.4780e+07e
2920 * pa * f 0.0000e+00e
2921 * qppp * f 0.0000e+00e
2922 * matid * f 6e
2923 * tw * f 5.5280e+02e
2924 *
2925 ***** type num id ctitle
2926 rod 900 900 $900$ nuclear reactor core fuel rods
2927 * ncrx ncrz
2928 1 4
2929 * nopow nrdr modez liqlev iaxcnd
2930 0 1 0 0 1
2931 * idbci idbco
2932 0 2
2933 * nrods nodes irftr nzmax
2934 3 10 0 5
2935 * dtxht(1) dtxht(2) dznht hgapo shelv
2936 0.0000e+00 0.0000e+00 0.0000e+00 1.0000e+03 1.3790e+00
2937 * irpwty ndgx ndhx nrts nhist
2938 14 6 11 5 0
2939 * irpwtr irpwsy nrpwrb nrpwsv nrpwrf

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2940	23.	1	-14	0	0
2941 *	izpwtr	izpwsy	nzpwtb	nzpwsy	nzpwrf
2942	0	1	1	0	0
2943 *	nmmrx	nfcii	nfcil		
2944	1	1	1		
2945 *	nzpwz	nzpwi	nfbpwt		
2946	21	1	0		
2947 *	react	tneut	rpwoff	rrpwmx	rpwscl
2948	0.0000e+00	1.6250e-05	-1.0000e+20	1.0000e+20	1.0000e+00
2949 *	rpowri	zpwin	zpwoff	rzpwmx	
2950	3.6900e+07	0.0000e+00	0.0000e+00	0.0000e+00	
2951 *	extsou	pldr	pdrat	fucrac	
2952	0.0000e+00	0.0000e+00	1.3341e+00	7.0000e-01	
2953 *	ircjtb(1,j)	ircjtb(2,j)	ircjtb(3,j)	ircjtb(4,j)	ibu(j)
2954	12	1	1	1	0
2955	1	7	1	5	0
2956	1	1	1	1	0
2957	1	1	1	1	0
2958 *	ircjfm(1)	ircjfm(2)	ircjfm(3)	ircjfm(4)	isnotb
2959	1	1	0	0	0
2960 *	powexp	bpp0	bpp1	bcr0	bcr1
2961	1.0000e+00	0.0000e+00	0.0000e+00	6.5169e-01	8.6900e+00
2962 *					
2963 *	nhocomo*	r05	37	83e	
2964 *	nhcelo*	-1	1	2	
2965 *	nhcelo*	1e		3	
2966 *	z	*	0.0000e+00	3.8100e-01	6.7200e-01
2967 *	z	*	e		1.1430e+00
2968 *	grav	*	f	1.0000e+00e	
2969 *	idrod	*	f	1e	
2970 *	rdx	*		1.3000e+03e	
2971 *	radrd	*		0.0000e+00	7.7449e-04
2972 *	radrd	*		3.8725e-03	1.5489e-03
2973 *	radrd	*	e		2.3235e-03
2974 *	matrd	*	r06	1	3r02
2975 *	nfax	*	f	0e	2e
2976 *	rftn	*	r10	5.5370e+02r10	5.5640e+02r10
2977 *	rftn	*	e	5.6015e+02r10	5.6390e+02r10
2978 *	rftn	*	e	5.6660e+02	
2979 *	rftn	*	e		
2980 *	rftn	*	r10	5.5370e+02r10	5.5640e+02r10
2981 *	rftn	*	e	5.6015e+02r10	5.6390e+02r10
2982 *	rdpwr	*		5.6660e+02	
2983 *	rdpwr	*			
2984 *	cpowr	*		1.0000e+00e	
2985 *	rpkf	*		1.5000e+00	5.0000e-01e
2986 *	zpwzt	*		0.0000e+00	1.5200e-01
2987 *	zpwzt	*		5.0300e-01	2.9200e-01
2988 *	zpwzt	*		8.8600e-01	3.9400e-01
2989 *	zpwzt	*		1.2990e+00	4.5600e-01
2990 *	zpwzt	*		1.6760e+00e	
2991 *	zpwzt	*		0.0000e+00s	
2992 *	zpwzt	*		0.0000e+00	5.9620e-01
2993 *	zpwzt	*		1.4285e+00	1.2174e+00
2994 *	zpwzt	*		1.3611e+00	1.4146e+00
2995 *	zpwzt	*		7.1230e-01	1.3075e+00
2996 *	zpwzt	*		8.9400e-02e	
2997 *	zpwzt	*	r02	0.0000e+00	2.0000e-01
2998 *	zpwzt	*		5.0000e-01	-5.1000e-04
2999 *	zpwzt	*		-1.0160e-02	3.0000e-01
3000 *	zpwzt	*		8.0000e-01	-2.0300e-02
3001 *	zpwzt	*		-3.5600e-02	7.0000e-01
3002 *	zpwzt	*		1.0000e+00	-5.3000e-02
3003 *	rctf	*		-1.4740e-01	9.0000e-01
3004 *	rctf	*		1.6550e-01	-1.5820e-01
3005 *	rctf	*		1.5000e+00	1.2000e+00
3006 *	rctf	*		-4.8000e-05	-1.6700e-01
3007 *	rctf	*		-4.2100e-05	1.4000e+00
3008 *	rctf	*	e	-2.8700e-05	-1.6770e-01
3009 *	rctc	*		0.0000e+00	1.6840e-01e
3010 *	rctc	*		2.9300e+02	4.0000e+02
3011 *	rctc	*		1.0000e+02	5.0000e+02
3012 *	rctc	*		-2.0500e-04	6.0000e+02
3013 *	rctc	*		-1.6090e-03	-5.8000e-05
3014 *	rctc	*		-6.0700e-04	-1.0100e-04
3015 *	rctc	*		-1.8600e-04	-9.0100e-04
3016 *	rctc	*		-2.9200e-05	-9.3900e-04
3017 *	rctc	*		-5.9300e-04	-1.2100e-04
3018 *	rctc	*		-1.6500e-04	-1.6600e-05
3019 *	rctc	*	f	0.0000e+00e	-2.7600e-04
3020 *	rcbm	*	f	0.0000e+00e	-4.4400e-04
3021 *	beta	*		1.6900e-04	8.3200e-04
3022 *	beta	*		2.4700e-04e	2.6400e-03
3023 *	lamda	*		3.8700e+00	3.1100e-01
3024 *	lamda	*		1.2700e-02e	1.1500e-01
3025 *	cdgn	*		9.9163e+07	1.9276e+10
3026 *	cdgn	*		4.4156e+10e	2.4089e+10
3027 *	lamdh	*		1.7720e+00	6.7430e-02
3028 *	lamdh	*		4.8100e-05	5.7260e-07
3029 *	lamdh	*		7.5850e-10e	1.0360e-07
3030 *	edh	*		2.9900e-03	8.2500e-03
3031 *	edh	*		6.4500e-03	1.6400e-03
					8.5000e-04
					4.3000e-04

3032 * edh * 5.7000e-04e
 3033 * cdhn * 6.2263e+04 5.2723e+05 8.4818e+06 1.1486e+08 9.0869e+08
 3034 * cdhn * 4.0742e+09 2.5550e+09 1.9468e+09 1.0161e+09 5.1462e+08
 3035 * cdhn * 6.8247e+08e
 3036 * fpuo2 * 0.0000e+00e
 3037 * ftd * 9.3000e-01e
 3038 * gmix * 9.8101e-01 0.0000e+000 1.0103e-02 1.7830e-03 0.0000e+00
 3039 * gmix * 7.0991e-03 0.0000e+00e
 3040 * gmles * 1.0000e+00e
 3041 * pgapt * 3.1300e+05e
 3042 * plvol * 0.0000e+00e
 3043 * pslen * 0.0000e+00e
 3044 * clemn * 0.0000e+00e
 3045 * burn * f 0.0000e+00e
 3046 * burn * f 0.0000e+00e
 3047 * burn * f 0.0000e+00e
 3048 *
 3049 *
 3050 * The following reference describes the LOFT steam generator as having 1845
 3051 * tubes, average tube length excluding tubesheet is 4.58 m (15.04 ft),
 3052 * secondary side area is 335 m^2 (3610 ft^2). The model as currently
 3053 * formulated has an average tube length of 4.55168 m (14.9333 ft) and a
 3054 * secondary side area of 335.059 m^2 3606.55 ft^2).
 3055 *
 3056 * Douglas L. Reeder, "LOFT System and Test Description (5.5-ft Nuclear
 3057 * Core 1 LOCEs)," Idaho National Engineering Laboratory report
 3058 * NUREG/CR-0247, TREE-1208, July 1978.
 3059 *
 3060 ***** type num id ctitle
 3061 rod 901 901 \$901\$ stgen u-tube inlet side
 3062 * ncrx ncrz ittc iext mld
 3063 1 4 0 0 0
 3064 * nopowr nrindr modez liqlev iaxcmd
 3065 1 2 1 0 0
 3066 * idbci idbco hdri hdro
 3067 2 2 1.0214e-02 1.2700e-02
 3068 * nrods nodes irftr nzmax irftr2
 3069 1 4 0 5 0
 3070 * dtxht(1) dtxht(2) dzmht hgapo shelv
 3071 3.0 10.0 0.001 0.0 0.37061
 3072 * nhcomi* f 2e
 3073 * nhceli* -2 2 3 4 5
 3074 * nhceli* 6e
 3075 * nhcomo* f 20e
 3076 * nhcelo* -1 1 2 3 4
 3077 * nhcelo* 5e
 3078 * dz * r03 5.6895e-01 5.6899e-01e
 3079 * grav * f 1.0e
 3080 * idrod * 1e
 3081 * idrodo* 1e
 3082 * rdx * 1845.e
 3083 * radrd * 5.1069e-03 5.5213e-03 5.9356e-03 6.3500e-03e
 3084 * matrd * f 12e
 3085 * nfax * f 0e
 3086 * rftn * f 556.0e
 3087 *
 3088 ***** type num id ctitle
 3089 rod 902 902 \$902\$ stgen u-tube outlet side
 3090 * ncrx ncrz ittc iext mld
 3091 1 4 0 0 0
 3092 * nopowr nrindr modez liqlev iaxcmd
 3093 1 2 1 0 0
 3094 * idbci idbco hdri hdro
 3095 2 2 1.0214e-02 1.2700e-02
 3096 * nrods nodes irftr nzmax irftr2
 3097 1 4 0 5 0
 3098 * dtxht(1) dtxht(2) dzmht hgapo shelv
 3099 3.0 10.0 0.001 0.0 0.37061
 3100 * nhcomi* f 2e
 3101 * nhceli* 9 -9 -8 -7 -6
 3102 * nhceli* -5e
 3103 * nhcomo* f 20e
 3104 * nhcelo* -1 1 2 3 4
 3105 * nhcelo* 5e
 3106 * dz * r03 5.6895e-01 5.6899e-01e
 3107 * grav * f 1.0e
 3108 * idrod * 1e
 3109 * idrodo* 1e
 3110 * rdx * 1845.e
 3111 * radrd * 5.1069e-03 5.5213e-03 5.9356e-03 6.3500e-03e
 3112 * matrd * f 12e
 3113 * nfax * f 0e
 3114 * rftn * f 556.0e
 3115 *
 3116 ***** type num id ctitle
 3117 rod 903 903 \$903\$ stgen lower downcomer wall
 3118 * ncrx ncrz ittc iext mld
 3119 1 4 0 0 0
 3120 * nopowr nrindr modez liqlev iaxcmd
 3121 1 2 1 0 0
 3122 * idbci idbco hdri hdro
 3123 2 2 1.28906 1.0160e-01

3124	*	nrods	nodes	irftr	nzmax	irftr2
3125	*	1	4	0	5	0
3126	*	dtxht(1)	dtxht(2)	dznht	hgapo	shelv
3127	*	3.0	10.0	0.001	0.0	0.0
3128	*	nhcomi* f	20e			
3129	*	nhceli*	-1	1	2	3
3130	*	nhceli*	5e			4
3131	*	nhcomo* f	22e			
3132	*	nhcelo*	9	-9	-8	-7
3133	*	nhcelo*	-5e			-6
3134	*	dz * r04	5.6895e-01e			
3135	*	grav * f	1.0e			
3136	*	idrod *	1e			
3137	*	idrodo*	1e			
3138	*	rdx *	1.0e			
3139	*	radrd *	6.4453e-01	6.4876e-01	6.5300e-01	6.5723e-01e
3140	*	matrd * f	6e			
3141	*	nfax * f	0e			
3142	*	rftn * f	541.57e			
3143	*					
3144	*****	type	num	id	ctitle	
3145	rod		904	904 \$904\$	stgen upper downcomer wall	
3146	*	ncrx	ncrz	ittc	iext	mld
3147	*	1	4	0	0	0
3148	*	nopowr	nridr	modez	liqlev	iaxcmd
3149	*	1	2	1	0	0
3150	*	idbci	idbco	hdri	hdro	
3151	*	2	2	1.0691	2.5400e-01	
3152	*	nrods	nodes	irftr	nzmax	irftr2
3153	*	1	4	0	5	0
3154	*	dtxht(1)	dtxht(2)	dznht	hgapo	shelv
3155	*	3.0	10.0	0.001	0.0	2.27580
3156	*	nhcomi* f	20e			
3157	*	nhceli*	-5	5	6	7
3158	*	nhceli*	8e			8
3159	*	nhcomo* f	22e			
3160	*	nhcelo*	5	-5	-4	-3
3161	*	nhcelo*	-1e			-2
3162	*	dz * r03	2.4700E-01	3.7050E-01e		
3163	*	grav * f	1.0e			
3164	*	idrod *	1e			
3165	*	idrodo*	1e			
3166	*	rdx *	1.0e			
3167	*	radrd *	5.7150e-01	5.7573e-01	5.7997e-01	5.8420e-01e
3168	*	matrd * f	6e			
3169	*	nfax * f	0e			
3170	*	rftn * f	541.57e			
3171	*					
3172	*****	type	num	id	ctitle	
3173	rod		905	905 \$905\$	stgen lower shell wall	
3174	*	ncrx	ncrz	ittc	iext	mld
3175	*	1	9	0	0	0
3176	*	nopowr	nridr	modez	liqlev	iaxcmd
3177	*	1	1	1	0	0
3178	*	idbci	idbco	hdri	hdro	
3179	*	2	1	2.5400e-01	1.5304	
3180	*	tlo	tvo	hlo	hvo	
3181	*	305.37	305.37	0.0	1.5801	
3182	*	nrods	nodes	irftr	nzmax	irftr2
3183	*	1	4	0	10	0
3184	*	dtxht(1)	dtxht(2)	dznht	hgapo	shelv
3185	*	3.0	10.0	0.001	0.0	0.0
3186	*	nhcomi* f	22e			
3187	*	nhceli*	-1	1	2	3
3188	*	nhceli*	5	6	7	8
3189	*	nhceli*	9e			9
3190	*	dz * r02	3.7050E-01r03	2.4700E-01r03	5.6895E-01	5.6895e-01e
3191	*	grav * f	-1.0e			
3192	*	idrod *	1e			
3193	*	rdx *	1.0e			
3194	*	radrd *	7.1120e-01	7.2919e-01	7.4718e-01	7.6518e-01e
3195	*	matrd * f	9e			
3196	*	nfax * f	0e			
3197	*	rftn * f	541.57e			
3198	*					
3199	*****	type	num	id	ctitle	
3200	rod		906	906 \$906\$	stgen upper shell wall	
3201	*	ncrx	ncrz	ittc	iext	mld
3202	*	1	3	0	0	0
3203	*	nopowr	nridr	modez	liqlev	iaxcmd
3204	*	1	1	1	0	0
3205	*	idbci	idbco	hdri	hdro	
3206	*	2	1	2.5400e-01	1.5304	
3207	*	tlo	tvo	hlo	hvo	
3208	*	305.37	305.37	0.0	1.5801	
3209	*	nrods	nodes	irftr	nzmax	irftr2
3210	*	1	4	0	4	0
3211	*	dtxht(1)	dtxht(2)	dznht	hgapo	shelv
3212	*	3.0	10.0	0.001	0.0	3.7050E-01
3213	*	nhcomi* f	21e			
3214	*	nhceli*	-2	2	3	4
3215	*	nhceli* e				4

```

3216 * dz    * r02 3.7050E-01   1.1115e+00e
3217 * grav  * f      -1.0e
3218 * idrod *          1e
3219 * rdx   *          1.0e
3220 * radrd *          7.1120e-01   7.2919e-01   7.4718e-01   7.6518e-01e
3221 * matrd * f      9e
3222 * nfax  * f      0e
3223 * rftn  * f      541.57e
3224 *
3225 ***** type      num      id      ctitle
3226 slab       ncrx      907      907 $907$ stgen primary plenum baffle
3227 *          ncrx      ncrz      ittc      iext      mid
3228 *          1          1          0          0          0
3229 *          nopowr    nrindr    modez      liqlev      iaxcmd
3230 *          1          2          1          0          0
3231 *          idbci     idbco     hdri      hdro
3232 *          2          2          3.3655e-01   3.3655e-01
3233 *          width     ipatch
3234 *          1.99342   nodes     irftr      nzmax      irftr2
3235 *          nrods     nodes     0          2          0
3236 *          1          4          0          2          0
3237 *          dtxht(1)  dtxht(2)  dznht    hgapo      shelv
3238 *          3.0        10.0      0.001    0.0        0.0
3239 *          nhcomi* f  2e
3240 *          nhceli* f  -1          1          2e
3241 *          nhcomo* f  2e
3242 *          nhcelo* f  10         -10        -9e
3243 *          dz        3.7061e-01e
3244 *          grav  * f  1.0e
3245 *          idrod *          1e
3246 *          idrodo*          1e
3247 *          rdx   *          1.0e
3248 *          radrd *          1.0      1.0106    1.0212    1.0317e
3249 *          matrd * f  6e
3250 *          nfax  * f  0e
3251 *          rftn  * f  567.50    562.60    557.70    552.80s
3252 *          rftn  * f  567.50    562.60    557.70    552.80e
3253 *
3254 ***** type      num      id      ctitle
3255 slab       ncrx      908      908 $908$ stgen inlet plenum wall
3256 *          ncrx      ncrz      ittc      iext      mid
3257 *          1          1          0          0          0
3258 *          nopowr    nrindr    modez      liqlev      iaxcmd
3259 *          1          1          1          0          0
3260 *          idbci     idbco     hdri      hdro
3261 *          2          1          3.3655e-01   1.0
3262 *          width     ipatch
3263 *          3.74680   0          hlo      hvo
3264 *          tlo       tvo      305.37    0.0        12.270
3265 *          nrods     nodes     305.37    0.0        12.270
3266 *          nodes     irftr      nzmax      irftr2
3267 *          1          4          0          2          0
3268 *          dtxht(1)  dtxht(2)  dznht    hgapo      shelv
3269 *          3.0        10.0      0.001    0.0        0.0
3270 *          nhcomi* f  2e
3271 *          nhceli* f  -1          1          2e
3272 *          dz        3.7061e-01e
3273 *          grav  * f  1.0e
3274 *          idrod *          1e
3275 *          rdx   *          1.0e
3276 *          radrd *          1.0      1.0296    1.0593    1.0889e
3277 *          matrd * f  9e
3278 *          nfax  * f  0e
3279 *          rftn  * f  567.50e
3280 *
3281 ***** type      num      id      ctitle
3282 slab       ncrx      909      909 $909$ stgen outlet plenum wall
3283 *          ncrx      ncrz      ittc      iext      mid
3284 *          1          1          0          0          0
3285 *          nopowr    nrindr    modez      liqlev      iaxcmd
3286 *          1          1          1          0          0
3287 *          idbci     idbco     hdri      hdro
3288 *          2          1          3.3655e-01   1.0
3289 *          width     ipatch
3290 *          3.74680   0          hlo      hvo
3291 *          tlo       tvo      305.37    0.0        12.270
3292 *          305.37    305.37    0.0        12.270
3293 *          nrods     nodes     irftr      nzmax      irftr2
3294 *          1          4          0          2          0
3295 *          dtxht(1)  dtxht(2)  dznht    hgapo      shelv
3296 *          3.0        10.0      0.001    0.0        0.0
3297 *          nhcomi* f  2e
3298 *          nhceli* f  10         -10        -9e
3299 *          dz        3.7061e-01e
3300 *          grav  * f  1.0e
3301 *          idrod *          1e
3302 *          rdx   *          1.0e
3303 *          radrd *          1.0      1.0296    1.0593    1.0889e
3304 *          matrd * f  9e
3305 *          nfax  * f  0e
3306 *          rftn  * f  552.80e
3307 *

```

```

3308 ***** type num id ctitle
3309 slab ncrx 910 910 $910$ stgen inlet tubesheet
3310 * ncrx ncrz ittc iext mld
3311 1 1 0 0 0
3312 * nopowr nrindr modez liglev iaxcnd
3313 1 1 1 0 0
3314 * idbci idbco hdri hdro
3315 2 0 3.3655e-01 1.0
3316 * width ipatch
3317 16.91739 0
3318 * nrods nodes irftr nzmax irftr2
3319 1 4 0 2 0
3320 * dtxht(1) dtxht(2) dznht hgapo shelv
3321 3.0 10.0 0.001 0.0 0.0
3322 * nhcomi* f 2e
3323 * nhceli* -1 1 2e
3324 * dz * 3.7061e-01e
3325 * grav * f 1.0e
3326 * idrod * 1e
3327 * rdx * 1.0e
3328 * radrd * 5.1054e-03 7.1669e-03 9.2283e-03 1.12898e-02e
3329 * matrd * f 9e
3330 * nfax * f 0e
3331 * rftn * f 567.50e
3332 *
3333 **** type num id ctitle
3334 slab ncrx 911 911 $911$ stgen outlet tubesheet
3335 * ncrx ncrz ittc iext mld
3336 1 1 0 0 0
3337 * nopowr nrindr modez liglev iaxcnd
3338 1 1 1 0 0
3339 * idbci idbco hdri hdro
3340 2 0 3.3655e-01 1.0
3341 * width ipatch
3342 16.91739 0
3343 * nrods nodes irftr nzmax irftr2
3344 1 4 0 2 0
3345 * dtxht(1) dtxht(2) dznht hgapo shelv
3346 3.0 10.0 0.001 0.0 0.0
3347 * nhcomi* f 2e
3348 * nhceli* 10 -10 -9e
3349 * dz * 3.7061e-01e
3350 * grav * f 1.0e
3351 * idrod * 1e
3352 * rdx * 1.0e
3353 * radrd * 5.1054e-03 7.1669e-03 9.2283e-03 1.12898e-02e
3354 * matrd * f 9e
3355 * nfax * f 0e
3356 * rftn * f 552.80e
3357 *
3358 end
3359 *
3360 ****
3361 * time-step data *
3362 ****
3363 *
3364 * dtmin dtmax tend rtwfp
3365 1.0000e-03 2.0000e-01 2.5000e+01 1.0000e+03
3366 * edint gfint dmpint sedint
3367 2.5000e+01 5.0000e-01 2.5000e+01 2.5000e+01
3368 *
3369 * dtmin dtmax tend rtwfp
3370 1.0000e-03 5.0000e-01 5.0000e+01 1.0000e+03
3371 * edint gfint dmpint sedint
3372 2.5000e+01 1.0000e+00 2.5000e+01 2.5000e+01
3373 *
3374 * dtmin dtmax tend rtwfp
3375 1.0000e-03 7.0000e-01 2.0000e+02 1.0000e+03
3376 * edint gfint dmpint sedint
3377 5.0000e+01 2.0000e+00 5.0000e+01 5.0000e+01
3378 *
3379 * endflag
3380 -1.0000e+00

```

LOFT L6-1 TRANSIENT INPUT LISTING FOR 1D VESSEL MODEL

```

88 *      + +++++++ +++++++ ++++++++
89 *      + pipe + + tee + + tee +
90 *      + + 37 +37+ 36 + + 30 +
91 *      + +++++++ +++++++ ++++++++
92 *      + 38 86 36
93 *      + +++++++ ++++++++
94 *      + tee + + tee +
95 *      + 83 +84+ 86 +
96 *      + +++++++ ++++++++
97 *      + 83
98 *      + +++++++ ++++++++
99 *      + tee + + fill +
100 *      + 33 +39+ 35 +
101 *      + +++++++ ++++++++
102 *      + 40
103 *      +
104 *      ++++++*****+*****+*****+*****+
105 *
106 * Experiment 16-1 simulated a loss of steam load in the steam generators
107 * of a four-loop commercial PWR in the Loss-Of-Fluid Test (LOFT) facility.
108 * The steady-state initial conditions of the experiment were:
109 * Primary Intact Loop: hot-leg mass flow 478.5 +-6.3 kg/s
110 *                      hot-leg pressure 1.478e+07+-1.1e+05 Pa
111 *                      hot-leg temperature 567.5 +-1.8 K
112 *                      cold-leg temperature 552.8 +-1.2 K
113 * Steam Gen. Sec. Side: steam & fw mass flow 20.1 +-0.6 kg/s
114 *                      steam-dome pressure 5.37e+05 +-6.0e+04 Pa
115 *                      liq/vap temperature 541.7 +-0.8 K
116 *                      dwncmr liquid level 3.183 +-0.034 m
117 * Pressurizer: pressure 1.487e+07+-2.0e+05 Pa
118 *                      liq/vap temperature 614.3 +-0.8 K
119 *                      liquid level 1.18 +-0.07 m
120 * The experiment's transient was initiated by closing the main steam flow
121 * control valve (MSFCV); the actual start of closing was observed to
122 * occur at 2.0 s (rather than at 0.0 s) based on parameter measurements.
123 * The pressurizer cycling heater (on initially) was shut off at 6.1+-0.1 s
124 * as the pressurizer pressure increased. The pressurizer sprayer was in-
125 * itiated at 9.1+-0.1 s to reduce primary-side (PS) pressure and remained
126 * on until 30.4+-0.1 s. The PS pressure continued to rise and caused the
127 * reactor to scram at 21.8+-0.2 s. Thereafter, the PS pressure reached a
128 * maximum value at 22.0+-0.2 s. To reduce steam-generator (SG) secondary-
129 * side (SS) pressure, the MSFCV began opening at 22.2+-0.2 s and began
130 * closing at 31.4+-0.2 s. The pressurizer cycling heater came on at
131 * 31.4+-0.1 s and the pressurizer backup heater came on at 32.5+-0.1 s
132 * to prevent the PS to pressure from falling further. The MSFCV opened
133 * and closed automatically at 91.2+-0.2 s and 97.8+-0.2 s, respectively,
134 * based on pressure setpoints and was manually opened and closed at
135 * 312.6+-0.2 s and 326.0+-0.4 s, respectively, to control SGSS pressure.
136 * The pressurizer backup heater was shut off at 415.4+-0.1 s and the
137 * experiment was ended at 700.0+-10.0 s.
138 *
139 * Experiment Events
140 *
141 * Main Steam Flow Control Valve (MSFCV) starts to close 2.0+-0.2 s
142 * Pressurizer cycling heater is set off 6.1+-0.1 s
143 * Pressurizer sprayer is set on 9.1+-0.1 s
144 * MSFCV reaches its closed position 11.6+-0.2 s
145 * Reactor core power is scrammed based on high pressure 21.8+-0.2 s
146 * Primary-side pressure reaches maximum 22.0+-0.2 s
147 * MSFCV starts to open based on high-pressure setpoint 22.2+-0.2 s
148 * Pressurizer level reaches maximum 26.5+-0.5 s
149 * Pressurizer sprayer is set off 30.4+-0.1 s
150 * MSFCV starts to close based on low-pressure setpoint 31.4+-0.2 s
151 * Pressurizer cycling heater is set on 31.4+-0.1 s
152 * Pressurizer backup heater is set on 32.5+-0.1 s
153 * MSFCV reaches its closed position 40.6+-0.2 s
154 * MSFCV starts to open based on high-pressure setpoint 91.2+-0.2 s
155 * MSFCV starts to close based on low-pressure setpoint 97.8+-0.2 s
156 * MSFCV reaches its closed position 104.4+-0.2 s
157 * MSFCV starts to open based on manual adjustment 312.6+-0.2 s
158 * MSFCV starts to close based on manual adjustment 326.0+-0.4 s
159 * MSFCV reaches its closed position 339.4+-0.4 s
160 * Pressurizer backup heater is set off 415.4+-0.1 s
161 * Experiment is ended 700.0+-10. s
162 *
163 ****
164 * namelist data *
165 ****
166 *
167 * SI/English units flags: 0--SI units/1--English units
168 * iogrfl: units flag for writing TRCGRF
169 * ioinp: units flag for reading TRACIN
170 * iolab: units flag for writing input to INLAB
171 * ioout: units flag for writing TRCOUT and TRCMMSG
172 *
173 * iunlab: input user-defined units labels (0-no/1-yes; default is 0)
174 * iunout: write units to file TRCOUT (0-no/1-yes; default is 1)
175 *
176 $inopts dtstrt=0.01, iadded=10, icflow=2, nhtstr=12,
177     iogrf=0, ioinp=0, iolab=1, ioout=0, iunlab=1, iunout=1 $
178 *
179 *      dstep      timet

```

```

180      -1    0.0000e+00
181 *      stdyst   transi      ncomp      njun      ipak
182     0           1          52          49          1
183 *      epso      epss
184     1.0000e-04  1.0000e-04
185 *      oitmax   sitmax      isolut      ncontr      nccfl
186     10          25          0          0          0
187 *      ntsv      ntcb      ntcf      ntrp      ntcp
188     21          13          46          20          2
189 *
190 ****
191 * component-number data *
192 ****
193 *
194 * iorder*      1      2      3      4      5
195 * iorder*      6      7      8      9      10
196 * iorder*     11     12     13     17     20
197 * iorder*     21     22    23s
198 * iorder*     24     25     29     30     31
199 * iorder*     33     34     35     36     37
200 * iorder*     40     41     43     73     74
201 * iorder*     75     77     78     83     86
202 * iorder*     95     96    900    901    902
203 * iorder*    903    904    905    906    907
204 * iorder*    908    909    910   911e
205 *
206 ****
207 * control-parameter data *
208 ****
209 *
210 * cp1sv *      1      16s
211 * cp1cb *     -1      -7s
212 * cp1tp *      1      -24s
213 * cp2sv *     17      21s
214 * cp2cb *     -8      -13s
215 * cp2tp *      1      0e
216 *
217 * signal variables
218 *
219 *      idsv      isvn      ilcn      icnl      icn2
220     0          0          0          0          0
221 *
222 *
223 * user-defined units-name data
224 *
225 *      lulabel      lunitsi      luniteng      ufactor      ushift
226     lumdot/m    lu(kg/s)/m   lu(lbm/s)/ft  0.671968931    0.0
227 *
228 **
229 * control blocks
230 *
231 *      idcb      icbn      icb1      icb2      icb3
232     0          0          0          0          0
233 *
234 * trips
235 *
236 *      ntse      ntct      ntsf      ntdp      ntsd
237     0          2          2          0          1
238 *
239 *      idtp      isrt      iset      itst      idsg
240     0          0          0          0          0
241 *
242 *      trip 22 initiated time-step data
243 *      ndid      ntid
244     1          1
245 *      itid(1)
246     22
247 *      dtmin      dtmax      dtend      dtsof
248     1.0000e-03  1.0000e+00  3.0000e+00  1.0000e+00
249 *      edint      gfint      dmpint      sedint
250     4.0000e+00  5.0000e-01  4.0000e+00  4.0000e+00
251 *
252 *
253 ****
254 * component data *
255 ****
256 *
257 end
258 *
259 ****
260 * time-step data *
261 ****
262 *
263 *      dtmin      dtmax      tend      rtwfp
264     1.0000e-03  2.0000e-01  4.0000e+01  1.0000e+00
265 *      edint      gfint      dmpint      sedint
266     5.0000e+01  1.0000e+00  1.2500e+02  5.0000e+01
267 *
268 *      dtmin      dtmax      tend      rtwfp
269     1.0000e-03  1.0000e+00  2.0000e+02  1.0000e+00
270 *      edint      gfint      dmpint      sedint
271     5.0000e+01  1.0000e+00  1.2500e+02  5.0000e+01

```

```
272 *  
273 *      dtmin      dtmax      tend      rtwfp  
274 *      1.0000e-03  1.0000e+00  7.0000e+02  1.0000e+00  
275 *      edint      gfint      dmpint      sedint  
276 *      5.0000e+01  1.0000e+00  1.2500e+02  5.0000e+01  
277 *  
278 *      endflag  
279 -1.0000e+00
```

APPENDIX R

LOFT L6-1 STEADY-STATE AND TRANSIENT INPUT LISTINGS FOR 3D VESSEL MODEL

This appendix contains the steady-state and transient-restart input listings for the LOFT L6-1 3D vessel model assessment problem as follows:

<u>Problem</u>	<u>Page</u>
1. LOFT L6-1 steady-state input listing for 3D vessel model	R-2
2. LOFT L6-1 transient input listing for 3D vessel model	R-37

LOFT L6-1 STEADY-STATE INPUT LISTING FOR 3D VESSEL MODEL

```

1 free format
2 *      1          2          3          4          5          6          7          8
3 *2345678901234567890123456789012345678901234567890123456789012345678901234567890
4 *
5 ****
6 * main data *
7 ****
8 *
9 *      numtcr      ieos      inopt      nmat
10        4          0          1          0
11 loft 16-1 with 3-d vessel
12 replaced 1-d vessel components with 3-d vessel j steiner Oct 1997
13 loft experiment 16-1 : posttest specifications modeled with a 1-d vessel
14 constrained steady-state calculation with nature of transient defined
15 *
16 * Test description problem: Pump 1 (component 5) is set for a CSS controlled
17 * flow of 250 kg/s and Pump 2 (component 4) is set for 240 kg/s. This
18 * difference needs to be confirmed from the data or otherwise resolved.
19 *
20 * modified by Thad Knight, 2/13/96
21 * deck from /devass/mod2-5.3.05/loft-16-1/1-dvess.s
22 * Initial changes amount to converting STGEN component to 2 PIPES, 2 TEEs, and
23 * 2 heat structures. I have maintained the component numbering scheme. The
24 * structural mass of the steam generator needs to be added later.
25 * Renumbered the first array values for NHCOMO and NHCELLO in rod 99 to avoid
26 * warning messages at the start of the run.
27 * Added input [INOPTS, user-defined units-name data, and additional
28 * control-block data cards (cards 2 and 4 as required)] to turn on
29 * units labeling and conversion.
30 * Changed heat structure component for the core to number 900.
31 * Corrected some CTITLE information and modified others to be more
32 * descriptive.
33 * Remodeld JCELLs in components 1, 3, 6, 7, 11, 21, 22, 29, 30, 31, 33, 34,
34 * 36, 40, 43, 73, 74, 83, 95, and 96 to resolve warning messages from
35 * FEMOM about area changes in the vicinity of JCELL. In general, I changed
36 * arrays DX, VOL, FA, FRIC, and GRAV for these components. I changed
37 * other arrays as necessary to fill them. Also, I factored the changes
38 * across junctions 1, 9, 29, 34, 37, 45, and 74 to maintain consistency
39 * across junctions. I maintained the HDs on each interface of the JCELLs
40 * because changing them would change the nonzero GRAVs at the first
41 * interface of the side leg; I did this by duplicating HD(old JCELL) and
42 * HD(old JCELL+1).
43 * Changed NFF=-1 to +1 at the JCELL+1 interfaces in components 22, 30, and 33.
44 * The changes avoid warning messages, and there are no longer area changes
45 * at those interfaces). I set NFF to a -1 at the JCELL+2 interfaces
46 * in those components to calculate the loss coefficient associated with the
47 * area change.
48 * I ran a null transient in which I replaced the two PRIZER components with
49 * PIPES and FILL 35 at the top of the vessel with a BREAK. I manually set
50 * all void fractions to 0.0, pressures to 1.5 MPa, air partial pressures to
51 * 0.0, liquid and wall temperatures to 500.0 K, and velocities to 0.0. I
52 * also set all powers to zero and pump speeds to zero and disabled the
53 * constrained steady state controllers. The initial run revealed many
54 * velocities > 0.1 m/s. I reevaluated all of the GRAVs and made the
55 * following changes to resolve elevation errors:
56 * Component 31: I changed the sign of all GRAVs in the main run of the
57 * component to better represent the actual LOFT geometry. Then to
58 * correct a -0.1567 m elevation difference down the pipe, I
59 * changed GRAV(7) from +1.0 to +0.72818405 (forced JUN1 and JUN2
60 * to the same elevation).
61 * Component 73: I changed GRAV(2) in the main leg from +1.0 to
62 * +0.98972962 to force the implied elevation difference between
63 * hot and cold legs through the pump suction to 0.0 (error had the
64 * Junction 66 0.0055 m lower than Junction 74).
65 * Component 73: I changed GRAV(2) in the side leg from +0.25395 to
66 * +0.06427634 to force the elevation difference between Junctions
67 * 45 and 74 to 0.0 as implied by the recirculation line from the
68 * broken hot leg to the pump suction (error had Junction 74
69 * 0.9479 m lower than Junction 45).
70 * Component 10: I increased the length of cells 1 and 2 from 0.56600 m
71 * to 0.70537663 m to force the elevation difference between the
72 * JCELLs of components 1 and 11 to 0.0 as implied by the
73 * pressurizer spray line (the error had component 11 0.2788 m
74 * higher than component 1). I changed the volumes of the two
75 * cells from 8.2030e-4 m^3 to 1.0223e-03 m^3 to preserve the
76 * VOL/DX.
77 * Component 41: I changed GRAV(2) in the side leg from 0.1990 to
78 * 0.19899989 to force the JCELLs of components 41 and 31 to the
79 * same elevation as implied by the reflood assist bypass line
80 * (through Junction 43) (the error had component 41 4.6e-07 m
81 * lower than component 31). This error appears to have been the
82 * result of extracting the input from a TRCDMP file at some time
83 * in the past.
84 * Components 21 and 22: I changed GRAV(1) and GRAV(2) on the side leg
85 * of component 21 and GRAV(1) in the main leg of component 22 from
86 * -0.33763 to -0.33759606 to correct an elevation error of
87 * -5.586e-05 m in the secondary loop defined by Junctions 24, 21,

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88 * 23, and 24. This error appears to have been the result of
 89 * extracting the input from a TRCDMP file at some time in the past
 90 * and of renoding JCELL of component 21 (described above).
 91 * Components 29 and 96: I changed GRAV(1) and GRAV(2) in the side leg
 92 * of component 29 and GRAV(1) in the main leg of component 96 to
 93 * -1.0 from the original values of -9.9985e-01, -0.99963215, and
 94 * -0.99963215 and DX(1) in the side leg of component 29 from 0.1 m
 95 * to 0.1006805 m to correct a 0.7765 mm elevation error between
 96 * the cold and hot legs implied by the path defined by Junctions
 97 * 40, 83, 38, 37, 95, 35, 96, and 34 (cold leg was low relative to
 98 * the hot leg). I also changed VOL(1) on the side leg of
 99 * component 29 from 1.4192e-02 m^3 to 0.01428858 m^3 to preserve
 100 * VOL/DX.
 101 * Component 96: I changed DX(1) in the side leg of component 96 from
 102 * 0.7955 m to 0.79549 m to correct a 5.0e-06 m elevation error
 103 * around the loop defined by Junctions 96, 35, 97, and 96. This
 104 * error was the result of renoding JCELL in component 96
 105 * (described above). To the accuracy that the volumes are input
 106 * and the original ratio VOL/DX, the change in DX(1) has no impact
 107 * on VOL(1).
 108 * Component 83: I changed GRAV(1) in the side leg of component 83 from
 109 * 0.0 to -0.0017408 to correct a 0.79 mm elevation error around
 110 * the loop defined by Junctions 37, 38, 84, 86, and 37.
 111 * With these changes the null transient run to 1000 s yielded maximum
 112 * velocities of 2.012e-03 m/s in components 95 and 96. All other velocities
 113 * were less than 1.0e-03.
 114 * Renoded components 20 and 22 so that there is a one-to-one correspondence in
 115 * cells to improve the connections of the heat structure between the
 116 * boiler/riser and the secondary downcomer. This change involved renoding
 117 * cell 5 of component 20 and cells 1 and 5 of component 22. I reset GRAV(1)
 118 * and GRAV(2) of the component 21 side leg and GRAV(1) and new GRAV(2) of
 119 * component 22 main leg to preserve the elevation closure of the secondary
 120 * loop defined by Junctions 24, 21, 23, and 24. I reran the null transient,
 121 * and maximum velocity in this loop is 4.861e-04 m/s.
 122 * Added an additional 9 heat structures (903-911) to represent the structural
 123 * mass of the steam generator--secondary downcomer wall, secondary shell,
 124 * primary-side plenum baffle, inlet plenum wall, outlet plenum wall, inlet
 125 * side tube sheet, and outlet side tube sheet. The structures for the
 126 * secondary downcomer and secondary shell assume that the inside radii from
 127 * the old stgen component were correct and that a single complete (RDX=1.0)
 128 * structure is defined for each; the old areas were not checked and may not
 129 * be preserved. The structures associated with the primary-side plenums,
 130 * represented as SLABS, preserve the area and thickness from the stgen
 131 * component.
 132 * Modified as necessary the signal variables to assure that they pointed
 133 * correctly at the appropriate components.
 134 *
 135 * +++++++ +++++++
 136 * + valve+ + pipe +
 137 * 67+ 10 +68+ 9 +
 138 * +++++++ +++++++
 139 * 60
 140 * +++++++
 141 * + break+ +prizer+
 142 * + 25 + + 13 +
 143 * +++++++
 144 * 26 44 61
 145 * +++++++ +++++++ +++++++ +++++++
 146 * + valve+ + fill + + pipe + + pipe +
 147 * + 23 + + 24 + + 75 + + 12 +
 148 * +++++++ +++++++ +++++++ +++++++
 149 * 22 25 42 64
 150 * +++++++ +++++++ +++++++ +++++++
 151 * + tee + + tee + + valve+ +prizer+
 152 * + 21 +23+ 22 + rods + 78 + + 8 +
 153 * +++++++ +++++++ |901 +++++++ +++++++
 154 * 21 24 |902 78 10
 155 * +++++++ +++++++ +++++++ +++++++ +++++++ +++++++
 156 * stgen + pipe +== pipe + + tee + + tee + +vessel+ + tee +
 157 * sec 21+ 20 ==+ 2 + 2 + 74 +74+ 1 + 9+region+45+ 31 +32
 158 * +++++++ +++++++ +++++++ +++++++ +define+ +++++++
 159 * 3 + with + 36
 160 * +++++++ +++++++ + a 1-d+ +++++++
 161 * + valve+ + tee + + model+ + tee +
 162 * 32+ 77 +77+ 73 + + + + 1+ 41 +44
 163 * +++++++ +++++++ + + + +++++++
 164 * 73 + + +
 165 * +++++++ + + + + (isolated)
 166 * + tee + intact + + broken
 167 * 5+ 3 + loop + + loop
 168 * +++++++ + + +
 169 * 5 4 + +
 170 * +++++++ +++++++ + +
 171 * + pump + + pump + + +
 172 * + 5 + + 4 + + +
 173 * +++++++ +++++++ + +
 174 * 7 6 + +
 175 * +++++++ +++++++ +++++++ + +
 176 * + tee + + tee + + tee + + +
 177 * 7+ 6 +66+ 11 + 8+ 7 +29+ +
 178 * +++++++ +++++++ +++++++ + +
 179 * 67 14 + +

```

180 *
181 *          +++++++ + + +
182 *          + fill + + +
183 *          + 17 + + +
184 *
185 * The vessel is modeled with 13 1-d hydro & 1 heat-structure components.
186 *
187 *          ++++++ ++++++ ++++++ ++++++ ++++++ ++++++ ++++++ ++++++
188 *          + vessel region defined with a 1-d model +
189 *          +
190 *          +           40 +
191 *          +          ++++++ ++++++ +
192 *          +          + tee + + tee +
193 *          94-----+ 43 +48+ 34 +---+45
194 *          +          ++++++ ++++++ +
195 *          +          47 +
196 *          +          ++++++ ++++++ +
197 *          +          + tee + + tee +
198 *          29-----+ 40 +46+ 29 +---+ 1
199 *          +          ++++++ ++++++ +
200 *          +          34 +
201 *          +          ++++++ ++++++ +
202 *          +          + rod + + tee + + tee +
203 *          +          + 900 + + 95 +97+ 96 +
204 *          +          ++++++ ++++++ ++++++ +
205 *          + || || 95 35 96 +
206 *          + ++++++ ++++++ ++++++ +
207 *          + pipe + + tee + + tee +
208 *          + + 37 +37+ 36 + + 30 +
209 *          + ++++++ ++++++ ++++++ +
210 *          + 38 86 36 +
211 *          + ++++++ ++++++ +
212 *          + + tee + + tee +
213 *          + + 83 +84+ 86 +
214 *          + ++++++ ++++++ +
215 *          + 83 +
216 *          + ++++++ ++++++ +
217 *          + + tee + + fill +
218 *          + + 33 +39+ 35 +
219 *          + ++++++ ++++++ +
220 *          + 40 +
221 *          +
222 *          ++++++ ++++++ ++++++ ++++++ ++++++ ++++++ ++++++
223 *
224 * Experiment 16-1 simulated a loss of steam load in the steam generators
225 * of a four-loop commercial PWR in the Loss-Of-Fluid Test (LOFT) facility.
226 * The steady-state initial conditions of the experiment were:
227 * Primary Intact Loop: hot-leg mass flow 478.5 +-6.3 kg/s
228 *                      hot-leg pressure 1.478e+07+-1.1e+05 Pa
229 *                      hot-leg temperature 567.5 +-1.8 K
230 *                      cold-leg temperature 552.8 +-1.2 K
231 * Steam Gen. Sec. Side: steam & fw mass flow 20.1 +-0.6 kg/s
232 *                      steam-dome pressure 5.37e+05 +-6.0e+04 Pa
233 *                      liq/vap temperature 541.7 +-0.8 K
234 *                      dwncmr liquid level 3.183 +-0.034 m
235 * Pressurizer: pressure 1.487e+07+-2.0e+05 Pa
236 *                      liq/vap temperature 614.3 +-0.8 K
237 *                      liquid level 1.18 +-0.07 m
238 * The experiment's transient was initiated by closing the main steam flow
239 * control valve (MSFCV); the actual start of closing was observed to
240 * occur at 2.0 s (rather than at 0.0 s) based on parameter measurements.
241 * The pressurizer cycling heater (on initially) was shut off at 6.1+-0.1 s
242 * as the pressurizer pressure increased. The pressurizer sprayer was in-
243 * itiated at 9.1+-0.1 s to reduce primary-side (PS) pressure and remained
244 * on until 30.4+-0.1 s. The PS pressure continued to rise and caused the
245 * reactor to scram at 21.8+-0.2 s. Thereafter, the PS pressure reached a
246 * maximum value at 22.0+-0.2 s. To reduce steam-generator (SG) secondary-
247 * side (SS) pressure, the MSFCV began opening at 22.2+-0.2 s and began
248 * closing at 31.4+-0.2 s. The pressurizer cycling heater came on at
249 * 31.4+-0.1 s and the pressurizer backup heater came on at 32.5+-0.1 s
250 * to prevent the PS pressure from falling further. The MSFCV opened
251 * and closed automatically at 91.2+-0.2 s and 97.8+-0.2 s, respectively,
252 * based on pressure setpoints and was manually opened and closed at
253 * 312.6+-0.2 s and 326.0+-0.4 s, respectively, to control SGSS pressure.
254 * The pressurizer backup heater was shut off at 415.4+-0.1 s and the
255 * experiment was ended at 700.0+-10.0 s.
256 *
257 * Experiment Events                                Experiment Time
258 * -----
259 * Main Steam Flow Control Valve (MSFCV) starts to close    2.0+-0.2 s
260 * Pressurizer cycling heater is set off                  6.1+-0.1 s
261 * Pressurizer sprayer is set on                         9.1+-0.1 s
262 * MSFCV reaches its closed position                   11.6+-0.2 s
263 * Reactor core power is scrammed based on high pressure 21.8+-0.2 s
264 * Primary-side pressure reaches maximum                22.0+-0.2 s
265 * MSFCV starts to open based on high-pressure setpoint 22.2+-0.2 s
266 * Pressurizer level reaches maximum                  26.5+-0.5 s
267 * Pressurizer sprayer is set off                     30.4+-0.1 s
268 * MSFCV starts to close based on low-pressure setpoint 31.4+-0.2 s
269 * Pressurizer cycling heater is set on                31.4+-0.1 s
270 * Pressurizer backup heater is set on                 32.5+-0.1 s
271 * MSFCV reaches its closed position                 40.6+-0.2 s

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272 * MSFCV starts to open based on high-pressure setpoint      91.2+-0.2 s
273 * MSFCV starts to close based on low-pressure setpoint     97.8+-0.2 s
274 * MSFCV reaches its closed position                      104.4+-0.2 s
275 * MSFCV starts to open based on manual adjustment       312.6+-0.2 s
276 * MSFCV starts to close based on manual adjustment       326.0+-0.4 s
277 * MSFCV reaches its closed position                      339.4+-0.4 s
278 * Pressurizer backup heater is set off                  415.4+-0.1 s
279 * Experiment is ended                                 700.0+-10. s
280 *
281 ****
282 * namelist data *
283 ****
284 *
285 *      SI/English units flags: 0--SI units/1--English units
286 *      iogrf: units flag for writing TRCRF
287 *      ioinp: units flag for reading TRACIN
288 *      iolab: units flag for writing input to INLAB
289 *      ioout: units flag for writing TRCOUT and TRCMSC
290 *
291 *      iunlab: input user-defined units labels (0-no/>0-yes; default is 0)
292 *      iunout: write units to file TRCOUT (0-no/1-yes; default is 1)
293 *
294 $inopts iadded=10, icflow=2, nhstr=22,
295         iogrf=0, ioinp=0, iolab=1, ioout=0, iunlab=1, iunout=1 $
296 *
297 *      dstep      timet
298 *      0          0.0
299 *      stdyst     transi      ncomp      njun      ipak
300 *      2          0          50          33          1
301 *      epso       epss
302 *      1.0000e-04 1.0000e-04
303 *      oitmax     sitmax      isolut      ncontr      nccfl
304 *      10          25          0          5          0
305 *      ntsv       ntcb        ntcf        ntrp        ntcp
306 *      21          13          46          20          2
307 *
308 ****
309 * component-number data *
310 ****
311 *
312 * iorder*      1          2          -3          4          5
313 * iorder*      6          7          8          9          10
314 * iorder*      11         12         13         17         20
315 * iorder*      21         22         23s
316 * iorder*      24         25         31s
317 * iorder*      41         73         74s
318 * iorder*      75         77         78         600s
319 * iorder*      801        802s
320 * iorder*      803        804        805        806        807
321 * iorder*      808        809        810        811        901
322 * iorder*      911        912        913        914        915
323 * iorder*      921        922        923        924        925
324 * iorder*      e
325 *
326 ****
327 * control-parameter data *
328 ****
329 *
330 * constrained steady-state controllers
331 *
332 *      numcss      amncss      amxcss      nmppcss      napcss
333 *      2          9.0000e-01  1.1000e+00  7002          2
334 * intact-loop steam-generator type-14 controller adjusts
335 *      the heat-transfer across the tubes (equivalent to old type 4)
336 *      801          0.5          1.5          7002          14
337 *      802          0.5          1.5          7002          14
338 * intact-loop pump 2 type-1 controller adjusts impeller rotational speed
339 *      4          2.0000e+02  5.0000e+02  -1          0
340 * intact-loop pump 1 type-1 controller adjusts impeller rotational speed
341 *      5          2.0000e+02  5.0000e+02  -1          0
342 * steam-flow control valve type-2 controller adjusts upstream pressure
343 *      23         0.0000e+00  1.0000e+00  1          0
344 *
345 * multipass control-parameter evaluations
346 *
347 * cp1sv *      1          16s
348 * cp1cb *      -1          -7s
349 * cp1tp *      1          -24s
350 * cp2sv *      17          21s
351 * cp2cb *      -8          -13s
352 * cp2tp *      1          0e
353 *
354 * signal variables
355 *
356 *      problem time
357 *      idsv      isvn      ilcm      icnl      icn2
358 *      1          0          0          0          0
359 *
360 *      hot-leg pressure
361 *      idsv      isvn      ilcm      icnl      icn2
362 *      2          21          1          1          0
363 *

```

```

364 *      hot-leg liquid temperature
365 *      idsv      isvn      ilcn      icnl      icn2
366 *      3          23          1          1          0
367 *
368 *      hot-leg liquid mass flow
369 *      idsv      isvn      ilcn      icnl      icn2
370 *      4          32          1          3          0
371 *      4          32          1          5          0
372 *
373 *      pressurizer-dome pressure
374 *      idsv      isvn      ilcn      icnl      icn2
375 *      5          21          9          1          0
376 *      5          21          13         1          0
377 *
378 *      pressurizer top-section liquid level
379 *      idsv      isvn      ilcn      icnl      icn2
380 *      6          20          13         7          1
381 *
382 *      pressurizer middle-section liquid level
383 *      idsv      isvn      ilcn      icnl      icn2
384 *      7          20          12         1          1
385 *
386 *      pressurizer bottom-section liquid level
387 *      idsv      isvn      ilcn      icnl      icn2
388 *      8          20          8          1          1
389 *
390 *      cold-leg pressure at hpis connection
391 *      idsv      isvn      ilcn      icnl      icn2
392 *      9          21          7          4          0
393 *      9          21          7          5          0
394 *
395 *      reactor-core power
396 *      idsv      isvn      ilcn      icnl      icn2
397 *      10         18          90         0          0
398 *      10         18          900        0          0
399 *      10         18          901        0          0
400 *
401 *      stgen-sec pipe 20 volume-averaged alpha
402 *      idsv      isvn      ilcn      icnl      icn2
403 *      11         27          20         1         -5
404 *      11         27          20         1         -8
405 *
406 *      stgen-sec tee 21 main volume-averaged alpha
407 *      idsv      isvn      ilcn      icnl      icn2
408 *      12         27          21         1         -2
409 *      12         27          21         1         -4
410 *
411 *      stgen-sec tee 21 side alpha
412 *      idsv      isvn      ilcn      icnl      icn2
413 *      13         27          21         3          0
414 *      13         27          21         5          0
415 *
416 *      stgen-sec tee 22 main volume-averaged alpha
417 *      idsv      isvn      ilcn      icnl      icn2
418 *      14         27          22         1         -4
419 *      14         27          22         1         -9
420 *
421 *      stgen-sec tee 22 side alpha
422 *      idsv      isvn      ilcn      icnl      icn2
423 *      15         27          22         5          0
424 *      15         27          22         10         0
425 *
426 *      stgen-sec tee 21 pressure
427 *      idsv      isvn      ilcn      icnl      icn2
428 *      16         21          21         2          0
429 *      16         21          21         4          0
430 *
431 *      trip 8 iset
432 *      idsv      isvn      ilcn      icnl      icn2
433 *      17         56          8          0          0
434 *
435 *      trip 20 iset
436 *      idsv      isvn      ilcn      icnl      icn2
437 *      18         56          20         0          0
438 *
439 *      trip 22 iset
440 *      idsv      isvn      ilcn      icnl      icn2
441 *      19         56          22         0          0
442 *
443 *      trip 23 iset
444 *      idsv      isvn      ilcn      icnl      icn2
445 *      20         56          23         0          0
446 *
447 *      trip -24 signal
448 *      idsv      isvn      ilcn      icnl      icn2
449 *      21         55          -24        0          0
450 *
451 *
452 * user-defined units-name data
453 *
454 *      lulabel      lunitsi      luniteng      ufactor      ushift
455 *      lumdot/m     lu(kg/s)/m    lu(lbm/s)/ft   0.671968931    0.0

```

```

456 *
457 *
458 * control blocks
459 *
460 *      pressurizer liquid-level for plot
461 *      idcb      icbn      icbl      icb2      icb3
462 *      -1        57        6         7         8
463 *      lugain    luxmin    luxmax    luconl    lucon2
464 *      lunounit lulength   lulength   lunounit lunounit
465 *      cbgain    cbxmin   cbxmax   cbcon1   cbcon2
466 *      1.0000e+00 0.0000e+00 1.7500e+00 0.0000e+00 0.0000e+00
467 *
468 *      idcb      icbn      icbl      icb2      icb3
469 *      -2        56        -1        0         0
470 *      lugain    luxmin    luxmax    luconl    lucon2
471 *      lunounit lulength   lulength   lunounit lunounit
472 *      cbgain    cbxmin   cbxmax   cbcon1   cbcon2
473 *      1.0000e+00 0.0000e+00 1.6400e+00 -1.1000e-01 0.0000e+00
474 *
475 *      stgen-sec downcomer liq-level for plot, cb -8, & trip 6
476 *      idcb      icbn      icbl      icb2      icb3
477 *      -3        56        11        0         0
478 *      lugain    luxmin    luxmax    luconl    lucon2
479 *      luvolume  luvolume  luvolume  lunounit lunounit
480 *      cbgain    cbxmin   cbxmax   cbcon1   cbcon2
481 *      2.7721e+00 0.0000e+00 2.7721e+00 0.0000e+00 0.0000e+00
482 *
483 *      idcb      icbn      icbl      icb2      icb3
484 *      -4        59        12        13        0
485 *      lugain    luxmin    luxmax    luconl    lucon2
486 *      lunounit luvolume  luvolume  luvolume  luvolume
487 *      cbgain    cbxmin   cbxmax   cbcon1   cbcon2
488 *      1.0000e+00 0.0000e+00 2.6178e+00 2.2348e+00 3.8297e-01
489 *
490 *      idcb      icbn      icbl      icb2      icb3
491 *      -5        59        14        15        0
492 *      lugain    luxmin    luxmax    luconl    lucon2
493 *      lunounit luvolume  luvolume  luvolume  luvolume
494 *      cbgain    cbxmin   cbxmax   cbcon1   cbcon2
495 *      1.0000e+00 0.0000e+00 1.2803e+00 1.2641e+00 1.6215e-02
496 *
497 *      idcb      icbn      icbl      icb2      icb3
498 *      -6        57        -3        -4        -5
499 *      lugain    luxmin    luxmax    luconl    lucon2
500 *      lunounit luvolume  luvolume  lunounit lunounit
501 *      cbgain    cbxmin   cbxmax   cbcon1   cbcon2
502 *      1.0000e+00 0.0000e+00 6.6702e+00 0.0000e+00 0.0000e+00
503 *
504 *      idcb      icbn      icbl      icb2      icb3
505 *      -7        101       -6        9         0
506 *      lugain    luxmin    luxmax    luconl    lucon2
507 *      lunounit lulength   lulength   lunounit lunounit
508 *      cbgain    cbxmin   cbxmax   cbcon1   cbcon2
509 *      1.0000e+00 0.0000e+00 5.6103e+00 0.0000e+00 0.0000e+00
510 *      luytab    luxtab(1)
511 *      lulength  luvolume
512 *
513 *      vapor vol      dc liq lev
514 *      (m3)          (m)
515 *      cbftb *      2.2660e+00 5.6103e+00s
516 *      cbftb *      2.5943e+00 4.6810e+00s
517 *      cbftb *      4.1502e+00 3.2004e+00s
518 *      cbftb *      4.4173e+00 2.9464e+00s
519 *      cbftb *      4.8360e+00 2.5440e+00s
520 *      cbftb *      5.0294e+00 2.3500e+00s
521 *      cbftb *      5.4051e+00 1.8860e+00s
522 *      cbftb *      5.8402e+00 1.2460e+00s
523 *      cbftb *      6.6702e+00 0.0000e+00e
524 *
525 *      stgen-sec feedwater-control controller for fill 24
526 *      idcb      icbn      icbl      icb2      icb3
527 *      -8        200       -7        0         0
528 *      lugain    luxmin    luxmax    luconl    lucon2
529 *      lumdot/m  lumassfw  lumassfw  lulength   lumassfw
530 *      cbgain    cbxmin   cbxmax   cbcon1   cbcon2
531 *      7.0000e+00 1.0000e+01 3.0000e+01 3.1830e+00 2.0100e+01
532 *      cbdt     cbtau     cbwt
533 *      1.0000e+01 1.0000e+00 0.0000e+00
534 *
535 *      idcb      icbn      icbl      icb2      icb3
536 *      -9        101       1         2         0
537 *      lugain    luxmin    luxmax    luconl    lucon2
538 *      lunounit lumassfw  lumassfw  lunounit lunounit
539 *      cbgain    cbxmin   cbxmax   cbcon1   cbcon2
540 *      1.0000e+00 0.0000e+00 2.0100e+01 0.0000e+00 0.0000e+00
541 *      luytab    luxtab(1)
542 *      lumassfw  lutime
543 *
544 *      time      mass flow
545 *      (s)       (kg/s)
546 *      cbftb *      1.0000e+00 2.0100e+01s
547 *      cbftb *      1.2000e+01 0.0000e+00e

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548 *
549 *      idcb      icbn      icb1      icb2      icb3
550 *      -10       22       -9       -8       17
551 *      lugain    luxmin    luxmax    luconl    lucon2
552 *      lunounit lumassfw  lumassfw  lunounit lunounit
553 *      cbgain    cbxmin   cbxmax   cbconl   cbcon2
554 *      1.0000e+00 0.0000e+00 1.0000e+02 0.0000e+00 0.0000e+00
555 *
556 *      stgen-sec steam-flow-control controller for valve 23
557 *      idcb      icbn      icb1      icb2      icb3
558 *      -11       22       19       18       20
559 *      lugain    luxmin    luxmax    luconl    lucon2
560 *      lurtimel lurtimel  lurtimel  lunounit lunounit
561 *      cbgain    cbxmin   cbxmax   cbconl   cbcon2
562 *      5.0000e-02 -5.0000e-02 5.0000e-02 0.0000e+00 0.0000e+00
563 *
564 *      idcb      icbn      icb1      icb2      icb3
565 *      -12       23       -11      0        0
566 *      lugain    luxmin    luxmax    luconl    lucon2
567 *      lunounit lunounit  lunounit  lunounit lunounit
568 *      cbgain    cbxmin   cbxmax   cbconl   cbcon2
569 *      1.0000e+00 0.0000e+00 1.0000e+00 0.0000e+00 6.3800e-01
570 *
571 *      idcb      icbn      icb1      icb2      icb3
572 *      -13       101      -12      12       0
573 *      lugain    luxmin    luxmax    luconl    lucon2
574 *      lunounit lunounit  lunounit  lunounit lunounit
575 *      cbgain    cbxmin   cbxmax   cbconl   cbcon2
576 *      1.0000e+00 0.0000e+00 1.0000e+00 0.0000e+00 0.0000e+00
577 *      luytab    luxtab(1)
578 *      lunounit lunounit
579 *
580 *      xpos      favlve
581 *      (-)      (-)
582 *      cbftb *  0.0000e+00 0.0000e+00s
583 *      cbftb *  1.0000e-01 7.3360e-02s
584 *      cbftb *  2.0000e-01 1.5334e-01s
585 *      cbftb *  3.0000e-01 2.4500e-01s
586 *      cbftb *  4.0000e-01 3.4000e-01s
587 *      cbftb *  5.0000e-01 4.4000e-01s
588 *      cbftb *  5.7500e-01 5.1733e-01s
589 *      cbftb *  6.0000e-01 5.4666e-01s
590 *      cbftb *  7.0000e-01 6.6000e-01s
591 *      cbftb *  8.0000e-01 7.7248e-01s
592 *      cbftb *  9.0000e-01 8.8665e-01s
593 *      cbftb *  1.0000e+00 1.0000e+00e
594 *
595 * trips
596 *
597 *      ntse      ntct      ntsf      ntsp      ntst
598 *      0         2         2         0         1
599 *
600 *      system low-pressure scram trip
601 *      idtp      isrt      iset      itst      idsg
602 *      1         1         0         1         2
603 *      setp(1)  setp(2)
604 *      1.4360e+07 1.4361e+07
605 *      dtsp(1)  dtsp(2)
606 *      0.0000e+00 0.0000e+00
607 *      ifsp(1)  ifsp(2)
608 *      0         0
609 *
610 *      system high-pressure scram trip
611 *      idtp      isrt      iset      itst      idsg
612 *      2         2         0         1         2
613 *      setp(1)  setp(2)
614 *      1.5769e+07 1.5770e+07
615 *      dtsp(1)  dtsp(2)
616 *      0.0000e+00 0.0000e+00
617 *      ifsp(1)  ifsp(2)
618 *      0         0
619 *
620 *      intact-loop hot-leg high-temperature scram trip
621 *      idtp      isrt      iset      itst      idsg
622 *      3         2         0         1         3
623 *      setp(1)  setp(2)
624 *      5.8320e+02 5.8330e+02
625 *      dtsp(1)  dtsp(2)
626 *      0.0000e+00 0.0000e+00
627 *      ifsp(1)  ifsp(2)
628 *      0         0
629 *
630 *      intact-loop low-mass-flow scram trip
631 *      idtp      isrt      iset      itst      idsg
632 *      4         1         0         1         4
633 *      setp(1)  setp(2)
634 *      4.3350e+02 4.3400e+02
635 *      dtsp(1)  dtsp(2)
636 *      2.0000e+00 0.0000e+00
637 *      ifsp(1)  ifsp(2)
638 *      0         0
639 *

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640 *      high core-averaged-power scram trip
641 *      idtp      isrt      iset      itst      idsg
642 *      5          2          0          1          10
643 *      setp(1)    setp(2)
644 *      5.1000e+07  5.1500e+07
645 *      dtsp(1)    dtsp(2)
646 *      0.0000e+00  0.0000e+00
647 *      ifsp(1)    ifsp(2)
648 *      0          0
649 *
650 *      stgen-sec downcomer low-liquid-level scram trip
651 *      idtp      isrt      iset      itst      idsg
652 *      6          1          0          1          -7
653 *      setp(1)    setp(2)
654 *      2.0000e+00  2.0100e+00
655 *      dtsp(1)    dtsp(2)
656 *      0.0000e+00  0.0000e+00
657 *      ifsp(1)    ifsp(2)
658 *      0          0
659 *
660 *      steady-state or transient flag trip
661 *      idtp      isrt      iset      itst      idsg
662 *      7          -1         -1         1          1
663 *      setp(1)    setp(2)
664 *      -2.0000e-05 -1.0000e-05
665 *      dtsp(1)    dtsp(2)
666 *      0.0000e+00  0.0000e+00
667 *      ifsp(1)    ifsp(2)
668 *      0          0
669 *
670 *      stgen-sec feedwater fill & steam-flow-control valve trip
671 *      idtp      isrt      iset      itst      idsg
672 *      8          2          0          1          1
673 *      setp(1)    setp(2)
674 *      -2.0000e-05 -1.0000e-05
675 *      dtsp(1)    dtsp(2)
676 *      0.0000e+00  0.0000e+00
677 *      ifsp(1)    ifsp(2)
678 *      0          0
679 *
680 *      warm-up-lines trip
681 *      idtp      isrt      iset      itst      idsg
682 *      9          2          0          1          1
683 *      setp(1)    setp(2)
684 *      -2.0000e-05 1.0000e+20
685 *      dtsp(1)    dtsp(2)
686 *      0.0000e+00  0.0000e+00
687 *      ifsp(1)    ifsp(2)
688 *      0          0
689 *
690 *      intact-loop pump-shutdown trip
691 *      idtp      isrt      iset      itst      idsg
692 *      10         2          0          1          1
693 *      setp(1)    setp(2)
694 *      -2.0000e-05 1.0000e+20
695 *      dtsp(1)    dtsp(2)
696 *      0.0000e+00  0.0000e+00
697 *      ifsp(1)    ifsp(2)
698 *      0          0
699 *
700 *      pressurizer power-operated-relief-valve trip
701 *      idtp      isrt      iset      itst      idsg
702 *      11         -3         0          1          5
703 *      setp(1)    setp(2)    setp(3)    setp(4)
704 *      1.6560e+07 1.6570e+07 1.6690e+07 1.6700e+07
705 *      dtsp(1)    dtsp(2)    dtsp(3)    dtsp(4)
706 *      0.0000e+00  0.0000e+00 0.0000e+00  0.0000e+00
707 *      ifsp(1)    ifsp(2)    ifsp(3)    ifsp(4)
708 *      0          0          0          0
709 *
710 *      pressurizer spray-valve trip
711 *      idtp      isrt      iset      itst      idsg
712 *      12         -3         0          1          5
713 *      setp(1)    setp(2)    setp(3)    setp(4)
714 *      1.4900e+07 1.5000e+07 1.5140e+07 1.5240e+07
715 *      dtsp(1)    dtsp(2)    dtsp(3)    dtsp(4)
716 *      0.0000e+00  1.0000e+04 1.0000e+04  0.0000e+00
717 *      ifsp(1)    ifsp(2)    ifsp(3)    ifsp(4)
718 *      0          0          0          0
719 *
720 *      pressurizer cycling-heaters trip flag
721 *      idtp      isrt      iset      itst      idsg
722 *      13         1          1          1          1
723 *      setp(1)    setp(2)
724 *      1.4750e+07 1.4930e+07
725 *      dtsp(1)    dtsp(2)
726 *      0.0000e+00  0.0000e+00
727 *      ifsp(1)    ifsp(2)
728 *      0          0
729 *
730 *      pressurizer backup-heaters trip flag
731 *      idtp      isrt      iset      itst      idsg

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732      14          1          0          1          5
733 *     setp(1)      setp(2)
734 *     1.4620e+07   1.4800e+07
735 *     dtsp(1)      dtsp(2)
736 *     0.0000e+00   0.0000e+00
737 *     ifsp(1)      ifsp(2)
738     0            0
739 *
740 *           steady state and transient ON trip
741 *     idtp      isrt      iset      itst      idsg
742     15          2          1          1          1
743 *     setp(1)      setp(2)
744 -2.0000e-05 -1.0000e-05
745 *     dtsp(1)      dtsp(2)
746 *     0.0000e+00   0.0000e+00
747 *     ifsp(1)      ifsp(2)
748     0            0
749 *
750 *           emergency-core-coolant low-pressure hpis trip
751 *     idtp      isrt      iset      itst      idsg
752     17          1          0          1          2
753 *     setp(1)      setp(2)
754 1.3297e+07 1.5500e+07
755 *     dtsp(1)      dtsp(2)
756 *     0.0000e+00   0.0000e+00
757 *     ifsp(1)      ifsp(2)
758     0            0
759 *
760 *           stgen-sec steam-flow-control valve closure trip
761 *           forced closure at 2 s into the 16-1 transient
762 *     idtp      isrt      iset      itst      idsg
763     20          -2         0          1          1
764 *     setp(1)      setp(2)
765 -2.0000e-05 -1.0000e-05
766 *     dtsp(1)      dtsp(2)
767 *     0.0000e+00   2.0000e+00
768 *     ifsp(1)      ifsp(2)
769     0            0
770 *
771 *           stgen-sec pressure-regulator trip after reactor scram
772 *     idtp      isrt      iset      itst      idsg
773     22          -3         0          1          16
774 *     setp(1)      setp(2)      setp(3)      setp(4)
775 6.7500e+06 6.8800e+06 6.8900e+06 6.9900e+06
776 *     dtsp(1)      dtsp(2)      dtsp(3)      dtsp(4)
777 *     3.5000e-01 1.0000e+04 1.0000e+04 2.0000e+00
778 *     ifsp(1)      ifsp(2)      ifsp(3)      ifsp(4)
779     1            1            2            2
780 *
781 *           coincidence scram trip
782 *     idtp      isrt      iset      itst      idsg
783     23          2            0            3            1
784 *     setp(1)      setp(2)
785 4.0000e-01 6.0000e-01
786 *     dtsp(1)      dtsp(2)
787 *     1.0000e+04 0.0000e+00
788 *     ifsp(1)      ifsp(2)
789     0            0
790 *
791 *           trip-controlled trip for pressurizer heaters
792 *     idtp      isrt      iset      itst      idsg
793     -24         -3         -1          3            2
794 *     setp(1)      setp(2)      setp(3)      setp(4)
795 -6.0000e-01 -4.0000e-01 4.0000e-01 6.0000e-01
796 *     dtsp(1)      dtsp(2)      dtsp(3)      dtsp(4)
797 *     0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
798 *     ifsp(1)      ifsp(2)      ifsp(3)      ifsp(4)
799     0            0            0            0
800 *
801 *           trip-controlled trip 23 signal (coincidence trip)
802 *     idtn      intn
803     1            6
804 *     itn(1)      itn(2)      itn(3)      itn(4)      itn(5)
805     1            2            3            4            5
806 *     itn(6)
807     6
808 *
809 *           trip-controlled trip 24 signal (pressurizer heaters)
810 *     idtn      intn
811     2            4
812 *     itn(1)      itn(2)      itn(3)      itn(4)
813     13           14           7            7
814 *
815 *           trip set-point-factor table for trip 22
816 *     idft      idsg      inf
817     1            1            6
818 *     ftx()      fty()
819 0.0000e+00 1.0000e+00 7.5000e+01 1.0000e+00 7.5100e+01
820 9.8519e-01 2.0000e+02 9.8519e-01 2.0010e+02 9.7778e-01
821 7.0000e+02 9.7778e-01
822 *
823 *           trip set-point-factor table for trip 22

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824 *      idft          idsg          inft
825 *      2              1             6
826 *      ftx()          fty()
827   0.0000e+00  1.0000e+00  7.5000e+01  1.0000e+00  7.5100e+01
828  9.9805e-01  2.0000e-02  9.9805e-01  2.0010e+02  9.9376e-01
829  7.0000e+02  9.9376e-01
830 *
831 *      trip 22 initiated time-step data
832 *      ndid          ntid
833 *      1              1
834 *      itid(1)
835 *      22
836 *      dtmin          dtmax          dtend          dtsof
837  1.0000e-03  1.0000e+00  3.0000e+00  1.0000e+00
838 *      edint          gfint          dmpit          sedint
839  4.0000e+00  5.0000e-01  4.0000e+00  4.0000e+00
840 *
841 ****
842 * component data *
843 ****
844 *
845 ***** type      num      id      ctitle
846 tee           1      1 $1$ intact-loop hot leg
847 *      jcell      nodes      ichf      cost      epsw
848 *      3           4      1 0.0000e+00  1.0000e-05
849 *      iconcl     ncell1     jun1      jun2      ipow1
850 *      0           4      9      74      0
851 *      iqptr1     iqpsv1     nqptb1    nqpsv1    nqprf1
852 *      0           0      0      0      0
853 *      radin1     th1       hout11    houtv1    toutl1
854  1.4209e-01  3.5710e-02  0.0000e+00  1.2270e+01  3.0537e+02
855 *      toutv1
856  3.0537e+02
857 *      qpin1     qpoff1     rqpmx1    qpsc11
858  0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
859 *      iconc2     ncell2     jun3      ipow2
860 *      0           3      10      0
861 *      iqptr2     iqpsv2     nqptb2    nqpsv2    nqprf2
862 *      0           0      0      0      0
863 *      radin2     th2       hout12    houtv2    toutl2
864  2.3300e-02  8.6968e-03  0.0000e+00  1.2270e+01  3.0537e+02
865 *      toutv2
866  3.0537e+02
867 *      qpin2     qpoff2     rqpmx2    qpsc12
868  0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
869 *
870 * dx + 1.8415e+00  1.0795e+00e
871 * dx * 1.8415e+00  3.5983E-01  3.5983E-01e
872 * vol + 1.1667e-01  6.8527e-02e
873 * vol * 1.1667e-01  2.2842E-02  2.2842E-02e
874 * fa + f 6.3425e-02e
875 * fa * r 2 6.3425e-02  6.3480E-02  6.3480E-02
876 * fric + 3.7203e-02  1.1170e-02  2.0282e-02e
877 * fric * 3.8186E-02  1.4822E-02  0.0          0.0  3.0891E-02
878 * fric * e
879 * grav * f 0.0000e+00e
880 * hd * f 2.8417e-01e
881 * icflg * f 0e
882 * nff * f 1e
883 * alp * f 0.0000e+00e
884 * vl * f 0.0000e+00e
885 * vv * f 0.0000e+00e
886 * tl * f 5.6750e+02e
887 * tv * f 5.6750e+02e
888 * p * f 1.4780e+07e
889 * pa * f 0.0000e+00e
890 * qppp * f 0.0000e+00e
891 * matid * f 7e
892 * tw * f 5.6750e+02e
893 *
894 * dx * 2.1499e+00  2.1213e+00  2.2217e+00e
895 * vol * 3.1149e-03  3.0744e-03  5.7059e-03e
896 * fa * r03 1.4493e-03  5.7321e-03e
897 * fric * 1.0000e-04  5.5032e-03r02  0.0000e+00e
898 * grav * 5.4510e-01r02  0.0000e+00  6.0410e-01e
899 * hd * r03 4.2957e-02  8.5430e-02e
900 * icflg * f 0e
901 * nff * r02 1r02 -1e
902 * alp * f 0.0000e+00e
903 * vl * f 0.0000e+00e
904 * vv * f 0.0000e+00e
905 * tl * f 6.1411e+02e
906 * tv * f 6.1411e+02e
907 * p * f 1.4780e+07e
908 * pa * f 0.0000e+00e
909 * qppp * f 0.0000e+00e
910 * matid * f 7e
911 * tw * f 6.1411e+02e
912 *
913 * the old STGEN component 2 has been converted into the following:
914 *      PIPE component 2
915 *      PIPE component 20

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916 *      TEE component 21
917 *      TEE component 22
918 *      ROD component 901 (placed before time-step data)
919 *      ROD component 902 (placed before time-step data)
920 ***** type      num      id      ctitle
921 pipe          2          2 $2$ steam generator primary
922 *      ncells      nodes      jun1      jun2      epsw
923     10          0          2          3      1.0e-5
924 *      ichf       iconc      iacc      ipow
925     1          0          0          0
926 *      radin      th      houtl      houtv      toutl
927     5.1069e-03  1.2431e-03      0.0      0.0      305.67
928 *      toutv      powin      powoff      rpwmxx      powscl
929     305.67      0.0      0.0      0.0      1.0
930 *
931 *      dx      *      3.7061e-01r03 5.6895e-01r02 5.6899e-01r03 5.6895e-01      3.7061e-01
932 *      dx      *      e
933 *      vol      *      3.3541e-01r03 8.6009e-02r02 8.6015e-02r03 8.6009e-02      3.3541e-01
934 *      vol      *      e
935 *      fa      *      8.8959e-02r09 1.5117e-01      8.8959e-02e
936 *      fric      *      2.0941e-01      3.5994e-03r07 0.0000e+00      5.9416e-03      1.5112e-01
937 *      fric      *      e
938 *      grav      *      6.1566e-01r04 1.0000e+00      0.0000e+00r04-1.0000e+00      -6.1566e-01
939 *      grav      *      e
940 *      hd      *      3.3655e-01r09 1.0214e-02      3.3655e-01e
941 *      icflg      *      f      0e
942 *      nff      *      f      1e
943 *      alp      *      f      0.0000e+00e
944 *      vl      *      f      0.0000e+00e
945 *      vv      *      f      0.0000e+00e
946 *      tl      *      5.6750e+02      5.6587e+02      5.6423e+02      5.6260e+02      5.6097e+02
947 *      tl      *      5.5933e+02      5.5770e+02      5.5607e+02      5.5443e+02      5.5280e+02
948 *      tl      *      e
949 *      tv      *      5.6750e+02      5.6587e+02      5.6423e+02      5.6260e+02      5.6097e+02
950 *      tv      *      5.5933e+02      5.5770e+02      5.5607e+02      5.5443e+02      5.5280e+02
951 *      tv      *      e
952 *      p      *      f      1.4780e+07e
953 *      pa      *      f      0.0000e+00e
954 *
955 ***** type      num      id      ctitle
956 pipe          20          20 $20$ steam generator boiler
957 *      ncells      nodes      jun1      jun2      epsw
958     8          0          24          21      1.0e-5
959 *      ichf       iconc      iacc      ipow
960     1          0          0          0
961 *      radin      th      houtl      houtv      toutl
962     5.1069e-03  1.2431e-03      0.0      0.0      305.67
963 *      toutv      powin      powoff      rpwmxx      powscl
964     305.67      0.0      0.0      0.0      1.0
965 *
966 *      dx      +      r04 5.6895e-01      1.1115e+00e
967 *      dx      +      r04 5.6895e-01r03 2.4700E-01      3.7050E-01e
968 *      vol      +      r04 4.4356e-01      9.9786e-01e
969 *      vol      +      r04 4.4356e-01r03 0.22174667      0.33262e
970 *      fa      +      2.1890e-01r03 7.7961e-01r02 8.9776e-01e
971 *      fa      +      2.1890e-01r03 7.7961e-01r05 8.9776e-01e
972 *      fric      +      2.0000e-02r05 0.0000e+00e
973 *      fric      +      2.0000e-02r08 0.0000e+00e
974 *      grav      +      0.0000e+00r05 1.0000e+00e
975 *      grav      +      0.0000e+00r08 1.0000e+00e
976 *      hd      +      r05 6.3500e-03      1.0691e+00e
977 *      hd      +      r05 6.3500e-03r04 1.0691e+00e
978 *      icflg      *      f      0e
979 *      nff      *      f      1e
980 *      alp      +      r03 0.0000e+00      3.5000e-01      1.0000e+00e
981 *      alp      +      r03 0.0000e+00      3.5000e-01r04 1.0000e+00e
982 *      vl      *      f      0.0000e+00e
983 *      vv      *      f      0.0000e+00e
984 *      tl      *      f      5.4157e+02e
985 *      tv      *      f      5.4157e+02e
986 *      p      *      f      5.3700e+06e
987 *      pa      *      f      0.0000e+00e
988 *
989 ***** type      num      id      ctitle
990 tee          21          21 $21$ steam generator steam dome
991 *      jcell      nodes      ichf      cost      epsw
992     2          0          1          0.0      1.0e-5
993 *      iconcl      ncell1      jun1      jun2      ipowl
994     0          4          21          22          0
995 *      radin1      th1      houtl1      houtv1      toutl1
996     0.53455      0.05      0.0      0.0      305.67
997 *      toutv1      pwini      pwoff1      rpwmxx1      pwscl1
998     305.67      0.0      0.0      0.0      1.0
999 *      iconc2      ncell2      jun3      ipow2
1000    0          1          23          0
1001 *      radin2      th2      houtl2      houtv2      toutl2
1002     0.53455      0.05      0.0      0.0      305.67
1003 *      toutv2      pwini2      pwoff2      rpwmxx2      pwscl2
1004     305.67      0.0      0.0      0.0      1.0
1005 *
1006 *      dx      +      f      1.1115e+00e
1007 *      dx      *      3.7050E-01      3.7050E-01      3.7050E-01      1.1115e+00e

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1008 * vol + 9.9786e-01 1.2370e+00e
1009 * vol * 3.3262E-01 3.3262E-01 3.3262E-01 1.2370e+00e
1010 * fa + 8.9776e-01 1.1129e+00 4.6329e-02e
1011 * fa * 8.9776e-01 8.9776E-01 8.9776E-01 1.1129e+00 4.6329e-02
1012 * fa * e
1013 * fric + 0.0000e+00 1.0000e+30 2.4460e-01e
1014 * fric * 0.0000e+00 0.0 1.0000e+30 0.0 2.4460e-01
1015 * fric * e
1016 * grav * f 1.0000e+00e
1017 * hd + r02 1.0691e+00 2.4290e-01e
1018 * hd * r04 1.0691e+00 2.4290e-01e
1019 * icflg * f 0e
1020 * nff * f 1e
1021 * alp * f 1.0000e+00e
1022 * vl * f 0.0000e+00e
1023 * vv * f 0.0000e+00e
1024 * tl * f 5.4157e+02e
1025 * tv * f 5.4157e+02e
1026 * p * f 5.3700e+06e
1027 * pa * f 0.0000e+00e
1028 *
1029 * dx * 7.4100e-01e
1030 * vol * 3.8297e-01e
1031 * fa * f 5.1683e-01e
1032 * fric * 1.0000e-04 0.0000e+00e
1033 * grav + f -3.3763e-01e
1034 * grav + f -0.33759606e
1035 * grav * f -0.40463059e
1036 * hd * f 2.5400e-01e
1037 * icflg * f 0e
1038 * nff * f 1e
1039 * alp * 1.0000e+00e
1040 * vl * f 0.0000e+00e
1041 * vv * f 0.0000e+00e
1042 * tl * 5.4157e+02e
1043 * tv * 5.4157e+02e
1044 * p * 5.3700e+06e
1045 * pa * 0.0000e+00e
1046 *
1047 ***** type num id ctitle
1048 tee 22 22 $22$ steam generator downcomer
1049 * jcell nodes ichf cost epsw
1050 4 0 1 0.0 1.0e-5
1051 * iconcl ncel11 jun1 jun2 ipowl
1052 0 9 23 24 0
1053 * radin1 th1 hout11 houtv1 tout11
1054 0.53455 0.05 0.0 0.0 305.67
1055 * toutv1 pwin1 pwoff1 rpwmx1 pwscl1
1056 305.67 0.0 0.0 0.0 1.0
1057 * iconc2 ncel12 jun3 ipow2
1058 0 1 25 0
1059 * radin2 th2 hout12 houtv2 tout12
1060 0.0508 0.02 0.0 0.0 305.67
1061 * toutv2 pwin2 pwoff2 rpwmx2 pwscl2
1062 305.67 0.0 0.0 0.0 1.0
1063 *
1064 * dx + r02 7.4100e-01 1.7069e+00 5.6895e-01e
1065 * dx + 7.4100e-01r03 2.4700E-01 1.7069e+00 5.6895e-01e
1066 * dx + r02 3.7050E-01r03 2.4700E-01r03 5.6895E-01 5.6895e-01e
1067 * vol + r02 3.8297e-01 3.7363e-01 1.2454e-01e
1068 * vol + 3.8297e-01r03 1.2766E-01 3.7363e-01 1.2454e-01e
1069 * vol + r02 1.9149E-01r03 1.2766E-01r03 1.2454E-01 1.2454e-01e
1070 * fa + r02 5.1683e-01r03 2.1890e-01e
1071 * fa + r02 5.1683e-01 5.1683E-01 5.1683E-01r03 2.1890e-01e
1072 * fa + r05 5.1683e-01r05 2.1890e-01e
1073 * fric + r04 0.0000e+00 2.0000e-02e
1074 * fric + r06 0.0000e+00 2.0000e-02e
1075 * fric + r09 0.0000e+00 2.0000e-02e
1076 * grav + -3.3763e-01r03-1.0000e+00 0.0000e+00e
1077 * grav + -0.33759606r05-1.0000e+00 0.0000e+00e
1078 * grav + r02-0.40463059r07-1.0000e+00 0.0000e+00e
1079 * hd + r02 2.5400e-01r02 1.0160e-01 6.3500e-03e
1080 * hd + r03 2.5400e-01r03 1.0160e-01 6.3500e-03e
1081 * hd + r04 2.5400e-01r05 1.0160e-01 6.3500e-03e
1082 * icflg * f 0e
1083 * nff + r02 1 -1r02 1e
1084 * nff + r04 1 -1r02 1e
1085 * nff + r05 1 -1r04 1e
1086 * alp + 1.0000e+00r03 0.0000e+00e
1087 * alp + 1.0000e+00r05 0.0000e+00e
1088 * alp + r02 1.0000e+00r07 0.0000e+00e
1089 * vl * f 0.0000e+00e
1090 * vv * f 0.0000e+00e
1091 * tl + 5.4157e+02r03 5.2500e+02e
1092 * tl + 5.4157e+02r05 5.2500e+02e
1093 * tl + r02 5.4157e+02r07 5.2500e+02e
1094 * tv * f 5.4157e+02e
1095 * p * f 5.3700e+06e
1096 * pa * f 0.0000e+00e
1097 *
1098 * dx * 2.0000e+00e
1099 * vol * 1.6215e-02e

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1100 * fa * f 8.1073e-03e
1101 * fric * 1.0000e-04 0.0000e+00e
1102 * grav * f 0.0000e+00e
1103 * hd * f 1.0160e-01e
1104 * icflg * f 0e
1105 * nff * f 1e
1106 * alp * 0.0000e+00e
1107 * vl * f 0.0000e+00e
1108 * vv * f 0.0000e+00e
1109 * tl * 5.0000e+02e
1110 * tv * 5.0000e+02e
1111 * p * 5.3700e+06e
1112 * pa * 0.0000e+00e
1113 *
1114 ***** type num id ctitle
1115 tee 3 $3$ pump suction
1116 * jcell nodes ichf cost epsw
1117 5 4 1 0.0000e+00 1.0000e-05
1118 * iconcl ncell1 jun1 jun2 ipowl
1119 0 9 4 5 0
1120 * iqptr1 iqpsv1 nqptb1 nqpsv1 nqprf1
1121 0 0 0 0 0
1122 * radini th1 houtl1 houtvl toutl1
1123 1.4209e-01 3.5710e-02 0.0000e+00 1.2270e+01 3.0537e+02
1124 * toutvl
1125 3.0537e+02
1126 * qpin1 qpooff1 rqpmax1 qpsc11
1127 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
1128 * iconc2 ncell2 jun3 ipow2
1129 0 1 73 0
1130 * iqptr2 iqpsv2 nqptb2 nqpsv2 nqprf2
1131 0 0 0 0 0
1132 * radin2 th2 houtl2 houtv2 toutl2
1133 1.4209e-01 3.5710e-02 0.0000e+00 1.2270e+01 3.0537e+02
1134 * toutv2
1135 3.0537e+02
1136 * qpin2 qpooff2 rqpmax2 qpsc12
1137 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
1138 *
1139 * dx + 3.0480e-01 3.3020e-01 5.5880e-01 6.8580e-01 5.5880e-01
1140 * dx * 3.0480e-01 3.3020e-01 5.5880e-01 2.0081E-01 2.8417E-01
1141 * dx * 2.0081E-01 5.5880e-01s
1142 * dx * 3.3020e-01 3.0480e-01e
1143 * vol + 1.1044e-02 1.6424e-02 3.5396e-02 4.3497e-02 3.5396e-02
1144 * vol * 1.1044e-02 1.6424e-02 3.5396e-02 1.2737E-02 1.8024E-02
1145 * vol * 1.2737E-02 3.5396e-02s
1146 * vol * 1.6424e-02 1.1044e-02e
1147 * fa + r02 3.6613e-02r04 6.3425e-02r02 3.6613e-02e
1148 * fa * r02 3.6613e-02r02 6.3425e-02 6.3425E-02r02 6.3425E-02
1149 * fa * r02 3.6613e-02e
1150 * fric + 2.8678e-02 3.6439e-02 2.1983e-03 1.1068e-01 1.1068e-01
1151 * fric * 2.8678e-02 3.6439e-02 2.1983e-03 1.8135E-01 0.0
1152 * fric * 0.0 1.8135E-01s
1153 * fric * 2.1983e-03 3.6439e-02 2.8678e-02e
1154 * grav + -6.2659e-01r02-1.0000e+00r02 0.0000e+00r02 1.0000e+00 6.2659e-01
1155 * grav * -6.2659e-01r02-1.0000e+00r04 0.0000e+00r02 1.0000e+00 6.2659e-01
1156 * grav * e
1157 * hd + r02 2.1591e-01r04 2.8417e-01r02 2.1591e-01e
1158 * hd * r02 2.1591e-01r06 2.8417e-01r02 2.1591e-01e
1159 * icflg * f 0e
1160 * nff * f 1e
1161 * alp * f 0.0000e+00e
1162 * vl * f 0.0000e+00e
1163 * vv * f 0.0000e+00e
1164 * tl * f 5.5280e+02e
1165 * tv * f 5.5280e+02e
1166 * p * f 1.4780e+07e
1167 * pa * f 0.0000e+00e
1168 * qppp * f 0.0000e+00e
1169 * matid * f 7e
1170 * tw * f 5.5280e+02e
1171 *
1172 * dx * 7.3120e-01e
1173 * vol * 4.6268e-02e
1174 * fa * f 6.3425e-02e
1175 * fric * 1.6244e-01 0.0000e+00e
1176 * grav * f 0.0000e+00e
1177 * hd * f 2.8417e-01e
1178 * icflg * f 0e
1179 * nff * f 1e
1180 * alp * 0.0000e+00e
1181 * vl * f 0.0000e+00e
1182 * vv * f 0.0000e+00e
1183 * tl * 5.5280e+02e
1184 * tv * 5.5280e+02e
1185 * p * 1.4780e+07e
1186 * pa * 0.0000e+00e
1187 * qppp * f 0.0000e+00e
1188 * matid * f 7e
1189 * tw * f 5.5280e+02e
1190 *
1191 ***** type num id ctitle

```

```

1192 pump      4      4 $4$ pump 2
1193 * ncells   nodes   jun1   jun2   epsw
1194 *          2       4        4       6   1.0000e-05
1195 * ichf     iconc   ipmpty   irp    ipm
1196 *          1       0        1       1    1
1197 * ipmpty   ipmpsv  npmptb   npmpsv  npmprf
1198 *          10      1       -10      0    0
1199 * iq3ptr   iq3sv   nqp3tb   nqp3sv  nqp3rf
1200 *          0       0        0       0    0
1201 * radin    th      houtl   houtv   toutl
1202 *          1.0795e-01 2.8580e-02 0.0000e+00 1.2270e+01 3.0537e+02
1203 * toutv    effmi
1204 *          3.0537e+02 3.1744e+02
1205 * tfr0     tfr1    tfr2    tfr3    tfrb
1206 *          3.6813e+00 0.0000e+00 2.3119e+02 0.0000e+00 0.0000e+00
1207 * tfr10    tfr11   tfr12   tfr13
1208 *          3.6813e+00 0.0000e+00 2.3119e+02 0.0000e+00
1209 * rhead    rtork   rflow   rrho   romea
1210 *          9.4154e+02 5.0000e+02 3.1500e-01 6.1400e+02 3.6966e+02
1211 * omega    omgoff  romgmx  omgscl  npmpsd
1212 *          3.6966e+02 -1.0000e+00 1.0000e+20 3.6966e+02 0
1213 * qp3in    qp3off  rqp3mx  qp3scl
1214 *          0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
1215 * option
1216 *          2
1217 *
1218 * dx      * f  1.3521e+00e
1219 * vol     * f  4.9555e-02e
1220 * fa      * f  3.6613e-02e
1221 * fric    * f  2.8678e-02r02 0.0000e+00e
1222 * grav    * f  6.2659e-01r02 0.0000e+00e
1223 * hd      * f  2.1591e-01e
1224 * icflg   * f  0e
1225 * nff     * f  1e
1226 * alp     * f  0.0000e+00e
1227 * ml      * f  0.0000e+00  2.4000e+02 0.0000e+00e
1228 * mv      * f  0.0000e+00e
1229 * tl      * f  5.5280e+02e
1230 * tv      * f  5.5280e+02e
1231 * p       * f  1.4780e+07e
1232 * pa      * f  0.0000e+00e
1233 * qppp    * f  0.0000e+00e
1234 * matid   * f  7e
1235 * tw      * f  5.5280e+02e
1236 *
1237 * pmptb   * 0.0000e+00  1.0000e+00  5.0000e+00  6.4516e-01  1.0000e+01
1238 * pmptb   * 4.3548e-01  1.8000e+01  2.2581e-01  2.0000e+01  1.2903e-01
1239 * pmptb   * 2.5000e+01  6.4516e-02  3.0000e+01  4.4355e-02  4.0000e+01
1240 * pmptb   * 2.4806e-02  4.4000e+01  1.9355e-02  4.6500e+01  0.0000e+00
1241 * pmptb   * e
1242 *
1243 ***** type num id ctitle
1244 pump      5      5 $5$ pump 1
1245 * ncells   nodes   jun1   jun2   epsw
1246 *          2       4        5       7   1.0000e-05
1247 * ichf     iconc   ipmpty   irp    ipm
1248 *          1       0        1       1    1
1249 * ipmpty   ipmpsv  npmptb   npmpsv  npmprf
1250 *          10      1       -10      0    0
1251 * iq3ptr   iq3sv   nqp3tb   nqp3sv  nqp3rf
1252 *          0       0        0       0    0
1253 * radin    th      houtl   houtv   toutl
1254 *          1.0795e-01 2.8580e-02 0.0000e+00 1.2270e+01 3.0537e+02
1255 * toutv    effmi
1256 *          3.0537e+02 3.1744e+02
1257 * tfr0     tfr1    tfr2    tfr3    tfrb
1258 *          3.6813e+00 0.0000e+00 2.3119e+02 0.0000e+00 0.0000e+00
1259 * tfr10    tfr11   tfr12   tfr13
1260 *          3.6813e+00 0.0000e+00 2.3119e+02 0.0000e+00
1261 * rhead    rtork   rflow   rrho   romea
1262 *          9.4154e+02 5.0000e+02 3.1500e-01 6.1400e+02 3.6966e+02
1263 * omega    omgoff  romgmx  omgscl  npmpsd
1264 *          3.6966e+02 -1.0000e+00 1.0000e+20 3.6966e+02 0
1265 * qp3in    qp3off  rqp3mx  qp3scl
1266 *          0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
1267 * option
1268 *          2
1269 *
1270 * dx      * f  1.3521e+00e
1271 * vol     * f  4.9555e-02e
1272 * fa      * f  3.6613e-02e
1273 * fric    * f  2.8678e-02r02 0.0000e+00e
1274 * grav    * f  6.2659e-01r02 0.0000e+00e
1275 * hd      * f  2.1591e-01e
1276 * icflg   * f  0e
1277 * nff     * f  1e
1278 * alp     * f  0.0000e+00e
1279 * ml      * f  0.0000e+00  2.5000e+02 0.0000e+00e
1280 * mv      * f  0.0000e+00e
1281 * tl      * f  5.5280e+02e
1282 * tv      * f  5.5280e+02e
1283 * p       * f  1.4780e+07e

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```

1284 * pa * f 0.0000e+00e
1285 * qppp * f 0.0000e+00e
1286 * matid * f 7e
1287 * tw * f 5.5280e+02e
1288 *
1289 * pmptb * 0.0000e+00 1.0000e+00 5.0000e+00 6.4516e-01 1.0000e+01
1290 * pmptb * 4.3548e-01 1.8000e+01 2.2581e-01 2.0000e+01 1.2903e-01
1291 * pmptb * 2.5000e-01 6.4516e-02 3.0000e+01 4.4355e-02 4.0000e+01
1292 * pmptb * 2.4806e-02 4.4000e+01 1.9355e-02 4.6500e+01 0.0000e+00
1293 * pmptb * e
1294 *
1295 ***** type num id ctitle
1296 tee 6 6 $6$ pump discharge
1297 * jcell nodes ichf cost epsw
1298 * 4 4 1 0.0000e+00 1.0000e-05
1299 * iconcl ncell1 jun1 jun2 ipowl
1300 * 0 5 7 66 0
1301 * iqptr1 iqpsv1 ncptbl nqpsv1 nqprfl
1302 * 0 0 0 0 0
1303 * radin1 th1 hout1 houtv1 toutl1
1304 1.0795e-01 2.8580e-02 0.0000e+00 1.2270e+01 3.0537e+02
1305 * toutv1
1306 3.0537e+02
1307 * qpin1 qpooff1 rqpmx1 qpsc11
1308 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
1309 * iconc2 ncell2 jun3 ipow2
1310 * 0 1 6 0
1311 * iqptr2 iqpsv2 ncptb2 nqpsv2 nqprf2
1312 * 0 0 0 0 0
1313 * radin2 th2 houtl2 houtv2 toutl2
1314 1.0795e-01 2.8580e-02 0.0000e+00 1.2270e+01 3.0537e+02
1315 * toutv2
1316 3.0537e+02
1317 * qpin2 qpooff2 rqpmx2 qpsc12
1318 0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
1319 *
1320 * dx + 1.3081e+00 3.3020e-01 8.1280e-01e
1321 * dx * 1.3081e+00 3.3020e-01 2.7093E-01 2.7093E-01 2.7093E-01
1322 * dx * e
1323 * vol + 4.7856e-02 1.6424e-02 5.1552e-02e
1324 * vol * 4.7856e-02 1.6424e-02 1.7184E-02 1.7184E-02 1.7184E-02
1325 * vol * e
1326 * fa + r02 3.6613e-02r02 6.3425e-02e
1327 * fa * r02 3.6613e-02 6.3425e-02 6.3425E-02 6.3425E-02 6.3425E-02
1328 * fa * e
1329 * fric + 0.0000e+00 2.3841e-02 6.7127e-02 5.2244e-02e
1330 * fric * 0.0000e+00 2.3841e-02 1.2764E-01 0.0 0.0
1331 * fric * 1.5673E-01e
1332 * grav * f 0.0000e+00e
1333 * hd + r02 2.1591e-01r02 2.8417e-01e
1334 * hd * r02 2.1591e-01r04 2.8417e-01e
1335 * icflg * f 0e
1336 * nff * f 1e
1337 * alp * f 0.0000e+00e
1338 * vl * f 0.0000e+00e
1339 * vv * f 0.0000e+00e
1340 * tl * f 5.5280e+02e
1341 * tv * f 5.5280e+02e
1342 * p * f 1.4780e+07e
1343 * pa * f 0.0000e+00e
1344 * qppp * f 0.0000e+00e
1345 * matid * f 7e
1346 * tw * f 5.5280e+02e
1347 *
1348 * dx * 3.9370e-01e
1349 * vol * 1.4442e-02e
1350 * fa * f 3.6613e-02e
1351 * fric * 3.5099e-01 0.0000e+00e
1352 * grav * f 0.0000e+00e
1353 * hd * f 2.1591e-01e
1354 * icflg * f 0e
1355 * nff * f 1e
1356 * alp * 0.0000e+00e
1357 * vl * f 0.0000e+00e
1358 * vv * f 0.0000e+00e
1359 * tl * 5.5280e+02e
1360 * tv * 5.5280e+02e
1361 * p * 1.4780e+07e
1362 * pa * 0.0000e+00e
1363 * qppp * f 0.0000e+00e
1364 * matid * f 7e
1365 * tw * f 5.5280e+02e
1366 *
1367 ***** type num id ctitle
1368 tee 7 7 $7$ intact-loop cold leg
1369 * jcell nodes ichf cost epsw
1370 * 2 4 1 0.0000e+00 1.0000e-05
1371 * iconcl ncell1 jun1 jun2 ipowl
1372 * 0 4 8 29 0
1373 * iqptr1 iqpsv1 ncptbl nqpsv1 nqprfl
1374 * 0 0 0 0 0
1375 * radin1 th1 hout1 houtv1 toutl1

```

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1376     1.4209e-01   3.5710e-02   0.0000e+00   1.2270e+01   3.0537e+02
1377 *      toutvl
1378   3.0537e+02
1379 *      qpin1      qpoff1      rqpmax1      qpsc11
1380   0.0000e+00   0.0000e+00   1.0000e+20   1.0000e+00
1381 *      iconc2      ncell2      jun3      ipow2
1382   0           1           14           0
1383 *      iqptr2      iqpsv2      ngptb2      nqpsv2      nqprf2
1384   0           0           0           0           0
1385 *      radin2      th2      houtl2      houtv2      toutl2
1386   4.3663e-02   1.3487e-02   0.0000e+00   0.0000e+00   3.0537e+02
1387 *      toutv2
1388   3.0537e+02
1389 *      qpin2      qpoff2      rqpmax2      qpsc12
1390   0.0000e+00   0.0000e+00   1.0000e+20   1.0000e+00
1391 *
1392 *      dx      +      7.0874e-01   1.3970e+00e
1393 *      dx      *      2.3625E-01   2.3625B-01   2.3625E-01   1.3970e+00e
1394 *      vol      +      4.4741e-02   8.8603e-02e
1395 *      vol      *      1.4914E-02   1.4914E-02   1.4914E-02   8.8603e-02e
1396 *      fa      +      f      6.3425e-02e
1397 *      fa      *      f      6.3425E-02   6.3128E-02   6.3128E-02r02 6.3425e-02e
1398 *      fric      +      r02   0.0000e+00   2.0000e-02e
1399 *      fric      *      r04   0.0000e+00   1.8719E-02e
1400 *      grav      *      f      0.0000e+00e
1401 *      hd      +      f      2.8417e-01e
1402 *      hd      *      r04   2.8417E-01   2.8418E-01e
1403 *      icflg      *      f      oe
1404 *      nff      *      f      1e
1405 *      alp      *      f      0.0000e+00e
1406 *      vl      *      f      0.0000e+00e
1407 *      vv      *      f      0.0000e+00e
1408 *      tl      *      f      5.5280e-02e
1409 *      tv      *      f      5.5280e+02e
1410 *      p       *      f      1.4780e+07e
1411 *      pa      *      f      0.0000e+00e
1412 *      qppp      *      f      0.0000e+00e
1413 *      matid      *      f      7e
1414 *      tw      *      f      5.5280e+02e
1415 *
1416 *      dx      *      1.5000e+00e
1417 *      vol      *      8.9838e-03e
1418 *      fa      *      f      5.9892e-03e
1419 *      fric      *      1.0000e-04   3.3380e-01e
1420 *      grav      *      -1.0000e+00   0.0000e+00e
1421 *      hd      *      f      8.7325e-02e
1422 *      icflg      *      f      oe
1423 *      nff      *      f      1e
1424 *      alp      *      0.0000e+00e
1425 *      vl      *      f      0.0000e+00e
1426 *      vv      *      f      0.0000e+00e
1427 *      tl      *      5.0000e+02e
1428 *      tv      *      5.0000e+02e
1429 *      p       *      1.4780e+07e
1430 *      pa      *      0.0000e+00e
1431 *      qppp      *      f      0.0000e+00e
1432 *      matid      *      f      7e
1433 *      tw      *      f      5.0000e+02e
1434 *
1435 ***** type      num      id      ctitle
1436 prizer      8          8      $8$ pressurizer bottom
1437 *      ncells      nodes      jun1      jun2
1438   1           4           64           10
1439 *      ichf      iconc      qp3in
1440   1           0           0.0000e+00
1441 *      radin      th      houtl      houtv      toutl
1442   4.2418e-01   7.4930e-02   0.0000e+00   2.7411e+00   3.0537e+02
1443 *      toutv      qheat      pset      dpmax      zhtr
1444   3.0537e+02   0.0000e+00   0.0000e+00   0.0000e+00   0.0000e+00
1445 *
1446 *      dx      *      2.0000e-01e
1447 *      vol      *      1.2770e-02e
1448 *      fa      *      5.6526e-01   5.7321e-03e
1449 *      fric      *      f      0.0000e+00e
1450 *      grav      *      -1.0000e+00   -6.0410e-01e
1451 *      hd      *      8.4836e-01   8.5430e-02e
1452 *      icflg      *      f      oe
1453 *      nff      *      f      -1e
1454 *      alp      *      0.0000e+00e
1455 *      vl      *      f      0.0000e+00e
1456 *      vv      *      f      0.0000e+00e
1457 *      tl      *      6.1411e+02e
1458 *      tv      *      6.1411e+02e
1459 *      p       *      1.4780e+07e
1460 *      pa      *      0.0000e+00e
1461 *      qppp      *      f      0.0000e+00e
1462 *      matid      *      f      9e
1463 *      tw      *      f      6.1411e+02e
1464 *
1465 ***** type      num      id      ctitle
1466 pipe      9          9      $9$ prizer top and prizer spray
1467 *      ncells      nodes      jun1      jun2      epsw

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1468      1          4          60          68  1.0000e-05
1469 *     ichf      iconc      iacc      ipow
1470      1          0          0          1
1471 *     ipowtr    ipowsv    npowtb    npowsv    npowrf
1472      7          1          2          0          0
1473 *     iqptr2    iqpsv2    nqptb2    nqpsv2    nqprf2
1474      0          0          0          0          0
1475 *     radin2    th2       houtl2    houtv2    toutl2
1476      2.3300e-02 8.7970e-03 0.0000e+00 1.2270e+01 3.0537e+02
1477 *     toutv2    pwin2     pwoff2    rpwmx2    pwsc12
1478      3.0537e+02 0.0000e+00 0.0000e+00 1.0000e+20 5.0000e+03
1479 *     qpin2     qpooff2   rgpmx2    qpsc12
1480      0.0000e+00 0.0000e+00 0.0000e+00 1.0000e+00
1481 *
1482 *     dx      * 4.6022e-02e
1483 *     vol      * 6.6699e-05e
1484 *     fa      * 1.4493e-04 1.4493e-03e
1485 *     fric     * f 0.0000e+00e
1486 *     grav     * f -1.0000e+00e
1487 *     hd      * f 4.2957e-02e
1488 *     icflg    * f 0e
1489 *     nff      * -1           1e
1490 *     alp      * 0.0000e+00e
1491 *     vl       * f 0.0000e+00e
1492 *     vv       * f 0.0000e+00e
1493 *     tl       * 4.5000e+02e
1494 *     tv       * 4.5000e+02e
1495 *     p        * 1.4780e+07e
1496 *     pa       * 0.0000e+00e
1497 *     qppp     * f 0.0000e+00e
1498 *     matid    * f 6e
1499 *     tw       * f 4.5000e+02e
1500 *
1501 *     powtb2* r02 0.0000e+00 2.0000e+01 1.0000e+00e
1502 *
1503 ***** type num id ctitle
1504 valve      10 10 $10$ prizer spray control valve
1505 *     ncells nodes jun1 jun2 epsw
1506      3          4       67       68  1.0000e-05
1507 *     ichf      iconc ivty     ivps      nvtb2
1508      1          0          3          2          0
1509 *     ivtr      ivsv  nvtb1    nvsv      nvrf
1510      12         1       -2          0          0
1511 *     iq3ptr    igp3sv nqp3tb    nqp3sv    nqp3rf
1512      0          0          0          0          0
1513 *     ivtrov    ivtyov
1514      0          0
1515 *     rvmx      rvov   fminov   fmaxov
1516      1.0000e+20 0.0000e+00 0.0000e+00 1.0000e+00
1517 *     radin     th       houtl    houtv    toutl
1518      3.3000e-02 8.6970e-03 0.0000e+00 1.2270e+01 3.0537e+02
1519 *     toutv     avlve   hvlve    favlve   xpos
1520      3.0537e+02 1.4490e-03 4.2957e-02 6.8600e-03 -1.0000e+00
1521 *     qp3in     qp3off   rgp3mx    qp3scl
1522      0.0000e+00 0.0000e+00 1.0000e+20 1.0000e+00
1523 *
1524 *     dx      + r02 5.6600e-01 7.0000e-01e
1525 *     dx      * r02 0.70537663 7.0000e-01e
1526 *     vol      + r02 8.2030e-04 1.0145e-03e
1527 *     vol      * r02 1.0223e-03 1.0145e-03e
1528 *     fa      * f 1.4493e-03e
1529 *     fric     * 0.0000e+00 1.0500e+01r02 0.0000e+00e
1530 *     grav     * f 1.0000e+00e
1531 *     hd      * f 4.2957e-02e
1532 *     icflg    * f 0e
1533 *     nff      * f 1e
1534 *     alp      * f 0.0000e+00e
1535 *     vl       * f 0.0000e+00e
1536 *     vv       * f 0.0000e+00e
1537 *     tl       * f 4.5000e+02e
1538 *     tv       * f 4.5000e+02e
1539 *     p        * f 1.4780e+07e
1540 *     pa       * f 0.0000e+00e
1541 *     qppp     * f 0.0000e+00e
1542 *     matid    * f 7e
1543 *     tw       * f 4.5000e+02e
1544 *
1545 *     vtb1     * 0.0000e+00 6.8600e-03 1.0000e-01 1.0000e+00e
1546 *
1547 ***** type num id ctitle
1548 tee       11 11 $11$ prizer spray source
1549 *     jcell    nodes ichf      cost      epsw
1550      2          4       1       0.0000e+00 1.0000e-05
1551 *     iconcl   ncell1 jun1     jun2     ipowl
1552      0          3       66       8          0
1553 *     iqptr1   iqpsv1 nqptb1   nqpsv1   nqprf1
1554 *     radin1   th1      houtl1   houtv1   toutl1
1555 *     toutv1   3.5710e-02 0.0000e+00 1.2270e+01 3.0537e+02
1556      1.4209e-01
1557 *     toutv1   3.0537e+02
1558 *     qpin1     qpooff1 rgpmx1    qpsc11

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1560      0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
1561 *     iconc2      ncell2      jun3      ipow2
1562      0           1           67           0
1563 *     iqptr2      iqpsv2      npptb2      npqsv2      npqr2
1564      0           0           0           0           0
1565 *     radin2      th2        houtl2      houtv2      toutl2
1566      2.3300e-02  8.6970e-03  0.0000e+00  1.2270e+01  3.0537e+02
1567 *     toutv2
1568      3.0537e+02
1569 *     qpin2      qpooff2      rqpmx2      qpsc12
1570      0.0000e+00  0.0000e+00  1.0000e+20  1.0000e+00
1571 *
1572 * dx   +   1.1684e+00e
1573 * dx   *   3.8947E-01   3.8947E-01   3.8947E-01e
1574 * vol  +   7.4190e-02e
1575 * vol  *   2.4730E-02   2.4730E-02   2.4730E-02e
1576 * fa   + f   6.3425e-02e
1577 * fa   * f   6.3425e-02   6.3497E-02   6.3497E-02   6.3425E-02e
1578 * fric  + f   5.2244e-02   0.0000e+00e
1579 * fric  * f   1.5673E-01   0.0           0.0           0.0000e+00e
1580 * grav  * f   0.0000e+00e
1581 * hd   * f   2.8417e-01e
1582 * icflg  * f   0e
1583 * nff  * f   1e
1584 * alp   * f   0.0000e+00e
1585 * vl    * f   0.0000e+00e
1586 * vv    * f   0.0000e+00e
1587 * tl    * f   5.5280e+02e
1588 * tv    * f   5.5280e+02e
1589 * p     * f   1.4780e+07e
1590 * pa    * f   0.0000e+00e
1591 * qppp  * f   0.0000e+00e
1592 * matid * f   7e
1593 * tw    * f   5.5280e+02e
1594 *
1595 * dx   *   7.4602e-01e
1596 * vol  *   1.0812e-03e
1597 * fa   * f   1.4493e-03e
1598 * fric  * f   1.0000e-04   0.0000e+00e
1599 * grav  * f   1.0000e+00e
1600 * hd   * f   4.2957e-02e
1601 * icflg  * f   0e
1602 * nff  * f   1e
1603 * alp   * f   0.0000e+00e
1604 * vl    * f   0.0000e+00e
1605 * vv    * f   0.0000e+00e
1606 * tl    * f   4.5000e+02e
1607 * tv    * f   4.5000e+02e
1608 * p     * f   1.4780e+07e
1609 * pa    * f   0.0000e+00e
1610 * qppp  * f   0.0000e+00e
1611 * matid * f   7e
1612 * tw    * f   4.5000e+02e
1613 *
1614 ***** type      num      id      ctitle
1615 pipe          12      12      $12$ pressurizer lower middle
1616 *     ncells      nodes      jun1      jun2      epsw
1617      1           4           61           64   1.0000e-05
1618 *     ichf       iconc      iacc      ipow
1619      1           0           0           1
1620 *     ipowtr      ipowsv      npowtb      npowsv      npowrf
1621      -24          21          8           0           0
1622 *     iq3ptr      iq3sv      npq3tb      npq3sv      npq3rf
1623      0           0           0           0           0
1624 *     radin      th        houtl      houtv      toutl
1625      4.2418e-01   7.4930e-02   0.0000e+00   2.7411e+00   3.0537e+02
1626 *     toutv      powin      powoff      rpowmx      powscl
1627      3.0537e+02   0.0000e+00   0.0000e+00   1.0000e+20   1.0000e+00
1628 *     qp3in      qp3off      rq3mxt      qp3scl
1629      0.0000e+00   0.0000e+00   1.0000e+20   1.0000e+00
1630 *
1631 * dx   *   1.5000e-01e
1632 * vol  *   8.4789e-02e
1633 * fa   * f   5.6526e-01e
1634 * fric  * f   0.0000e+00e
1635 * grav  * f   -1.0000e+00e
1636 * hd   * f   8.4836e-01e
1637 * icflg  * f   0e
1638 * nff  * f   1           -1e
1639 * alp   * f   0.0000e+00e
1640 * vl    * f   0.0000e+00e
1641 * vv    * f   0.0000e+00e
1642 * tl    * f   6.1411e+02e
1643 * tv    * f   6.1411e+02e
1644 * p     * f   1.4780e+07e
1645 * pa    * f   0.0000e+00e
1646 * qppp  * f   0.0000e+00e
1647 * matid * f   9e
1648 * tw    * f   6.1411e+02e
1649 *
1650 * powtb *   -1.2500e+00   3.9800e+02   -7.5000e-01   3.9800e+02   -5.0000e-01
1651 * powtb *   0.0000e+00   5.0000e-01   0.0000e+00   7.5000e-01   3.6000e+04

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1652 * powtb * 1.2500e+00 3.6000e+04 1.7500e+00 4.8000e+04 2.2500e+00
1653 * powtb * 4.8000e+04e
1654 *
1655 ***** type num id ctitle
1656 prizer ncells nodes jun1 jun2 $13$ pressurizer upper middle
1657 * 7 4 60 61
1658 * ichf iconc qp3in
1659 * 1 0 0.0000e+00
1660 * radin th houtl houtv toutl
1661 * 4.2418e-01 7.4930e-02 0.0000e+00 2.7411e+00 3.0537e+02
1662 * toutv qheat pset dmax zhtr
1663 * 3.0537e+02 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
1664 *
1665 *
1666 * dx * 1.3073e-01 4.0000e-01r05 2.0000e-01e
1667 * vol * 6.7133e-02 2.0259e-01r05 1.1305e-01e
1668 * fa * 1.4493e-04 5.0647e-01r06 5.6526e-01e
1669 * fric * f 0.0000e+00e
1670 * grav * 1.0000e+00r07-1.0000e+00e
1671 * hd * 4.2957e-02r07 8.4836e-01e
1672 * icflg * f 0e
1673 * nff * -1r07 1e
1674 * alp * r02 1.0000e+00 2.9032e-01r04 0.0000e+00e
1675 * vl * f 0.0000e+00e
1676 * vv * f 0.0000e+00e
1677 * tl * f 6.1411e+02e
1678 * tv * f 6.1411e+02e
1679 * p * f 1.4780e+07e
1680 * pa * f 0.0000e+00e
1681 * qppp * f 0.0000e+00e
1682 * matid * f 9e
1683 * tw * f 6.1411e+02e
1684 *
1685 ***** type num id ctitle
1686 fill ncells nodes junl ifty ioff $17$ hpis injection
1687 * 17 17
1688 * 14 8 1
1689 * iftr ifsv iftb nfsv nfrf
1690 * 17 1 -12 0 0
1691 * twtold rfmx concin felv
1692 * 0.0000e+00 1.0000e+20 0.0000e+00 0.0000e+00
1693 * dbin violin alpin vlin tlin
1694 * 1.5000e+00 8.9838e-03 0.0000e+00 0.0000e+00 3.7500e+02
1695 * pin pain flowin vvin tvin
1696 * 1.4780e+07 0.0000e+00 0.0000e+00 0.0000e+00 3.7500e+02
1697 * vmscl vvscl
1698 * 1.0000e+00 1.0000e+00
1699 *
1700 * vmtb * r02 0.0000e+00 2.0000e-01 2.4375e-01 1.6000e+00 3.8875e+00
1701 * vmtb * 2.0600e+01 3.8937e+00 2.1600e+01 1.4750e+00 2.2600e+01
1702 * vmtb * 3.7500e-01 2.3600e+01 2.5000e-01 2.6600e+01 1.5937e-01
1703 * vmtb * 3.3600e+01 1.2500e-01 3.9600e+01 1.2500e-01 4.0100e+01
1704 * vmtb * 0.0000e+00 1.0000e+04 0.0000e+00e
1705 *
1706 ***** type num id ctitle
1707 valve ncells nodes jun1 jun2 $23$ steam line valve
1708 * 23 23
1709 * 6 0 22 26 1.0000e-05
1710 * ichf iconc ivty ivps nvtb2
1711 * 1 0 3 6 0
1712 * ivtr ivsv nvtb1 nvsv nvrf
1713 * 8 -13 0 0 0
1714 * ivtroy ivtyov
1715 * 0 0
1716 * rvmx rvov fminov fmaxov
1717 * 1.0000e+20 0.0000e+00 0.0000e+00 1.0000e+00
1718 * radin th houtl houtv toutl
1719 * 1.2140e-01 1.5100e-02 0.0000e+00 0.0000e+00 3.0537e+02
1720 * toutv avlve hvlve favlve xpos
1721 * 3.0537e+02 3.7580e-02 2.1870e-01 5.8973e-01 6.3800e-01
1722 *
1723 * dx * f 5.0119e+00e
1724 * vol * f 2.3220e-01e
1725 * fa * f 4.6329e-02e
1726 * fric * 2.4460e-01r04 0.0000e+00 6.4900e+00 0.0000e+00e
1727 * grav * 1.0000e+00r06 0.0000e+00e
1728 * hd * f 2.4290e-01e
1729 * icflg * r05 0 1 0e
1730 * nff * r06 1 -1e
1731 * alp * f 1.0000e+00e
1732 * vl * f 0.0000e+00e
1733 * vv * f 0.0000e+00e
1734 * tl * f 5.4157e+02e
1735 * tv * f 5.4157e+02e
1736 * p * 5.3700e+06 5.3628e+06 5.3556e+06 5.3483e+06 5.3411e+06
1737 * p * 2.1500e+06e
1738 * pa * f 0.0000e+00e
1739 *
1740 ***** type num id ctitle
1741 fill ncells nodes jun1 ifty ioff $24$ steam generator feedwater
1742 * 24 24
1743 * 25 8 0

```

1744	*	iftr	ifsv	nftb	nfsv	nfrf
1745	*	15	-10	0	0	0
1746	*	twold	rfrm	concin	felv	
1747	*	0.0000e+00	1.0000e+20	0.0000e+00	0.0000e+00	
1748	*	dxin	volin	alpin	vlin	tlin
1749	*	2.0000e+00	1.6215e-02	0.0000e+00	0.0000e+00	4.7900e+02
1750	*	pin	pain	flowin	vvin	tvin
1751	*	5.3700e+06	0.0000e+00	2.0100e+01	0.0000e+00	4.7900e+02
1752	*					
1753	*****	type	num	id	ctitle	
1754	break		25	25	\$25\$	stm gen sec brk
1755	*	juni	ibty	isat	ioff	
1756	*	26	0	3	0	
1757	*	dxin	volin	alpin	tin	pin
1758	*	5.0119e+00	2.3220e+01	1.0000e+00	4.8800e+02	2.1500e+06
1759	*	pain	concin	rblmx	poff	belv
1760	*	0.0000e+00	0.0000e+00	0.0000e+00	2.1500e+06	0.0000e+00
1761	*					
1762	*****	type	num	id	ctitle	
1763	tee		31	31	\$31\$	broken loop hot leg
1764	*	jcell	nodes	ichf	cost	epsw
1765	*	3	4	1	0.0000e+00	1.0000e-05
1766	*	iconcl	ncell1	jun1	jun2	ipowl
1767	*	0	20	45	32	0
1768	*	iqptrl	iqpsv1	nqptbl	nqpsv1	nqprf1
1769	*	0	0	0	0	0
1770	*	radin1	th1	houtl1	houtvl	toutl1
1771	*	1.4209e-01	3.5710e-02	0.0000e+00	1.2270e+01	3.0537e+02
1772	*	toutvl				
1773	*	3.0537e+02				
1774	*	qpin1	qpoff1	rqpmax1	qpsc11	
1775	*	0.0000e+00	0.0000e+00	1.0000e+20	1.0000e+00	
1776	*	iconc2	ncell2	jun3	ipow2	
1777	*	0	3	43	0	
1778	*	iqptr2	iqpsv2	nqptb2	nqpsv2	nqprf2
1779	*	0	0	0	0	0
1780	*	radin2	th2	hout12	houtv2	toutl2
1781	*	1.0795e-01	2.8580e-02	0.0000e+00	1.2270e+01	3.0537e+02
1782	*	toutv2				
1783	*	3.0537e+02				
1784	*	qpin2	qpoff2	rqpmax2	qpsc12	
1785	*	0.0000e+00	0.0000e+00	1.0000e+20	1.0000e+00	
1786	*					
1787	*	dx	+	9.2939e-01	5.5880e-01	1.3890e+00
1788	*	dx	*	9.2939e-01	1.6825E-01	2.2230E-01
1789	*	dx	*	2.9921e-01	8.5396e-01s	
1790	*	dx	*	1.6921e+00	1.0772e+00	2.6314e-01
1791	*	dx	*	1.5080e+00	3.3020e-01	2.7940e-01
1792	*	dx	*	8.3185e-01	2.9921e-01	5.0000e-01e
1793	*	vol	+	5.8701e-02	3.5442e-02	5.0618e-02
1794	*	vol	*	5.8701e-02	1.0671E-02	1.4099E-02
1795	*	vol	*	2.4919e-03	3.8990e-02s	
1796	*	vol	*	1.7868e-01	1.1383e-01	2.7779e-02
1797	*	vol	*	4.3550e-02	2.0105e-03	1.7726e-02
1798	*	vol	*	6.9660e-03	2.4919e-03	2.4542e-03e
1799	*	fa	+	r03	6.3425e-02r02	8.3677e-03r06
1800	*	fa	+	r05	6.3425e-02r02	8.3677e-03r06
1801	*	fa	*	r04	8.3677e-03	2.0694e-02e
1802	*	fric	+		7.0547e-02	5.1558e-02
1803	*	fric	*		7.4149E-02	6.9903E-02
1804	*	fric	*		3.7870e-02	3.7944e-02s
1805	*	fric	*		6.1057e-02	1.9809e-01
1806	*	fric	*		2.1500e-01	2.6383e-01
1807	*	fric	*		0.0000e+00	2.5031e-02
1808	*	grav	+	r04	0.0000e+00r03-1.0000e+00r02	0.0000e+00r04
1809	*	grav	+	r02	-1.0000e+00r02	0.0000e+00e
1810	*	grav	*	r06	0.0000e+00	0.72818405r02+1.0000e+00r02
1811	*	grav	*	r02	0.0000e+00r02+1.0000e+00r02	0.0000e+00e
1812	*	hd	*	r03	2.8418e-01r02	1.0322e-01r06
1813	*	hd	*	r05	2.8418e-01r02	1.0322e-01r06
1814	*	hd	*	r04	1.0322e-01	2.5720e-01e
1815	*	icflg	*	f	0e	
1816	*	nff	*	f	1e	
1817	*	alp	*	f	0.0000e+00e	
1818	*	vl	*	f	0.0000e+00e	
1819	*	vv	*	f	0.0000e+00e	
1820	*	tl	*	f	5.6750e+02e	
1821	*	tv	*	f	5.6750e+02e	
1822	*	p	*	f	1.4780e+07e	
1823	*	pa	*	f	0.0000e+00e	
1824	*	qppp	*	f	0.0000e+00e	
1825	*	matid	*	f	7e	
1826	*	tw	*	f	5.6750e+02e	
1827	*					
1828	*	dx	*		1.3890e+00	8.1400e-01
1829	*	vol	*		5.4000e-02	3.1400e-02
1830	*	fa	*		3.8800e-02e	1.9860e-01e
1831	*	fric	*		1.1160e-01r03	0.0000e+00e
1832	*	grav	*		0.0000e+00	2.2420e-01
1833	*	hd	*	r03	2.2230e-01	1.4100e-03e
1834	*	icflg	*	f	0e	
1835	*	nff	*	f	1e	

1836	* alp	* f	0.0000e+00e		
1837	* vl	* f	0.0000e+00e		
1838	* vv	* f	0.0000e+00e		
1839	* tl	* f	5.5280e+02e		
1840	* tv	* f	5.5280e+02e		
1841	* p	* f	1.4780e+07e		
1842	* pa	* f	0.0000e+00e		
1843	* qppp	* f	0.0000e+00e		
1844	* matid	* f	7e		
1845	* tw	* f	5.5280e+02e		
1846	*				
1847	*****	type	num	id	ctitle
1848	tee		41	41	\$41\$ broken loop cold leg
1849	*	jcell	nodes	ichf	cost epsw
1850	*	2	4	1	0.0000e+00 1.0000e-05
1851	*	iconcl	ncell1	jun1	jun2 ipowl
1852	*	0	2	1	44 0
1853	*	iqptr1	iqpsvl	nqptb1	nqpsvl nqprf1
1854	*	0	0	0	0 0
1855	*	radin1	th1	hout11	houtv1 tout11
1856	*	1.4209e-01	3.5710e-02	0.0000e+00	1.2270e+01 3.0537e+02
1857	*	toutv1			
1858	*	3.0537e+02			
1859	*	qpin1	qpooff1	rgpmx1	qpsc11
1860	*	0.0000e+00	0.0000e+00	1.0000e+20	1.0000e+00
1861	*	iconc2	ncell2	jun3	ipow2
1862	*	0	2	43	0
1863	*	iqptr2	iqpsv2	nqptb2	nqpsv2 nqprf2
1864	*	0	0	0	0 0
1865	*	radin2	th2	hout12	houtv2 tout12
1866	*	1.0795e-01	2.8580e-02	0.0000e+00	1.2270e+01 3.0537e+02
1867	*	toutv2			
1868	*	3.0537e+02			
1869	*	qpin2	qpooff2	rgpmx2	qpsc12
1870	*	0.0000e+00	0.0000e+00	1.0000e+20	1.0000e+00
1871	*				
1872	*	dx	* f	1.1858e+00e	
1873	*	vol	* f	7.5209e-02e	
1874	*	fa	* f	6.3425e-02e	
1875	*	fric	+	2.0000e-02 1.0990e-01	1.7900e-02e
1876	*	fric	*	2.7309e-02 1.0990e-01	1.7900e-02e
1877	*	grav	* f	0.0000e+00e	
1878	*	hd	* f	2.8418e-01e	
1879	*	icflg	* f	0e	
1880	*	nnf	* f	1e	
1881	*	alp	* f	0.0000e+00e	
1882	*	vl	* f	0.0000e+00e	
1883	*	vv	* f	0.0000e+00e	
1884	*	tl	* f	5.5280e+02e	
1885	*	tv	* f	5.5280e+02e	
1886	*	p	* f	1.4780e+07e	
1887	*	pa	* f	0.0000e+00e	
1888	*	qppp	* f	0.0000e+00e	
1889	*	matid	* f	7e	
1890	*	tw	* f	5.5280e+02e	
1891	*				
1892	*	dx	*	8.8500e-01 7.2834e+00e	
1893	*	vol	*	3.4338e-02 2.8260e-01e	
1894	*	fa	* f	3.8800e-02e	
1895	*	fric	*	1.0000e-04r02 0.0000e+00e	
1896	*	grav	*	0.0000e+00 1.9900e-01	0.0000e+00e
1897	*	grav	*	0.0000e+00 0.19899989	0.0000e+00e
1898	*	hd	r02	2.2230e-01 1.4100e-03e	
1899	*	icflg	* f	0e	
1900	*	nnf	* f	1e	
1901	*	alp	* f	0.0000e+00e	
1902	*	vl	* f	0.0000e+00e	
1903	*	vv	* f	0.0000e+00e	
1904	*	tl	* f	5.5280e+02e	
1905	*	tv	* f	5.5280e+02e	
1906	*	p	* f	1.4780e+07e	
1907	*	pa	* f	0.0000e+00e	
1908	*	qppp	* f	0.0000e+00e	
1909	*	matid	* f	7e	
1910	*	tw	* f	5.5280e+02e	
1911	*				
1912	*****	type	num	id	ctitle
1913	tee		73	73	\$73\$ recir line from blhl to ilps
1914	*	jcell	nodes	ichf	cost epsw
1915	*	4	4	1	0.0000e+00 1.0000e-05
1916	*	iconcl	ncell1	jun1	jun2 ipowl
1917	*	0	6	73	3 0
1918	*	iqptr1	iqpsvl	nqptb1	nqpsvl nqprf1
1919	*	0	0	0	0 0
1920	*	radin1	th1	hout11	houtv1 tout11
1921	*	1.4209e-01	3.5710e-02	0.0000e+00	1.2270e+01 3.0537e+02
1922	*	toutv1			
1923	*	3.0537e+02			
1924	*	qpin1	qpooff1	rgpmx1	qpsc11
1925	*	0.0000e+00	0.0000e+00	1.0000e+20	1.0000e+00
1926	*	iconc2	ncell2	jun3	ipow2
1927	*	0	2	77	0

1928	*	iqptr2	iqpsv2	nqptb2	nqpsv2	nqprf2
1929	*	0	0	0	0	0
1930	*	radin2	th2	hout12	houtv2	toutl2
1931	*	2.3300e-02	8.6970e-03	0.0000e+00	0.0000e+00	3.0537e+02
1932	*	toutv2				
1933	*	3.0537e+02				
1934	*	qpin2	qpoff2	rqpmax2	qpsc12	
1935	*	0.0000e+00	0.0000e+00	1.0000e+20	1.0000e+00	
1936	*					
1937	*	dx	+	5.5880e-01	5.0800e-01	3.5560e-01
1938	*	dx	*	5.5880e-01	5.0800e-01	1.1853E-01
1939	*	dx	*	3.8100e-01e		1.1853E-01
1940	*	vol	+	3.5396e-02	3.2281e-02	2.6052e-02
1941	*	vol	*	3.5396e-02	3.2281e-02	8.6840E-03
1942	*	vol	*	3.1715e-02e		
1943	*	fa	+	r03 6.3425e-02	8.3195e-02	8.8959e-02e
1944	*	fa	*	r03 6.3425e-02	7.3262E-02	8.3195e-02
1945	*	fa	*	e		8.8959e-02
1946	*	fric	+	0.0000e+00	6.4676e-02	0.0000e+00
1947	*	fric	*	0.0000e+00	6.4676e-02	0.0000E+00
1948	*	fric	*	1.2468E-03	1.5112e-01e	
1949	*	grav	+	0.0000e+00r03	1.0000e+00	6.1566e-01e
1950	*	grav	*	0.0000e+00	0.98972962r04	1.0000e+00
1951	*	hd	+	r03 2.8417e-01	3.2546e-01	3.3655e-01e
1952	*	hd	*	r04 2.8417e-01r02	3.2546e-01	3.3655e-01e
1953	*	icflg	*	f	0e	
1954	*	nff	*	f	1e	
1955	*	alp	*	f	0.0000e+00e	
1956	*	vl	*	f	0.0000e+00e	
1957	*	vv	*	f	0.0000e+00e	
1958	*	tl	*	f	5.5280e+02e	
1959	*	tv	*	f	5.5280e+02e	
1960	*	p	*	f	1.4780e+07e	
1961	*	pa	*	f	0.0000e+00e	
1962	*	qppp	*	f	0.0000e+00e	
1963	*	matid	*	f	7e	
1964	*	tw	*	f	5.5280e+02e	
1965	*					
1966	*	dx	*	f	5.0000e+00e	
1967	*	vol	*	f	7.2465e-03e	
1968	*	fa	*	f	1.4493e-03e	
1969	*	fric	*		1.0000e-04r02	0.0000e+00e
1970	*	grav	+	0.0000e+00	2.5395e-01	0.0000e+00e
1971	*	grav	*	0.0000e+00	0.06427634	0.0000e+00e
1972	*	hd	*	f	4.2960e-02e	
1973	*	icflg	*	f	0e	
1974	*	nff	*	f	1e	
1975	*	alp	*	f	0.0000e+00e	
1976	*	vl	*	f	0.0000e+00e	
1977	*	vv	*	f	0.0000e+00e	
1978	*	tl	*	f	5.6750e+02e	
1979	*	tv	*	f	5.6750e+02e	
1980	*	p	*	f	1.4780e+07e	
1981	*	pa	*	f	0.0000e+00e	
1982	*	qppp	*	f	0.0000e+00e	
1983	*	matid	*	f	7e	
1984	*	tw	*	f	5.6750e+02e	
1985	*					
1986	*****	type	num	id	ctitle	
1987	tee		74	74	\$74\$ recir line from blcl to ilhl	
1988	*	jcell	nodes	ichf	cost	epsw
1989	*	4	4	1	0.0000e+00	1.0000e-05
1990	*	iconcl	ncell1	jun1	jun2	ipowl
1991	*	0	7	74	2	0
1992	*	iqptr1	iqpsv1	nqptb1	nqpsv1	nqprf1
1993	*	0	0	0	0	0
1994	*	radin1	th1	hout11	houtv1	toutl1
1995	*	1.4209e-01	3.5710e-02	0.0000e+00	1.2270e+01	3.0537e+02
1996	*	toutv1				
1997	*	3.0537e-02				
1998	*	qpin1	qpoff1	rqpmax1	qpsc11	
1999	*	0.0000e+00	0.0000e+00	1.0000e+20	1.0000e+00	
2000	*	iconc2	ncell2	jun3	ipow2	
2001	*	0	2	78	0	
2002	*	iqptr2	iqpsv2	nqptb2	nqpsv2	nqprf2
2003	*	0	0	0	0	0
2004	*	radin2	th2	hout12	houtv2	toutl2
2005	*	2.3300e-02	8.7970e-03	0.0000e+00	0.0000e+00	3.0537e+02
2006	*	toutv2				
2007	*	3.0537e+02				
2008	*	qpin2	qpoff2	rqpmax2	qpsc12	
2009	*	0.0000e+00	0.0000e+00	1.0000e+20	1.0000e+00	
2010	*					
2011	*	dx	+	1.0160e+00	5.5880e-01	1.7780e-01
2012	*	dx	*	1.0160e+00	5.5880e-01	5.9267E-02
2013	*	dx	*	3.5560e-01	5.3340e-01e	5.9267E-02
2014	*	vol	+	4.9555e-02	3.5396e-02	1.1327e-02
2015	*	vol	*	4.9555e-02	3.5396e-02	3.7757E-03
2016	*	vol	*	2.6052e-02	4.3325e-02e	4.3325e-02
2017	*	fa	+	r05 6.3425e-02	8.8959e-02e	
2018	*	fa	*	r03 6.3425e-02	6.3706E-02	6.3425E-02
2019	*	fa	*	e		8.8959e-02

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2020 * fric + 2.0282e-02 3.8262e-02 1.0416e-01 4.5334e-03 3.6089e-02
2021 * fric * 3.0891E-02 3.8262e-02 1.2414E-01 0.0 0.0
2022 * fric * 5.8287E-03 3.6089e-02s
2023 * fric * 2.0941e-01e
2024 * grav + r05 0.0000e+00 6.1566e-01e
2025 * grav * r07 0.0000e+00 6.1566e-01e
2026 * hd + r04 2.8417e-01 3.2546e-01 3.3655e-01e
2027 * hd * r06 2.8417e-01 3.2546e-01 3.3655e-01e
2028 * icflg * f 0e
2029 * nff * f 1e
2030 * alp * f 0.0000e+00e
2031 * vl * f 0.0000e+00e
2032 * vv * f 0.0000e+00e
2033 * tl * f 5.6750e-02e
2034 * tv * f 5.6750e-02e
2035 * p * f 1.4780e+07e
2036 * pa * f 0.0000e+00e
2037 * qppp * f 0.0000e+00e
2038 * matid * f 7e
2039 * tw * f 5.6750e-02e
2040 *
2041 * dx * 4.4785e+00 5.0000e+00e
2042 * vol * 6.4907e-03 7.2465e-03e
2043 * fa * f 1.4493e-03e
2044 * fric * 1.0000e-04r02 0.0000e+00e
2045 * grav * f 0.0000e+00e
2046 * hd * f 4.2960e-02e
2047 * icflg * f 0e
2048 * nff * f 1e
2049 * alp * f 0.0000e+00e
2050 * vl * f 0.0000e+00e
2051 * vv * f 0.0000e+00e
2052 * tl * f 5.5280e-02e
2053 * tv * f 5.5280e-02e
2054 * p * f 1.4780e+07e
2055 * pa * f 0.0000e+00e
2056 * qppp * f 0.0000e+00e
2057 * matid * f 7e
2058 * tw * f 5.5280e-02e
2059 *
2060 ***** type num id ctitle
2061 pipe 75 75 $75$ blcl outlet pipe
2062 * ncells nodes jun1 jun2 epsw
2063 1 0 44 42 1.0000e-05
2064 * ichf iconc iacc ipow
2065 1 0 0 0
2066 * radin th houtl houtv toutl
2067 9.5880e-01 1.5992e-01 0.0000e+00 0.0000e+00 3.0537e+02
2068 * toutv
2069 3.0537e+02
2070 *
2071 * dx * 5.0000e-01e
2072 * vol * 3.1714e-02e
2073 * fa * 6.3427e-02 1.2858e-05e
2074 * fric * 1.7900e-02 6.5246e-03e
2075 * grav * f 0.0000e+00e
2076 * hd * 2.8418e-01 4.0462e-03e
2077 * icflg * f 0e
2078 * nff * f 1e
2079 * alp * 0.0000e+00e
2080 * vl * f 0.0000e+00e
2081 * vv * f 0.0000e+00e
2082 * tl * f 5.5280e-02e
2083 * tv * f 5.5280e-02e
2084 * p * 1.4780e+07e
2085 * pa * 0.0000e+00e
2086 *
2087 ***** type num id ctitle
2088 valve 77 77 $77$ recirc vlive (blhl to ilps)
2089 * ncells nodes jun1 jun2 epsw
2090 2 0 77 32 1.0000e-05
2091 * ichf iconc ivty ivps nvtb2
2092 1 0 3 2 0
2093 * ivtr ivsv nvtbl nvsv nvrf
2094 9 1 -2 0 0
2095 * ivtroy ivtyov
2096 0 0
2097 * rvmx rvov fminov fmaxov
2098 1.0000e+20 0.0000e+00 0.0000e+00 1.0000e+00
2099 * radin th houtl houtv toutl
2100 3.3000e-02 8.6970e-03 0.0000e+00 0.0000e+00 3.0537e+02
2101 * toutv avlve hvlive favlive xpos
2102 3.0537e+02 1.4490e-03 4.2957e-02 1.0000e+00 1.0000e+00
2103 *
2104 * dx * f 5.0000e-01e
2105 * vol * 7.2465e-04 1.0347e-02e
2106 * fa * r02 1.4493e-03 2.0694e-02e
2107 * fric * r02 0.0000e+00 5.0970e-01e
2108 * grav * f 0.0000e+00e
2109 * hd * r02 4.2960e-02 2.5720e-01e
2110 * icflg * f 0e
2111 * nff * f 1 -1 1e

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2112 * alp * f 0.0000e+00e
2113 * vl * f 0.0000e+00e
2114 * vv * f 0.0000e+00e
2115 * tl * f 5.6750e+02e
2116 * tv * f 5.6750e+02e
2117 * p * f 1.4780e+07e
2118 * pa * f 0.0000e+00e
2119 *
2120 * vtbl * 0.0000e+00 1.0000e+00 5.0000e-01 0.0000e+00e
2121 *
2122 ***** type num id ctitle
2123 valve 78 78 $78$ recirc valve (blc1 to ilhl)
2124 * ncells nodes jun1 jun2 epsw
2125 2 0 78 42 1.0000e-05
2126 * ichf iconc ivty ivps nvtb2
2127 1 0 3 2 0
2128 * ivtr ivsv nvtbl nvsv nvrf
2129 9 1 -2 0 0
2130 * ivtrov ivtyov
2131 0 0
2132 * rvmx rvov fminov fmaxov
2133 1.0000e+20 0.0000e+00 0.0000e+00 1.0000e+00
2134 * radin th houtl houtv toutl
2135 3.3000e-02 8.6970e-03 0.0000e+00 0.0000e+00 3.0537e+02
2136 * toutv avlve hvlv favlve xpos
2137 3.0537e+02 1.4490e-03 4.2957e-02 1.0000e+00 1.0000e+00
2138 *
2139 * dx * f 5.0000e-01e
2140 * vol * 7.2465e-04 2.6644e-04e
2141 * fa * r02 1.4493e-03 1.2858e-05e
2142 * fric * r02 0.0000e+00 6.5246e-03e
2143 * grav * f 0.0000e+00e
2144 * hd * r02 4.2960e-02 4.0462e-03e
2145 * icflg * f 0e
2146 * nff * 1 -1 1e
2147 * alp * f 0.0000e+00e
2148 * vl * f 0.0000e+00e
2149 * vv * f 0.0000e+00e
2150 * tl * f 5.5280e+02e
2151 * tv * f 5.5280e+02e
2152 * p * f 1.4780e+07e
2153 * pa * f 0.0000e+00e
2154 *
2155 * vtbl * 0.0000e+00 1.0000e+00 5.0000e-01 0.0000e+00e
2156 *
2157 ***** type num id ctitle
2158 vessel 600 600 $600$ (t=2,r=2,z=9) cell 3-d vessel
2159 * nasx nrssx ntsx ncsr ivssbf
2160 9 2 2 4 0
2161 * idcu idcl idcr icru icrl
2162 8 2 1 6 2
2163 * icrr ilcsp iucsp iuhp iconc
2164 1 0 0 0 0
2165 * igeom nvent nvvtb
2166 0 0 0
2167 * shelv epsw
2168 -4.9880e+00 1.0000e-05
2169 *
2170 * z * 5.3200e-01 1.3790e+00 1.7600e+00 2.1920e+00 2.522e+00
2171 * z * 3.0550e+00 4.8460e+00 5.1300e+00 5.9000e+00e
2172 * rad * 3.2900e-01 4.7000e-01e
2173 * th * 1.8000e+02 3.6000e+02e
2174 *
2175 * lisrl lisrc lisrf ljuns
2176 8 1 3 9
2177 8 2 3 45
2178 8 3 3 29
2179 8 4 3 1
2180 *
2181 * level 1
2182 *
2183 * cfzl-t* f 0.0000e+00e
2184 * cfzl-z* f 0.0000e+00e
2185 * cfzl-r* f 0.0000e+00e
2186 * cfzv-t* f 0.0000e+00e
2187 * cfzv-z* f 0.0000e+00e
2188 * cfzv-r* f 0.0000e+00e
2189 * vol * f 1.0000e+00e
2190 * fa-t * f 1.0000e+00e
2191 * fa-z * f 1.0000e+00e
2192 * fa-r * r02 1.0000e+00r02 0.0000e+00e
2193 * hd-t * f 1.0000e-01e
2194 * hd-z * f 1.0000e-01e
2195 * hd-r * f 1.0000e-01e
2196 * alpn * f 0.0000e+00e
2197 * vvn-t * f 0.0000e+00e
2198 * vvn-z * f 0.0000e+00e
2199 * vvn- * f 0.0000e+00e
2200 * vln-t * f 0.0000e+00e
2201 * vln-z * f 0.0000e+00e
2202 * vln-r * f 0.0000e+00e
2203 * tvn * f 5.5280e+02e

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2204 * tln * f 5.5280e+02e
2205 * pn * f 1.4780e+07e
2206 * pan * f 0.0000e+00e
2207 *
2208 * level 2
2209 *
2210 * cfzl-t* f 0.0000e+00e
2211 * cfzl-z* r02 2.4437e-02r02 0.0000e+00e
2212 * cfzl-r* f 0.0000e+00e
2213 * cfzv-t* f 0.0000e+00e
2214 * cfzv-z* r02 2.4437e-02r02 0.0000e+00e
2215 * cfzv-r* f 0.0000e+00e
2216 * vol * r02 9.4800e-01r02 5.3450e-01e
2217 * fa-t * r02 8.3720e-01r02 4.4460e-01e
2218 * fa-z * r02 4.8100e-01r02 3.7500e-01e
2219 * fa-r * r02 2.3600e-01r02 0.0000e+00e
2220 * hd-t * r02 1.2200e-02r02 1.0000e-01e
2221 * hd-z * r02 1.2200e-02r02 1.0000e-01e
2222 * hd-r * r02 1.2200e-02r02 1.0000e-01e
2223 * alpn * f 0.0000e+00e
2224 * vvn-t * f 0.0000e+00e
2225 * vvn-z * f 0.0000e+00e
2226 * vvn-r * f 0.0000e+00e
2227 * vln-t * f 0.0000e+00e
2228 * vln-z * f 0.0000e+00e
2229 * vln-r * f 0.0000e+00e
2230 * tvn * f 5.5280e+02e
2231 * tln * f 5.5280e+02e
2232 * pn * f 1.4780e+07e
2233 * pan * f 0.0000e+00e
2234 *
2235 * level 3
2236 *
2237 * cfzl-t* f 0.0000e+00e
2238 * cfzl-z* f 0.0000e+00e
2239 * cfzl-r* f 0.0000e+00e
2240 * cfzv-t* f 0.0000e+00e
2241 * cfzv-z* f 0.0000e+00e
2242 * cfzv-r* f 0.0000e+00e
2243 * vol * r02 5.5120e-01r02 3.7500e-01e
2244 * fa-t * r02 2.5100e-01r02 3.6200e-01e
2245 * fa-z * r02 4.8100e-01r02 3.7500e-01e
2246 * fa-r * f 0.0000e+00e
2247 * hd-t * r02 1.2200e-02r02 1.0000e-01e
2248 * hd-z * r02 1.2200e-02r02 1.0000e-01e
2249 * hd-r * r02 1.2200e-02r02 1.0000e-01e
2250 * alpn * f 0.0000e+00e
2251 * vvn-t * f 0.0000e+00e
2252 * vvn-z * f 0.0000e+00e
2253 * vvn-r * f 0.0000e+00e
2254 * vln-t * f 0.0000e+00e
2255 * vln-z * f 0.0000e+00e
2256 * vln-r * f 0.0000e+00e
2257 * tvn * r02 5.5460e+02r02 5.5280e+02e
2258 * tln * r02 5.5460e+02r02 5.5280e+02e
2259 * pn * f 1.4780e+07e
2260 * pan * f 0.0000e+00e
2261 *
2262 * level 4
2263 *
2264 * cfzl-t* f 0.0000e+00e
2265 * cfzl-z* f 0.0000e+00e
2266 * cfzl-r* f 0.0000e+00e
2267 * cfzv-t* f 0.0000e+00e
2268 * cfzv-z* f 0.0000e+00e
2269 * cfzv-r* f 0.0000e+00e
2270 * vol * r02 5.5120e-01r02 3.7500e-01e
2271 * fa-t * r02 2.5100e-01r02 3.6200e-01e
2272 * fa-z * r02 4.8100e-01r02 3.7500e-01e
2273 * fa-r * f 0.0000e+00e
2274 * hd-t * r02 1.2200e-02r02 1.0000e-01e
2275 * hd-z * r02 1.2200e-02r02 1.0000e-01e
2276 * hd-r * r02 1.2200e-02r02 1.0000e-01e
2277 * alpn * f 0.0000e+00e
2278 * vvn-t * f 0.0000e+00e
2279 * vvn-z * f 0.0000e+00e
2280 * vvn-r * f 0.0000e+00e
2281 * vln-t * f 0.0000e+00e
2282 * vln-z * f 0.0000e+00e
2283 * vln-r * f 0.0000e+00e
2284 * tvn * r02 5.5820e+02r02 5.5280e+02e
2285 * tln * r02 5.5820e+02r02 5.5280e+02e
2286 * pn * f 1.4780e+07e
2287 * pan * f 0.0000e+00e
2288 *
2289 * level 5
2290 *
2291 * cfzl-t* f 0.0000e+00e
2292 * cfzl-z* f 0.0000e+00e
2293 * cfzl-r* f 0.0000e+00e
2294 * cfzv-t* f 0.0000e+00e
2295 * cfzv-z* f 0.0000e+00e

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2296 * cfzv-r* f 0.0000e+00e
2297 * vol   * r02 5.5120e-01r02 3.7500e-01e
2298 * fa-t  * r02 2.5100e-01r02 3.6200e-01e
2299 * fa-z  * r02 4.8100e-01r02 3.7500e-01e
2300 * fa-r  * f 0.0000e+00e
2301 * hd-t  * r02 1.2200e-02r02 1.0000e-01e
2302 * hd-z  * r02 1.2200e-02r02 1.0000e-01e
2303 * hd-r  * r02 1.2200e-02r02 1.0000e-01e
2304 * alpn  * f 0.0000e+00e
2305 * vvn-t * f 0.0000e+00e
2306 * vvn-z * f 0.0000e+00e
2307 * vvn-r * f 0.0000e+00e
2308 * vln-t * f 0.0000e+00e
2309 * vln-z * f 0.0000e+00e
2310 * vln-r * f 0.0000e+00e
2311 * tvn   * r02 5.6210e+02r02 5.5280e+02e
2312 * tln   * r02 5.6210e+02r02 5.5280e+02e
2313 * pn    * f 1.4780e+07e
2314 * pan   * f 0.0000e+00e
2315 *
2316 * level  6
2317 *
2318 * cfzl-t* f 0.0000e+00e
2319 * cfzl-z* r02 1.0000e-02r02 0.0000e+00e
2320 * cfzl-r* f 0.0000e+00e
2321 * cfzv-t* f 0.0000e+00e
2322 * cfzv-z* r02 1.0000e-02r02 0.0000e+00e
2323 * cfzv-r* f 0.0000e+00e
2324 * vol   * r02 5.5120e-01r02 3.7500e-01e
2325 * fa-t  * r02 2.5100e-01r02 3.6200e-01e
2326 * fa-z  * r02 4.8100e-01r02 3.7500e-01e
2327 * fa-r  * f 0.0000e+00e
2328 * hd-t  * r02 1.2200e-02r02 1.0000e-01e
2329 * hd-z  * r02 1.2200e-02r02 1.0000e-01e
2330 * hd-r  * r02 1.2200e-02r02 1.0000e-01e
2331 * alpn  * f 0.0000e+00e
2332 * vvn-t * f 0.0000e+00e
2333 * vvn-z * f 0.0000e+00e
2334 * vvn-r * f 0.0000e+00e
2335 * vln-t * f 0.0000e+00e
2336 * vln-z * f 0.0000e+00e
2337 * vln-r * f 0.0000e+00e
2338 * tvn   * r02 5.6570e+02r02 5.5280e+02e
2339 * tln   * r02 5.6570e+02r02 5.5280e+02e
2340 * pn    * f 1.4780e+07e
2341 * pan   * f 0.0000e+00e
2342 *
2343 * level  7
2344 *
2345 * cfzl-t* f 0.0000e+00e
2346 * cfzl-z* r02 3.2000e-02r02 1.0000e-04e
2347 * cfzl-r* f 0.0000e+00e
2348 * cfzv-t* f 0.0000e+00e
2349 * cfzv-z* r02 3.2000e-02r02 1.0000e-04e
2350 * cfzv-r* f 0.0000e+00e
2351 * vol   * r02 9.8600e-01r02 4.1660e-01e
2352 * fa-t  * r02 3.6600e-01r02 3.6200e-01e
2353 * fa-z  * r02 3.6500e-01r02 3.7500e-01e
2354 * fa-r  * f 0.0000e+00e
2355 * hd-t  * r02 1.2200e-02r02 1.0000e-01e
2356 * hd-z  * r02 1.2200e-02r02 1.0000e-01e
2357 * hd-r  * r02 1.2200e-02r02 1.0000e-01e
2358 * alpn  * f 0.0000e+00e
2359 * vvn-t * f 0.0000e+00e
2360 * vvn-z * f 0.0000e+00e
2361 * vvn-r * f 0.0000e+00e
2362 * vln-t * f 0.0000e+00e
2363 * vln-z * f 0.0000e+00e
2364 * vln-r * f 0.0000e+00e
2365 * tvn   * r02 5.6750e+02r02 5.5280e+02e
2366 * tln   * r02 5.6750e+02r02 5.5280e+02e
2367 * pn    * f 1.4780e+07e
2368 * pan   * f 0.0000e+00e
2369 *
2370 * level  8
2371 *
2372 * cfzl-t* f 0.0000e+00e
2373 * cfzl-z* f 0.0000e+00e
2374 * cfzl-r* f 0.0000e+00e
2375 * cfzv-t* f 0.0000e+00e
2376 * cfzv-z* f 0.0000e+00e
2377 * cfzv-r* f 0.0000e+00e
2378 * vol   * r02 9.8600e-01r02 1.0000e+00e
2379 * fa-t  * r02 3.6600e-01r02 3.6200e-01e
2380 * fa-z  * r02 3.6500e-01r02 0.0000e+00e
2381 * fa-r  * f 0.0000e+00e
2382 * hd-t  * r02 1.2200e-02r02 1.0000e-01e
2383 * hd-z  * r02 1.2200e-02r02 1.0000e-01e
2384 * hd-r  * r02 1.2200e-02r02 1.0000e-01e
2385 * alpn  * f 0.0000e+00e
2386 * vvn-t * f 0.0000e+00e
2387 * vvn-z * f 0.0000e+00e

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2388 * vvn-r * f 0.0000e+00e
2389 * vln-t * f 0.0000e+00e
2390 * vln-z * f 0.0000e+00e
2391 * vln-r * f 0.0000e+00e
2392 * tvn * r02 5.6750e+02r02 5.5280e+02e
2393 * tln * r02 5.6750e+02r02 5.5280e+02e
2394 * pn * f 1.4780e+07e
2395 * pan * f 0.0000e+00e
2396 *
2397 * level 9
2398 *
2399 * cfzl-t* f 0.0000e+00e
2400 * cfzl-z* f 0.0000e+00e
2401 * cfzl-r* f 0.0000e+00e
2402 * cfzv-t* f 0.0000e+00e
2403 * cfzv-z* f 0.0000e+00e
2404 * cfzv-r* f 0.0000e+00e
2405 * vol * r02 9.8600e-01r02 0.0000e+00e
2406 * fa-t * r02 3.6600e-01r02 0.0000e+00e
2407 * fa-z * f 0.0000e+00e
2408 * fa-r * f 0.0000e+00e
2409 * hd-t * r02 1.2200e-02r02 1.0000e-01e
2410 * hd-z * r02 1.2200e-02r02 1.0000e-01e
2411 * hd-r * r02 1.2200e-02r02 1.0000e-01e
2412 * alpn * f 0.0000e+00e
2413 * vvn-t * f 0.0000e+00e
2414 * vvn-z * f 0.0000e+00e
2415 * vvn-r * f 0.0000e+00e
2416 * vln-t * f 0.0000e+00e
2417 * vln-z * f 0.0000e+00e
2418 * vln-r * f 0.0000e+00e
2419 * tvn * f 5.6750e+02e
2420 * tln * f 5.6750e+02e
2421 * pn * f 1.4780e+07e
2422 * pan * f 0.0000e+00e
2423 *
2424 ****steam generator heat structures****
2425 *
2426 ****
2427 *
2428 ***** type num id ctitle
2429 rod 801 801 $801$ stgen u-tube inlet side
2430 * ncrx ncrz ittc iext mld
2431 1 4 0 0 0
2432 * nopowr nrdr modez liqlev iaxcnd
2433 1 2 1 0 0
2434 * idbci idbco hdri hdro
2435 2 2 1.0214e-02 1.2700e-02
2436 * nrods nodes irftr nzmax irftr2
2437 1 4 0 5 0
2438 * dtxht(1) dtxht(2) dznhrt hgapo shelv
2439 3.0 10.0 0.001 0.0 0.37061
2440 * nhcomi* f 2e
2441 * nhceli* -2 2 3 4 5
2442 * nhceli* 6e
2443 * nhcomo* f 20e
2444 * nhcelo* -1 1 2 3 4
2445 * nhcelo* 5e
2446 * dz * r03 5.6895e-01 5.6899e-01e
2447 * grav * f 1.0e
2448 * idrod * 1e
2449 * idrodo* 1e
2450 * rdx * 1845.e
2451 * radrd * 5.1069e-03 5.5213e-03 5.9356e-03 6.3500e-03e
2452 * matrd * f 12e
2453 * nfax * f 0e
2454 * rftn * f 556.0e
2455 *
2456 ***** type num id ctitle
2457 rod 802 802 $802$ stgen u-tube outlet side
2458 * ncrx ncrz ittc iext mld
2459 1 4 0 0 0
2460 * nopowr nrdr modez liqlev iaxcnd
2461 1 2 1 0 0
2462 * idbci idbco hdri hdro
2463 2 2 1.0214e-02 1.2700e-02
2464 * nrods nodes irftr nzmax irftr2
2465 1 4 0 5 0
2466 * dtxht(1) dtxht(2) dznhrt hgapo shelv
2467 3.0 10.0 0.001 0.0 0.37061
2468 * nhcomi* f 2e
2469 * nhceli* 9 -9 -8 -7 -6
2470 * nhceli* -5e
2471 * nhcomo* f 20e
2472 * nhcelo* -1 1 2 3 4
2473 * nhcelo* 5e
2474 * dz * r03 5.6895e-01 5.6899e-01e
2475 * grav * f 1.0e
2476 * idrod * 1e
2477 * idrodo* 1e
2478 * rdx * 1845.e
2479 * radrd * 5.1069e-03 5.5213e-03 5.9356e-03 6.3500e-03e

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2480 * matrd * f          12e
2481 * nfax   * f          0e
2482 * rftn   * f          556.0e
2483 *
2484 ***** type      num      id      ctitle
2485 rod           ncrx      803      803 $803$ stgen lower downcomer wall
2486 *           ncrx      ncrz      ittc      iext      mld
2487     1           4          0          0          0
2488 *           nopowr    nrindr    modez      liqlev      iaxcnd
2489     1           2          1          0          0
2490 *           idbci     idbco     hdri      hdro
2491     2           2          1.28906  1.0160e-01
2492 *           nrods     nodes     irftr      nzmax      irftr2
2493     1           4          0          5          0
2494 *           dtxht(1)  dtxht(2)  dznhht    hgapo      shelv
2495     3.0          10.0      0.001     0.0        0.0
2496 * nhcomi* f          20e
2497 * nhceli* -1          1          2          3          4
2498 * nhceli* 5e
2499 * nhcomo* f          22e
2500 * nhcelo* 9
2501 * nhcelo* -5e
2502 * dz     * r04 5.6895e-01e
2503 * grav  * f          1.0e
2504 * idrod * 1e
2505 * idrodo* 1e
2506 * rdx   * 1.0e
2507 * radrd * 6.4453e-01  6.4876e-01  6.5300e-01  6.5723e-01e
2508 * matrd * f          6e
2509 * nfax   * f          0e
2510 * rftn   * f          541.57e
2511 *
2512 ***** type      num      id      ctitle
2513 rod           ncrx      804      804 $804$ stgen upper downcomer wall
2514 *           ncrx      ncrz      ittc      iext      mld
2515     1           4          0          0          0
2516 *           nopowr    nrindr    modez      liqlev      iaxcnd
2517     1           2          1          0          0
2518 *           idbci     idbco     hdri      hdro
2519     2           2          1.0691   2.5400e-01
2520 *           nrods     nodes     irftr      nzmax      irftr2
2521     1           4          0          5          0
2522 *           dtxht(1)  dtxht(2)  dznhht    hgapo      shelv
2523     3.0          10.0      0.001     0.0        2.27580
2524 * nhcomi* f          20e
2525 * nhceli* -5
2526 * nhceli* 8e
2527 * nhcomo* f          22e
2528 * nhcelo* 5
2529 * nhcelo* -1e
2530 * dz     * r03 2.4700E-01  3.7050E-01e
2531 * grav  * f          1.0e
2532 * idrod * 1e
2533 * idrodo* 1e
2534 * rdx   * 1.0e
2535 * radrd * 5.7150e-01  5.7573e-01  5.7997e-01  5.8420e-01e
2536 * matrd * f          6e
2537 * nfax   * f          0e
2538 * rftn   * f          541.57e
2539 *
2540 ***** type      num      id      ctitle
2541 rod           ncrx      805      805 $805$ stgen lower shell wall
2542 *           ncrx      ncrz      ittc      iext      mld
2543     1           9          0          0          0
2544 *           nopowr    nrindr    modez      liqlev      iaxcnd
2545     1           1          1          0          0
2546 *           idbci     idbco     hdri      hdro
2547     2           1          2.5400e-01  1.5304
2548 *           tlo       two       hlo       hvo
2549     305.37    305.37    0.0       1.5801
2550 *           nrods     nodes     irftr      nzmax      irftr2
2551     1           4          0          10         0
2552 *           dtxht(1)  dtxht(2)  dznhht    hgapo      shelv
2553     3.0          10.0      0.001     0.0        0.0
2554 * nhcomi* f          22e
2555 * nhceli* -1          1          2          3          4
2556 * nhceli* 5
2557 * nhceli* 9e
2558 * dz     * r02 3.7050E-01r03 2.4700E-01r03 5.6895E-01  5.6895e-01e
2559 * grav  * f          -1.0e
2560 * idrod * 1e
2561 * rdx   * 1.0e
2562 * radrd * 7.1120e-01  7.2919e-01  7.4718e-01  7.6518e-01e
2563 * matrd * f          9e
2564 * nfax   * f          0e
2565 * rftn   * f          541.57e
2566 *
2567 ***** type      num      id      ctitle
2568 rod           ncrx      806      806 $806$ stgen upper shell wall
2569 *           ncrx      ncrz      ittc      iext      mld
2570     1           3          0          0          0
2571 *           nopowr    nrindr    modez      liqlev      iaxcnd

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2572          1          1          1          0          0
2573 *      idbci      idbco      hdri      hdro
2574          2          1  2.5400e-01  1.5304
2575 *      tlo      two      hlo      hvo
2576          305.37    305.37    0.0      1.5801
2577 *      nrods    nodes      irftr      nzmax      irftr2
2578          1          4          0          4          0
2579 *      dtxht(1)  dtxht(2)  dznht      hgapo      shelv
2580          3.0        10.0     0.001      0.0  3.7050E-01
2581 *      nhcomi* f      21e
2582 *      nhceli* f      -2
2583 *      nhceli* e
2584 *      dz      * r02 3.7050E-01  1.1115e+00e
2585 *      grav * f      -1.0e
2586 *      idrod *      1e
2587 *      rdx *      1.0e
2588 *      radrd *      7.1120e-01  7.2919e-01  7.4718e-01  7.6518e-01e
2589 *      matrd * f      9e
2590 *      nfax * f      0e
2591 *      rftn * f      541.57e
2592 *
2593 ***** type      num      id      ctitle
2594 slab      807      807 $807$ stgen primary plenum baffle
2595 *      ncrx      ncrz      ittc      iext      mld
2596          1          1          0          0          0
2597 *      nopowr    nrdr      modez      liqlev      iaxcmd
2598          1          2          1          0          0
2599 *      idbci      idbco      hdri      hdro
2600          2          2  3.3655e-01  3.3655e-01
2601 *      width      ipatch
2602          1.99342    0
2603 *      nrods    nodes      irftr      nzmax      irftr2
2604          1          4          0          2          0
2605 *      dtxht(1)  dtxht(2)  dznht      hgapo      shelv
2606          3.0        10.0     0.001      0.0
2607 *      nhcomi* f      2e
2608 *      nhceli* f      -1
2609 *      nhcomo* f      2e
2610 *      nhcelo* f      10
2611 *      dz      * 3.7061e-01e
2612 *      grav * f      1.0e
2613 *      idrod *      1e
2614 *      idrodo*      1e
2615 *      rdx *      1.0e
2616 *      radrd *      1.0
2617 *      matrd * f      6e
2618 *      nfax * f      0e
2619 *      rftn *      567.50
2620 *      rftn *      567.50
2621 *
2622 ***** type      num      id      ctitle
2623 slab      808      808 $808$ stgen inlet plenum wall
2624 *      ncrx      ncrz      ittc      iext      mld
2625          1          1          0          0          0
2626 *      nopowr    nrdr      modez      liqlev      iaxcmd
2627          1          1          1          0          0
2628 *      idbci      idbco      hdri      hdro
2629          2          1  3.3655e-01
2630 *      width      ipatch
2631          3.74680    0
2632 *      tlo      two      hlo      hvo
2633          305.37    305.37    0.0  12.270
2634 *      nrods    nodes      irftr      nzmax      irftr2
2635          1          4          0          2          0
2636 *      dtxht(1)  dtxht(2)  dznht      hgapo      shelv
2637          3.0        10.0     0.001      0.0
2638 *      nhcomi* f      2e
2639 *      nhceli* f      -1
2640 *      dz      * 3.7061e-01e
2641 *      grav * f      1.0e
2642 *      idrod *      1e
2643 *      rdx *      1.0e
2644 *      radrd *      1.0
2645 *      matrd * f      9e
2646 *      nfax * f      0e
2647 *      rftn * f      567.50e
2648 *
2649 ***** type      num      id      ctitle
2650 slab      809      809 $809$ stgen outlet plenum wall
2651 *      ncrx      ncrz      ittc      iext      mld
2652          1          1          0          0          0
2653 *      nopowr    nrdr      modez      liqlev      iaxcmd
2654          1          1          1          0          0
2655 *      idbci      idbco      hdri      hdro
2656          2          1  3.3655e-01
2657 *      width      ipatch
2658          3.74680    0
2659 *      tlo      two      hlo      hvo
2660          305.37    305.37    0.0  12.270
2661 *      nrods    nodes      irftr      nzmax      irftr2
2662          1          4          0          2          0
2663 *      dtxht(1)  dtxht(2)  dznht      hgapo      shelv

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2664      3.0      10.0      0.001      0.0      0.0
2665 * nhcomi* f      2e
2666 * nhceli*      10      -10      -9e
2667 * dz      * 3.7061e-01e
2668 * grav      * f      1.0e
2669 * idrod      *      1e
2670 * rdx      *      1.0e
2671 * radrd      *      1.0      1.0296      1.0593      1.0889e
2672 * matrd      * f      9e
2673 * nfax      * f      0e
2674 * rftn      * f      552.80e
2675 *
2676 ***** type      num      id      ctitle
2677 slab      810      810 $810$ stgen inlet tubesheet
2678 *      ncrx      ncrz      ittc      iext      mld
2679      1      1      0      0      0
2680 *      nopowr      nrindr      modez      liqlev      iaxcnd
2681      1      1      1      0      0
2682 *      idbci      idbco      hdri      hdro
2683      2      0      3.3655e-01      1.0
2684 *      width      ipatch
2685      16.91739      0
2686 *      nrods      nodes      irftr      nzmax      irftr2
2687      1      4      0      2      0
2688 *      dtxht(1)      dtxht(2)      dnzh      hgapo      shelv
2689      3.0      10.0      0.001      0.0
2690 * nhcomi* f      2e
2691 * nhceli*      -1      1      2e
2692 * dz      * 3.7061e-01e
2693 * grav      * f      1.0e
2694 * idrod      *      1e
2695 * rdx      *      1.0e
2696 * radrd      * 5.1054e-03      7.1669e-03      9.2283e-03      1.12898e-02e
2697 * matrd      * f      9e
2698 * nfax      * f      0e
2699 * rftn      * f      567.50e
2700 *
2701 ***** type      num      id      ctitle
2702 slab      811      811 $811$ stgen outlet tubesheet
2703 *      ncrx      ncrz      ittc      iext      mld
2704      1      1      0      0      0
2705 *      nopowr      nrindr      modez      liqlev      iaxcnd
2706      1      1      1      0      0
2707 *      idbci      idbco      hdri      hdro
2708      2      0      3.3655e-01      1.0
2709 *      width      ipatch
2710      16.91739      0
2711 *      nrods      nodes      irftr      nzmax      irftr2
2712      1      4      0      2      0
2713 *      dtxht(1)      dtxht(2)      dnzh      hgapo      shelv
2714      3.0      10.0      0.001      0.0
2715 * nhcomi* f      2e
2716 * nhceli*      10      -10      -9e
2717 * dz      * 3.7061e-01e
2718 * grav      * f      1.0e
2719 * idrod      *      1e
2720 * rdx      *      1.0e
2721 * radrd      * 5.1054e-03      7.1669e-03      9.2283e-03      1.12898e-02e
2722 * matrd      * f      9e
2723 * nfax      * f      0e
2724 * rftn      * f      552.80e
2725 *
2726 **** vessel heat structures ****
2727 *
2728 ****
2729 *
2730 ***** type      num      id      ctitle
2731 rod      901      901 $901$ fuel rods
2732 *      ncrx      ncrz
2733      2      4
2734 *      nopowr      nrindr      modez      liqlev      iaxcnd
2735      0      1      0      0      1
2736 *      idbci      idbco
2737      0      2
2738 *      nrods      nodes      irftr      nzmax
2739      2      10      0      5
2740 *      dtxht(1)      dtxht(2)      dnzh      hgapo      shelv
2741      0.0000e+00      0.0000e+00      0.0000e+00      1.0000e+03      1.3790e+00
2742 *      irpwtr      ndgx      ndhx      nrts      nhist
2743      14      6      11      5      0
2744 *      irpwtr      irpwsv      nrpwtb      nrpwsv      nrpwrf
2745      23      1      -14      0      0
2746 *      izpwtr      izpwsv      nzpwtb      nzpwsv      nzpwrf
2747      0      1      1      0      0
2748 *      mmwrx      nfci      nfcil
2749      1      1      1
2750 *      nzpwz      nzpwi      nfbgwt
2751      21      1      0
2752 *      react      tneut      rpwoff      rrpwmx      rpwscl
2753      0.0000e+00      1.6250e-05      -1.0000e+20      1.0000e+20      1.0000e+00
2754 *      rpowri      zpwin      zpwoff      rzpwmx
2755      3.6900e+07      0.0000e+00      0.0000e+00      0.0000e+00

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	extsou	pldr	pdrat	fucrac	
2756	*				
2757	*	0.0000e+00	0.0000e+00	1.3341e+00	7.0000e-01
2758	*	ircjtb(1,j)	ircjtb(2,j)	ircjtb(3,j)	ircjtb(4,j)
2759		12	1	1	ibu(j)
2760		1	7	1	5
2761		1	1	1	0
2762		1	1	1	0
2763	*	ircjfm(1)	ircjfm(2)	ircjfm(3)	ircjfm(4)
2764		1	1	0	0
2765	*	powexp	bpp0	bpp1	bcr0
2766		1.0000e+00	0.0000e+00	0.0000e+00	bcr1
2767	*				
2768	*	nhcomo* f	600e		
2769	*	nhcelo*	2	3	4
2770	*	nhcelo*	7e		5
2771	*	z *	1.3790e+00	1.7600e+00	2.1920e+00
2772	*	z *	3.0550e+00e		
2773	*	grav * f	1.0000e+00e		
2774	*	idrod *	1	2e	
2775	*	rdx * f	6.5000e+02e		
2776	*	radrd *	0.0000e+00	7.7449e-04	1.5489e-03
2777	*	radrd *	3.0979e-03	3.8725e-03	4.6622e-03
2778	*	radrd *	5.0508e-03	5.3594e-03e	
2779	*	matrd * r06	1	3r02	2e
2780	*	nfax * f	0e		
2781	*	rftn * r10	5.5370e+02r10	5.5640e+02r10	5.6015e+02r10
2782	*	rftn * r10	5.6660e+02e		
2783	*	rftn * r10	5.5370e+02r10	5.5640e+02r10	5.6015e+02r10
2784	*	rftn * r10	5.6660e+02e		
2785	*	rdpwr *	9.5500e-01	9.6000e-01	9.6500e-01
2786	*	rdpwr *	9.9000e-01	1.0160e+00	1.0600e+00r03
2787	*	cpowr * f	1.0000e+00e		
2788	*	zpwtz *	0.0000e+00	1.5200e-01	2.9200e-01
2789	*	zpwtz *	5.0300e-01	5.4600e-01	6.4800e-01
2790	*	zpwtz *	8.8600e-01	9.5300e-01	1.0540e+00
2791	*	zpwtz *	1.2990e+00	1.3590e+00	1.5110e+00
2792	*	zpwtz *	1.6760e+00e		1.6130e+00
2793	*	zpwtb *	0.0000e+00s		
2794	*	zpwtb *	0.0000e+00	5.9620e-01	1.2174e+00
2795	*	zpwtb *	1.4285e+00	1.5722e+00	1.5828e+00
2796	*	zpwtb *	1.3611e+00	1.4416e+00	1.3075e+00
2797	*	zpwtb *	7.1230e-01	6.2360e-01	2.8790e-01
2798	*	zpwtb *	8.9400e-02e		1.5260e-01
2799	*	rpwtb * r02	0.0000e+00	2.0000e-01	-5.1000e-04
2800	*	rpwtb *	5.0000e-01	-1.0160e-02	6.0000e-01
2801	*	rpwtb *	-3.5600e-02	8.0000e-01	-5.3000e-02
2802	*	rpwtb *	1.0000e+00	-1.4740e-01	1.1000e+00
2803	*	rpwtb *	-1.6550e-01	1.3000e+00	-1.6700e-01
2804	*	rpwtb *	1.5000e+00	-1.6840e-01e	1.4000e+00
2805	*	rctf *	2.9300e+02	4.0000e+02	5.0000e+02
2806	*	rctf *	1.0000e+03	1.2000e+03	1.4000e+03
2807	*	rctf *	2.0000e+03	2.2000e+03r03	0.0000e+00
2808	*	rctf *	-4.8000e-05	-4.2100e-05	-3.8000e-05
2809	*	rctf *	-2.8700e-05	-2.6800e-05	-2.5300e-05
2810	*	rctf * e			-2.4000e-05
2811	*	rctc *	0.0000e+00	2.9300e+02	3.9430e+02
2812	*	rctc *	5.6090e+02	5.8870e+02	6.1650e+02
2813	*	rctc *	1.0000e+02	8.0000e+02	1.5000e+03
2814	*	rctc *	-2.0500e-04	-3.2300e-04	-5.0800e-04
2815	*	rctc *	-1.6090e-03	-5.8000e-05	-1.6000e-04
2816	*	rctc *	-6.0700e-04	-9.0100e-04	-1.3770e-03
2817	*	rctc *	-1.8600e-04	-3.3900e-04	-4.9600e-04
2818	*	rctc *	-2.9200e-05	-7.0200e-05	-1.2100e-04
2819	*	rctc *	-5.9300e-04	-9.3600e-04	-1.6600e-05
2820	*	rctc *	-1.6500e-04	-2.7600e-04	-4.4400e-04
2821	*	rcal * f	0.0000e+00e		
2822	*	rchm * f	0.0000e+00e		
2823	*	beta *	1.6900e-04	8.3200e-04	2.6400e-03
2824	*	beta *	2.4700e-04e		
2825	*	lamda *	3.8700e+00	1.4000e+00	3.1100e-01
2826	*	lamda *	1.2700e-02e		
2827	*	cdgn *	9.9163e+07	1.3495e+09	1.9276e+10
2828	*	cdgn *	4.4156e+10e		
2829	*	lamdh *	1.7720e+00	5.7740e-01	6.7430e-02
2830	*	lamdh *	4.8100e-05	5.3440e-06	5.7260e-07
2831	*	lamdh *	7.5850e-10e		
2832	*	edh *	2.9900e-03	8.2500e-03	1.5500e-02
2833	*	edh *	6.4500e-03	2.3100e-03	1.6400e-03
2834	*	edh *	5.7000e-04e		
2835	*	cdhn *	6.2263e+04	5.2723e+05	8.4818e+06
2836	*	cdhn *	4.0742e+09	2.5550e+09	1.9468e+09
2837	*	cdhn *	6.8247e+08e		
2838	*	fpuo2 * f	0.0000e+00e		
2839	*	ftd * f	9.3000e-01e		
2840	*	gmix *	9.8101e-01	0.0000e+00	1.0103e-02
2841	*	gmix *	7.0991e-03	0.0000e+00s	
2842	*	gmix *	9.8101e-01	0.0000e+00	1.0103e-02
2843	*	gmix *	7.0991e-03	0.0000e+00e	
2844	*	gmles * f	1.0000e+00e		
2845	*	pgapt * f	3.1300e+05e		
2846	*	plvol * f	0.0000e+00e		
2847	*	pslem * f	0.0000e+00e		

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2848 * clenn * f 0.0000e+00e
2849 * burn * f 0.0000e+00e
2850 * burn * f 0.0000e+00e
2851 *
2852 ***** type num id ctitle
2853 rod 911 911 $911$ vessel-wall structure (lp-1)
2854 * ncrx ncrz
2855 * 2 1
2856 * nopolr nrdr modez liqlev iaxcnd
2857 1 1 0 0 0
2858 * idbci idbco
2859 0 2
2860 * nrods nodes irftr nzmax
2861 2 4 0 2
2862 * dtxht(1) dtxht(2) dznht hgapo shelv
2863 3.0000e+00 1.0000e+01 5.0000e-03 0.0000e+00 0.0000e+00
2864 *
2865 * nhcomo* f 600e
2866 * nhcelo* 0 1 2e
2867 * z * 0.0000e+00 5.3200e-01e
2868 * grav * 1.0000e+00e
2869 * idrod * 3 4e
2870 * rdx * f 2.3640e-01e
2871 * radrd * 4.6990e-01 6.9200e-01 7.2700e-01 7.3279e-01e
2872 * matrd * f 6e
2873 * nfax * 0e
2874 * rftn * f 5.5280e+02e
2875 * rftn * f 5.5280e+02e
2876 *
2877 ***** type num id ctitle
2878 rod 912 912 $912$ vessel-wall structure (lp-2)
2879 * ncrx ncrz
2880 * 2 1
2881 * nopolr nrdr modez liqlev iaxcnd
2882 1 1 0 0 0
2883 * idbci idbco
2884 0 2
2885 * nrods nodes irftr nzmax
2886 2 4 0 2
2887 * dtxht(1) dtxht(2) dznht hgapo shelv
2888 3.0000e+00 1.0000e+01 5.0000e-03 0.0000e+00 5.3200e-01
2889 *
2890 * nhcomo* f 600e
2891 * nhcelo* 1 2 3e
2892 * z * 5.3200e-01 1.3790e+00e
2893 * grav * 1.0000e+00e
2894 * idrod * 3 4e
2895 * rdx * f 4.1520e-01e
2896 * radrd * 4.6990e-01 6.9200e-01 7.2700e-01 7.3279e-01e
2897 * matrd * f 6e
2898 * nfax * 0e
2899 * rftn * f 5.5280e+02e
2900 * rftn * f 5.5280e+02e
2901 *
2902 ***** type num id ctitle
2903 rod 913 913 $913$ vessel-wall structure (dc-1)
2904 * ncrx ncrz
2905 * 2 4
2906 * nopolr nrdr modez liqlev iaxcnd
2907 1 1 0 0 0
2908 * idbci idbco
2909 0 2
2910 * nrods nodes irftr nzmax
2911 2 4 0 7
2912 * dtxht(1) dtxht(2) dznht hgapo shelv
2913 3.0000e+00 1.0000e+01 5.0000e-03 0.0000e+00 1.3790e+00
2914 *
2915 * nhcomo* f 600e
2916 * nhcelo* 2 3 4 5s
2917 * nhcelo* 6 7e
2918 * z * 1.3790e+00 1.7600e+00 2.1920e+00 2.5220e+00s
2919 * z * 3.0550e+00e
2920 * grav * f 1.0000e+00e
2921 * idrod * 3 4e
2922 * rdx * f 6.3160e-01e
2923 * radrd * 4.6990e-01 6.9200e-01 7.2700e-01 7.3279e-01e
2924 * matrd * f 6e
2925 * nfax * f 0e
2926 * rftn * f 5.5280e+02e
2927 * rftn * f 5.5280e+02e
2928 *
2929 ***** type num id ctitle
2930 rod 914 914 $914$ vessel-wall structure (dc-2)
2931 * ncrx ncrz
2932 * 2 1
2933 * nopolr nrdr modez liqlev iaxcnd
2934 1 1 0 0 0
2935 * idbci idbco
2936 0 2
2937 * nrods nodes irftr nzmax
2938 2 4 0 2
2939 * dtxht(1) dtxht(2) dznht hgapo shelv

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2940      3.0000e+00   1.0000e+01   5.0000e-03   0.0000e+00   3.0550e+00
2941 *
2942 * nhcomo* f       600e
2943 * nhcelo*          6           7           8e
2944 * z    *   3.0550e+00   4.8460e+00e
2945 * grav  *   1.0000e+00e
2946 * idrod *          3           4e
2947 * rdx  * f   5.9347e-01e
2948 * radrd *   4.6990e-01   6.9200e-01   7.2700e-01   7.3279e-01e
2949 * matrd * f       6e
2950 * nfax  *          0e
2951 * rftn  * f   5.5280e+02e
2952 * rftn  * f   5.5280e+02e
2953 *
2954 ***** type      num      id      ctitle
2955 rod        915      915 $915$ vessel-wall structure (ia-1)
2956 *
2957 *      ncrx      ncrz
2958 *      2           1
2959 *      nopowr     nrindr
2960 *      1           1      modez      0      liglev      0      iaxcmd      0
2961 *      idbci      idbco
2962 *      nrods      nodes      irftr      nzmax
2963 *      2           4      0           2
2964 *      dtxht(1)   dtxht(2)   dznht      hgapo      shelv
2965   3.0000e+00   1.0000e+01   5.0000e-03   0.0000e+00   4.8460e+00
2966 *
2967 * nhcomo* f       600e
2968 * nhcelo*          7           8           9e
2969 * z    *   4.8460e+00   5.1300e+00e
2970 * grav  *   1.0000e+00e
2971 * idrod *          3           4e
2972 * rdx  * f   2.5236e+00e
2973 * radrd *   4.6990e-01   6.9200e-01   7.2700e-01   7.3279e-01e
2974 * matrd * f       6e
2975 * nfax  *          0e
2976 * rftn  * f   5.5280e+02e
2977 * rftn  * f   5.5280e+02e
2978 *
2979 ***** type      num      id      ctitle
2980 rod        921      921 $921$ vessel-wall structure (bottom)
2981 *
2982 *      ncrx      ncrz
2983 *      2           1
2984 *      nopowr     nrindr
2985 *      1           1      modez      0      liglev      0      iaxcmd      0
2986 *      idbci      idbco
2987 *      nrods      nodes      irftr      nzmax
2988 *      2           4      0           2
2989 *      dtxht(1)   dtxht(2)   dznht      hgapo      shelv
2990   3.0000e+00   1.0000e+01   5.0000e-03   0.0000e+00   0.0000e+00
2991 *
2992 * nhcomo* f       600e
2993 * nhcelo*          0           1           2e
2994 * z    *   0.0000e+00   5.3200e-01e
2995 * grav  *   1.0000e+00e
2996 * idrod *          1           2e
2997 * rdx  * f   5.7260e-02e
2998 * radrd *   7.3279e-01   8.5100e-01   8.8600e-01   8.9186e-01e
2999 * matrd * f       6e
3000 * nfax  *          0e
3001 * rftn  * f   5.5280e+02e
3002 * rftn  * f   5.5280e+02e
3003 *
3004 ***** type      num      id      ctitle
3005 rod        922      922 $922$ core-support structure
3006 *
3007 *      ncrx      ncrz
3008 *      2           1
3009 *      nopowr     nrindr
3010 *      1           1      modez      0      liglev      0      iaxcmd      0
3011 *      idbci      idbco
3012 *      nrods      nodes      irftr      nzmax
3013 *      2           4      0           2
3014 *      dtxht(1)   dtxht(2)   dznht      hgapo      shelv
3015   3.0000e+00   1.0000e+01   5.0000e-03   0.0000e+00   5.3200e-01
3016 *
3017 * nhcomo* f       600e
3018 * nhcelo*          1           2           3e
3019 * z    *   5.3200e-01   1.3790e+00e
3020 * grav  *   1.0000e+00e
3021 * idrod *          1           2e
3022 * rdx  * f   1.3450e+00e
3023 * radrd *   3.8100e-01   4.0410e-01   4.1310e-01   4.1910e-01e
3024 * matrd * f       6e
3025 * nfax  *          0e
3026 * rftn  * f   5.5280e+02e
3027 * rftn  * f   5.5280e+02e
3028 *
3029 ***** type      num      id      ctitle
3030 rod        923      923 $923$ upper-plenum structure (5&6)
3031 *

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```

3032      2          1
3033 *      nopowr    nrindr    modez    liqlev    iaxcnd
3034      1          1          0
3035 *      idbci     idbco
3036      0          2
3037 *      nrods     nodes     irftr     nzmax
3038      2          4          0          2
3039 *      dtxht(1)  dtxht(2)  dznht    hgapo     shlev
3040      3.0000e+00  1.0000e+01  5.0000e-03  0.0000e+00  3.0550e+00
3041 *
3042 *      nhcomo* f   600e
3043 *      nhcelo*    6          7          8e
3044 *      z         3.0550e+00  4.8460e+00e
3045 *      grav      1.0000e+00e
3046 *      idrod     1          2e
3047 *      rdx       3.2189e+00e
3048 *      radrd     3.3197e-01  3.6000e-01  3.7500e-01  3.8100e-01e
3049 *      matrd     6e
3050 *      nfax      0e
3051 *      rftn      5.6750e+02e
3052 *      rftn      5.6750e+02e
3053 *
3054 ***** type      num      id      ctitle
3055 rod        924      924 $924$ upper-plenum structure (7)
3056 *      ncrx     ncrz
3057      2          1
3058 *      nopowr    nrindr    modez    liqlev    iaxcnd
3059      1          1          0          0
3060 *      idbci     idbco
3061      0          2
3062 *      nrods     nodes     irftr     nzmax
3063      2          4          0          2
3064 *      dtxht(1)  dtxht(2)  dznht    hgapo     shlev
3065      3.0000e+00  1.0000e+01  5.0000e-03  0.0000e+00  4.8460e+00
3066 *
3067 *      nhcomo* f   600e
3068 *      nhcelo*    7          8          9e
3069 *      z         4.8460e+00  5.1300e+00e
3070 *      grav      1.0000e+00e
3071 *      idrod     1          2e
3072 *      rdx       5.7870e+00e
3073 *      radrd     3.3197e-01  3.6000e-01  3.7500e-01  3.8100e-01e
3074 *      matrd     6e
3075 *      nfax      0e
3076 *      rftn      5.6750e+02e
3077 *      rftn      5.6750e+02e
3078 *
3079 ***** type      num      id      ctitle
3080 rod        925      925 $925$ upper-plenum structure (8)
3081 *      ncrx     ncrz
3082      2          1
3083 *      nopowr    nrindr    modez    liqlev    iaxcnd
3084      1          1          0          0
3085 *      idbci     idbco
3086      0          2
3087 *      nrods     nodes     irftr     nzmax
3088      2          4          0          2
3089 *      dtxht(1)  dtxht(2)  dznht    hgapo     shlev
3090      3.0000e+00  1.0000e+01  5.0000e-03  0.0000e+00  5.1300e+00
3091 *
3092 *      nhcomo* f   600e
3093 *      nhcelo*    8          9          10e
3094 *      z         5.1300e+00  5.9000e+00e
3095 *      grav      1.0000e+00e
3096 *      idrod     1          2e
3097 *      rdx       2.8230e+00e
3098 *      radrd     3.3197e-01  3.6000e-01  3.7500e-01  3.8100e-01e
3099 *      matrd     6e
3100 *      nfax      0e
3101 *      rftn      5.6750e+02e
3102 *      rftn      5.6750e+02e
3103 *
3104 end
3105 *
3106 ****
3107 * time-step data *
3108 ****
3109 *
3110 *      dtmin    dtmax    tend    rtwfp
3111 1.0000e-03  2.0000e-01  2.5000e+01  1.0000e+03
3112 *      edint    gfint    dmpint  sedint
3113 2.5000e+01  5.0000e-01  2.6000e+01  2.5000e+01
3114 *
3115 *      dtmin    dtmax    tend    rtwfp
3116 1.0000e-03  5.0000e-01  5.0000e+01  1.0000e+03
3117 *      edint    gfint    dmpint  sedint
3118 2.4500e+01  1.0000e+00  2.6000e+01  2.4500e+01
3119 *
3120 *      dtmin    dtmax    tend    rtwfp
3121 1.0000e-03  7.0000e-01  2.0000e+02  1.0000e+03
3122 *      edint    gfint    dmpint  sedint
3123 5.0000e+01  2.0000e+00  1.5100e+02  5.0000e+01

```

3124 *
3125 * endflag
3126 -1.0000e+00

LOFT L6-1 TRANSIENT INPUT DECK FOR 3D VESSEL MODEL

```

1 free format
2 *      1      2      3      4      5      6      7      8
3 *234567890123456789012345678901234567890123456789012345678901234567890
4 *
5 *****
6 * main data *
7 *****
8 *
9 *      numctr      ieos      inopt      rmat
10 *      4          0          1          0
11 loft 16-1 with 3-d vessel
12 replaced 1-d vessel components with 3-d vessel j steiner Oct 1997
13 loft test 16-1, restart for the transient calculation with a 1-d vessel
14 *
15 * modified by Thad Knight, 3/10/96
16 * deck from /devass/mod2-5.3.05/loft-16-1/1-dvess.t
17 *
18 *
19 *      +++++++ ++++++++
20 *      + valve+ + pipe +
21 *      67+ 10 +68+ 9 +
22 *      +++++++ ++++++++
23 *      60
24 *      ++++++++
25 *      + break+
26 *      + 25 +
27 *      ++++++++
28 *      26          44      61
29 *      +++++++ ++++++++
30 *      + valve+ + fill +
31 *      + 23 + + 24 +
32 *      +++++++ ++++++++
33 *      22      25          42      64
34 *      +++++++ ++++++++
35 *      + tee + + tee +
36 *      + 21 +23+ 22 + rods
37 *      +++++++ ++++++++
38 *      21      24 |902      78      10
39 *      +++++++ ++++++++
40 *      stgen + pipe + + pipe + + tee + + tee + +vessel+ + tee +
41 *      sec 21+ 20 +==+ 2 + 2+ 74 +74+ 1 + 9+region+45+ 31 +32
42 *      +++++++ ++++++++
43 *      3          + with + 36
44 *      +++++++ ++++++++
45 *      + valve+ + tee +
46 *      32+ 77 +77+ 73 +
47 *      +++++++ ++++++++
48 *      73
49 *      ++++++++
50 *      + tee + intact + + + (isolated)
51 *      5+ 3 + loop + + broken
52 *      ++++++++
53 *      5      4
54 *      +++++++ ++++++++
55 *      + pump + + pump +
56 *      + 5 + + 4 +
57 *      +++++++ ++++++++
58 *      7      6
59 *      +++++++ ++++++++
60 *      + tee + + tee + + tee + +
61 *      7+ 6 +66+ 11 + 8+ 7 +29+
62 *      +++++++ ++++++++
63 *      67      14
64 *      +++++++ +
65 *      + fill +
66 *      + 17 +
67 *      +++++++ ++++++++
68 *
69 * The vessel is modeled with 13 1-d hydro & 1 heat-structure components.
70 *
71 *      ++++++++
72 *      + vessel region defined with a 1-d model +
73 *      +
74 *      +
75 *      40
76 *      +++++++ ++++++++
77 *      + tee + + tee +
78 *      9+-----+ 43 +48+ 34 +----+45
79 *      +++++++ ++++++++
80 *      47
81 *      +++++++ ++++++++
82 *      + tee + + tee +
83 *      29+-----+ 40 +46+ 29 +----+ 1
84 *      +++++++ ++++++++
85 *      34
86 *      +++++++ ++++++++
87 *      + rod + + tee + + tee +
88 *      + 900 + + 95 +97+ 96 +

```

```

88 *      + ++++++++
89 *      + || ||    95 35 96 +
90 *      + +++++++ +++++++ ++++++++
91 *      + pipe + + tee + + tee +
92 *      + 37 +37+ 36 + + 30 +
93 *      + +++++++ +++++++ ++++++++
94 *      + 38     86 36 +
95 *      + +++++++ ++++++++
96 *      + tee + + tee +
97 *      + 83 +84+ 86 +
98 *      + +++++++ ++++++++
99 *      + 83 +
100 *      + +++++++ ++++++++
101 *      + tee + + fill +
102 *      + 33 +39+ 35 +
103 *      + +++++++ ++++++++
104 *      + 40 +
105 *      +
106 *      + +++++++ ++++++++
107 *
108 * Experiment 16-1 simulated a loss of steam load in the steam generators
109 * of a four-loop commercial PWR in the Loss-Of-Fluid Test (LOFT) facility.
110 * The steady-state initial conditions of the experiment were:
111 * Primary Intact Loop: hot-leg mass flow 478.5 +6.3 kg/s
112 *                      hot-leg pressure 1.478e+07+1.1e+05 Pa
113 *                      hot-leg temperature 567.5 +1.8 K
114 *                      cold-leg temperature 552.8 +1.2 K
115 * Steam Gen. Sec. Side: steam & fw mass flow 20.1 +0.6 kg/s
116 *                      steam-dome pressure 5.37e+05 +6.0e+04 Pa
117 *                      liq/vap temperature 541.7 +0.8 K
118 *                      dwncmr liquid level 3.183 +0.034 m
119 * Pressurizer:        pressure 1.487e+07+2.0e+05 Pa
120 *                      liq/vap temperature 614.3 +0.8 K
121 *                      liquid level 1.18 +0.07 m
122 * The experiment's transient was initiated by closing the main steam flow
123 * control valve (MSFCV); the actual start of closing was observed to
124 * occur at 2.0 s (rather than at 0.0 s) based on parameter measurements.
125 * The pressurizer cycling heater (on initially) was shut off at 6.1+-0.1 s
126 * as the pressurizer pressure increased. The pressurizer sprayer was in-
127 * itiated at 9.1+-0.1 s to reduce primary-side (PS) pressure and remained
128 * on until 30.4+-0.1 s. The PS pressure continued to rise and caused the
129 * reactor to scram at 21.8+-0.2 s. Thereafter, the PS pressure reached a
130 * maximum value at 22.0+-0.2 s. To reduce steam-generator (SG) secondary-
131 * side (SS) pressure, the MSFCV began opening at 22.4+-0.2 s and began
132 * closing at 31.4+-0.2 s. The pressurizer cycling heater came on at
133 * 31.4+-0.1 s and the pressurizer backup heater came on at 32.5+-0.1 s
134 * to prevent the PS to pressure from falling further. The MSFCV opened
135 * and closed automatically at 91.2+-0.2 s and 97.8+-0.2 s, respectively,
136 * based on pressure setpoints and was manually opened and closed at
137 * 312.6+-0.2 s and 326.0+-0.4 s, respectively, to control SGSS pressure.
138 * The pressurizer backup heater was shut off at 415.4+-0.1 s and the
139 * experiment was ended at 700.0+-10.0 s.
140 *
141 * Experiment Events                                Experiment Time
142 * -----
143 * Main Steam Flow Control Valve (MSFCV) starts to close   2.0+-0.2 s
144 * Pressurizer cycling heater is set off                 6.1+-0.1 s
145 * Pressurizer sprayer is set on                         9.1+-0.1 s
146 * MSFCV reaches its closed position                  11.6+-0.2 s
147 * Reactor core power is scrambled based on high pressure 21.8+-0.2 s
148 * Primary-side pressure reaches maximum                22.0+-0.2 s
149 * MSFCV starts to open based on high-pressure setpoint 22.2+-0.2 s
150 * Pressurizer level reaches maximum                  26.5+-0.5 s
151 * Pressurizer sprayer is set off                     30.4+-0.1 s
152 * MSFCV starts to close based on low-pressure setpoint 31.4+-0.2 s
153 * Pressurizer cycling heater is set on                31.4+-0.1 s
154 * Pressurizer backup heater is set on                 32.5+-0.1 s
155 * MSFCV reaches its closed position                  40.6+-0.2 s
156 * MSFCV starts to open based on high-pressure setpoint 91.2+-0.2 s
157 * MSFCV starts to close based on low-pressure setpoint 97.8+-0.2 s
158 * MSFCV reaches its closed position                  104.4+-0.2 s
159 * MSFCV starts to open based on manual adjustment    312.6+-0.2 s
160 * MSFCV starts to close based on manual adjustment    326.0+-0.4 s
161 * MSFCV reaches its closed position                  339.4+-0.4 s
162 * Pressurizer backup heater is set off                415.4+-0.1 s
163 * Experiment is ended                               700.0+-10.0 s
164 *
165 ***** namelist data ****
166 * namelist data *
167 ***** namelist data ****
168 *
169 * SI/English units flags: 0--SI units/1--English units
170 * iogrf: units flag for writing TRCRF
171 * ioinp: units flag for reading TRACIN
172 * iolab: units flag for writing input to INLAB
173 * ioout: units flag for writing TRCOUT and TRCMMSG
174 *
175 * iunlab: input user-defined units labels (0-no/>0-yes; default is 0)
176 * iunout: write units to file TRCOUT (0-no/1-yes; default is 1)
177 *
178 $inopts dtstrt=0.01, iadded=10, icflow=2, nhtstr=22,
179          iogrf=0, ioinp=0, iolab=1, ioout=0, iunlab=1, iunout=1 $

```

```

180 *
181 *      dstep      timet
182 *      -1      0.0000e+00
183 *      stdyst      transi      ncomp      njun      ipak
184 *      0          1          50          33          1
185 *      epso      epss
186 *      1.0000e-04      1.0000e-04
187 *      oitmax      sitmax      isolut      ncontr      nccfl
188 *      10          25          0          0          0
189 *      ntsv      ntcb      ntcf      ntrp      ntcp
190 *      21          13          46          20          2
191 *
192 ****
193 * component-number data *
194 ****
195 *
196 * iorder*      1      2      3      4      5
197 * iorder*      6      7      8      9      10
198 * iorder*      11     12     13     17     20
199 * iorder*      21     22    23s
200 * iorder*      24     25    31s
201 * iorder*      41     73    74s
202 * iorder*      75     77     78   600s
203 * iorder*     801    802s
204 * iorder*     803    804     805     806     807
205 * iorder*     808    809     810     811     901
206 * iorder*     911    912     913     914     915
207 * iorder*     921    922     923     924     925
208 * iorder*     e
209 *
210 ****
211 * control-parameter data *
212 ****
213 *
214 * cplsv *      1      16s
215 * cplcb *      -1      -7s
216 * cpltp *      1      -24s
217 * cp2sv *      17      21s
218 * cp2cb *      -8      -13s
219 * cp2tp *      1      0e
220 *
221 * signal variables
222 *
223 *      idsvv      isvn      ilcn      icnl      icn2
224 *      0          0          0          0          0
225 *
226 *
227 * user-defined units-name data
228 *
229 *      lulabel      lunitsi      luniteng      ufactor      ushift
230 *      lumdot/m      lu(kg/s)/m      lu(lbm/s)/ft      0.671968931      0.0
231 *
232 **
233 * control blocks
234 *
235 *      idcb      icbn      icbl      icb2      icb3
236 *      0          0          0          0          0
237 *
238 * trips
239 *
240 *      ntse      ntct      ntsf      ntdp      ntsd
241 *      0          2          2          0          1
242 *
243 *      idtp      isrt      iset      itst      idsg
244 *      0          0          0          0          0
245 *
246 *      trip 22 initiated time-step data
247 *      ndid      ntid
248 *      1          1
249 *      itid(1)
250 *      22
251 *
252 *      dtmin      dtmax      dtend      dtsof
253 *      1.0000e-03      1.0000e+00      3.0000e+00      1.0000e+00
254 *      edint      gfint      dmpit      sedint
255 *      4.0000e+00      5.0000e-01      4.0000e+00      4.0000e+00
256 *
257 *
258 ****
259 * component data *
260 ****
261 *
262 end
263 *
264 ****
265 * time-step data *
266 ****
267 *
268 *      dtmin      dtmax      tend      rtwfp
269 *      1.0000e-03      2.0000e-01      4.0000e+01      1.0000e+00
270 *      edint      gfint      dmpint      sedint
271 *      5.0000e+01      1.0000e+00      1.2500e+02      5.0000e+01

```

```
272 *      dtmin      dtmax      tend      rtwfp
273 *      1.0000e-03  1.0000e+00  2.0000e+02  1.0000e+00
274 *      edint      gfint      dmpint      sedint
275 *      5.0000e+01  1.0000e+00  1.2500e+02  5.0000e+01
276
277 *
278 *      dtmin      dtmax      tend      rtwfp
279 *      1.0000e-03  1.0000e+00  7.0000e+02  1.0000e+00
280 *      edint      gfint      dmpint      sedint
281 *      5.0000e+01  1.0000e+00  1.2500e+02  5.0000e+01
282 *
283 *      endflag
284 -1.0000e+00
```

APPENDIX S

CCTF RUN 54 INPUT LISTING

The corrected 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. S-45.

```
1 free format
2 *
3 *****
4 * main data *
5 *****
6 *
7 *      numtcr      ieos      inopt      nmat
8     145          0          1          4
9 Corrected CCTF-54 Input Model By J. F. Lime Oct 1999
10 Two corrections were made to the CCTF-54 input model:
11 (1) The azimuthal noding was corrected from 180/180 degrees to 90/270 degrees
12 to matched the intact loop noding. The three intact loops were modeled as one
13 combined intact loop. Therefore, the azimuthal noding of the vessel should
14 match how the intact loops were modeled.
15 (2) The axial power shape was corrected to model the 17-step axial-power profile
16 of the actual heater rod. The previous CCTF-54 model had a coarsely-noded
17 7-level axial-power shape.
18 *
19 cctf run54 developmental assessment calculation
20 trac-pfi mod2 version 5.0
21 this model was developed by running the trac input deck from
22 /cctf/run54/tracin through gocvrt. the following changes were
23 made to the original model.
24 a) the junction flow areas were adjusted to take care of the following
25 error messages:
26 the junction flow area 1.6604e-01 of component 3 is greater than the vol/dx
27 flow area 8.8885e-02 of the cell across the junction and 1.5532e-01 of cell 1
28
29 the junction flow area 4.9812e-01 of component 8 is greater than the vol/dx
30 flow area 4.6593e-01 of the cell across the junction and 2.6665e-01 of cell 12
31
32 the azimuthal flow area 1.0797e-01 of vessel 1 interface (r= 3,t= 1,z= 1) is
33 greater than the cell vol/rdt flow areas 8.3137e-02 and 8.3137e-02 on each side
34
35 the azimuthal flow area 1.0797e-01 of vessel 1 interface (r= 3,t= 2,z= 1) is
36 greater than the cell vol/rdt flow areas 8.3137e-02 and 8.3137e-02 on each side
37
38 the azimuthal flow area 1.5189e-01 of vessel 1 interface (r= 4,t= 1,z= 1) is
39 greater than the cell vol/rdt flow areas 1.3670e-01 and 1.3670e-01 on each side
40
41 the azimuthal flow area 1.5189e-01 of vessel 1 interface (r= 4,t= 2,z= 1) is
42 greater than the cell vol/rdt flow areas 1.3670e-01 and 1.3670e-01 on each side
43
44 the axial flow area 2.6140e-02 of vessel 1 interface (r= 1,t= 1,z=11) is
45 greater than the cell vol/dz flow areas 2.1173e-02 and 1.8559e-02 on each side
46
47 the axial flow area 2.6140e-02 of vessel 1 interface (r= 1,t= 2,z=11) is
48 greater than the cell vol/dz flow areas 2.1173e-02 and 1.8559e-02 on each side
49
50 the axial flow area 7.8419e-02 of vessel 1 interface (r= 2,t= 1,z=11) is
51 greater than the cell vol/dz flow areas 6.3519e-02 and 5.5678e-02 on each side
52
53 the axial flow area 7.8419e-02 of vessel 1 interface (r= 2,t= 2,z=11) is
54 greater than the cell vol/dz flow areas 6.3519e-02 and 5.5678e-02 on each side
55
56 the axial flow area 1.1751e-01 of vessel 1 interface (r= 3,t= 1,z=11) is
57 greater than the cell vol/dz flow areas 9.8712e-02 and 8.3435e-02 on each side
58
59 the axial flow area 1.1751e-01 of vessel 1 interface (r= 3,t= 2,z=11) is
60 greater than the cell vol/dz flow areas 9.8712e-02 and 8.3435e-02 on each side
61
62 b) the hydraulic diameter of the first and last junctions of the
63 steam generator secondary were set to a non-zero value (even though
64 the flow area is zero) to get the code to run.
65
66 c) the nff's were all set to -1
67 to cause an automatic calculation of
68 abrupt expansion/contraction form losses.
69
70 d) the new reflood model was turned on (namelist newrfd=1 was added)
71 and added funh, nhscra, and zsgrid arrays.
72
73 e) the time step sizes were increased.
74
75 f) the rod axial power shape was adjusted to take advantage of mod2's
76 ability to input an exact power distribution. this involved
```

77 reworking the zpwzt and zpwtb arrays. the number of coarse mesh
 78 nodes went from 7 to 19, the maximum number of fine mesh cells went
 79 from 100 to 200, and the dtxht criterial was reduced.
 80
 81 g) the rod power history was expanded from 10 points to over 1200 points
 82 (based on experimental data) to better match the input power.
 83
 84 h) the temperatures everywhere except the lower plenum and fills were
 85 changed from 393.0 to 414.2 (the average of the te30yxx thermocouple
 86 data from the test) to better match the initial fluid and wall temps.
 87
 88 i) took out the bump in the cold leg ecc fill liquid temperature table
 89
 90 j) extended the material property tables in case the code wants to
 91 calculate temperatures in excess of 1200 k.
 92
 93 k) added namelist variable nosets=2 to cause the code to calculate the
 94 sets3d equation every time step.
 95
 96 l) increase the maximum time step size beyond 84 seconds.
 97
 98 m) set all of the vessel cfzl-z's to negative numbers to get an automatic
 99 calculation of abrupt expansion/contraction form losses.
 100
 101 n) the rod nodalization was set back the way it originally was (7 coarse
 102 meshes with a 1-to-1 relationship with the hydro cells). the
 103 integration option was also set back the way it originally was as well.
 104
 105 o) to damp the loop oscillations, all the roughness numbers were
 106 changed from 0.0 to 4.5720e-05
 107
 108 p) the heat conductor temperatures in the reactor vessel, ring 4 were set
 109 from 4.142e+02 to 4.680e+02 for levels 2 and above. the inner rings
 110 were changed from 4.142e+02 to 4.230e+02. this is consistent with the
 111 initial conditions in the data report, page 31 table 3.1
 112
 113 q) the maximum time step size was reduced to avoid the water hammer in
 114 the downcomer soon after cold leg injection begins.
 115
 116 r) added 30 heat slabs to represent the core barrel
 117
 118 s) moved the location of the ring 3-ring 4 boundary from inside the core
 119 barrel to outside of the core barrel. the vessel rad(3), vol, fa-t,
 120 fa-z, hd-t and hd-z arrays were recomputed. this was done to eliminate
 121 vol and fa values greater than 1.0
 122
 123 t) the radial cfzl-r in level 1 was set to a small negative number to
 124 cause form loss computation.
 125
 126 u) set idcu=idcl=idcr=0 to turn off special downcomer models
 127
 128 v) set the dtxht(1), dtxht(2), dnht, and nzmax parameters back to the
 129 old mod1 values, and took out the core barrel heat slabs to make the
 130 calculation directly comparable to the original MOD1 calculation.
 131
 132
 133
 134 -----
 135
 136 the original comment cards are as follows:
 137
 138 cctf run 54 posttest analysis with trac-pfl(mod 1) ver 11.8 (8/24/84)
 139 * * * * * revised loop components * * * * *
 140 jaeri recommendations used for some heater rod material properties.
 141 new vapor loss coefficients in vessel core
 142 new radial loss coefficients in levels 4 - 10
 143 akimotos nodding for combined and broken cold legs
 144 vessel nodding:
 145 four radial rings
 146 two azimuthal zones
 147 sixteen axial levels
 148 three levels in lower plenum
 149 seven levels in core
 150 six levels in upper plenum
 151 system nodding:
 152 three intact loops lumped into one loop
 153 cold leg between vessel and break is modeled without the expansion
 154 *
 155 *****
 156 * namelist data *
 157 *****
 158 *
 159 &inopts
 160 nrslv=1, iadded=10, nhtstr=24, newrfd=3,
 161 iblaus=1, imfr=3,
 162 &end
 163 *
 164 * dstep timet
 165 0 0.0000e+00
 166 * stdyst transi ncomp njun ipak
 167 0 1 43 17 1
 168 * epso epss

```

169      1.0000e-04  1.0000e-04
170 *      oitmax      sitmax    isolut    ncontr
171      10          10        0          0
172 *      ntsv       ntcbl     ntcf      ntrp      ntcp
173      9           8        0          3          1
174 *
175 ****
176 * component-number data *
177 ****
178 *
179 * iorder*      1          2          3          4          5
180 * iorder*      6          7          8          11         12
181 * iorder*      13         14         15         16         17
182 * iorder*      18         19         25         28s
183      999         998       997       996       995
184      994         993s      973s
185      974
186      918         917       916       915s
187      914         913       912       911       910
188      909         908       907s
189 784s
190 670 669e
191 *
192 *
193 ****
194 * material-properties data *
195 ****
196 *
197 * matb *      55        58        59        60e
198 * ptbln * r02  7r02      5e
199 *
200 * prptb(1,i)  prptb(2,i)  prptb(3,i)  prptb(4,i)  prptb(5,i)
201 3.0000e+02  8.3500e+03  4.4487e+02  1.2337e+01  1.0000e+00
202 5.0000e+02  8.3500e+03  4.9042e+02  1.5834e+01  1.0000e+00
203 7.0000e+02  8.3500e+03  5.3948e+02  1.9331e+01  1.0000e+00
204 9.0000e+02  8.3500e+03  5.8987e+02  2.2828e+01  1.0000e+00
205 1.1000e+03  8.3500e+03  6.3939e+02  2.6324e+01  1.0000e+00
206 1.3000e+03  8.3500e+03  6.8588e+02  2.9821e+01  1.0000e+00
207 2.0000e+03  8.3500e+03  6.8588e+02  2.9821e+01  1.0000e+00
208 e
209 *
210 * prptb(1,i)  prptb(2,i)  prptb(3,i)  prptb(4,i)  prptb(5,i)
211 3.0000e+02  3.8000e+03  8.4970e+02  3.5870e+01  1.0000e+00
212 5.0000e+02  3.8000e+03  9.6550e+02  2.0173e+01  1.0000e+00
213 7.0000e+02  3.8000e+03  1.0813e+03  1.2529e+01  1.0000e+00
214 9.0000e+02  3.8000e+03  1.1971e+03  8.9514e+00  1.0000e+00
215 1.1000e+03  3.8000e+03  1.3129e+03  7.1615e+00  1.0000e+00
216 1.3000e+03  3.8000e+03  1.4287e+03  6.1228e+00  1.0000e+00
217 2.0000e+03  3.8000e+03  1.4287e+03  6.1228e+00  1.0000e+00
218 e
219 *
220 * prptb(1,i)  prptb(2,i)  prptb(3,i)  prptb(4,i)  prptb(5,i)
221 3.0000e+02  2.8000e+03  9.8640e+02  1.6300e+00  1.0000e+00
222 6.0000e+02  2.8000e+03  1.1358e+03  1.4200e+00  1.0000e+00
223 9.0000e+02  2.8000e+03  1.2852e+03  1.2100e+00  1.0000e+00
224 1.3000e+03  2.8000e+03  1.4844e+03  9.3000e-01  1.0000e+00
225 2.0000e+03  2.8000e+03  1.4844e+03  9.3000e-01  1.0000e+00
226 e
227 *
228 * prptb(1,i)  prptb(2,i)  prptb(3,i)  prptb(4,i)  prptb(5,i)
229 3.0000e+02  8.4103e+03  4.4029e+02  1.4340e+01  8.4000e-01
230 6.0000e+02  8.2925e+03  5.0636e+02  1.9331e+01  8.4000e-01
231 9.0000e+02  8.1747e+03  5.7242e+02  2.4322e+01  8.4000e-01
232 1.2000e+03  8.0569e+03  6.3839e+02  2.9314e+01  8.4000e-01
233 2.0000e+03  8.0569e+03  6.3839e+02  2.9314e+01  8.4000e-01
234 e
235 *
236 *
237 ****
238 * control-parameter data *
239 ****
240 *
241 *
242 * signal variables
243 * idsv  isvn   ilcn   icnl   icn2
244 101   0       0       0       0 * problem time
245 102   0       1       0       0 * time-step size
246 103   27      1       1001  -8001 * lower-plenum level-1 vap. vol. fr.
247 104   27      1       1002  -6003 * lower-plenum levels 2 and 3 vap. vol. fr.
248 105   27      1       7002  -8016 * downcomer vap. vol. fr.
249 106   27      1       1004  -6010 * core vap. vol. fr.
250 107   27      1       1011  -6016 * upper-plenum vap. vol. fr.
251 108   75      1       1001  -8001 * lower-plenum level-1 liquid density
252 109   76      1       1002  -6003 * lower-plenum levels 2 and 3 liquid density
253 *
254 * control blocks
255 * idcb  ichn   icbl   icb2   icb3
256 * cbgain  cbxmin  cbxmax  cbcon1  cbcon2
257 *
258 * constant number 1
259 -1      9       *const*
260      1.0      1.0      1.0      1.0

```

```

261 *
262 *      weighted lower-plenum vapor volume fraction
263   -2      59      *wsum*    103      104
264           1.0      0.0      1.0      0.5396    0.4604
265 *
266 *      lower-plenum liquid volume fraction
267   -3      54      *subtr*   -1      -2
268           0.0      0.0      0.0      0.0      0.0
269 *
270 *      downcomer liquid volume fraction
271   -4      54      *subtr*   -1     105
272           0.0      0.0      0.0      0.0      0.0
273 *
274 *      core liquid volume fraction
275   -5      54      *subtr*   -1     106
276           0.0      0.0      0.0      0.0      0.0
277 *
278 *      upper plenum liquid volume fraction
279   -6      54      *subtr*   -1     107
280           0.0      0.0      0.0      0.0      0.0
281 *
282 *      weighted lower-plenum liquid density
283   -7      59      *wsum*    108      109
284           1.0      0.0      1.0e20    0.5396    0.4604
285 *
286 *      lower plenum delta-p=2.0594e-05 x rholiq x liquid volume fraction
287   -8      39      *multi*   -7      -3
288           2.0594e-05   -1.0e20    1.0e20    0.0      0.0
289 *
290 * trips
291 *      ntse      ntct      ntsf      nt dp      ntsd
292   0          0          0          3          0
293 *      idtp      isrt      iset      itst      idsg
294   1001      2          0          1          101
295 *      setp(1)    setp(2)
296   8.3999e+01  8.4000e+01
297 *      dtsp(1)    dtsp(2)
298   0.0000e+00  0.0000e+00
299 *      ifsp(1)    ifsp(2)
300   0          0
301 *      idtp      isrt      iset      itst      idsg
302   1002      2          1          1          101
303 *      setp(1)    setp(2)
304   0.0000e+00  0.0000e+00
305 *      dtsp(1)    dtsp(2)
306   0.0000e+00  0.0000e+00
307 *      ifsp(1)    ifsp(2)
308   0          0
309 *      idtp      isrt      iset      itst      idsg
310   1003      2          0          1          101
311 *      setp(1)    setp(2)
312   0.0000e+00  0.0000e+00
313 *      dtsp(1)    dtsp(2)
314   0.0000e+00  0.0000e+00
315 *      ifsp(1)    ifsp(2)
316   0          0
317 *      ndmp
318   3
319 *      idmp()
320   1001      1002      1003
321 *
322 ****
323 * component data *
324 ****
325 *
326 ***** type      num      id      ctitle
327 vessel      1      1 $1$ cctf reactor vessel
328 *      nasx      nrsx      ntsx      ncsr      ivssbf
329   16          4          2          5          0
330 *      idcu      idcl      idcr      icru      icrl
331   16          1          3          10         3
332 *      0          0          0          10         3 #5.3.05 deck input
333 *      icrr      ilcsp      iucsp      iuhp      iconc
334   3          0          0          0          0
335 *      igeom      nvent      nvvtb      nsgrid
336   0          0          0          *6* 0
337 *      shelv      epsw
338   0.0000e+00  4.5720e-05
339 *      z      *      9.1500e-01  1.9000e+00  2.1000e+00  2.4050e+00  3.0150e+00
340 *      z      *      3.6250e+00  4.2350e+00  4.8450e+00  5.4550e+00  5.7600e+00
341 *      z      *      6.0000e+00  6.2400e+00  6.5000e+00  6.9600e+00  7.4000e+00
342 *      z      *      8.6470e+00e
343 *      rad      *      1.2900e-01  2.5800e-01  4.8050e-01  5.4200e-01
344 *      th      *      90.0      360.0 e
345 *      funh      *      r2 0.11948214 r2 0.15865495 s
346 *      funh      *      r2 0.20909698 r2 1.0 e
347 *      nhsc4      f 999 e
348 *      zsgrid      2.670 3.335 4.000 s
349 *      zsgrid      4.665 5.330 5.758 e
350 *      lisrl      lisrc      lisrf      ljuns
351   15          7          3          1
352   15          5          3          2

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353      15      8      3
354      15      6      3
355          1      7      3
356      *
357      * level  1
358      *
359      * cfzl-t* f -1.0000e-04e
360      * cfzl-z* f -1.0000e-04e
361      * cfzl-r* f -1.0000e-04e
362      * cfzv-t* f 0.0000e-04e
363      * cfzv-z* f 0.0000e-04e
364      * cfzv-r* f 0.0000e-04e
365      * vol   * r04 7.4000e-01r02 8.0254e-01r02 1.0000e+00e
366      * fa-t  * r04 4.0000e-01r02 8.0342e-01r02 1.0000e+00e
367      * fa-z  * r04 4.2000e-01r02 3.4356e-01r02 1.0000e+00e
368      * fa-r  * r04 4.0000e-01r02 5.9471e-01r02 0.0000e+00e
369      * hd-t  * r04 2.2800e-02r02 0.39676 r02 0.119e
370      * hd-z  * r04 1.3000e-02r02 2.8800e-02r02 0.123e
371      * hd-r  * r04 2.2800e-02r02 0.4855r02 0.0000e+00e
372      * alpn  * f 0.0000e+00e
373      * vvn-t * f 0.0000e+00e
374      * vvn-z * f 0.0000e+00e
375      * vvn-r * f 0.0000e+00e
376      * vln-t * f 0.0000e+00e
377      * vln-z * f 0.0000e+00e
378      * vln-r * f 0.0000e+00e
379      * tvn   * f 3.9300e+02e
380      * tln   * f 3.9300e+02e
381      * pn    * f 2.0000e+05e
382      * pan   * f 0.0000e+00e
383      *
384      * level  2
385      *
386      * cfzl-t* f -1.0000e-04e
387      * cfzl-z* f -1.0000e-04e
388      * cfzl-r* f 0.0000e-04e
389      * cfzv-t* f 0.0000e-04e
390      * cfzv-z* f 0.0000e-04e
391      * cfzv-r* f 0.0000e-04e
392      * vol   * r04 7.4000e-01r02 7.3602e-01r02 1.0000e+00e
393      * fa-t  * r04 4.0000e-01r02 2.4692e-01 r02 1.0000e+00e
394      * fa-z  * r04 5.9000e-01r02 6.7592e-01r02 1.0000e+00e
395      * fa-r  * r04 4.0000e-01r04 0.0000e+00e
396      * hd-t  * r04 2.2800e-02r02 2.4060e-01r02 0.123e+00e
397      * hd-z  * r04 1.3000e-02r02 4.6000e-02r02 1.2300e-01e
398      * hd-r  * r04 2.2800e-02r04 0.0000e+00e
399      * alpn  * f 1.0000e+00e
400      * vvn-t * f 0.0000e+00e
401      * vvn-z * f 0.0000e+00e
402      * vvn-r * f 0.0000e+00e
403      * vln-t * f 0.0000e+00e
404      * vln-z * f 0.0000e+00e
405      * vln-r * f 0.0000e+00e
406      * tvn   * f 4.1420e+02e
407      * tln   * f 4.1420e+02e
408      * pn    * f 2.0000e+05e
409      * pan   * f 0.0000e+00e
410      *
411      * level  3
412      *
413      * cfzl-t* f -1.0000e-04e
414      * cfzl-z* r04 -1.1102e-01r02 -1.2189e-01r02 -1.0000e-04e
415      * cfzl-r* f 0.0000e-04e
416      * cfzv-t* f 0.0000e-04e
417      * cfzv-z* r04 4.4407e-01r02 4.8756e-01r02 0.0000e-04e
418      * cfzv-r* f 0.0000e-04e
419      * vol   * r04 5.9000e-01r02 0.45738r02 1.0000e+00e
420      * fa-t  * r04 2.5000e-01r02 0.24692 r02 1.0 e
421      * fa-z  * r02 1.1400e-01r02 1.1460e-01r02 0.04944r02 1.00e
422      * fa-r  * r04 2.5000e-01r04 0.0000e+00e
423      * hd-t  * r04 1.4400e-02r02 2.4060e-01r02 0.123e
424      * hd-z  * r04 1.2460e-02r02 1.3680e-02r02 1.2300e-01e
425      * hd-r  * r04 1.4400e-02r04 0.0000e+00e
426      * alpn  * f 1.0000e+00e
427      * vvn-t * f 0.0000e+00e
428      * vvn-z * f 0.0000e+00e
429      * vvn-r * f 0.0000e+00e
430      * vln-t * f 0.0000e+00e
431      * vln-z * f 0.0000e+00e
432      * vln-r * f 0.0000e+00e
433      * tvn   * f 4.1420e+02e
434      * tln   * f 4.1420e+02e
435      * pn    * f 2.0000e+05e
436      * pan   * f 0.0000e+00e
437      *
438      * level  4
439      * cfzl-t* f -1.0000e-04e
440      * cfzl-z* f -1.0000e-04e
441      * cfzl-r* r04 8.7633e-02r02 1.3910e+01r02 0.0000e-04e
442      * cfzv-t* f 0.0000e-04e
443      * cfzv-z* f 0.0000e-04e
444      * cfzv-r* r04 8.7633e-02r02 1.3910e+01r02 0.0000e-04e

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

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537 * vln-t * f 0.0000e+00e
538 * vln-z * f 0.0000e+00e
539 * vln-r * f 0.0000e+00e
540 * tvn * f 4.1420e+02e
541 * tln * f 4.1420e+02e
542 * pn * f 2.0000e+05e
543 * pan * f 0.0000e+00e
544 *
545 * level 8
546 *
547 * cfzl-t* f -1.0000e-04e
548 * cfzl-z* r04 -2.4509e-02r02 -2.6909e-02r02 -1.0000e-04e
549 * cfzl-r* r04 8.7633e-02r02 1.3910e+01r02 0.0000e-04e
550 * cfzv-t* f 0.0000e-04e
551 * cfzv-z* r04 2.4509e-02r02 2.6909e-02r02 0.0000e-04e
552 * cfzv-r* r04 8.7633e-02r02 1.3910e+01r02 0.0000e-04e
553 * vol * r04 5.3000e-01r02 0.26161 r02 1.0e
554 * fa-t * r04 2.5000e-01r02 0.09312 r02 1.0e
555 * fa-z * r04 5.3000e-01r02 0.26161 r02 1.0e
556 * fa-r * r04 2.5000e-01r04 0.0000e+00e
557 * hd-t * r06 6.3000e-03r02 1.2300e-01e
558 * hd-z * r04 1.2460e-02r02 1.3680e-02r02 0.123e
559 * hd-r * r04 6.3000e-03r04 0.0000e+00e
560 * alpn * f 1.0000e+00e
561 * vvn-t * f 0.0000e+00e
562 * vvn-z * f 0.0000e+00e
563 * vvn-r * f 0.0000e+00e
564 * vln-t * f 0.0000e+00e
565 * vln-z * f 0.0000e+00e
566 * vln-r * f 0.0000e+00e
567 * tvn * f 4.1420e+02e
568 * tln * f 4.1420e+02e
569 * pn * f 2.0000e+05e
570 * pan * f 0.0000e+00e
571 *
572 * level 9
573 *
574 * cfzl-t* f -1.0000e-04e
575 * cfzl-z* r04 -2.4509e-02r02 -2.6909e-02r02 -1.0000e-04e
576 * cfzl-r* r04 8.7633e-02r02 1.3910e+01r02 0.0000e-04e
577 * cfzv-t* f 0.0000e-04e
578 * cfzv-z* r04 2.4509e-02r02 2.6909e-02r02 0.0000e-04e
579 * cfzv-r* r04 8.7633e-02r02 1.3910e+01r02 0.0000e-04e
580 * vol * r04 5.3000e-01r02 0.26161 r02 1.0e
581 * fa-t * r04 2.5000e-01r02 0.09312 r02 1.0e
582 * fa-z * r04 5.3000e-01r02 0.26161 r02 1.0e
583 * fa-r * r04 2.5000e-01r04 0.0000e+00e
584 * hd-t * r06 6.3000e-03r02 1.2300e-01e
585 * hd-z * r04 1.2460e-02r02 1.3680e-02r02 0.123e
586 * hd-r * r04 6.3000e-03r04 0.0000e+00e
587 * alpn * f 1.0000e+00e
588 * vvn-t * f 0.0000e+00e
589 * vvn-z * f 0.0000e+00e
590 * vvn-r * f 0.0000e+00e
591 * vln-t * f 0.0000e+00e
592 * vln-z * f 0.0000e+00e
593 * vln-r * f 0.0000e+00e
594 * tvn * f 4.1420e+02e
595 * tln * f 4.1420e+02e
596 * pn * f 2.0000e+05e
597 * pan * f 0.0000e+00e
598 *
599 * level 10
600 *
601 * cfzl-t* f -1.0000e-04e
602 * cfzl-z* r04 -5.7191e-02r02 -6.2791e-02r02 -1.0000e-04e
603 * cfzl-r* r04 8.7633e-02r02 1.3910e+01r02 0.0000e-04e
604 * cfzv-t* f 0.0000e-04e
605 * cfzv-z* r04 5.7191e-02r02 6.2791e-02r02 0.0000e-04e
606 * cfzv-r* r04 8.7633e-02r02 1.3910e+01r02 0.0000e-04e
607 * vol * r04 5.3000e-01r02 0.26161 r02 1.0e
608 * fa-t * r04 2.5000e-01r02 0.09312 r02 1.0e
609 * fa-z * r04 5.3000e-01r02 0.26161 r02 1.0e
610 * fa-r * r04 2.5000e-01r04 0.0000e+00e
611 * hd-t * r06 6.3000e-03r02 1.2300e-01e
612 * hd-z * r04 1.2460e-02r02 1.3680e-02r02 0.123e
613 * hd-r * r04 6.3000e-03r04 0.0000e+00e
614 * alpn * f 1.0000e+00e
615 * vvn-t * f 0.0000e+00e
616 * vvn-z * f 0.0000e+00e
617 * vvn-r * f 0.0000e+00e
618 * vln-t * f 0.0000e+00e
619 * vln-z * f 0.0000e+00e
620 * vln-r * f 0.0000e+00e
621 * tvn * f 4.1420e+02e
622 * tln * f 4.1420e+02e
623 * pn * f 2.0000e+05e
624 * pan * f 0.0000e+00e
625 *
626 * level 11
627 *
628 * cfzl-t* f -1.0000e-04e

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629 * cfzl-z* r04 -6.2300e-02r02 -6.8400e-02r02 -1.0000e-04e
630 * cfzl-r* f 0.0000e-04e
631 * cfzv-t* f 0.0000e-04e
632 * cfzv-z* r04 6.2300e-02r02 6.8400e-02r02 0.0000e-04e
633 * cfzv-r* f 0.0000e-04e
634 * vol * r04 8.1000e-01r02 0.37998 r02 1.0e
635 * fa-t * r04 6.2000e-01r02 0.32647 r02 1.0e
636 * fa-z * r04 8.1000e-01r02 0.37998 r02 1.0e
637 * fa-r * r04 6.2000e-01r04 0.0000e+00e
638 * hd-t * r06 6.3000e-03r02 0.123e
639 * hd-z * r04 1.2460e-02r02 1.3680e-02r02 0.123e
640 * hd-r * r04 6.3000e-03r04 0.0000e+00e
641 * alpn * f 1.0000e+00e
642 * vvn-t * f 0.0000e+00e
643 * vvn-z * f 0.0000e+00e
644 * vvn-r * f 0.0000e+00e
645 * vln-t * f 0.0000e+00e
646 * vln-z * f 0.0000e+00e
647 * vln-r * f 0.0000e+00e
648 * tvn * f 4.1420e+02e
649 * tln * f 4.1420e+02e
650 * pn * f 2.0000e+05e
651 * pan * f 0.0000e+00e
652 *
653 * level 12
654 *
655 * cfzl-t* f -1.0000e-04e
656 * cfzl-z* f -1.0000e-04e
657 * cfzl-r* f 0.0000e-04e
658 * cfzv-t* f 0.0000e-04e
659 * cfzv-z* f 0.0000e-04e
660 * cfzv-r* f 0.0000e-04e
661 * vol * r04 7.1000e-01r02 0.3208 r02 1.0e
662 * fa-t * r04 5.0000e-01r02 0.29465 r02 1.0 e
663 * fa-z * r02 3.8180e-01r02 3.3700e-01r02 1.6499e-01r02 1.00e
664 * fa-r * r04 5.0000e-01r04 0.0000e+00e
665 * hd-t * r06 1.2800e-02r02 0.123e
666 * hd-z * r06 1.2800e-02r02 0.123e
667 * hd-r * r04 1.2800e-02r04 0.0000e+00e
668 * alpn * f 1.0000e+00e
669 * vvn-t * f 0.0000e+00e
670 * vvn-z * f 0.0000e+00e
671 * vvn-r * f 0.0000e+00e
672 * vln-t * f 0.0000e+00e
673 * vln-z * f 0.0000e+00e
674 * vln-r * f 0.0000e+00e
675 * tvn * f 4.1420e+02e
676 * tln * f 4.1420e+02e
677 * pn * f 2.0000e+05e
678 * pan * f 0.0000e+00e
679 *
680 * level 13
681 *
682 * cfzl-t* f -1.0000e-04e
683 * cfzl-z* f -1.0000e-04e
684 * cfzl-r* f 0.0000e-04e
685 * cfzv-t* f 0.0000e-04e
686 * cfzv-z* f 0.0000e-04e
687 * cfzv-r* f 0.0000e-04e
688 * vol * r02 9.2900e-01r02 9.1000e-01r02 0.67137r02 1.0e
689 * fa-t * r04 9.0000e-01r02 4.4845e-01r02 1.00e
690 * fa-z * r02 9.2900e-01r02 6.5000e-01r02 3.9774e-01r02 1.00e
691 * fa-r * r04 7.9000e-01r04 0.0000e+00e
692 * hd-t * r06 2.5000e-01r02 0.123e
693 * hd-z * r02 6.1500e-01r02 2.3780e-01r02 2.1260e-01r02 0.123e
694 * hd-r * r04 2.5000e-01r04 0.0000e+00e
695 * alpn * f 1.0000e+00e
696 * vvn-t * f 0.0000e+00e
697 * vvn-z * f 0.0000e+00e
698 * vvn-r * f 0.0000e+00e
699 * vln-t * f 0.0000e+00e
700 * vln-z * f 0.0000e+00e
701 * vln-r * f 0.0000e+00e
702 * tvn * f 4.1420e+02e
703 * tln * f 4.1420e+02e
704 * pn * f 2.0000e+05e
705 * pan * f 0.0000e+00e
706 *
707 * level 14
708 *
709 * cfzl-t* f -1.0000e-04e
710 * cfzl-z* f -1.0000e-04e
711 * cfzl-r* f 0.0000e-04e
712 * cfzv-t* f 0.0000e-04e
713 * cfzv-z* f 0.0000e-04e
714 * cfzv-r* f 0.0000e-04e
715 * vol * r02 9.2900e-01r02 9.2000e-01r02 0.67137r02 1.0 e
716 * fa-t * r04 6.0000e-01r02 0.45375 r02 1.00e
717 * fa-z * r02 9.2900e-01r02 9.1000e-01r02 0.3686 r02 1.0 e
718 * fa-r * r04 6.0000e-01r04 0.0000e+00e
719 * hd-t * r06 2.5000e-01r02 0.123e
720 * hd-z * r02 6.1500e-01r02 2.3780e-01r02 2.1260e-01r02 0.123e

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721 * hd-r * r04 2.5000e-01r04 0.0000e+00e
722 * alpn * f 1.0000e+00e
723 * vvn-t * f 0.0000e+00e
724 * vvn-z * f 0.0000e+00e
725 * vvn-r * f 0.0000e+00e
726 * vln-t * f 0.0000e+00e
727 * vln-z * f 0.0000e+00e
728 * vln-r * f 0.0000e+00e
729 * tvn * f 4.1420e+02e
730 * tln * f 4.1420e+02e
731 * pn * f 2.0000e+05e
732 * pan * f 0.0000e+00e
733 *
734 * level 15
735 *
736 * cfzl-t* f -1.0000e-04e
737 * cfzl-z* f -1.0000e-04e
738 * cfzl-r* f 0.0000e-04e
739 * cfzv-t* f 0.0000e-04e
740 * cfzv-z* f 0.0000e-04e
741 * cfzv-r* f 0.0000e-04e
742 * vol * r02 9.2900e-01r02 9.2000e-01r02 0.67137r02 1.0 e
743 * fa-t * r04 6.0000e-01r02 0.45375 r02 1.00e
744 * fa-z * r02 9.2900e-01r02 9.2000e-01r02 0.3686 r02 1.0 e
745 * fa-r * r04 6.0000e-01r04 0.0000e+00e
746 * hd-t * r06 2.5000e-01r02 0.123e
747 * hd-z * r02 6.1500e-01r02 2.3780e-01r02 2.1260e-01r02 0.123e
748 * hd-r * r04 2.5000e-01r04 0.0000e+00e
749 * alpn * f 1.0000e+00e
750 * vvn-t * f 0.0000e+00e
751 * vvn-z * f 0.0000e+00e
752 * vvn-r * f 0.0000e+00e
753 * vln-t * f 0.0000e+00e
754 * vln-z * f 0.0000e+00e
755 * vln-r * f 0.0000e+00e
756 * tvn * f 4.1420e+02e
757 * tln * f 4.1420e+02e
758 * pn * f 2.0000e+05e
759 * pan * f 0.0000e+00e
760 *
761 * level 16
762 *
763 * cfzl-t* f -1.0000e-04e
764 * cfzl-z* f -1.0000e-04e
765 * cfzl-r* f 0.0000e-04e
766 * cfzv-t* f 0.0000e-04e
767 * cfzv-z* f 0.0000e-04e
768 * cfzv-r* f 0.0000e-04e
769 * vol * r02 9.2900e-01r02 9.2000e-01r02 0.67137r02 1.0 e
770 * fa-t * r04 6.0000e-01r02 0.45375 r02 1.00e
771 * fa-z * r02 9.2900e-01r02 9.2000e-01r02 0.3686 r02 1.0 e
772 * fa-r * r04 6.0000e-01r04 0.0000e+00e
773 * hd-t * r06 2.5000e-01r02 0.123e
774 * hd-z * r02 6.1500e-01r02 2.3780e-01r02 2.1260e-01r02 0.123e
775 * hd-r * r04 2.5000e-01r04 0.0000e+00e
776 * alpn * f 1.0000e+00e
777 * vvn-t * f 0.0000e+00e
778 * vvn-z * f 0.0000e+00e
779 * vvn-r * f 0.0000e+00e
780 * vln-t * f 0.0000e+00e
781 * vln-z * f 0.0000e+00e
782 * vln-r * f 0.0000e+00e
783 * tvn * f 4.1420e+02e
784 * tln * f 4.1420e+02e
785 * pn * f 2.0000e+05e
786 * pan * f 0.0000e+00e
787 *
788 ***** type num id ctitle
789 tee 6 6 $6$ cold leg--combined loop
790 * jcell nodes ichf cost epsw
791 * 18 2 1 7.0700e-01 4.5720e-05
792 * iconcl ncell1 jun1 jun2 ipowl
793 * 0 22 12 3 0
794 * iqptr1 iqpsvl npptb1 npqsv1 npqrfl
795 * 0 0 0 0 0
796 * radin1 th1 houtl1 houtv1 toutl1
797 * 3.0200e-01 1.0000e-02 0.0000e+00 0.0000e+00 2.9300e+02
798 * toutv1
799 * 2.9300e+02
800 * qpin1 qpoff1 rqpmx1 qpsc1
801 * 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
802 * iconc2 ncell2 jun3 ipow2
803 * 0 1 11 0
804 * iqptr2 iqpsv2 npptb2 npqsv2 npqrfl
805 * 0 0 0 0 0
806 * radin2 th2 houtl2 houtv2 toutl2
807 * 4.0700e-02 4.0000e-03 0.0000e+00 0.0000e+00 2.9300e+02
808 * toutv2
809 * 2.9300e+02
810 * qpin2 qpoff2 rqpmx2 qpsc1
811 * 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
812 *

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813 * dx   *    3.0000e-01    2.1650e-01    2.1310e-01    9.9140e-01    1.8866e+00
814 * dx   *    2.1400e+00    2.2800e+00    9.4000e-01    9.0000e-01    3.2900e-01
815 * dx   *    2.7500e-01    2.5200e-01    5.2400e-01    2.6000e-01    4.4000e-01
816 * dx   *    r02 6.8500e-01    8.0000e-01r03 8.5730e-01    8.0000e-01e
817 * vol  *    1.3978e-01    1.7177e-01    8.7117e-02    5.6265e-02    1.0707e-01
818 * vol  *    1.2145e-01    1.2940e-01    5.3349e-02    5.1078e-02    3.0387e-02
819 * vol  *    5.6388e-02    2.2821e-02    4.7454e-02    2.8650e-01    2.4972e-02
820 * vol  *    r02 3.8868e-02    4.5402e-02r03 4.8654e-02    4.5402e-02e
821 * fa   *    4.659e-01    4.3413e-01    3.4821e-01r07 5.6760e-02    2.1265e-02
822 * fa   *    r03 9.0561e-02r09 5.6760e-02e
823 * fric *    r10 0.0000e+00    2.1500e-01r06    0.0r02    .001 f    0.0000e+00e
824 * grav *    r03-1.0000e+00    -7.6604e-01r02-1.0000e+00r02 0.0000e+00r06 1.0000e+00
825 * grav *    r09 0.0000e+00e
826 * hd   *    3.9570e-01    3.6880e-01    3.2940e-01r07 1.5520e-01    9.5000e-02
827 * hd   *    r03 4.7340e-02r09 1.5520e-01e
828 * nff  *    r17 -1r02      1 f        -1e
829 * alp  *    f    1.0000e+00e
830 * vl   *    f    0.0000e+00e
831 * vv   *    f    0.0000e+00e
832 * tl   *    f    4.1420e+02e
833 * tv   *    f    4.1420e+02e
834 * p    *    f    2.0000e+05e
835 * pa   *    f    0.0000e+00e
836 * qppp  *    f    0.0000e+00e
837 * matid *    6e
838 * tw   *    f    4.1420e+02e
839 *
840 * dx   *    1.0000e+00e
841 * vol  *    5.2050e-03e
842 * fa   *    f    5.2050e-03e
843 * fric *    f    .001 f    0.0000e+00e
844 * grav *    f    7.0700e-01e
845 * hd   *    f    4.7000e-02e
846 * nff  *    1           -1e
847 * alp  *    f    1.0000e+00e
848 * vl   *    f    0.0000e+00e
849 * vv   *    f    0.0000e+00e
850 * tl   *    f    4.1420e+02e
851 * tv   *    f    4.1420e+02e
852 * p    *    f    2.0000e+05e
853 * pa   *    f    0.0000e+00e
854 * qppp  *    f    0.0000e+00e
855 * matid *    6e
856 * tw   *    f    3.6250e+02e
857 *
858 ***** type    num      id      ctitle
859 pipe     7      7 $7$ hot leg--combined loop
860 *       ncells    nodes      jun1      jun2      epsw
861      3          2          4          13      4.5720e-05
862 *       ichf      iconc      iacc      ipow
863      1          0          0          0
864 *       iq3ptr    iq3sv      nq3tb      nq3sv      nq3rf
865      0          0          0          0          0
866 *       radin    th        houtl      houtv      toutl
867      2.3280e-01  5.0000e-03  0.0000e+00  0.0000e+00  2.9300e+02
868 *       toutv
869 2.9300e+02
870 *       qp3in      qp3off      rqp3mx      qp3scl
871 0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
872 *
873 * dx   *    3.3810e+00    2.4860e+00    7.9800e-01e
874 * vol  *    1.9190e-01    1.4110e-01    2.9700e-01e
875 * fa   *    r03 5.6750e-02    3.7240e-01e
876 * fric *    f    0.0000e+00e
877 * grav *    r02 0.0000e+00    7.6600e-01    1.0000e+00e
878 * hd   *    r03 1.5520e-01    4.7960e-01e
879 * nff  *    f    -1e
880 * alp  *    f    1.0000e+00e
881 * vl   *    f    0.0000e+00e
882 * vv   *    f    0.0000e+00e
883 * tl   *    f    4.1420e+02e
884 * tv   *    f    4.1420e+02e
885 * p    *    f    2.0000e+05e
886 * pa   *    f    0.0000e+00e
887 * qppp  *    f    0.0000e+00e
888 * matid *    6e
889 * tw   *    f    4.1420e+02e
890 *
891 ***** type    num      id      ctitle
892 pipe     8      8 $8$ ilsg primary
893 *
894 *       ncells    nodes      jun1      jun2      epsw
895      12         0          13         12      4.5720e-5
896 *
897 *       ichf      iconc      iacc      ipow
898      1          0          0          0
899 *
900 *       radin    th        houtl      houtv      toutl
901 9.8000e-03  2.9000e-03  0.0          0.0          300.0
902 *
903 *       toutv      powin      powoff      rpowmx      powscl
904 300.0        0.          0.          0.          1.

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905 *
906 * dx    *      7.9800e-01r02 5.0000e-01   1.5240e+00r04 2.5240e+00   1.5240e+00
907 * dx    * r02 5.0000e-01   7.9800e-01e
908 * vol   *      2.9700e-01r02 7.1500e-02   2.1780e-01r04 3.6090e-01   2.1780e-01
909 * vol   * r02 7.1500e-02   2.1279e-01e
910 * fa    *      3.7240e-01r11 1.4300e-01   4.659e-01e
911 * fric  * f     0.0000e+00e
912 * grav  * r06 1.0000e+00   0.0000e+00r06-1.0000e+00e
913 * hd    *      4.7960e-01r11 1.9600e-02   3.9570e-01e
914 * nff   * f     -1e
915 * alp   * f     1.0000e+00e
916 * vl    * f     0.0000e+00e
917 * vv    * f     0.0000e+00e
918 * tl    * f     4.1420e+02e
919 * tv    * f     4.1420e+02e
920 * p     * f     2.0000e+05e
921 * pa    * f     0.0000e+00e
922 *
923 ***** type      num      id      ctitle
924 pipe     28      28 $28$ ilsg secondary
925 *
926 *      ncells      nodes      jun1      jun2      epsw
927 *      5           0          16         17       4.5720e-5
928 *
929 *      ichf       iconc      iacc      ipow
930 *      1           0          0          0
931 *
932 *      radin      th        houtl      houtv      toutl
933 *      0.          0.         0.0        0.0       300.0
934 *
935 *      toutv      powin      powoff      rpowmx      powscl
936 *      300.0      0.          0.          0.          1.
937 *
938 *      dx    * r02 5.0000e-01   1.5240e+00   2.5240e+00   2.7510e+00e
939 *      vol   * 1.7940e+00   5.9400e-01   1.8060e+00   2.9920e+00   3.3150e+00
940 e
941 *      fa    *      0.0000e+00r04 1.1853e+00   0.0000e+00e
942 *      fric  * f     0.0000e+00e
943 *      grav  * f     1.0000e+00e
944 *      hd    * f     1.0240e-01 e
945 *      nff   * f     -1e
946 *      alp   * r04 0.0000e+00   2.5400e-01e
947 *      vl    * f     0.0000e+00e
948 *      vv    * f     0.0000e+00e
949 *      tl    *      4.8000e+02   5.2500e+02r03 5.4000e+02e
950 *      tv    *      4.8000e+02   5.2500e+02r03 5.4000e+02e
951 *      p     *      5.2500e+06   5.2400e+06   5.2300e+06   5.2200e+06   5.2100e+06
952 e
953 *      pa    * f     0.0000e+00e
954 *
955 ***** type      num      id      ctitle
956 pipe     2      2 $2$ broken cold leg-vessel side
957 *      ncells      nodes      jun1      jun2      epsw
958 *      6           3           1          7       4.5720e-05
959 *      ichf       iconc      iacc      ipow
960 *      1           0           0          0
961 *      iq3ptr     iq3sv      nq3tb      nq3sv      nq3rf
962 *      0           0           0          0          0
963 *      radin      th        houtl      houtv      toutl
964 *      1.3000e-01   5.0000e-03   0.0000e+00   0.0000e+00   2.9300e+02
965 *      toutv
966 *      2.9300e+02
967 *      iq3in     iq3off      rq3mx      qp3sc1
968 *      0.0000e+00   0.0000e+00   0.0000e+00   0.0000e+00
969 *
970 *      dx    * r02 1.3700e+00   9.7000e-01r02 1.7600e+00   2.0000e+00e
971 *      vol   * r02 2.5850e-02   7.1340e-02r02 1.2940e-01   1.4710e-01e
972 *      fa    * r03 1.8870e-02r04 7.3540e-02e
973 *      fric  * r02 0.0000e+00   9.0000e-02r02 2.0000e-02r02 1.0000e-02e
974 *      grav  * r03 0.0000e+00   -7.5000e-01   -1.0000e+00   -5.5000e-01   0.0000e+00
975 e
976 *      hd    * r03 1.5500e-01r04 3.0600e-01e
977 *      nff   * f     -1e
978 *      alp   * f     1.0000e+00e
979 *      vl    * f     0.0000e+00e
980 *      vv    * f     0.0000e+00e
981 *      tl    * f     4.1420e+02e
982 *      tv    * f     4.1420e+02e
983 *      p     * f     2.0000e+05e
984 *      pa    * f     0.0000e+00e
985 *      qppp  * f     0.0000e+00e
986 *      matid * f     6e
987 *      tw    * f     4.1420e+02e
988 *
989 ***** type      num      id      ctitle
990 pipe     3      3 $3$ broken cold leg-st gen side
991 *      ncells      nodes      jun1      jun2      epsw
992 *      21          2           9          8       4.5720e-05
993 *      ichf       iconc      iacc      ipow
994 *      1           0           0          0
995 *      iq3ptr     iq3sv      nq3tb      nq3sv      nq3rf
996 *      0           0           0          0

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997 * radin      th      houtl      houtv      toutl
998 * 1.0100e-01 9.0000e-03 0.0000e+00 0.0000e+00 2.9300e+02
999 * toutv
1000 * 2.9300e+02
1001 * qp3in      qp3off      rqp3mx      qp3scl
1002 * 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
1003 *
1004 * dx   * 3.0000e-01 2.1650e-01 2.1310e-01 9.9140e-01 1.8866e+00
1005 * dx   * 2.1400e+00 2.2800e+00 9.4000e-01 9.0000e-01 3.2900e-01
1006 * dx   * 2.7500e-01 2.5200e-01 5.2400e-01 2.6000e-01 4.4000e-01
1007 * dx   * r02 6.8500e-01 8.0000e-01 8.8990e-01 3.5250e+00 2.1500e+00
1008 e
1009 * vol   * 4.6595e-02 5.7256e-02 2.9039e-02 1.8755e-02 3.5691e-02
1010 * vol   * 4.0484e-02 4.3133e-02 1.7783e-02 1.7026e-02 1.0129e-02
1011 * vol   * 1.8796e-02 7.6070e-03 1.5818e-02 9.5500e-02 8.3240e-03
1012 * vol   * r02 1.2956e-02 1.5134e-02 1.6837e-02 6.6690e-02 1.4990e-01
1013 e
1014 * fa   * 1.5532e-01 1.4471e-01 1.1607e-01r07 1.8920e-02 7.0882e-03
1015 * fa   * r03 3.0187e-02r07 1.8920e-02 6.9700e-02e
1016 * fric  * r10 0.0000e+00 2.1500e-01r11 0.0000e+00e
1017 * grav  * r03-1.0000e+00 -7.6604e-01r02-1.0000e+00r02 0.0000e+00r06 1.0000e+00
1018 * grav  * r06 0.0000e+00 4.5820e-01 0.0000e+00e
1019 * hd   * 3.9570e-01 3.6880e-01 3.2940e-01r07 1.5520e-01 9.5000e-02
1020 * hd   * r03 4.7340e-02r07 1.5520e-01 2.9790e-01e
1021 * nff  * f -1e
1022 * alp  * f 1.0000e+00e
1023 * vl   * f 0.0000e+00e
1024 * vv   * f 0.0000e+00e
1025 * tl   * f 4.1420e+02e
1026 * tv   * f 4.1420e+02e
1027 * p    * f 2.0000e+05e
1028 * pa   * f 0.0000e+00e
1029 * qppp  * f 0.0000e+00e
1030 * matid * 6e
1031 * tw   * f 4.1420e+02e
1032 *
1033 ***** type num id ctitle
1034 pipe 4 4 $4$ hot leg--broken loop
1035 * ncells nodes jun1 jun2 epsw
1036 * 3 2 2 10 4.5720e-05
1037 * ichf iconc iacc ipow
1038 * 1 0 0 0
1039 * iq3tr iq3sv nqp3tb nqp3sv nqp3rf
1040 * 0 0 0 0 0
1041 * radin th houtl houtv toutl
1042 * 7.7600e-02 5.0000e-03 0.0000e+00 0.0000e+00 2.9300e+02
1043 * toutv
1044 * 2.9300e+02
1045 * qp3in qp3off rqp3mx qp3scl
1046 * 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
1047 *
1048 * dx   * 3.3810e+00 2.4860e+00 7.9800e-01e
1049 * vol  * 6.3960e-02 4.7030e-02 9.9000e-02e
1050 * fa   * r03 1.8920e-02 1.2410e-01e
1051 * fric  * f 0.0000e+00e
1052 * grav  * r02 0.0000e+00 7.6600e-01 1.0000e+00e
1053 * hd   * r03 1.5520e-01 4.7960e-01e
1054 * nff  * f -1e
1055 * alp  * f 1.0000e+00e
1056 * vl   * f 0.0000e+00e
1057 * vv   * f 0.0000e+00e
1058 * tl   * f 4.1420e+02e
1059 * tv   * f 4.1420e+02e
1060 * p    * f 2.0000e+05e
1061 * pa   * f 0.0000e+00e
1062 * qppp  * f 0.0000e+00e
1063 * matid * 6e
1064 * tw   * f 4.1420e+02e
1065 *
1066 ***** type num id ctitle
1067 pipe 5 5 $5$ blsg primary
1068 *
1069 * ncells nodes jun1 jun2 epsw
1070 * 12 0 10 9 4.5720e-5
1071 *
1072 * ichf iconc iacc ipow
1073 * 1 0 0 0
1074 *
1075 * radin th houtl houtv toutl
1076 * 9.8000e-03 2.9000e-03 0.0 0.0 300.0
1077 *
1078 * toutv powin powoff rpowmx powscl
1079 * 300.0 0. 0. 0. 1.
1080 *
1081 * dx   * 7.9800e-01r02 5.0000e-01 1.5240e+00r04 2.5240e+00 1.5240e+00
1082 * dx   * r02 5.0000e-01 7.9800e-01e
1083 * vol  * 9.9000e-02r02 2.3800e-02 7.2600e-02r04 1.2030e-01 7.2600e-02
1084 * vol  * r02 2.3800e-02 7.0930e-02e
1085 * fa   * 1.2410e-01r11 4.7670e-02 1.5532e-01e
1086 * fric  * f 0.0000e+00e
1087 * grav  * r06 1.0000e+00 0.0000e+00r06-1.0000e+00e
1088 * hd   * 4.7960e-01r11 1.9600e-02 3.9570e-01e

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1089 * nff * f -1e
1090 * alp * f 1.0000e+00e
1091 * vl * f 0.0000e+00e
1092 * vv * f 0.0000e+00e
1093 * tl * f 4.1420e+02e
1094 * tv * f 4.1420e+02e
1095 * p * f 2.0000e+05e
1096 * pa * f 0.0000e+00e
1097 *
1098 ***** type num id ctitle
1099 pipe 25 25 $25$ blsg secondary
1100 *
1101 * ncells nodes jun1 jun2 epsw
1102 5 0 14 15 4.5720e-5
1103 *
1104 * ichf iconc iacc ipow
1105 1 0 0 0
1106 *
1107 * radin th houtl houtv toutl
1108 0. 0. 0.0 0.0 300.0
1109 *
1110 * toutv powin powoff rpowmx powscl
1111 300.0 0. 0. 0. 1.
1112 *
1113 * dx * r02 5.0000e-01 1.5240e+00 2.5240e+00 2.7510e+00e
1114 * vol * 5.9800e-01 1.9800e-01 6.0200e-01 9.9720e-01 1.1050e+00
1115 e
1116 * fa * 0.0000e+00r04 3.9510e-01 0.0000e+00e
1117 * fric * f 0.0000e+00e
1118 * grav * f 1.0000e+00e
1119 * hd *f 1.0240e-01e
1120 * nff * f -1e
1121 * alp * r04 0.0000e+00 2.5400e-01e
1122 * vl * f 0.0000e+00e
1123 * vv * f 0.0000e+00e
1124 * tl * 4.8400e+02 5.2200e+02r03 5.4000e+02e
1125 * tv * 4.8400e+02 5.2200e+02r03 5.4000e+02e
1126 * p * 5.2500e-06 5.2400e+06 5.2300e+06 5.2200e+06 5.2100e+06
1127 e
1128 * pa * f 0.0000e+00e
1129 *
1130 ***** type num id ctitle
1131 pipe 11 11 $11$ lower plenum ecc pipe
1132 * ncells nodes jun1 jun2 epsw
1133 1 0 5 6 4.5720e-05
1134 * ichf iconc iacc ipow
1135 0 0 0 0
1136 * radin th houtl houtv toutl
1137 7.7600e-02 1.0000e-03 0.0000e+00 0.0000e+00 2.9300e+02
1138 * toutv
1139 2.9300e+02
1140 *
1141 * dx * 1.0000e-01e
1142 * vol * 1.8900e-03e
1143 * fa * f 1.8900e-02e
1144 * fric * f 0.0000e+00e
1145 * grav * f 0.0000e+00e
1146 * hd * f 1.5200e-01e
1147 * nff * f -1e
1148 * alp * 0.0000e+00e
1149 * vl * f 0.0000e+00e
1150 * vv * f 0.0000e+00e
1151 * tl * 4.1420e+02e
1152 * tv * 4.1420e+02e
1153 * p * 2.0000e+05e
1154 * pa * 0.0000e+00e
1155 *
1156 ***** type num id ctitle
1157 fill 12 12 $12$ lower plenum ecc fill
1158 * jun1 ifty ioff
1159 6 9 0
1160 * iftr ifsv nftb nfsv nfrf
1161 1003 101 7 0 0
1162 * twtold rfmx concin felv
1163 0.0000e+00 1.0000e+05 0.0000e+00 0.0000e+00
1164 * dbin violin alpin vlin tlin
1165 1.0000e-01 1.8900e-02 0.0000e+00 0.0000e+00 4.1420e+02
1166 * pin pain flowin vvin tvin
1167 2.0000e+05 0.0000e+00 0.0000e+00 0.0000e+00 4.1420e+02
1168 * vmscl vvscl
1169 1.0000e+00 1.0000e+00
1170 * tlscl tvscl pscl pascl conscl
1171 1.0000e+00 1.0000e+00 1.0000e+00 1.0000e+00 1.0000e+00
1172 *
1173 * vmtb * r02 0.0000e+00 8.0000e+01 0.0000e+00 8.4000e+01 4.8681e+00
1174 * vmtb * 9.1000e+01 5.5105e+00 9.4000e+01 5.0868e+00 9.9000e+01
1175 * vmtb * 0.0000e+00 6.0000e+02 0.0000e+00e
1176 * vvtb * r02 0.0000e+00 5.0000e+01 0.0000e+00 1.0000e+02 0.0000e+00
1177 * vvtb * 1.5000e+02 0.0000e+00 2.0000e+02 0.0000e+00 3.0000e+02
1178 * vvtb * 0.0000e+00 6.0000e+02 0.0000e+00e
1179 * tlbt * 0.0000e+00 3.9300e+02 8.0000e+01 3.9300e+02 8.8200e+01
1180 * tlbt * 3.9300e+02 8.8500e+01 3.1000e+02 1.6000e+02 3.1000e+02

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1181 * tltb * 2.0000e+02 3.1000e+02 6.0000e+02 3.1000e+02e
1182 * tvtb * 0.0000e+00 4.1420e+02 5.0000e+01 4.1420e+02 1.0000e+02
1183 * tvtb * 4.1420e+02 1.5000e+02 4.1420e+02 2.0000e+02 4.1420e+02
1184 * tvtb * 3.0000e+02 4.1420e+02 6.0000e+02 4.1420e+02e
1185 * alptb * r02 0.0000e+00 5.0000e+01 0.0000e+00 1.0000e+02 0.0000e+00
1186 * alptb * 1.5000e+02 0.0000e+00 2.0000e+02 0.0000e+00 3.0000e+02
1187 * alptb * 0.0000e+00 6.0000e+02 0.0000e+00e
1188 * ptb * 0.0000e+00 2.0000e+05 5.0000e+01 2.0000e+05 1.0000e+02
1189 * ptb * 2.0000e+05 1.5000e+02 2.0000e+05 2.0000e+02 2.0000e+05
1190 * ptb * 3.0000e+02 2.0000e+05 6.0000e+02 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 6.0000e+02 0.0000e+00e
1194 *
1195 ***** type num id ctitle
1196 fill 13 13 $13$ cold leg ecc fill
1197 * jun1 ifty ioff
1198 11 9 0
1199 * iftr ifsv nftb nfsv nfrf
1200 1003 101 8 0 0
1201 * twtold rfmx concin felv
1202 0.0000e+00 1.0000e+05 0.0000e+00 0.0000e+00
1203 * dxin violin alpin vlin tlin
1204 1.0000e+00 5.2050e-03 0.0000e+00 0.0000e+00 3.8300e+02
1205 * pin pain flowin vvin tvin
1206 2.0000e+05 0.0000e+00 0.0000e+00 0.0000e+00 4.1420e+02
1207 * vmscl vvscl
1208 1.0000e+00 1.0000e+00
1209 * tlscl tvscl pscl pascl conscl
1210 1.0000e+00 1.0000e+00 1.0000e+00 1.0000e+00 1.0000e+00
1211 *
1212 * vmtb * r02 0.0000e+00 9.2000e+01 0.0000e+00 9.6000e+01 1.3660e+01
1213 * vmtb * 9.9000e+01 1.6442e+01 1.0400e+02 1.6473e+01 1.0900e+02
1214 * vmtb * 3.1820e+00 1.2100e+00 2.1810e+00 6.0000e+02 2.1864e+00
1215 e
1216 * vvtb * r02 0.0000e+00 5.0000e+01 0.0000e+00 1.0000e+02 0.0000e+00
1217 * vvtb * 1.5000e+02 0.0000e+00 2.0000e+02 0.0000e+00 3.0000e+02
1218 * vvtb * 0.0000e+00 5.0000e+02 0.0000e+00 6.0000e+02 0.0000e+00
1219 e
1220 * tltb * 0.0000e+00 3.8700e+02 8.1000e+01 3.8700e+02 9.2000e+01
1221 * tltb * 3.8700e+02 9.5000e+01 3.1000e+02 9.6000e+01 3.0900e+02
1222 * tltb * 1.0700e+02 3.0800e+02 1.2300e+02 3.1100e+02 6.0000e+02
1223 * tltb * 3.1100e+02e
1224 * tvtb * 0.0000e+00 4.1420e+02 5.0000e+01 4.1420e+02 1.0000e+02
1225 * tvtb * 4.1420e+02 1.5000e+02 4.1420e+02 2.0000e+02 4.1420e+02
1226 * tvtb * 3.0000e+02 4.1420e+02 5.0000e+02 4.1420e+02 6.0000e+02
1227 * tvtb * 4.1420e+02e
1228 * alptb * r02 0.0000e+00 5.0000e+01 0.0000e+00 1.0000e+02 0.0000e+00
1229 * alptb * 1.5000e+02 0.0000e+00 2.0000e+02 0.0000e+00 3.0000e+02
1230 * alptb * 0.0000e+00 5.0000e+02 0.0000e+00 6.0000e+02 0.0000e+00
1231 e
1232 * ptb * 0.0000e+00 2.0000e+05 5.0000e+01 2.0000e+05 1.0000e+02
1233 * ptb * 2.0000e+05 1.5000e+02 2.0000e+05 2.0000e+02 2.0000e+05
1234 * ptb * 3.0000e+02 2.0000e+05 5.0000e+02 2.0000e+05 6.0000e+02
1235 * ptb * 2.0000e+05e
1236 * patb * r02 0.0000e+00 5.0000e+01 0.0000e+00 1.0000e+02 0.0000e+00
1237 * patb * 1.5000e+02 0.0000e+00 2.0000e+02 0.0000e+00 3.0000e+02
1238 * patb * 0.0000e+00 5.0000e+02 0.0000e+00 6.0000e+02 0.0000e+00
1239 e
1240 *
1241 ***** type num id ctitle
1242 break 14 14 $14$ cold leg break-vessel side
1243 * jun1 ibty isat ioff
1244 7 1 3 1
1245 * ibtr ibsv nbttb nbsv nbrf
1246 0 101 23 0 0
1247 * dxin violin alpin tin pin
1248 1.6670e+00 3.1500e-02 1.0000e+00 4.1420e+02 2.0000e+05
1249 * pain concin rhmx poff belv
1250 0.0000e+00 0.0000e+00 1.5000e+05 0.0000e+00 0.0000e+00
1251 * pscl tlscl tvscl pascl conscl
1252 1.0000e+00 1.0000e-06 1.0000e+00 1.0000e+00 1.0000e+00
1253 * ptb * 0.0000e+00 2.0280e+05 2.6000e+01 2.0280e+05 2.7000e+01
1254 * ptb * 2.0310e+05 8.2000e+01 2.0310e+05 9.4000e+01 2.2080e+05
1255 * ptb * 9.6000e+01 2.2390e+05 1.0400e+02 2.0700e+05 1.0800e+02
1256 * ptb * 2.1100e+05 1.1400e+02 2.0920e+05 1.2700e+02 2.2060e+05
1257 * ptb * 1.8500e+02 2.0550e+05 2.2000e+02 2.0280e+05 2.5600e+02
1258 * ptb * 2.0180e+05 3.0200e+02 2.0280e+05 3.3200e+02 2.0460e+05
1259 * ptb * 3.6500e+02 2.0490e+05 3.9100e+02 2.0460e+05 4.8000e+02
1260 * ptb * 2.0370e+05 5.0400e+02 2.0430e+05 5.3600e+02 2.0280e+05
1261 * ptb * 5.5400e+02 2.0120e+05 5.7000e+02 2.0240e+05 6.0000e+02
1262 * ptb * 2.0340e+05e
1263 *
1264 ***** type num id ctitle
1265 break 15 15 $15$ cold leg break-st gen side
1266 * jun1 ibty isat ioff
1267 8 1 3 1
1268 * ibtr ibsv nbttb nbsv nbrf
1269 0 101 23 0 0
1270 * dxin violin alpin tin pin
1271 2.1500e+00 1.4990e-01 1.0000e+00 4.1420e+02 2.0000e+05
1272 * pain concin rhmx poff belv

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1273     0.0000e+00  0.0000e+00  1.5000e+05  0.0000e+00  0.0000e+00
1274 *      pscl      tlscl    tvscl    pascl    conscl
1275   1.0000e+00  1.0000e-06  1.0000e+00  1.0000e+00  1.0000e+00
1276 *  ptb   *  0.0000e+00  2.0280e+05  2.6000e+01  2.0280e+05  2.7000e+01
1277 *  ptb   *  2.0310e-05  8.2000e+01  2.0310e+05  9.4000e+01  2.2080e+05
1278 *  ptb   *  9.6000e-01  2.2390e+05  1.0400e+02  2.0700e+05  1.0800e+02
1279 *  ptb   *  2.1100e+05  1.1400e+02  2.0920e+05  1.2700e+02  2.2060e+05
1280 *  ptb   *  1.8500e-02  2.0550e+05  2.2000e+02  2.0280e+05  2.5600e+02
1281 *  ptb   *  2.0180e+05  3.0200e+02  2.0280e+05  3.3200e+02  2.0460e+05
1282 *  ptb   *  3.6500e+02  2.0490e+05  3.9100e+02  2.0460e+05  4.8000e+02
1283 *  ptb   *  2.0370e+05  5.0400e+02  2.0430e+05  5.3600e+02  2.0280e+05
1284 *  ptb   *  5.5400e+02  2.0120e+05  5.7000e+02  2.0240e+05  6.0000e+02
1285 *  ptb   *  2.0340e+05e
1286 *
1287 ***** type    num      id      ctitle
1288 fill      18  18 $18$ st. gen. sec.-combined loop
1289 *      jun1    ifty    ioff
1290   16          1      0
1291 *  twtold   rfmx    concin   felv
1292   0.0000e+00  1.0000e+05  0.0000e+00  0.0000e+00
1293 *  dxin     violin  alpin    vlin    tlin
1294   2.5240e+00  2.9916e+00  0.0000e+00  0.0000e+00  5.4000e+02
1295 *  pin      pain    flowin   vvin    tvin
1296   5.2500e+06  0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
1297 *
1298 ***** type    num      id      ctitle
1299 fill      19  19 $19$ st. gen. sec.-combined loop
1300 *      jun1    ifty    ioff
1301   17          1      0
1302 *  twtold   rfmx    concin   felv
1303   0.0000e+00  1.0000e+05  0.0000e+00  0.0000e+00
1304 *  dxin     violin  alpin    vlin    tlin
1305   2.7510e+00  3.3153e+00  0.0000e+00  0.0000e+00  5.4000e+02
1306 *  pin      pain    flowin   vvin    tvin
1307   5.2500e+06  0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
1308 *
1309 ***** type    num      id      ctitle
1310 fill      16  16 $16$ st. gen. sec.-broken loop
1311 *      jun1    ifty    ioff
1312   14          1      0
1313 *  twtold   rfmx    concin   felv
1314   0.0000e+00  1.0000e+05  0.0000e+00  0.0000e+00
1315 *  dxin     violin  alpin    vlin    tlin
1316   2.5240e+00  9.9720e-01  0.0000e+00  0.0000e+00  5.4000e+02
1317 *  pin      pain    flowin   vvin    tvin
1318   5.2500e+06  0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
1319 *
1320 ***** type    num      id      ctitle
1321 fill      17  17 $17$ st. gen. sec.-broken loop
1322 *      jun1    ifty    ioff
1323   15          1      0
1324 *  twtold   rfmx    concin   felv
1325   0.0000e+00  1.0000e+05  0.0000e+00  0.0000e+00
1326 *  dxin     violin  alpin    vlin    tlin
1327   2.7510e+00  1.1051e+00  0.0000e+00  0.0000e+00  5.4000e+02
1328 *  pin      pain    flowin   vvin    tvin
1329   5.2500e+06  0.0000e+00  0.0000e+00  0.0000e+00  0.0000e+00
1330 *
1331 *      type    num      id      ctitle
1332 rod      999    999 $999$ fuel rod component
1333 *      ncrx      ncrz
1334   6          7
1335 *  nopowr   nrdr     modez    liqlev  iaxcmd  * card 2
1336   0          0      0      1
1337 *  idbci     idbco    hdri     hdro
1338   0          2  0.0000e+00  1.3650e-02
1339 *  nrods     nodes    irftr    nzmax  irftr2
1340   6          6  1002    250   1002
1341 *  dtxht(1) dtxht(2) dznht   hgapo  shelfv
1342   2.5000e+00  1.0000e+01  1.0000e-03  1.0000e+10  2.1000e+00
1343 *  irpwty   ndgx     ndhx    nrt  nhist  0 * card 11
1344   7          0      0      10
1345 *  irpwtr   irpwsv  nrpwtb  nrpwsv  nrpwrf  0 * card 14
1346   1002    101  -1201    0
1347 *  izpwtw   izpwsy  nzpwtb  nzpwsy  nzpwrif  0 * card 15
1348   1002    101    1
1349 *  nmwrx    nfcii   nfcil
1350   0          0      0
1351 *  nzpwtz   nzpwi   nfbpwt
1352   18          -1      0
1353 *  react    tneut   rpwoff  rrpmx  rpwscl  1.0000e+00 * card 18
1354   0.0000e+00  0.0000e+00  0.0000e+00  1.0000e+30
1355 *  rpowri   zpwin  zpwoff  rzpwmx
1356   2.5713e+03  0.0000e+00  0.0000e+00  1.0000e+09 * card 19
1357 *  extsou   pldr    pdrat   fucrac
1358   0.0000e+00  0.0000e+00  1.3364e+00  1.0000e+00 * card 20
1359 *  nhcomo
1360 f      1e
1361 *  nhcelo
1362   -4s
1363   4s
1364   5s

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1365          6s
1366          7s
1367          8s
1368          9s
1369          10s
1370          11e
1371          z
1372          2.1000e+00s
1373          2.4050e+00s
1374          3.0150e+00s
1375          3.6250e+00s
1376          4.2350e+00s
1377          4.8450e+00s
1378          5.4550e+00s
1379          5.7600e+00e
1380          *      grav.
1381          f      1.0e
1382          *      rdx   * 57.0 171.0 171.0 513.0 s
1383          *      rdx   * 228.0 684.0 e
1384          *      radrd * 0.0000e+00 2.7000e-03 3.3000e-03 4.3500e-03 4.8500e-03
1385          *      radrd * 5.3500e-03e
1386          *      matrd * 58      55      59r02      60e
1387          *      nfax * f      1e
1388          *      rftn * f 414.2 e
1389          *      rftn * f 414.2 e
1390          *      rftn * f 414.2 e
1391          *      rftn * f 414.2 e
1392          *      rftn * f 414.2 e
1393          *      rftn * f 414.2 e
1394          *      rdpwr * 0.0000e+00 7.0980e-01 1.0000e+00r03 0.0000e+00e
1395          *      cpowr * r02 1.3600e+00r02 1.2000e+00r02 7.6000e-01e
1396          *      rpkf f 1.      e
1397          *      zpwzr *
1398          2.1 s
1399          2.355 s
1400          2.605 s
1401          2.815 s
1402          3.015 s
1403          3.215 s
1404          3.425 s
1405          3.625 s
1406          3.825 s
1407          4.035 s
1408          4.235 s
1409          4.435 s
1410          4.645 s
1411          4.845 s
1412          5.045 s
1413          5.255 s
1414          5.505 s
1415          5.76 e
1416          *      zpwzr *
1417          0.0 s
1418          0.406 s
1419          0.651 s
1420          0.854 s
1421          1.01 s
1422          1.15 s
1423          1.26 s
1424          1.34 s
1425          1.38 s
1426          1.4 s
1427          1.38 s
1428          1.34 s
1429          1.26 s
1430          1.15 s
1431          1.01 s
1432          0.854 s
1433          0.651 s
1434          0.406 s
1435          0.0 e
1436          *
1437          *      rpwtb computed from experimental data by summing
1438          *      data channels wt01m, wt02m, . . . wt09m
1439          *
1440          0.e+00 2.5713e+03 s
1441          5.e-01 5.9609e+03 s
1442          1.e+00 1.64843e+05 s
1443          1.5e+00 1.51367e+06 s
1444          2.e+00 4.0619e+06 s
1445          2.5e+00 6.7131e+06 s
1446          3.e+00 8.343e+06 s
1447          3.5e+00 8.7462e+06 s
1448          4.e+00 8.6925e+06 s
1449          4.5e+00 8.6017e+06 s
1450          5.e+00 8.6903e+06 s
1451          5.5e+00 8.931e+06 s
1452          6.e+00 9.1316e+06 s
1453          6.5e+00 9.202e+06 s
1454          7.e+00 9.2066e+06 s
1455          7.5e+00 9.2016e+06 s
1456          8.e+00 9.2215e+06 s

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1457	8.5e+00	9.2696e+06	s
1458	9.e+00	9.3102e+06	s
1459	9.5e+00	9.3192e+06	s
1460	1.e+01	9.313e+06	s
1461	1.05e+01	9.3117e+06	s
1462	1.1e+01	9.3278e+06	s
1463	1.15e+01	9.3434e+06	s
1464	1.2e+01	9.3462e+06	s
1465	1.25e+01	9.3429e+06	s
1466	1.3e+01	9.3417e+06	s
1467	1.35e+01	9.3424e+06	s
1468	1.4e+01	9.3451e+06	s
1469	1.45e+01	9.3482e+06	s
1470	1.5e+01	9.3494e+06	s
1471	1.55e+01	9.3465e+06	s
1472	1.6e+01	9.3409e+06	s
1473	1.65e+01	9.3431e+06	s
1474	1.7e+01	9.3483e+06	s
1475	1.75e+01	9.3507e+06	s
1476	1.8e+01	9.3517e+06	s
1477	1.85e+01	9.3491e+06	s
1478	1.9e+01	9.3463e+06	s
1479	1.95e+01	9.3479e+06	s
1480	2.e+01	9.3518e+06	s
1481	2.05e+01	9.3537e+06	s
1482	2.1e+01	9.3525e+06	s
1483	2.15e+01	9.3503e+06	s
1484	2.2e+01	9.3544e+06	s
1485	2.25e+01	9.3547e+06	s
1486	2.3e+01	9.3506e+06	s
1487	2.35e+01	9.3484e+06	s
1488	2.4e+01	9.3469e+06	s
1489	2.45e+01	9.3472e+06	s
1490	2.5e+01	9.3471e+06	s
1491	2.55e+01	9.3503e+06	s
1492	2.6e+01	9.3527e+06	s
1493	2.65e+01	9.35e+06	s
1494	2.7e+01	9.3473e+06	s
1495	2.75e+01	9.3485e+06	s
1496	2.8e+01	9.3499e+06	s
1497	2.85e+01	9.3503e+06	s
1498	2.9e+01	9.348e+06	s
1499	2.95e+01	9.349e+06	s
1500	3.e+01	9.3508e+06	s
1501	3.05e+01	9.3705e+06	s
1502	3.1e+01	9.4026e+06	s
1503	3.15e+01	9.4152e+06	s
1504	3.2e+01	9.3908e+06	s
1505	3.25e+01	9.368e+06	s
1506	3.3e+01	9.3592e+06	s
1507	3.35e+01	9.3635e+06	s
1508	3.4e+01	9.3635e+06	s
1509	3.45e+01	9.358e+06	s
1510	3.5e+01	9.3551e+06	s
1511	3.55e+01	9.3541e+06	s
1512	3.6e+01	9.356e+06	s
1513	3.65e+01	9.3548e+06	s
1514	3.7e+01	9.3527e+06	s
1515	3.75e+01	9.3529e+06	s
1516	3.8e+01	9.3519e+06	s
1517	3.85e+01	9.3498e+06	s
1518	3.9e+01	9.3496e+06	s
1519	3.95e+01	9.3493e+06	s
1520	4.e+01	9.3495e+06	s
1521	4.05e+01	9.3502e+06	s
1522	4.1e+01	9.3508e+06	s
1523	4.15e+01	9.3502e+06	s
1524	4.2e+01	9.3495e+06	s
1525	4.25e+01	9.3508e+06	s
1526	4.3e+01	9.3512e+06	s
1527	4.35e+01	9.3496e+06	s
1528	4.4e+01	9.3475e+06	s
1529	4.45e+01	9.3488e+06	s
1530	4.5e+01	9.3503e+06	s
1531	4.55e+01	9.3492e+06	s
1532	4.6e+01	9.3461e+06	s
1533	4.65e+01	9.3463e+06	s
1534	4.7e+01	9.3491e+06	s
1535	4.75e+01	9.3491e+06	s
1536	4.8e+01	9.3479e+06	s
1537	4.85e+01	9.3487e+06	s
1538	4.9e+01	9.3493e+06	s
1539	4.95e+01	9.3493e+06	s
1540	5.e+01	9.3512e+06	s
1541	5.05e+01	9.3528e+06	s
1542	5.1e+01	9.3532e+06	s
1543	5.15e+01	9.3503e+06	s
1544	5.2e+01	9.3493e+06	s
1545	5.25e+01	9.3493e+06	s
1546	5.3e+01	9.3507e+06	s
1547	5.35e+01	9.3516e+06	s
1548	5.4e+01	9.3517e+06	s

1549	5.45e+01	9.3508e+06	s
1550	5.5e+01	9.352e+06	s
1551	5.55e+01	9.3516e+06	s
1552	5.6e+01	9.3502e+06	s
1553	5.65e+01	9.3499e+06	s
1554	5.7e+01	9.3529e+06	s
1555	5.75e+01	9.3518e+06	s
1556	5.8e+01	9.3497e+06	s
1557	5.85e+01	9.3496e+06	s
1558	5.9e+01	9.3501e+06	s
1559	5.95e+01	9.3506e+06	s
1560	6.e+01	9.3534e+06	s
1561	6.05e+01	9.3552e+06	s
1562	6.1e+01	9.3558e+06	s
1563	6.15e+01	9.3536e+06	s
1564	6.2e+01	9.3529e+06	s
1565	6.25e+01	9.3525e+06	s
1566	6.3e+01	9.3518e+06	s
1567	6.35e+01	9.3533e+06	s
1568	6.4e+01	9.3536e+06	s
1569	6.45e+01	9.3523e+06	s
1570	6.5e+01	9.3502e+06	s
1571	6.55e+01	9.3518e+06	s
1572	6.6e+01	9.3524e+06	s
1573	6.65e+01	9.3525e+06	s
1574	6.7e+01	9.3514e+06	s
1575	6.75e+01	9.3517e+06	s
1576	6.8e+01	9.3533e+06	s
1577	6.85e+01	9.3534e+06	s
1578	6.9e+01	9.3528e+06	s
1579	6.95e+01	9.3489e+06	s
1580	7.e-01	9.3499e+06	s
1581	7.05e+01	9.3551e+06	s
1582	7.1e+01	9.3586e+06	s
1583	7.15e+01	9.3569e+06	s
1584	7.2e+01	9.3539e+06	s
1585	7.25e+01	9.355e+06	s
1586	7.3e+01	9.3542e+06	s
1587	7.35e+01	9.3537e+06	s
1588	7.4e+01	9.3538e+06	s
1589	7.45e+01	9.3531e+06	s
1590	7.5e+01	9.3539e+06	s
1591	7.55e+01	9.3557e+06	s
1592	7.6e+01	9.3557e+06	s
1593	7.65e+01	9.3537e+06	s
1594	7.7e+01	9.3514e+06	s
1595	7.75e+01	9.35e+06	s
1596	7.8e+01	9.35e+06	s
1597	7.85e+01	9.3508e+06	s
1598	7.9e+01	9.3545e+06	s
1599	7.95e+01	9.3553e+06	s
1600	8.e+01	9.3555e+06	s
1601	8.05e+01	9.3543e+06	s
1602	8.1e+01	9.3534e+06	s
1603	8.15e+01	9.3533e+06	s
1604	8.2e+01	9.353e+06	s
1605	8.25e+01	9.352e+06	s
1606	8.3e+01	9.3504e+06	s
1607	8.35e+01	9.35e+06	s
1608	8.4e+01	9.3525e+06	s
1609	8.45e+01	9.3546e+06	s
1610	8.5e+01	9.3543e+06	s
1611	8.55e+01	9.3533e+06	s
1612	8.6e+01	9.3546e+06	s
1613	8.65e+01	9.354e+06	s
1614	8.7e+01	9.352e+06	s
1615	8.75e+01	9.3521e+06	s
1616	8.8e+01	9.3539e+06	s
1617	8.85e+01	9.3543e+06	s
1618	8.9e+01	9.3531e+06	s
1619	8.95e+01	9.3531e+06	s
1620	9.e+01	9.3519e+06	s
1621	9.05e+01	9.2499e+06	s
1622	9.1e+01	8.8152e+06	s
1623	9.15e+01	8.1582e+06	s
1624	9.2e+01	7.7817e+06	s
1625	9.25e+01	7.78e+06	s
1626	9.3e+01	7.8594e+06	s
1627	9.35e+01	7.8961e+06	s
1628	9.4e+01	7.8788e+06	s
1629	9.45e+01	7.8214e+06	s
1630	9.5e+01	7.7652e+06	s
1631	9.55e+01	7.7253e+06	s
1632	9.6e+01	7.6994e+06	s
1633	9.65e+01	7.6823e+06	s
1634	9.7e+01	7.6638e+06	s
1635	9.75e+01	7.6421e+06	s
1636	9.8e+01	7.6206e+06	s
1637	9.85e+01	7.6054e+06	s
1638	9.9e+01	7.5887e+06	s
1639	9.95e+01	7.5698e+06	s
1640	1.e+02	7.5482e+06	s

1641	1.005e+02	7.5316e+06	s
1642	1.01e+02	7.5172e+06	s
1643	1.015e+02	7.5005e+06	s
1644	1.02e+02	7.4848e+06	s
1645	1.025e+02	7.4674e+06	s
1646	1.03e+02	7.4504e+06	s
1647	1.035e+02	7.4381e+06	s
1648	1.04e+02	7.4255e+06	s
1649	1.045e+02	7.4096e+06	s
1650	1.05e+02	7.396e+06	s
1651	1.055e+02	7.3829e+06	s
1652	1.06e+02	7.3656e+06	s
1653	1.065e+02	7.3541e+06	s
1654	1.07e+02	7.3426e+06	s
1655	1.075e+02	7.327e+06	s
1656	1.08e+02	7.3135e+06	s
1657	1.085e+02	7.3022e+06	s
1658	1.09e+02	7.2883e+06	s
1659	1.095e+02	7.274e+06	s
1660	1.1e+02	7.2612e+06	s
1661	1.105e+02	7.2491e+06	s
1662	1.11e+02	7.2382e+06	s
1663	1.115e+02	7.2241e+06	s
1664	1.12e+02	7.2092e+06	s
1665	1.125e+02	7.199e+06	s
1666	1.13e+02	7.1924e+06	s
1667	1.135e+02	7.1876e+06	s
1668	1.14e+02	7.1826e+06	s
1669	1.145e+02	7.1706e+06	s
1670	1.15e+02	7.1563e+06	s
1671	1.155e+02	7.1406e+06	s
1672	1.16e+02	7.1269e+06	s
1673	1.165e+02	7.1178e+06	s
1674	1.17e+02	7.1104e+06	s
1675	1.175e+02	7.1026e+06	s
1676	1.18e+02	7.093e+06	s
1677	1.185e+02	7.0804e+06	s
1678	1.19e+02	7.0667e+06	s
1679	1.195e+02	7.0511e+06	s
1680	1.2e+02	7.0416e+06	s
1681	1.205e+02	7.0328e+06	s
1682	1.21e+02	7.0229e+06	s
1683	1.215e+02	7.0128e+06	s
1684	1.22e+02	7.0035e+06	s
1685	1.225e+02	6.9926e+06	s
1686	1.23e+02	6.9871e+06	s
1687	1.235e+02	6.9846e+06	s
1688	1.24e+02	6.9746e+06	s
1689	1.245e+02	6.9602e+06	s
1690	1.25e+02	6.9496e+06	s
1691	1.255e+02	6.9415e+06	s
1692	1.26e+02	6.9314e+06	s
1693	1.265e+02	6.9175e+06	s
1694	1.27e+02	6.9058e+06	s
1695	1.275e+02	6.8989e+06	s
1696	1.28e+02	6.89e+06	s
1697	1.285e+02	6.8837e+06	s
1698	1.29e+02	6.8797e+06	s
1699	1.295e+02	6.8718e+06	s
1700	1.3e+02	6.8636e+06	s
1701	1.305e+02	6.8527e+06	s
1702	1.31e+02	6.8421e+06	s
1703	1.315e+02	6.836e+06	s
1704	1.32e+02	6.8269e+06	s
1705	1.325e+02	6.8163e+06	s
1706	1.33e+02	6.8091e+06	s
1707	1.335e+02	6.8007e+06	s
1708	1.34e+02	6.7913e+06	s
1709	1.345e+02	6.7842e+06	s
1710	1.35e+02	6.7757e+06	s
1711	1.355e+02	6.7642e+06	s
1712	1.36e+02	6.7565e+06	s
1713	1.365e+02	6.7554e+06	s
1714	1.37e+02	6.7529e+06	s
1715	1.375e+02	6.7421e+06	s
1716	1.38e+02	6.7308e+06	s
1717	1.385e+02	6.7221e+06	s
1718	1.39e+02	6.7152e+06	s
1719	1.395e+02	6.7113e+06	s
1720	1.4e+02	6.7085e+06	s
1721	1.405e+02	6.7001e+06	s
1722	1.41e+02	6.6893e+06	s
1723	1.415e+02	6.6819e+06	s
1724	1.42e+02	6.6754e+06	s
1725	1.425e+02	6.6712e+06	s
1726	1.43e+02	6.6637e+06	s
1727	1.435e+02	6.6527e+06	s
1728	1.44e+02	6.642e+06	s
1729	1.445e+02	6.6356e+06	s
1730	1.45e+02	6.6332e+06	s
1731	1.455e+02	6.6318e+06	s
1732	1.46e+02	6.6254e+06	s

1733	1.465e+02	6.6143e+06	s
1734	1.47e+02	6.6045e+06	s
1735	1.475e+02	6.601e+06	s
1736	1.48e+02	6.6003e+06	s
1737	1.485e+02	6.5978e+06	s
1738	1.49e+02	6.5917e+06	s
1739	1.495e+02	6.5834e+06	s
1740	1.5e+02	6.5745e+06	s
1741	1.505e+02	6.5664e+06	s
1742	1.51e+02	6.56e+06	s
1743	1.515e+02	6.5554e+06	s
1744	1.52e+02	6.5522e+06	s
1745	1.525e+02	6.5479e+06	s
1746	1.53e+02	6.5416e+06	s
1747	1.535e+02	6.5343e+06	s
1748	1.54e+02	6.5281e+06	s
1749	1.545e+02	6.5255e+06	s
1750	1.55e+02	6.5231e+06	s
1751	1.555e+02	6.5174e+06	s
1752	1.56e+02	6.511e+06	s
1753	1.565e+02	6.5004e+06	s
1754	1.57e+02	6.4884e+06	s
1755	1.575e+02	6.4813e+06	s
1756	1.58e+02	6.4789e+06	s
1757	1.585e+02	6.4786e+06	s
1758	1.59e+02	6.4775e+06	s
1759	1.595e+02	6.4733e+06	s
1760	1.6e+02	6.4678e+06	s
1761	1.605e+02	6.4606e+06	s
1762	1.61e+02	6.4523e+06	s
1763	1.615e+02	6.4457e+06	s
1764	1.62e+02	6.4452e+06	s
1765	1.625e+02	6.4438e+06	s
1766	1.63e+02	6.4367e+06	s
1767	1.635e+02	6.426e+06	s
1768	1.64e+02	6.4148e+06	s
1769	1.645e+02	6.4072e+06	s
1770	1.65e+02	6.4021e+06	s
1771	1.655e+02	6.3996e+06	s
1772	1.66e+02	6.3978e+06	s
1773	1.665e+02	6.3948e+06	s
1774	1.67e+02	6.391e+06	s
1775	1.675e+02	6.3876e+06	s
1776	1.68e+02	6.385e+06	s
1777	1.685e+02	6.3813e+06	s
1778	1.69e+02	6.3752e+06	s
1779	1.695e+02	6.3662e+06	s
1780	1.7e+02	6.3585e+06	s
1781	1.705e+02	6.3545e+06	s
1782	1.71e+02	6.3529e+06	s
1783	1.715e+02	6.3534e+06	s
1784	1.72e+02	6.3537e+06	s
1785	1.725e+02	6.3542e+06	s
1786	1.73e+02	6.3521e+06	s
1787	1.735e+02	6.3417e+06	s
1788	1.74e+02	6.3302e+06	s
1789	1.745e+02	6.3242e+06	s
1790	1.75e+02	6.322e+06	s
1791	1.755e+02	6.3182e+06	s
1792	1.76e+02	6.3113e+06	s
1793	1.765e+02	6.3069e+06	s
1794	1.77e+02	6.3069e+06	s
1795	1.775e+02	6.3044e+06	s
1796	1.78e+02	6.2978e+06	s
1797	1.785e+02	6.2908e+06	s
1798	1.79e+02	6.2869e+06	s
1799	1.795e+02	6.2844e+06	s
1800	1.8e+02	6.2812e+06	s
1801	1.805e+02	6.2773e+06	s
1802	1.81e+02	6.273e+06	s
1803	1.815e+02	6.2679e+06	s
1804	1.82e+02	6.261e+06	s
1805	1.825e+02	6.2523e+06	s
1806	1.83e+02	6.2477e+06	s
1807	1.835e+02	6.2451e+06	s
1808	1.84e+02	6.24e+06	s
1809	1.845e+02	6.2343e+06	s
1810	1.85e+02	6.2308e+06	s
1811	1.855e+02	6.2268e+06	s
1812	1.86e+02	6.2217e+06	s
1813	1.865e+02	6.2179e+06	s
1814	1.87e+02	6.2144e+06	s
1815	1.875e+02	6.2101e+06	s
1816	1.88e+02	6.2048e+06	s
1817	1.885e+02	6.2013e+06	s
1818	1.89e+02	6.198e+06	s
1819	1.895e+02	6.1929e+06	s
1820	1.9e+02	6.1879e+06	s
1821	1.905e+02	6.1841e+06	s
1822	1.91e+02	6.182e+06	s
1823	1.915e+02	6.1789e+06	s
1824	1.92e+02	6.1743e+06	s

1825	1.925e+02	6.1719e+06	s
1826	1.93e+02	6.1707e+06	s
1827	1.935e+02	6.1655e+06	s
1828	1.94e+02	6.1583e+06	s
1829	1.945e+02	6.1548e+06	s
1830	1.95e+02	6.1526e+06	s
1831	1.955e+02	6.1453e+06	s
1832	1.96e+02	6.136e+06	s
1833	1.965e+02	6.1297e+06	s
1834	1.97e+02	6.1246e+06	s
1835	1.975e+02	6.1231e+06	s
1836	1.98e+02	6.1236e+06	s
1837	1.985e+02	6.1239e+06	s
1838	1.99e+02	6.1233e+06	s
1839	1.995e+02	6.1193e+06	s
1840	2.e+02	6.1124e+06	s
1841	2.005e+02	6.1048e+06	s
1842	2.01e+02	6.1002e+06	s
1843	2.015e+02	6.096e+06	s
1844	2.02e+02	6.0892e+06	s
1845	2.025e+02	6.084e+06	s
1846	2.03e+02	6.0809e+06	s
1847	2.035e+02	6.0798e+06	s
1848	2.04e+02	6.0794e+06	s
1849	2.045e+02	6.0773e+06	s
1850	2.05e+02	6.0757e+06	s
1851	2.055e+02	6.0709e+06	s
1852	2.06e+02	6.0606e+06	s
1853	2.065e+02	6.0514e+06	s
1854	2.07e+02	6.0479e+06	s
1855	2.075e+02	6.0468e+06	s
1856	2.08e+02	6.0462e+06	s
1857	2.085e+02	6.0483e+06	s
1858	2.09e+02	6.0495e+06	s
1859	2.095e+02	6.0442e+06	s
1860	2.1e+02	6.0373e+06	s
1861	2.105e+02	6.0345e+06	s
1862	2.11e+02	6.0334e+06	s
1863	2.115e+02	6.0292e+06	s
1864	2.12e+02	6.0225e+06	s
1865	2.125e+02	6.0195e+06	s
1866	2.13e+02	6.0184e+06	s
1867	2.135e+02	6.0161e+06	s
1868	2.14e+02	6.0143e+06	s
1869	2.145e+02	6.0139e+06	s
1870	2.15e+02	6.0134e+06	s
1871	2.155e+02	6.0127e+06	s
1872	2.16e+02	6.0117e+06	s
1873	2.165e+02	6.0111e+06	s
1874	2.17e+02	6.0107e+06	s
1875	2.175e+02	6.0103e+06	s
1876	2.18e+02	6.01e+06	s
1877	2.185e+02	6.0086e+06	s
1878	2.19e+02	6.0074e+06	s
1879	2.195e+02	6.0074e+06	s
1880	2.2e+02	6.0087e+06	s
1881	2.205e+02	6.01e+06	s
1882	2.21e+02	6.0101e+06	s
1883	2.215e+02	6.0086e+06	s
1884	2.22e+02	6.0094e+06	s
1885	2.225e+02	6.0107e+06	s
1886	2.23e+02	6.0106e+06	s
1887	2.235e+02	6.0103e+06	s
1888	2.24e+02	6.0098e+06	s
1889	2.245e+02	6.0069e+06	s
1890	2.25e+02	6.005e+06	s
1891	2.255e+02	6.0041e+06	s
1892	2.26e+02	6.0045e+06	s
1893	2.265e+02	6.0044e+06	s
1894	2.27e+02	6.0016e+06	s
1895	2.275e+02	5.9986e+06	s
1896	2.28e+02	5.9978e+06	s
1897	2.285e+02	5.9982e+06	s
1898	2.29e+02	5.9981e+06	s
1899	2.295e+02	5.9977e+06	s
1900	2.3e+02	5.9974e+06	s
1901	2.305e+02	5.9989e+06	s
1902	2.31e+02	6.0005e+06	s
1903	2.315e+02	5.99e+06	s
1904	2.32e+02	5.972e+06	s
1905	2.325e+02	5.9602e+06	s
1906	2.33e+02	5.9548e+06	s
1907	2.335e+02	5.9541e+06	s
1908	2.34e+02	5.9556e+06	s
1909	2.345e+02	5.9554e+06	s
1910	2.35e+02	5.9534e+06	s
1911	2.355e+02	5.9543e+06	s
1912	2.36e+02	5.9551e+06	s
1913	2.365e+02	5.9454e+06	s
1914	2.37e+02	5.9296e+06	s
1915	2.375e+02	5.9168e+06	s
1916	2.38e+02	5.9091e+06	s

1917	2.385e+02	5.9075e+06	s
1918	2.39e+02	5.9091e+06	s
1919	2.395e+02	5.9105e+06	s
1920	2.4e+02	5.9109e+06	s
1921	2.405e+02	5.9093e+06	s
1922	2.41e+02	5.9067e+06	s
1923	2.415e+02	5.8952e+06	s
1924	2.42e+02	5.8753e+06	s
1925	2.425e+02	5.8577e+06	s
1926	2.43e+02	5.8492e+06	s
1927	2.435e+02	5.8482e+06	s
1928	2.44e+02	5.8496e+06	s
1929	2.445e+02	5.8498e+06	s
1930	2.45e+02	5.8494e+06	s
1931	2.455e+02	5.8478e+06	s
1932	2.46e+02	5.8454e+06	s
1933	2.465e+02	5.8402e+06	s
1934	2.47e+02	5.8325e+06	s
1935	2.475e+02	5.8228e+06	s
1936	2.48e+02	5.8147e+06	s
1937	2.485e+02	5.8148e+06	s
1938	2.49e+02	5.8183e+06	s
1939	2.495e+02	5.8186e+06	s
1940	2.5e+02	5.8155e+06	s
1941	2.505e+02	5.8142e+06	s
1942	2.51e+02	5.813e+06	s
1943	2.515e+02	5.8012e+06	s
1944	2.52e+02	5.7863e+06	s
1945	2.525e+02	5.7782e+06	s
1946	2.53e+02	5.7725e+06	s
1947	2.535e+02	5.77e+06	s
1948	2.54e+02	5.7716e+06	s
1949	2.545e+02	5.7729e+06	s
1950	2.55e+02	5.7702e+06	s
1951	2.555e+02	5.7693e+06	s
1952	2.56e+02	5.7706e+06	s
1953	2.565e+02	5.7648e+06	s
1954	2.57e+02	5.7529e+06	s
1955	2.575e+02	5.7452e+06	s
1956	2.58e+02	5.7424e+06	s
1957	2.585e+02	5.7389e+06	s
1958	2.59e+02	5.734e+06	s
1959	2.595e+02	5.734e+06	s
1960	2.6e+02	5.7386e+06	s
1961	2.605e+02	5.7403e+06	s
1962	2.61e+02	5.7368e+06	s
1963	2.615e+02	5.7257e+06	s
1964	2.62e+02	5.7103e+06	s
1965	2.625e+02	5.6985e+06	s
1966	2.63e+02	5.693e+06	s
1967	2.635e+02	5.6938e+06	s
1968	2.64e+02	5.694e+06	s
1969	2.645e+02	5.6917e+06	s
1970	2.65e+02	5.6901e+06	s
1971	2.655e+02	5.6918e+06	s
1972	2.66e+02	5.6923e+06	s
1973	2.665e+02	5.6844e+06	s
1974	2.67e+02	5.6722e+06	s
1975	2.675e+02	5.6633e+06	s
1976	2.68e+02	5.658e+06	s
1977	2.685e+02	5.6574e+06	s
1978	2.69e+02	5.6604e+06	s
1979	2.695e+02	5.6613e+06	s
1980	2.7e+02	5.6582e+06	s
1981	2.705e+02	5.6557e+06	s
1982	2.71e+02	5.6548e+06	s
1983	2.715e+02	5.6449e+06	s
1984	2.72e+02	5.6288e+06	s
1985	2.725e+02	5.6173e+06	s
1986	2.73e+02	5.6123e+06	s
1987	2.735e+02	5.6114e+06	s
1988	2.74e+02	5.6113e+06	s
1989	2.745e+02	5.6124e+06	s
1990	2.75e+02	5.6141e+06	s
1991	2.755e+02	5.6132e+06	s
1992	2.76e+02	5.6107e+06	s
1993	2.765e+02	5.6106e+06	s
1994	2.77e+02	5.6102e+06	s
1995	2.775e+02	5.6057e+06	s
1996	2.78e+02	5.6005e+06	s
1997	2.785e+02	5.5999e+06	s
1998	2.79e+02	5.6004e+06	s
1999	2.795e+02	5.5992e+06	s
2000	2.8e+02	5.5989e+06	s
2001	2.805e+02	5.5997e+06	s
2002	2.81e+02	5.5997e+06	s
2003	2.815e+02	5.5974e+06	s
2004	2.82e+02	5.5911e+06	s
2005	2.825e+02	5.5813e+06	s
2006	2.83e+02	5.5745e+06	s
2007	2.835e+02	5.5704e+06	s
2008	2.84e+02	5.5673e+06	s

2009	2.845e+02	5.5667e+06	s
2010	2.85e+02	5.5679e+06	s
2011	2.855e+02	5.5685e+06	s
2012	2.86e+02	5.5674e+06	s
2013	2.865e+02	5.5649e+06	s
2014	2.87e+02	5.5581e+06	s
2015	2.875e+02	5.5422e+06	s
2016	2.88e+02	5.5284e+06	s
2017	2.885e+02	5.5236e+06	s
2018	2.89e+02	5.5223e+06	s
2019	2.895e+02	5.5227e+06	s
2020	2.9e+02	5.5234e+06	s
2021	2.905e+02	5.5233e+06	s
2022	2.91e+02	5.5229e+06	s
2023	2.915e+02	5.5211e+06	s
2024	2.92e+02	5.5152e+06	s
2025	2.925e+02	5.5054e+06	s
2026	2.93e+02	5.4969e+06	s
2027	2.935e+02	5.4907e+06	s
2028	2.94e+02	5.4865e+06	s
2029	2.945e+02	5.4863e+06	s
2030	2.95e+02	5.4867e+06	s
2031	2.955e+02	5.4864e+06	s
2032	2.96e+02	5.4862e+06	s
2033	2.965e+02	5.4855e+06	s
2034	2.97e+02	5.478e+06	s
2035	2.975e+02	5.4624e+06	s
2036	2.98e+02	5.4501e+06	s
2037	2.985e+02	5.446e+06	s
2038	2.99e+02	5.4455e+06	s
2039	2.995e+02	5.4465e+06	s
2040	3.e+02	5.4476e+06	s
2041	3.005e+02	5.4479e+06	s
2042	3.01e+02	5.4478e+06	s
2043	3.015e+02	5.4472e+06	s
2044	3.02e+02	5.4421e+06	s
2045	3.025e+02	5.4309e+06	s
2046	3.03e+02	5.4221e+06	s
2047	3.035e+02	5.419e+06	s
2048	3.04e+02	5.4171e+06	s
2049	3.045e+02	5.4164e+06	s
2050	3.05e+02	5.416e+06	s
2051	3.055e+02	5.4165e+06	s
2052	3.06e+02	5.4169e+06	s
2053	3.065e+02	5.4163e+06	s
2054	3.07e+02	5.4129e+06	s
2055	3.075e+02	5.4071e+06	s
2056	3.08e+02	5.4032e+06	s
2057	3.085e+02	5.4e+06	s
2058	3.09e+02	5.3966e+06	s
2059	3.095e+02	5.395e+06	s
2060	3.1e+02	5.3947e+06	s
2061	3.105e+02	5.3961e+06	s
2062	3.11e+02	5.3975e+06	s
2063	3.115e+02	5.3954e+06	s
2064	3.12e+02	5.3889e+06	s
2065	3.125e+02	5.3783e+06	s
2066	3.13e+02	5.3698e+06	s
2067	3.135e+02	5.367e+06	s
2068	3.14e+02	5.3671e+06	s
2069	3.145e+02	5.3678e+06	s
2070	3.15e+02	5.3671e+06	s
2071	3.155e+02	5.3664e+06	s
2072	3.16e+02	5.3663e+06	s
2073	3.165e+02	5.3647e+06	s
2074	3.17e+02	5.3574e+06	s
2075	3.175e+02	5.3459e+06	s
2076	3.18e+02	5.3388e+06	s
2077	3.185e+02	5.3371e+06	s
2078	3.19e+02	5.3362e+06	s
2079	3.195e+02	5.3354e+06	s
2080	3.2e+02	5.3348e+06	s
2081	3.205e+02	5.334e+06	s
2082	3.21e+02	5.3333e+06	s
2083	3.215e+02	5.3342e+06	s
2084	3.22e+02	5.3328e+06	s
2085	3.225e+02	5.3275e+06	s
2086	3.23e+02	5.3223e+06	s
2087	3.235e+02	5.3194e+06	s
2088	3.24e+02	5.3174e+06	s
2089	3.245e+02	5.3173e+06	s
2090	3.25e+02	5.3178e+06	s
2091	3.255e+02	5.3175e+06	s
2092	3.26e+02	5.3176e+06	s
2093	3.265e+02	5.3149e+06	s
2094	3.27e+02	5.3063e+06	s
2095	3.275e+02	5.2957e+06	s
2096	3.28e+02	5.2895e+06	s
2097	3.285e+02	5.2887e+06	s
2098	3.29e+02	5.2882e+06	s
2099	3.295e+02	5.2893e+06	s
2100	3.3e+02	5.29e+06	s

2101 3.305e+02 5.2885e+06 s
2102 3.31e+02 5.287e+06 s
2103 3.315e+02 5.287e+06 s
2104 3.32e+02 5.2815e+06 s
2105 3.325e+02 5.2689e+06 s
2106 3.33e+02 5.2595e+06 s
2107 3.335e+02 5.2573e+06 s
2108 3.34e+02 5.2565e+06 s
2109 3.345e+02 5.2559e+06 s
2110 3.35e+02 5.2558e+06 s
2111 3.355e+02 5.2553e+06 s
2112 3.36e+02 5.2547e+06 s
2113 3.365e+02 5.2548e+06 s
2114 3.37e+02 5.2531e+06 s
2115 3.375e+02 5.2476e+06 s
2116 3.38e+02 5.2438e+06 s
2117 3.385e+02 5.2438e+06 s
2118 3.39e+02 5.2434e+06 s
2119 3.395e+02 5.2426e+06 s
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2123 3.415e+02 5.2407e+06 s
2124 3.42e+02 5.2338e+06 s
2125 3.425e+02 5.2226e+06 s
2126 3.43e+02 5.2155e+06 s
2127 3.435e+02 5.2143e+06 s
2128 3.44e+02 5.2138e+06 s
2129 3.445e+02 5.2121e+06 s
2130 3.45e+02 5.2108e+06 s
2131 3.455e+02 5.2113e+06 s
2132 3.46e+02 5.211e+06 s
2133 3.465e+02 5.2087e+06 s
2134 3.47e+02 5.2024e+06 s
2135 3.475e+02 5.1903e+06 s
2136 3.48e+02 5.1794e+06 s
2137 3.485e+02 5.1766e+06 s
2138 3.49e+02 5.177e+06 s
2139 3.495e+02 5.1765e+06 s
2140 3.5e+02 5.1756e+06 s
2141 3.505e+02 5.1766e+06 s
2142 3.51e+02 5.1777e+06 s
2143 3.515e+02 5.1766e+06 s
2144 3.52e+02 5.1726e+06 s
2145 3.525e+02 5.1676e+06 s
2146 3.53e+02 5.1649e+06 s
2147 3.535e+02 5.1641e+06 s
2148 3.54e+02 5.1635e+06 s
2149 3.545e+02 5.1643e+06 s
2150 3.55e+02 5.1656e+06 s
2151 3.555e+02 5.1666e+06 s
2152 3.56e+02 5.166e+06 s
2153 3.565e+02 5.1638e+06 s
2154 3.57e+02 5.1568e+06 s
2155 3.575e+02 5.1449e+06 s
2156 3.58e+02 5.1353e+06 s
2157 3.585e+02 5.1319e+06 s
2158 3.59e+02 5.1314e+06 s
2159 3.595e+02 5.1316e+06 s
2160 3.6e+02 5.1311e+06 s
2161 3.605e+02 5.1315e+06 s
2162 3.61e+02 5.1326e+06 s
2163 3.615e+02 5.1312e+06 s
2164 3.62e+02 5.1284e+06 s
2165 3.625e+02 5.1246e+06 s
2166 3.63e+02 5.1207e+06 s
2167 3.635e+02 5.1184e+06 s
2168 3.64e+02 5.1186e+06 s
2169 3.645e+02 5.1199e+06 s
2170 3.65e+02 5.1199e+06 s
2171 3.655e+02 5.1199e+06 s
2172 3.66e+02 5.1204e+06 s
2173 3.665e+02 5.1182e+06 s
2174 3.67e+02 5.1103e+06 s
2175 3.675e+02 5.0991e+06 s
2176 3.68e+02 5.0906e+06 s
2177 3.685e+02 5.0869e+06 s
2178 3.69e+02 5.086e+06 s
2179 3.695e+02 5.0857e+06 s
2180 3.7e+02 5.0853e+06 s
2181 3.705e+02 5.0853e+06 s
2182 3.71e+02 5.0853e+06 s
2183 3.715e+02 5.0856e+06 s
2184 3.72e+02 5.0801e+06 s
2185 3.725e+02 5.0689e+06 s
2186 3.73e+02 5.0608e+06 s
2187 3.735e+02 5.0579e+06 s
2188 3.74e+02 5.0575e+06 s
2189 3.745e+02 5.0585e+06 s
2190 3.75e+02 5.0586e+06 s
2191 3.755e+02 5.0581e+06 s
2192 3.76e+02 5.0583e+06 s

2193	3.765e+02	5.0587e+06	s
2194	3.77e+02	5.0554e+06	s
2195	3.775e+02	5.0489e+06	s
2196	3.78e+02	5.0443e+06	s
2197	3.785e+02	5.0427e+06	s
2198	3.79e+02	5.041e+06	s
2199	3.795e+02	5.0411e+06	s
2200	3.8e+02	5.0426e+06	s
2201	3.805e+02	5.0427e+06	s
2202	3.81e+02	5.0417e+06	s
2203	3.815e+02	5.0406e+06	s
2204	3.82e+02	5.0376e+06	s
2205	3.825e+02	5.0306e+06	s
2206	3.83e+02	5.0247e+06	s
2207	3.835e+02	5.0234e+06	s
2208	3.84e+02	5.0235e+06	s
2209	3.845e+02	5.0246e+06	s
2210	3.85e+02	5.0258e+06	s
2211	3.855e+02	5.0254e+06	s
2212	3.86e+02	5.0246e+06	s
2213	3.865e+02	5.0245e+06	s
2214	3.87e+02	5.0232e+06	s
2215	3.875e+02	5.0181e+06	s
2216	3.88e+02	5.0119e+06	s
2217	3.885e+02	5.0088e+06	s
2218	3.89e+02	5.0086e+06	s
2219	3.895e+02	5.0081e+06	s
2220	3.9e+02	5.0066e+06	s
2221	3.905e+02	5.0057e+06	s
2222	3.91e+02	5.0055e+06	s
2223	3.915e+02	5.0044e+06	s
2224	3.92e+02	4.9977e+06	s
2225	3.925e+02	4.9861e+06	s
2226	3.93e+02	4.9796e+06	s
2227	3.935e+02	4.9791e+06	s
2228	3.94e+02	4.979e+06	s
2229	3.945e+02	4.9779e+06	s
2230	3.95e+02	4.9773e+06	s
2231	3.955e+02	4.9777e+06	s
2232	3.96e+02	4.9795e+06	s
2233	3.965e+02	4.9804e+06	s
2234	3.97e+02	4.9779e+06	s
2235	3.975e+02	4.971e+06	s
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2243	4.015e+02	4.9635e+06	s
2244	4.02e+02	4.9562e+06	s
2245	4.025e+02	4.9444e+06	s
2246	4.03e+02	4.936e+06	s
2247	4.035e+02	4.9327e+06	s
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2254	4.07e+02	4.9331e+06	s
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2256	4.08e+02	4.9353e+06	s
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2284	4.22e+02	4.882e+06	s

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2592 5.76e+02 4.4455e+06 s
2593 5.765e+02 4.4446e+06 s
2594 5.77e+02 4.4449e+06 s
2595 5.775e+02 4.4414e+06 s
2596 5.78e+02 4.4331e+06 s
2597 5.785e+02 4.4259e+06 s
2598 5.79e+02 4.4231e+06 s
2599 5.795e+02 4.4237e+06 s
2600 5.8e+02 4.4247e+06 s
2601 5.805e+02 4.4262e+06 s
2602 5.81e+02 4.4262e+06 s
2603 5.815e+02 4.4251e+06 s
2604 5.82e+02 4.4236e+06 s
2605 5.825e+02 4.4202e+06 s
2606 5.83e+02 4.4148e+06 s
2607 5.835e+02 4.4116e+06 s
2608 5.84e+02 4.4114e+06 s
2609 5.845e+02 4.4118e+06 s
2610 5.85e+02 4.4124e+06 s
2611 5.855e+02 4.4132e+06 s
2612 5.86e+02 4.4137e+06 s
2613 5.865e+02 4.413e+06 s
2614 5.87e+02 4.4123e+06 s
2615 5.875e+02 4.4126e+06 s
2616 5.88e+02 4.4127e+06 s
2617 5.885e+02 4.4119e+06 s
2618 5.89e+02 4.4114e+06 s
2619 5.895e+02 4.412e+06 s
2620 5.9e+02 4.4132e+06 s
2621 5.905e+02 4.4143e+06 s
2622 5.91e+02 4.415e+06 s
2623 5.915e+02 4.4147e+06 s
2624 5.92e+02 4.412e+06 s
2625 5.925e+02 4.4013e+06 s
2626 5.93e+02 4.3881e+06 s
2627 5.935e+02 4.3801e+06 s
2628 5.94e+02 4.3766e+06 s
2629 5.945e+02 4.3782e+06 s
2630 5.95e+02 4.3811e+06 s
2631 5.955e+02 4.3815e+06 s
2632 5.96e+02 4.3804e+06 s
2633 5.965e+02 4.3801e+06 s
2634 5.97e+02 4.3796e+06 s
2635 5.975e+02 4.3785e+06 s
2636 5.98e+02 4.3786e+06 s
2637 5.985e+02 4.38e+06 s
2638 5.99e+02 4.3804e+06 s
2639 5.995e+02 4.3794e+06 s
2640 6.e+02 4.3786e+06 e
2641 * fpuo2 * f 0.0000e+00e
2642 * ftd * f 1.0000e+00e
2643 * gmix * f 0.0000e+00e
2644 * gmles * f 0.0000e+00e
2645 * pgapt * f 0.0000e+00e
2646 * plvol * f 0.0000e+00e
2647 * pslen * f 0.0000e+00e
2648 * clemn * f 0.0000e+00e
2649 * burn * f 0.0000e+00e
2650 * burn * f 0.0000e+00e
2651 * burn * f 0.0000e+00e
2652 * burn * f 0.0000e+00e

```

```

2653 * burn * f 0.0000e+00e
2654 * burn * f 0.0000e+00e
2655 * type num id ctitle
2656 slab 998 998 $998$ lev 1 ring 1-3 slabs
2657 *
2658 * ncrx ncrz
2659 6 1
2660 *
2661 * nopowr nrindr modez liglev iaxcnd
2662 1 1 1 0 0
2663 *
2664 * idbci idbco
2665 0 2
2666 *
2667 * width
2668 1.0929
2669 *
2670 * nrods nodes irftr nzmax irftr2
2671 6 4 0 5 0
2672 *
2673 * dtxht(1) dtxht(2) dznht hgapo shelv
2674 5. 25. .002 0. 0.
2675 *
2676 * nhcomo
2677 f 1e
2678 *
2679 * nhcelo + + + +
2680 -1 1 2e
2681 *
2682 * dz +
2683 .915e
2684 *
2685 * grav
2686 f 1.0000E+00e
2687 *
2688 * idrod + + + +
2689 1 2 3 4 5
2690 6e
2691 *
2692 * rdx * 1.088 3.264 5.266 15.798 s
2693 * rdx * 5.266 15.798 e
2694 *
2695 * radrd 0.0 .002 .0035 .0043e
2696 *
2697 * matrd
2698 6e
2699 f
2700 *
2701 * nfax
2702 f 1e
2703 *
2704 * rftn
2705 f 393.e
2706 f 393.e
2707 f 393.e
2708 f 393.e
2709 f 393.e
2710 f 393.e
2711 *
2712 * type num id ctitle
2713 slab 997 997 $997$ lev 1 ring 4 slabs
2714 *
2715 * ncrx ncrz
2716 2 1
2717 *
2718 * nopowr nrindr modez liglev iaxcnd
2719 1 1 1 0 0
2720 *
2721 * idbci idbco
2722 0 2
2723 *
2724 * width
2725 1.0929
2726 *
2727 * nrods nodes irftr nzmax irftr2
2728 2 4 0 5 0
2729 *
2730 * dtxht(1) dtxht(2) dznht hgapo shelv
2731 5. 25. .002 0. 0.
2732 *
2733 * nhcomo
2734 f 1e
2735 *
2736 * nhcelo + + + +
2737 -1 1 2e
2738 *
2739 * dz +
2740 .915e
2741 *
2742 * grav
2743 f 1.0000E+00e
2744 *

```

```

2745 *      idrod      +      +
2746      7      8e      +
2747 *
2748 *      rdx * 2.07 6.21 e
2749 *
2750 *      radrd      .04      .08      .09e
2751      0.0
2752 *
2753 *      matrd      6e
2754 r 2      9
2755 *
2756 *      nfax      1e
2757 f
2758 *
2759 *      rftn
2760 f      393.e
2761 f      393.e
2762 *
2763 *
2764 *      type      num      id      ctitle
2765 slab      996      996 $996$ lev 2 ring 1-3 slabs
2766 *
2767 *      ncrx      ncrz
2768      6      1
2769 *
2770 *      nopowr      nrindr      modez      liqlev      iaxcnd
2771      1      1      1      0      0
2772 *
2773 *      idbci      idbco
2774      0      2
2775 *
2776 *      width      1.0152
2777 *
2778 *
2779 *      nrods      nodes      irftr      nzmax      irftr2
2780      6      4      0      5      0
2781 *
2782 *      dtxht(1)      dtxht(2)      dnzhht      hgapo      shelv
2783      5.      25.      .002      0.      0.
2784 *
2785 *      nhcomo      1e
2786 f
2787 *
2788 *      nhcelo      +
2789      -2      2      3e      +
2790 *
2791 *      dz      +
2792      .985e      +
2793 *
2794 *      grav
2795 f      1.00000E+00e
2796 *
2797 *      idrod      +
2798      1      2      3      4      5
2799      6e
2800 *
2801 *      rdx * 1.17 3.51 5.67 17.01 s
2802 *      rdx * 7.36 11.04 e
2803 *
2804 *      radrd      .002      .0035      .0043e
2805      0.0
2806 *
2807 *      matrd      6e
2808 f
2809 *
2810 *      nfax      1e
2811 f
2812 *
2813 *      rftn
2814 f      393.e
2815 f      393.e
2816 f      393.e
2817 f      393.e
2818 f      393.e
2819 f      393.e
2820 *
2821 *      type      num      id      ctitle
2822 slab      995      995 $995$ lev 2 ring 4 slabs
2823 *
2824 *      ncrx      ncrz
2825      2      1
2826 *
2827 *      nopowr      nrindr      modez      liqlev      iaxcnd
2828      1      1      1      0      0
2829 *
2830 *      idbci      idbco
2831      0      2
2832 *
2833 *      width      1.0152
2834 *
2835 *      nrods      nodes      irftr      nzmax      irftr2
2836 f

```

```

2837          2          4          0          5          0
2838 *      dtxht(1)      dtxht(2)
2839 *      5.          25.        dznht     hgapo     shlev
2840 *          .002       0.          0.
2841 *
2842 *      nhcomo
2843 f      1e
2844 *
2845 *      nhcelo
2846 *      -2          +          +          +
2847 *
2848 *      dz
2849 *      .985e
2850 *
2851 *      grav
2852 f      1.0000E+00e
2853 *
2854 *      idrod
2855 *      7          +          +          +
2856 *
2857 *      rdx * 0.79 2.37 e
2858 *
2859 *      radrd
2860 *      0.0          .04         .08         .09e
2861 *
2862 *      matrd
2863 r 2    9          6e
2864 *
2865 *      nfax
2866 f      1e
2867 *
2868 *      rftn
2869 f      393.e
2870 f      393.e
2871 *
2872 *
2873 *      type      num      id      ctitle
2874 slab     994      994 $994$ lev 3 ring 1-3 slabs
2875 *
2876 *      ncrx      ncrz
2877 *      6          1
2878 *
2879 *      nopowr
2880 *      nrindr
2881 *      modez
2882 *      idbci      idbco
2883 *      0          2
2884 *
2885 *      width
2886 *      5.0000
2887 *
2888 *      nrods      nodes
2889 *      6          4      irftr
2890 *      nzmax
2891 *      dtxht(1)      dtxht(2)
2892 *      5.          25.        dznht     hgapo     shlev
2893 *          .002       0.          0.
2894 *
2895 f      nhcomo
2896 *      1e
2897 *
2898 *      nhcelo
2899 *      -3          +          +          +
2900 *      dz
2901 *      .200e
2902 *
2903 *      grav
2904 f      1.0000E+00e
2905 *
2906 *      idrod
2907 *      1          +          +          +
2908 *      6e
2909 *
2910 *      rdx * 0.33 0.99 1.608 4.824 s
2911 *      rdx * 1.91 5.73 e
2912 *
2913 *      radrd
2914 *      0.0          .002         .0035       .0043e
2915 *
2916 *      matrd
2917 f      6e
2918 *
2919 *      nfax
2920 f      1e
2921 *
2922 *      rftn
2923 f      393.e
2924 f      393.e
2925 f      393.e
2926 f      393.e
2927 f      393.e
2928 f      393.e

```

```

2929 *
2930 *      type      num      id      ctitle
2931 slab     993      993 $993$ lev 3 ring 4 slabs
2932 *
2933 *      ncrx      ncrz
2934     2          1
2935 *
2936 *      nopowr    nrindr    modez    liqlev    iaxcnd
2937     1          1          1          0          0
2938 *
2939 *      idbci     idbco
2940     0          2
2941 *
2942 *      width
2943     5.0000
2944 *
2945 *      nrods     nodes    irftr    nzmax    irftr2
2946     2          4          0          5          0
2947 *
2948 *      dtxht(1)  dtxht(2)  dznht    hgapo    shelv
2949     5.          25.        .002      0.        0.
2950 *
2951 *      nhcomo
2952 f      1e
2953 *
2954 *      nhcelo
2955     -3          +          +          +
2956 *
2957 *      dz
2958     .200e
2959 *
2960 *      grav
2961 f      1.0000E+00e
2962 *
2963 *      idrod
2964     7          +          +          +
2965 *
2966 *      rdx * 0.16 0.48 e
2967 *
2968 *      radrd
2969     0.0         .04        .08        .09e
2970 *
2971 *      matrd
2972 r      2          9          6e
2973 *
2974 *      nfax
2975 f      1e
2976 *
2977 *      rftn
2978 f      393.e
2979 f      393.e
2980 *
2981 *      type      num      id      ctitle
2982 slab     974      974 $974$ lev 4-10 ring 1-3 slabs
2983 *
2984 *      ncrx      ncrz
2985     6          7
2986 *
2987 *      nopowr    nrindr    modez    liqlev    iaxcnd
2988     1          1          1          0          0
2989 *
2990 *      idbci     idbco
2991     0          2
2992 *
2993 *      width
2994     1.6393
2995 *
2996 *      nrods     nodes    irftr    nzmax    irftr2
2997     6          4          0          15         0
2998 *
2999 *      dtxht(1)  dtxht(2)  dznht    hgapo    shelv
3000     5.          25.        .002      0.        2.1
3001 *
3002 *      nhcomo
3003 f      1e
3004 *
3005 *      nhcelo
3006     -4          +          +          +
3007     8          4          5          6          7
3008 *
3009 *      dz
3010     .305        +          +          +
3011     .610        .610        .610        .610
3012 *
3013 *      grav
3014 f      1.0000E+00e
3015 *
3016 *      idrod
3017     1          +          +          +
3018     6e          2          3          4          5
3019 *
3020 *      rdx * 0.1586 0.4758 0.6612 1.9836 s

```

```

3021 * rdx * 1.235 3.705 e
3022 *
3023 *      radrd
3024     0.0          .002       .0035      .0043e
3025 *
3026 *      matrd
3027 f      6e
3028 *
3029 *      nfax
3030 f      1e
3031 *
3032 *      rftn
3033 f      393.e
3034 f      393.e
3035 f      393.e
3036 f      393.e
3037 f      393.e
3038 f      393.e
3039 *
3040 *
3041 *      type      num      id      ctitle
3042 slab    973      973 $973$ lev 4-10 ring 4 slabs
3043 *
3044 *      ncrx      ncrz
3045     2          7
3046 *
3047 *      nopowr    nrindr    modez    liqlev    iaxcnd
3048     1          1          1          0          0
3049 *
3050 *      idbci     idbco
3051     0          2
3052 *
3053 *      width
3054     1.6393
3055 *
3056 *      nrods     nodes    irftr    nzmax    irftr2
3057     2          4          0          15          0
3058 *
3059 *      dtxht(1)  dtxht(2)  dznht    hgapo    shelv
3060     5.         25.        .002      0.        2.1
3061 *
3062 *      nhcomo
3063 f      1e
3064 *
3065 *      nhcelo    +
3066     -4         4          5          6          7
3067     8          9          10         11e
3068 *
3069 *      dz        +
3070     .305       .610        .610       .610
3071     .610       .305e
3072 *
3073 *      grav
3074 f      1.0000E+00e
3075 *
3076 *      idrod    +
3077     7          8e
3078 *
3079 *      rdx * 0.519 1.557 e
3080 *
3081 *      radrd
3082     0.0        .04        .08       .09e
3083 *
3084 *      matrd
3085 r 2      9          6e
3086 *
3087 *      nfax
3088 f      1e
3089 *
3090 *      rftn
3091 f      393.e
3092 f      393.e
3093 *
3094 *      type      num      id      ctitle
3095 slab    918      918 $918$ lev 11 ring 1-3 slabs
3096 *
3097 *      ncrx      ncrz
3098     6          1
3099 *
3100 *      nopowr    nrindr    modez    liqlev    iaxcnd
3101     1          1          1          0          0
3102 *
3103 *      idbci     idbco
3104     0          2
3105 *
3106 *      width
3107     4.1667
3108 *
3109 *      nrods     nodes    irftr    nzmax    irftr2
3110     6          4          0          5          0
3111 *
3112 *      dtxht(1)  dtxht(2)  dznht    hgapo    shelv

```

```

3113      5.        25.       .002       0.       0.
3114 *
3115 *      nhcomo
3116 f      1e
3117 *
3118 *      nhcelo
3119 -11      +       +       +
3120 *      11      12e
3121 *      dz
3122 .240e
3123 *
3124 *      grav
3125 f      1.0000E+00e
3126 *
3127 *      idrod
3128 1      2       +       +
3129 6e
3130 *
3131 *      rdx * 0.2 0.6 0.965 2.895 s
3132 *      rdx * 1.192 3.576 e
3133 *
3134 *      radrd
3135 0.0      .002      .0035      .0043e
3136 *
3137 *      matrd
3138 f      6e
3139 *
3140 *      nfax
3141 f      1e
3142 *
3143 *      rftn
3144 f      393.e
3145 f      393.e
3146 f      393.e
3147 f      393.e
3148 f      393.e
3149 f      393.e
3150 *
3151 *      type      num      id      ctitle
3152 slab    917      917      $917$ lev 11 ring 4 slabs
3153 *
3154 *      ncrx      ncrz
3155 2      1
3156 *
3157 *      nopowr    nrdr      modez      liglev      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 2      4      0      5      0
3168 *
3169 *      dtxht(1)  dtxht(2)
3170 5.      25.      dznh      hgapo      shlev
3171 *
3172 *      nhcomo
3173 f      1e
3174 *
3175 *      nhcelo
3176 -11      +       +       +
3177 *
3178 *      dz
3179 .240e
3180 *
3181 *      grav
3182 f      1.0000E+00e
3183 *
3184 *      idrod
3185 7      8e      +       +
3186 *
3187 *      rdx * 0.204 0.612 e
3188 *
3189 *      radrd
3190 0.0      .04      .08      .09e
3191 *
3192 *      matrd
3193 r 2      9      6e
3194 *
3195 *      nfax
3196 f      1e
3197 *
3198 *      rftn
3199 f      393.e
3200 f      393.e
3201 *
3202 *
3203 *      type      num      id      ctitle
3204 slab    916      916      $916$ lev 12 ring 1-3 slabs

```

```

3205 *
3206 *      ncrx      ncrz
3207     6          1
3208 *
3209 *      nopowr    nrindr
3210     1          1      modez   1      liqlev   0      iaxcnd   0
3211 *
3212 *      idbci     idbco
3213     0          2
3214 *
3215 *      width
3216     4.1667
3217 *
3218 *      nrods     nodes
3219     6          4      irftr    0      nzmax    5      irftr2   0
3220 *
3221 *      dtxht(1)  dtxht(2)
3222     5.          25.     dznht   .002     hgapo    0.     shelv   0.
3223 *
3224 *      nhcomo
3225 f      1e
3226 *
3227 *      nhcelo
3228     -12         +       +       +
3229 *
3230 *      dz
3231     .240e
3232 *
3233 *      grav
3234 f      1.0000E+00e
3235 *
3236 *      idrod
3237     1          2      +       3      +       4      +
3238     6e
3239 *
3240 *      rdx * 0.0369 0.1107 0.1474 0.4422 s
3241 *      rdx * 0.374 1.122 e
3242 *
3243 *      radrd
3244     0.0        .002     .0035   .0043e
3245 *
3246 *      matrd
3247 f      6e
3248 *
3249 *      nfax
3250 f      1e
3251 *
3252 *      rftn
3253 f      393.e
3254 f      393.e
3255 f      393.e
3256 f      393.e
3257 f      393.e
3258 f      393.e
3259 *
3260 *      type      num      id      ctitle
3261 slab    915      915      $915$ lev 12 ring 4 slabs
3262 *
3263 *      ncrx      ncrz
3264     2          1
3265 *
3266 *      nopowr    nrindr
3267     1          1      modez   1      liqlev   0      iaxcnd   0
3268 *
3269 *      idbci     idbco
3270     0          2
3271 *
3272 *      width
3273     4.1667
3274 *
3275 *      nrods     nodes
3276     2          4      irftr    0      nzmax    5      irftr2   0
3277 *
3278 *      dtxht(1)  dtxht(2)
3279     5.          25.     dznht   .002     hgapo    0.     shelv   0.
3280 *
3281 *      nhcomo
3282 f      1e
3283 *
3284 *      nhcelo
3285     -12         +       +       +
3286 *
3287 *      dz
3288     .240e
3289 *
3290 *      grav
3291 f      1.0000E+00e
3292 *
3293 *      idrod
3294     7          8e      +       +       +       +
3295 *
3296 *      rdx * 0.204 0.612 e

```

```

3297 *
3298 *      radrd
3299      0.0       .04       .08       .09e
3300 *
3301 *      matrd
3302 r 2      9       6e
3303 *
3304 *      nfax
3305 f      1e
3306 *
3307 *      rftn
3308 f      393.e
3309 f      393.e
3310 *
3311 *
3312 *      type      num      id      ctitle
3313 slab     914      914 $914$ lev 13 ring 1-3 slabs
3314 *
3315 *      ncrx      ncrz
3316      6      1
3317 *
3318 *      nopowr    nrindr
3319      1      1      modez
3320      1      1      liqlev
3321 *      idbci     idbco
3322      0      2
3323 *
3324 *      width
3325      3.8462
3326 *
3327 *      nrods     nodes
3328      6      4      irftr
3329      0      0      nzmax
3330 *      dtxht(1)  dtxht(2)
3331      5.      25.      dnht
3332      .002      hgapo
3333 *      nhcomo
3334 f      1e
3335 *
3336 *      nhcelo    +
3337      -13      13      14e
3338 *
3339 *      dz
3340      .260e
3341 *
3342 *      grav
3343 f      1.0000E+00e
3344 *
3345 *      idrod    +
3346      1      2      3      +
3347      6e      4      5
3348 *
3349 *      rdx * 0.0195 0.0585 0.156 0.468 s
3350 *      rdx * 0.44 1.32 e
3351 *
3352 *      radrd
3353      0.0       .002       .0035       .0043e
3354 *
3355 *      matrd
3356 f      6e
3357 *
3358 *      nfax
3359 f      1e
3360 *
3361 *      rftn
3362 f      393.e
3363 f      393.e
3364 f      393.e
3365 f      393.e
3366 f      393.e
3367 f      393.e
3368 *
3369 *      type      num      id      ctitle
3370 slab     913      913 $913$ lev 13 ring 4 slabs
3371 *
3372 *      ncrx      ncrz
3373      2      1
3374 *
3375 *      nopowr    nrindr
3376      1      1      modez
3377      1      1      liqlev
3378 *      idbci     idbco
3379      0      2
3380 *
3381 *      width
3382      3.8462
3383 *
3384 *      nrods     nodes
3385      2      4      irftr
3386      0      0      nzmax
3387 *      dtxht(1)  dtxht(2)
3388      5.      25.      dnht
3389      .002      hgapo
3390      0.      0.      shlev

```

```

3389 *
3390 *      nhcomo
3391 f       1e
3392 *
3393 *      nhcelo      +      +
3394     -13      13      14e
3395 *
3396 *      dz      +
3397     .260e
3398 *
3399 *      grav
3400 f     1.0000E+00e
3401 *
3402 *      idrod      +
3403     7      8e
3404 *
3405 *      rdx * 0.221 0.663 e
3406 *
3407 *      radrd
3408     0.0      .04      .08      .09e
3409 *
3410 *      matrd
3411 r 2      9      6e
3412 *
3413 *      nfax
3414 f       1e
3415 *
3416 *      rftn
3417 f     393.e
3418 f     393.e
3419 *
3420 *      type      num      id      ctitle
3421 slab     912      912 $912$ lev 14 ring 1-3 slabs
3422 *
3423 *      ncrx      ncrz
3424     6      1
3425 *
3426 *      nopowr    nrindr
3427     1      1      modez
3428 *
3429 *      idbci    idbco
3430     0      2
3431 *
3432 *      width
3433     2.1739
3434 *
3435 *      nrods    nodes
3436     6      4      irftr
3437 *
3438 *      dtxht(1)  dtxht(2)
3439     5.      25.      dznhn
3440 *
3441 *      nhcomo
3442 f       1e
3443 *
3444 *      nhcelo      +
3445     -14      14      15e
3446 *
3447 *      dz      +
3448     .460e
3449 *
3450 *      grav
3451 f     1.0000E+00e
3452 *
3453 *      idrod      +
3454     1      2      3      4      5
3455     6e
3456 *
3457 *      rdx * 0.04 0.12 0.2636 0.7908 s
3458 *      rdx * 0.667 2.001 e
3459 *
3460 *      radrd
3461     0.0      .002      .0035      .0043e
3462 *
3463 *      matrd
3464 f       6e
3465 *
3466 *      nfax
3467 f       1e
3468 *
3469 *      rftn
3470 f       393.e
3471 f       393.e
3472 f       393.e
3473 f       393.e
3474 f       393.e
3475 f       393.e
3476 *
3477 *      type      num      id      ctitle
3478 slab     911      911 $911$ lev 14 ring 4 slabs
3479 *
3480 *      ncrx      ncrz

```

```

3481      2      1
3482  *      nopowr      nrindr      modez      liqlev      iaxcnd
3483      *      1          1          1          0          0
3484
3485  *
3486  *      idbci      idbco
3487      0          2
3488  *
3489  *      width
3490      2.1739
3491  *
3492  *      nrods      nodes      irftr      nzmax      irftr2
3493      2          4          0          5          0
3494  *
3495  *      dtxht(1)    dtxht(2)    dznht      hgapo      shelv
3496      5.          25.        .002        0.          0.
3497  *
3498  *      nhcomo      1e
3499  f
3500  *
3501  *      nhcelo      +          +          +          +
3502      -14         14         15e
3503  *
3504  *      dz          +          +          +          +
3505      .460e
3506  *
3507  *      grav
3508  f      1.0000E+00e
3509  *
3510  *      idrod      +          +          +          +
3511      7          8e
3512  *
3513  *      rdx  *  0.3916  1.1748 e
3514  *
3515  *      radrd      0.0        .04        .08        .09e
3516
3517  *
3518  *      matrd
3519  r 2      9          6e
3520  *
3521  *      nfax
3522  f      1e
3523  *
3524  *      rftn
3525  f      393.e
3526  f      393.e
3527  *
3528  *
3529  *      type      num      id      ctitle
3530  slab     910      910      $910$ lev 15 ring 1-3 slabs
3531  *
3532  *      ncrx      ncrz
3533      6          1
3534  *
3535  *      nopowr      nrindr      modez      liqlev      iaxcnd
3536      1          1          1          0          0
3537  *
3538  *      idbci      idbco
3539      0          2
3540  *
3541  *      width
3542      2.2727
3543  *
3544  *      nrods      nodes      irftr      nzmax      irftr2
3545      6          4          0          5          0
3546
3547  *      dtxht(1)    dtxht(2)    dznht      hgapo      shelv
3548      5.          25.        .002        0.          0.
3549  *
3550  *      nhcomo      1e
3551  f
3552  *
3553  *      nhcelo      +          +          +          +
3554      -15         15         16e
3555  *
3556  *      dz          +          +          +          +
3557      .440e
3558  *
3559  *      grav
3560  f      1.0000E+00e
3561  *
3562  *      idrod      +          +          +          +
3563      1          2          3          4          5
3564      6e
3565  *
3566  *      rdx  *  0.06575  0.19725  0.2636  0.7908 s
3567  *      rdx  *  0.657  2.001 e
3568  *
3569  *      radrd      0.0        .002        .0035        .0043e
3570
3571  *
3572  *      matrd

```

```

3573 f 6e
3574 *
3575 * nfax
3576 f 1e
3577 *
3578 * rftn
3579 f 393.e
3580 f 393.e
3581 f 393.e
3582 f 393.e
3583 f 393.e
3584 f 393.e
3585 *
3586 * type 909 num 909 id ctitle
3587 slab $909$ lev 15 ring 4 slabs
3588 *
3589 * ncrx ncrz
3590 2 1
3591 *
3592 * nopowr nrdr modez liqlev iaxcnd
3593 1 1 1 0 0
3594 *
3595 * idbci idbco
3596 0 2
3597 *
3598 * width
3599 2.2727
3600 *
3601 * nrods nodes irftr nzmax irftr2
3602 2 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 -15 15 16e +
3612 *
3613 * dz +
3614 .440e +
3615 *
3616 * grav
3617 f 1.0000E+00e
3618 *
3619 * idrod + +
3620 7 8e +
3621 *
3622 * rdx * 0.3916 1.1748 e
3623 *
3624 * radrd
3625 0.0 .04 .08 .09e
3626 *
3627 * matrd
3628 r 2 9 6e
3629 *
3630 * nfax
3631 f 1e
3632 *
3633 * rftn
3634 f 393.e
3635 f 393.e
3636 *
3637 *
3638 * type 908 num 908 id ctitle
3639 slab $908$ lev 16 ring 1-3 slabs
3640 *
3641 * ncrx ncrz
3642 6 1
3643 *
3644 * nopowr nrdr modez liqlev iaxcnd
3645 1 1 1 0 0
3646 *
3647 * idbci idbco
3648 0 2
3649 *
3650 * width
3651 .8019
3652 *
3653 * nrods nodes irftr nzmax irftr2
3654 6 4 0 5 0
3655 *
3656 * dtxht(1) dtxht(2) dznht hgapo shelv
3657 5. 25. .002 0. 0.
3658 *
3659 * nhcomo
3660 f 1e
3661 *
3662 * nhcelo + +
3663 -16 16 16e +
3664 *

```

```

3665 *      dz          +          +          +          +
3666      1.247e
3667 *
3668 *      grav
3669 f     1.0000E+00e
3670 *
3671 *      idrod      +          +          +          +
3672      1          2          3          4          5
3673      6e
3674 *
3675 *      rdx *  0.17825  0.53475  0.7146  2.1438 s
3676 *      rdx *  1.808   5.424 e
3677 *
3678 *      radrd
3679      0.0        .002       .0035      .0043e
3680 *
3681 *      matrd
3682 f     6e
3683 *
3684 *      nfax
3685 f     1e
3686 *
3687 *      rftn
3688 f     393.e
3689 f     393.e
3690 f     393.e
3691 f     393.e
3692 f     393.e
3693 f     393.e
3694 *
3695 *      type      num      id      ctitle
3696 slab    907      907 $907$ lev 16 ring 4 slabs
3697 *
3698 *      ncrx      ncrz
3699      2          1
3700 *
3701 *      nopowr    nrindr    modez    liqlev    iaxcnd
3702      1          1          1          0          0
3703 *
3704 *      idbci     idbco
3705      0          2
3706 *
3707 *      width
3708      .8019
3709 *
3710 *      nrods     nodes    irftr     nzmax    irftr2
3711      2          4          0          5          0
3712 *
3713 *      dtxht(1)  dtxht(2)  dznht    hgapo    shelv
3714      5.         25.       .002      0.        0.
3715 *
3716 *      nhcomo
3717 f     1e
3718 *
3719 *      nhcelo
3720      -16        16        16e
3721 *
3722 *      dz
3723      1.247e
3724 *
3725 *      grav
3726 f     1.0000E+00e
3727 *
3728 *      idrod      +
3729      7          8e
3730 *
3731 *      rdx *  1.062   3.186 e
3732 *
3733 *      radrd
3734      0.0        .04       .08       .09e
3735 *
3736 *      matrd
3737 r 2    9          6e
3738 *
3739 *      nfax
3740 f     1e
3741 *
3742 *      rftn
3743 f     393.e
3744 f     393.e
3745 *
3746 * start of core barrel heat slabs
3747 *
3748 *      type      num      id      ctitle
3749 slab    784      784 $784$ lev 2-16 ring 4 cb slabs
3750 *
3751 *      ncrx      ncrz
3752      2          15
3753 *
3754 *      nopowr    nrindr    modez    liqlev    iaxcnd
3755      1          2          1          0          0
3756 *

```

```

3757 *      idbci      idbco
3758      2          2
3759 *
3760 *      width
3761      1.4844
3762 *
3763 *      nrods      nodes      irftr      nzmax
3764      2          5          0          31
3765 *
3766 *      dtxht(1)    dtxht(2)
3767      3.          1.          .002       hgapo      shlev
3768 *
3769 *      nhcomi
3770 f      1e
3771 *
3772 *      nhceli      +
3773      -2          2          3          4          +
3774      6           7          8          9          10
3775      11          12         13         14          15
3776      16          16e
3777 *
3778 *
3779 *      nhcomo
3780 f      1e
3781 *
3782 *      nhcelo      +
3783      -2          2          3          4          5
3784      6           7          8          9          10
3785      11          12         13         14          15
3786      16          16e
3787 *
3788 *      dz          +
3789      .985        .200        .305        .610        .610
3790      .610        .610        .610        .305        .240
3791      .240        .260        .460        .440        1.247e
3792 *
3793 *      grav
3794 f      1.00000E+00e
3795 *
3796 *      idrod      +
3797      5           6e
3798 *
3799 *      idrodo      +
3800      7           8e
3801 *
3802 *      rdx * 0.5 1.5 e
3803 *
3804 *      radrd      +
3805      0.0         .002        .008        .014        .016e
3806 *
3807 *      matrd      6e
3808 f
3809 *
3810 *      nfax
3811 f      1e
3812 *
3813 *      rftn
3814 f      423.e
3815 f      423.e
3816 *
3817 *      end of core barrel heat slabs
3818 *
3819 *      type      num      id      cttitle
3820 rod      670      670      $670$ ilsg tubes
3821 *
3822 *      ncrx      ncrz      ittc
3823      1           10          0
3824 *
3825 *      nopowr     nrindr     modez      liqlev      iaxcnd      cd 3
3826      1           0           1           0
3827 *
3828 *      idbci      idbco      hdri       hdro
3829      2           2           .0196       .0254
3830 *
3831 *      nrods      nodes      irftr      nzmax
3832      1           3           0           100
3833 *
3834 *      dtxht(1)    dtxht(2)
3835      3.          10.        5.e-3       hgapo      shlev      cd 10
3836 *
3837 *      nhcomi      8e
3838 f
3839 *
3840 *      nhceli
3841      -2s
3842      2s
3843      3s
3844      4s
3845      5s
3846      6s
3847      7s
3848      8s

```

```

3849          9s
3850          10s
3851          11s
3852          12e
3853 *
3854 *      nhcomo
3855 f       28e
3856 *
3857 *      nhcelo
3858     -1s
3859     1s
3860     2s
3861     3s
3862     4s
3863     5s
3864     -5s
3865     -4s
3866     -3s
3867     -2s
3868     -1s
3869     -1e
3870 *      +      +      +      +
3871 *      dz    * r02 5.0000e-01   1.5240e+00r04 2.5240e+00   1.5240e+00s
3872 *      dz    * r02 5.0000e-01e
3873 *      grav  * r04      1.        .7071      -.7071r04      -1.e
3874 *      rdx   *      474.e
3875 *      radrd * r02      .0098     .01125      .0127e
3876 *      matrd * r02      6e
3877 *      nfax  * r10      3e
3878 *      +      +      +
3879 *      rftn  * r03 4.1420e+02r03 4.8000e+02r03 5.2500e+02r12 5.4000e+02s
3880 *      rftn  * r03 5.2500e+02r03 4.8000e+02r03 4.1420e+02r03 4.1420e+02e
3881 *
3882 *      type   num      id      ctitle
3883 rod      669      669      $669$ blsg tubes
3884 *
3885 *      ncrx   ncrz      ittc
3886     1      10      0
3887 *
3888 *      nopowr nrindr      modez      liqlev      iaxcnd
3889     1      0      1      0      0
3890 *
3891 *      idbci  idbco      hdri      hdro
3892     2      2      .0196     .0254
3893 *
3894 *      nrods  nodes      irftr      nzmax
3895     1      3      0      100
3896 *
3897 *      dtxht(1) dtxht(2)      dznhht      hgapo      shelv
3898     3.      10.      5.e-3     6.e4     0.
3899 *
3900 *      nhcomi
3901 f       5e
3902 *
3903 *      nhceli
3904     -2s
3905     2s
3906     3s
3907     4s
3908     5s
3909     6s
3910     7s
3911     8s
3912     9s
3913     10s
3914     11s
3915     12e
3916 *
3917 *      nhcomo
3918 f       25e
3919 *
3920 *      nhcelo
3921     -1s
3922     1s
3923     2s
3924     3s
3925     4s
3926     5s
3927     -5s
3928     -4s
3929     -3s
3930     -2s
3931     -1s
3932     -1e
3933 *      +      +      +
3934 *      dz    * r02 5.0000e-01   1.5240e+00r04 2.5240e+00   1.5240e+00s
3935 *      dz    * r02 5.0000e-01e
3936 *      grav  * r04      1.        .7071      -.7071r04      -1.e
3937 *      rdx   *      158.e
3938 *      radrd * r02      .0098     .01125      .0127e
3939 *      matrd * r02      6e
3940 *      nfax  * r10      3e

```

```

3941 *      +
3942 * rftn  * r03 4.1420e+02r03 4.8400e+02r03 5.2200e+02r12 5.4000e+02s
3943 * rftn  * r03 5.2200e+02r03 4.8400e+02r03 4.1420e+02r03 4.1420e+02e
3944 *
3945 end
3946 *
3947 ****
3948 * time-step data *
3949 ****
3950 *
3951 *      dtmin      dtmax      tend      rtwfp
3952 * 1.0000e-06 2.0000e-02 8.0000e+01 0.0000e+00
3953 *      edint      gfint      dmpint      sedint
3954 * 4.0000e+01 1.0000e+00 4.0000e+01 4.0000e+01
3955 *
3956 *      dtmin      dtmax      tend      rtwfp
3957 * 1.0000e-06 5.0000e-03 1.0000e+02 0.0000e+00
3958 *      edint      gfint      dmpint      sedint
3959 * 2.0000e+01 1.0000e+00 2.0000e+01 2.0000e+01
3960 *
3961 *      dtmin      dtmax      tend      rtwfp
3962 * 1.0000e-06 5.0000e-03 2.0000e+02 0.0000e+00
3963 *      edint      gfint      dmpint      sedint
3964 * 2.5000e+01 1.0000e+00 2.5000e+01 2.5000e+01
3965 *
3966 *      dtmin      dtmax      tend      rtwfp
3967 * 1.0000e-06 1.0000e-02 4.0000e+02 0.0000e+00
3968 *      edint      gfint      dmpint      sedint
3969 * 5.0000e+01 1.0000e+00 5.0000e+01 5.0000e+01
3970 *
3971 *      dtmin      dtmax      tend      rtwfp
3972 * 1.0000e-06 2.0000e-02 6.0000e+02 0.0000e+00
3973 *      edint      gfint      dmpint      sedint
3974 * 1.0000e+02 1.0000e+00 1.0000e+02 1.0000e+02
3975 *
3976 *      dtmin      dtmax      tend      rtwfp
3977 *      endflag
3978 -1.0000e+00

```

CCTF-54 TRANSIENT-RESTART INPUT LISTING

```

1 free format
2 *
3 *****
4 * main data *
5 *****
6 *
7 *      numtcr      ieos      inopt      rmat
8      145          0          1          4
9 Corrected CCTF-54 Input Model By J. F. Lime Oct 1999
10 Two corrections were made to the CCTF-54 input model:
11 (1) The azimuthal noding was corrected from 180/180 degrees to 90/270 degrees
12 to matched the intact loop noding. The three intact loops were modeled as one
13 combined intact loop. Therefore, the azimuthal noding of the vessel should
14 match how the intact loops were modeled.
15 (2) The axial power shape was corrected to model the 17-step axial-power profile
16 of the actual heater rod. The previous CCTF-54 model had a coarsely-noded
17 7-level axial-power shape.
18 *
19 cctf run54 developmental assessment calculation
20 trac-pf1 mod2 version 5.0
21 this model was developed by running the trac input deck from
22 /cctf/run54/tracin through gocvrt. the following changes were
23 made to the original model.
24 a) the junction flow areas were adjusted to take care of the following
25   error messages:
26   the junction flow area 1.6604e-01 of component 3 is greater than the vol/dx
27   flow area 8.8885e-02 of the cell across the junction and 1.5532e-01 of cell 1
28   the junction flow area 4.9812e-01 of component 8 is greater than the vol/dx
29   flow area 4.6593e-01 of the cell across the junction and 2.6665e-01 of cell 12
30   the azimuthal flow area 1.0797e-01 of vessel 1 interface (r= 3,t= 1,z= 1) is
31   greater than the cell vol/rdt flow areas 8.3137e-02 and 8.3137e-02 on each side
32   the azimuthal flow area 1.0797e-01 of vessel 1 interface (r= 3,t= 2,z= 1) is
33   greater than the cell vol/rdt flow areas 8.3137e-02 and 8.3137e-02 on each side
34   the azimuthal flow area 1.5189e-01 of vessel 1 interface (r= 4,t= 1,z= 1) is
35   greater than the cell vol/rdt flow areas 1.3670e-01 and 1.3670e-01 on each side
36   the azimuthal flow area 1.5189e-01 of vessel 1 interface (r= 4,t= 2,z= 1) is
37   greater than the cell vol/rdt flow areas 1.3670e-01 and 1.3670e-01 on each side
38   the axial flow area 2.6140e-02 of vessel 1 interface (r= 1,t= 1,z=11) is
39   greater than the cell vol/dz flow areas 2.1173e-02 and 1.8559e-02 on each side
40   the axial flow area 2.6140e-02 of vessel 1 interface (r= 1,t= 2,z=11) is
41   greater than the cell vol/dz flow areas 2.1173e-02 and 1.8559e-02 on each side
42   the axial flow area 7.8419e-02 of vessel 1 interface (r= 2,t= 1,z=11) is
43   greater than the cell vol/dz flow areas 6.3519e-02 and 5.5678e-02 on each side
44   the axial flow area 7.8419e-02 of vessel 1 interface (r= 2,t= 2,z=11) is
45   greater than the cell vol/dz flow areas 6.3519e-02 and 5.5677e-02 on each side
46   the axial flow area 1.1751e-01 of vessel 1 interface (r= 3,t= 1,z=11) is
47   greater than the cell vol/dz flow areas 9.8712e-02 and 8.3435e-02 on each side
48   the axial flow area 1.1751e-01 of vessel 1 interface (r= 3,t= 2,z=11) is
49   greater than the cell vol/dz flow areas 9.8712e-02 and 8.3435e-02 on each side
50   b) the hydraulic diameter of the first and last junctions of the
51   steam generator secondary were set to a non-zero value (even though
52   the flow area is zero) to get the code to run.
53   c) the nff's were all set to -1
54   to cause an automatic calculation of
55   abrupt expansion/contraction additive form losses.
56   d) the new reflood model was turned on (namelist newrfd=1 was added)
57   and added funhf, nhscfa, and zsggrid arrays.
58   e) the time step sizes were increased.
59   f) the rod axial power shape was adjusted to take advantage of mod2's
60   ability to input an exact power distribution. this involved
61   reworking the zpwz and zpwzb arrays. the number of coarse mesh
62   nodes went from 7 to 19, the maximum number of fine mesh cells went
63   from 100 to 200, and the dtxht criterial was reduced.
64   g) the rod power history was expanded from 10 points to over 1200 points
65   (based on experimental data) to better match the input power.
66   h) the temperatures everywhere except the lower plenum and fills were
67   changed from 393.0 to 414.2 (the average of the te30yxx thermocouple
68   data from the test) to better match the initial fluid and wall temps.
69   i) took out the bump in the cold leg ecc fill liquid temperature table
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89
90 j) extended the material property tables in case the code wants to
91 calculate temperatures in excess of 1200 k.
92
93 k) added namelist variable nosets=2 to cause the code to calculate the
94 sets3d equation every time step.
95
96 l) increase the maximum time step size beyond 84 seconds.
97
98 m) set all of the vessel cfz1-z's to negative numbers to get an automatic
99 calculation of abrupt expansion/contraction form losses.
100
101 n) the rod nodalization was set back the way it originally was (7 coarse
102 meshes with a 1-to-1 relationship with the hydro cells). the
103 integration option was also set back the way it originally was as well.
104
105 o) to damp the loop oscillations, all the roughness numbers were
106 changed from 0.0 to 4.5720e-05
107
108 p) the heat conductor temperatures in the reactor vessel, ring 4 were set
109 from 4.142e+02 to 4.680e+02 for levels 2 and above. the inner rings
110 were changed from 4.142e+02 to 4.230e+02. this is consistent with the
111 initial conditions in the data report, page 31 table 3.1
112
113 q) the maximum time step size was reduced to avoid the water hammer in
114 the downcomer soon after cold leg injection begins.
115
116 r) added 30 heat slabs to represent the core barrel
117
118 s) moved the location of the ring 3-ring 4 boundary from inside the core
119 barrel to outside of the core barrel. the vessel rad(3), vol, fa-t,
120 fa-z, hd-t and hd-z arrays were recomputed. this was done to eliminate
121 vol and fa values greater than 1.0
122
123 t) the radial cfz1-r in level 1 was set to a small negative number to
124 cause form loss computation.
125
126 u) set idcu=idcl=idcr=0 to turn off special downcomer models
127
128 v) set the dtxht(1), dtxht(2), dznh, and nzmax parameters back to the
129 old mod1 values, and took out the core barrel heat slabs to make the
130 calculation directly comparable to the original MOD1 calculation.
131
132
133
134 -----
135
136 the original comment cards are as follows:
137
138 cctf run 54 posttest analysis with trac-pf1(mod 1) ver 11.8 (8/24/84)
139 * * * * * revised loop components * * * * *
140 jaeri recommendations used for some heater rod material properties.
141 new vapor loss coefficients in vessel core
142 new radial loss coefficients in levels 4 - 10
143 akimotos nodding for combined and broken cold legs
144 vessel nodding:
145 four radial rings
146 two azimuthal zones
147 sixteen axial levels
148 three levels in lower plenum
149 seven levels in core
150 six levels in upper plenum
151 system nodding:
152 three intact loops lumped into one loop
153 cold leg between vessel and break is modeled without the expansion
154 *
155 ****
156 * namelist data *
157 ****
158 *
159 &inopts
160 nrslv=1,iadded=10,nhtstr=24,newrfd=3, imfr=3,
161 iblaus=1,
162 &end
163 *
164 *      dstep      timet
165     4241    80.015229
166 *      stdyst      transi      ncomp      njun      ipak
167     0          1          43          17          1
168 *      epso      epss
169     1.0000e-04  1.0000e-04
170 *      oitmax      sitmax      isolut      ncontr
171     10         10          0          0
172 *      ntsv       ntcb      ntcf      ntrp      ntcp
173     9          8          0          3          1
174 *
175 ****
176 * component-number data *
177 ****
178 *
179 * iorder*           1          2          3          4          5
180 * iorder*           6          7          8          11         12

```

```

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

```

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