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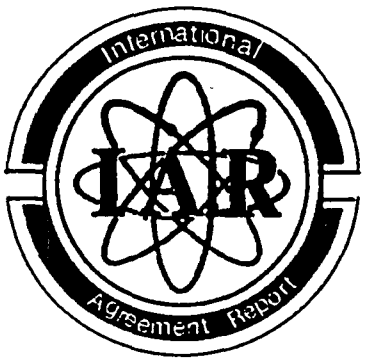

International Agreement Report

Application of RELAP5/MOD3.1 Code to the LOFT Test L3–6

Prepared by
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ABSTRACT

A calculation of LOFT Experiment L3-6, a small break equivalent to a 4-in. diameter rupture in the cold leg of a four-loop commercial pressurized water reactor, has been performed to help validate RELAP5/MOD3.1 for this application.

The version of the code to be used is SCDAP/RELAP5/MOD3.1.8d0.

Three calculations were carried out in order to study the sensitivity to change break nozzle superheated discharge coefficient.

Conducted comparative analysis of the LOFT L3-6 experiment shows on the whole a reasonable agreement between calculated and measured data. Some discrepancies in the system pressure do not distort a picture of the transient.

Contents

1. INTRODUCTION.

An International Thermal-Hydraulic Code Assessment and Application Program (ICAP) is at present being conducted by several countries under the auspices of USNRC. The goal of the program is to make quantitative statements regarding the prediction capabilities of the current best-estimate thermal-hydraulic computer codes. Such codes have been used for many years as state-of-the art instruments to study and verify numerical and correlative computational models with experimental results. Some of these codes have reached a high degree sophistication. So far, however, these codes have not achieved status as reactor licensing tools. The present ICAP aims to quantify uncertainties in the codes so that the codes may be used for licensing purposes.

The SCDAP/RELAP5/MOD3.1 code has been chosen by RRC KI as tool for performing Nuclear Reactor Safety Analysis.

Before undertaking the formal plant calculations, the code is being tested in a wide range of experiments. This exercise is necessary to help identify and quantify any code shortcoming, in particular for the Russian types of reactors.

The LOFT L3-6 experiment has been chosen as a part of the Russian Thermal-Hydraulic best-estimate codes Verification Program.

The LOFT-experiment series L-3 was designed to provide large-scale blowdown system data for PWR small break transients. As part of the Russian ICAP contribution one experiment out of the L3 series was assigned. In the experiment treated in this report, the LOFT L3-6, the main circulation pumps were allowed to operate at normal speed throughout the test.

This calculation is to form part of assessment matrix for the RELAP5 code. This matrix seeks to cover the range of conditions likely to be found when calculating full scale plant transients, and this test, in particular, contains many features that are typical for small break accidents.

2. FACILITY AND TEST DESCRIPTION.

2.1. The LOFT for the L3-6 Experiment.

The LOFT (Loss-of-Fluid-Test) facility is a 50-MW(t) PWR with instrumentation to measure and provide data on the thermal-hydraulic conditions throughout the system. Operation of the LOFT system is typical of large [~ 1000 MW(e)] commercial PWR operations. The LOFT is a scaled down on a volume and a flow area of components and power representation of a PWR. The elevations were not preserved with several components. The LOFT facility consists of:

- A reactor vessel with an annular downcomer, a lower plenum, an upper plenum, and a nuclear core (5.5-ft length) with lower and support structure.
- An active intact loop with a steam generator, a pressurizer, and two parallel primary coolant pumps.
- A passive broken loop with a simulated steam generator and pump, and two pipelines (dead-ended or connected to blowdown assemblies for large breaks);
- A blowdown suppresion system consisting of a header, supression tank and a spray system.
- An emergency core coolant (ECC) injection system consisting of a low head safety injection pump, a high head safety injection pump, and a accumulator, and the associated pipework.

The Experiment L3-6 is one of Small Break Experiments Series L3 that was designed to provide large-scale blowdown system data for a PWR small break transient. In the L3-6 a small break is an offtake pipe, 34 mm in diameter, connected at right angles to the 14-in. cold leg of the active loop. This pipe contains a break orifice and leads to a valve and further to a blowdown suppression tank. The valve is opened to initiate a break. The flow out of the cold leg is choked at the break orifice that has an area (205.9 mm^2) corresponding to the flow area of a 4-in. diameter break (2.5%) in a commercial PWR.

In the L3-6 the accumulator and Low Pressure Injection System (LPIS) were not actuated, and the Pressure Injection System (HPIS) flow was directed to the reactor Downcomer.

The broken loop recirculation lines were isolated.

The primary coolant pumps were operated during the experiment. Cooling water was injected to the bearings of the pumps.

The Experiment L3-6 principal objective was to determine the primary system mass inventory and distribution as a function of time during the small break depressurization. The specific goal was to compare with similar Experiment L3-5 to see an influence of the pump run on a core uncovery.

The LOFT main components and small break configuration are shown in Fig. 1 (Appendix C).

2.2. The L3-6 Experiment.

In the Experiment L3-6:

- The Pressurizer heaters were turned off prior to blowdown.
- The reactor with the power level 50 MW was scrammed ~ 6 s before blowdown initiation.
- When the control rods were fully inserted, blowdown was initiated from the cold leg.
- In secondary side termination of main feed water and MSCV (Main Steam Control Valve) closure were started at Scram signal.
- Auxiliary feed water was initiated at 73 s and terminated at 1856 s.
- The HPIS of the ECC injection system was initiated at 3.6 s after break on.
- The primary coolant pumps were automatically tripped at 2371.4 s, when the lowest indicated primary coolant hot leg pressure reached 2.15 MPa.

The Pump stop indicates the L3-6 finishing and beginning of another Experiment (L8-1).

3. THE CODE.

The code used in calculations is the latest version .8d0 of the SCDAP/RELAP5/MOD3.1. The version was received from INEL in the May 1994 according to the Agreement between RRC KI and US NRC. Code has been installed on the IBM PC486/DX2 with reducing of the main dynamic dimension (lfsize = 450000).

4. INPUT DECK DEVELOPMENT.

4.1. Noding.

As we only started to simulate the LOFT Experiments with the code RELAP5, and there is collected large experience of modelling and analysing of these transients transferred in many reports, so we used in this L3-6 calculation the traditional model as a basis of input data set. Hydrodynamic components and heat structures geometry data were taken from Input Dataset Reference Document /5/ prepared in Winfrith Centre. Initial conditions cards were added. Total configuration and numbering of components were preserved as in reference. Our corrected noding scheme is in Fig. 2.

The main modifications put in the developed input model are as follows:

In secondary side the component *separatr* was replaced with *branch.* Our experience shows that similar change permits to receive stable and rather realistic physical conditions in the Steam generator (accounting energy conservation);

In the Primary side the Downcomer and the Filler gap were divided in parallel flow channels feeding from the Intact loop and the Broken loop hot legs. Now the Downcomer is represented as 206 and 216 components, and the Filler gap is 208 and 218. Also, the inlet annulus of the vessel is divided in two parts: 200, 202, 204 and 210, 212, 214;

Cooling water injection to pumps feeds into volume 140;

The break unit is represented as a horizontal volume connecting the cold leg pipe (184 volume) with a crossflow junction and a discharge volume (805) with a valve junction (183). The break valve 183 has a fully opened area in 205.9 mm^2 and a choked flow flag.

4.2. Initial conditions.

The initial state of system before a scram signal was reached in the usual procedure. Preliminary distribution of temperatures and pressures were put down in an input deck, and time dependent volumes were applied as pressure controllers for the Steam Generator and the Pressurizer. In the Secondary side velocities were used in junction initial conditions cards.

The established conditions are compared to experimental magnitudes in Table 1 (Appendix B). The coolant temperatures in the Intact loop and the Steam Generator turned out to be a bit over the upper limit values. This excess was neglected because acceptable heat transfer through the Steam generator tube walls was achieved. The temperatures in the Broken loop and the other parameters were agreed with the L3-6 initial conditions measured values, within experimental uncertainties.

5. TRANSIENT ANALYSIS.

5.1. The Main Course of Transient.

When performing of post-test calculations, one has possibility to face to measured data. To run more successfully an experimental HPIS flow rate set on time was used in the transient . Rates of closure of the main steam valve (MSCV) and terminating of the main feed supply were adjusted to reach correct increase of the Steam Generator Dome pressure during the early stage of the transient (20 to 40 s) through the comparison to experimental pressure. Finally, main feed is terminated in 4 s after blowdown initiation and MSCV is closed in 10 s after blowdown. Information of the MSCV partial opening (14% of a full area) occurred on ~ 88 s after rupture was used in the steam line operation setting.

Useful references were discovered out from a report on the same Experiment analysis /4/. That are:

> In the Experiment MSCV control logic incorrectly triggered on a noise at 88 s;
>
> Recommendation of using 0.84 value as a two-phase choking multiplier at a break junction.

Our test runs with a two-phase discharge coefficient (0.82 to 0.88 variety) showed that 0.85 is rather suitable to the developed model. Thereby, the default value 1.0 was set for a subcooled coefficient, 0.85 for a two-phase coefficient. Transiting to single vapour flow regime was occurred in the transient run at ~860 s and the exercises with the restart point at the 800 s were conducted with a superheated coefficient value varied in a wide range: from 0.5 to 1.1. The run with the superheated multiplier equals to 0.6 presents as a base case. Two other runs with 0.76 and 1.0 values will be shown later.

The prepared input data set and restart transient files are enclosed in a full form (Appendix A).

Timings of main events are shown in comparison in Table 2.

5.2. Transient Results.

The results of the LOFT L3-6 RELAP5/MOD3.1.8d0 post-test calculations are shown in Appendix C.

As it was stated above, the substance of the L3-6 is the investigation of the system depressurization. Special attention is paid to the pressure response during the postulated transient.

The early stage of the transient is distinctive with emptying of the Pressurizer. As can be seen from Fig. 3, the liquid level in the Pressurizer was calculated to drop to 0.04 m, which was the uncertainty limit in the experimental measurement about 4 s later than occurred in the experiment. The calculated Pressurizer pressure, as shown in Fig. 4 was calculated to decrease

a little slower than occurred during the experiment. This difference is not enough to do search for whys. Then, the primary side pressure is checked out of the hot leg pressure (Fig. 5). Calculation plot goes close to experimental one until ~ 860 s. In the secondary pressure plot (Fig. 6) the occasional opening of MSCV is reflected into drops in pressure and liquid level (Fig. 7) at 100 s about for all the plots. The calculated value of the Steam Generator collapsed level is a little underestimated. This can be due to the voidage in the riser region or differences in geometric details between the input model and the reference being in the cross sectional area and height. However, divergence between a calculated and measured levels do not oversized 10 cm, that, on our opinion, is not important for the LOFT L3-6 experiment. The liquid level in the Upper plenum of the Reactor vessel (Fig. 8) is shown only for calculation. The HPIS flow rate (Fig. 10) was set in the input deck by table (on the measured data), and so it is presented for calculation only. Calculation temperature plots (Fig. 11 and 12) are not coincident with real plots exactly, in particular, for the reactor Downcomer temperature (Fig. 12). The cause of this distortion could be a slightly incorrect initial temperature state (as seen in Table 1).

Obvious discrepancies with the experiment becomes clear in the run when the second third of the transient starting, concerned to the mass flow rate through break orifice (Fig. 9) and the hot leg pressure (Fig. 5). At the time about 820 s the calculation shows sharp decrease of the primary system pressure. Non-realistic behaviour of the pressure can be explained with not absolutely correct simulation by the RELAP5 code of the critical discharge at transiting from a two-phase flow to a superheated vapour flow. As seen in Fig. S-8, at the time about 820 s calculation shows a instantaneous jump in void fraction of the discharge volume (snglvol 184) from about 0.6 up to 1.0. This leads to a sharp increase of the gas velocity (to 40 m/s) through break (Fig. S-7) and further to a primary system pressure fall (Fig. 5, S-2). At the same moment, the mass rate is perpendicular reduced (Fig. 9, S-1).

After the single vapour discharge began, the code produced a mass error. In Fig. S-5 one may see that *emass* parameter is negative and is increasing by magnitude after 860 s.

The coolant in the Primary side is at the saturation, so temperatures of the fluid (Fig. 11, 12, S-4) and of the cladding (Fig. 13, 14) have the shape which is similar to the primary pressure.

5.3. Sensitivity Calculations.

A few calculations were carried out in order to study sensitivity to variety of the superheated discharge coefficient. Three of them are shown in figures S-1 ÷ S-4.

The main goal of this study is an attempt to avoid the non-realistic primary pressure decreasing, observed after 820 s. The superheated discharge coefficients in sensitivity studies demonstrated as the most interesting are 0.6, 0.76 and 1.0.

The reduction of superheated discharge coefficient from 1.0 up to 0.6 causes some reducing of the rate of pressure decreasing, but does not influences on the transient principle picture. However, for the magnitude of the superheated discharge coefficient in 0.6 some overestimating of the calculated primary system pressure during the last stage of the transient ($\tau > 2000$ s) is observed.

Varying in superheated coefficients is not depicted in the Secondary pressure (Fig. S-3).

6. RUN STATISTICS.

The input model for RELAP5/MOD3.1 calculation for the LOFT L3-6 encompassed:

- 136 Volumes
- 153 Junctions
- 144 Heat Structures
- 670 Total Mesh Points

The volumes include: 2 pump components, 8 time-dependent volumes of which two were used for the steady-state initiating. Among the junctions there are 3 valve components and 4 time dependent junctions.

During the transient calculation the following features were:

- Computer time CPU = 39040.4 sec,
- Number of time steps DT = 81532,
- Number of volumes C = 136

For Transient real time RT = 2400 sec.

Resulting in the following ***grind time*** (the code efficiency factor):

$$\textbf{\textit{Grind time}} = \frac{CPU}{C \times DT} = 0.00352$$

The computer used was IBM PC486/DX2.

7. CONCLUSION.

The LOFT small break experiment L3-6 has been assessed with using the RELAP5/MOD3.1.8d0 code. Three sensitivity calculations were carried out with changes concerning the break junction superheated discharge coefficient.

The code predictions compare reasonably well with the experiment concerning to the first-hand parameters such as the system pressure, fluid temperatures and the Pressurizer and the Steam generator liquid levels.

In the calculated steady state, the experimental initial data were fairly well reproduced.

The predicted voiding start for the hot leg and for the cold leg of the Intact loop was in close agreement with the experiment.

Some discrepancies in the primary system pressure after the cold leg dried out took place. This behaviour of the primary system pressure can be explained as not correct the RELAP5/MOD3.1 code simulation of the vapour discharge flow at transiting from a two-phase flow to a superheated flow.

Two sensitivity calculations with different superheated discharge coefficients showed that changing of the superheated discharge coefficient from 1.0 up to 0.6 leads to some reduction of the rate of pressure decreasing. However, for the magnitude of the superheated discharge coefficient in 0.6 some overestimate of the primary system pressure at the final stage of the transient (τ>2000 s) is observed.

In general, a whole agreement between the experimental data and the code calculational values in performed simulation of the LOFT Experiment L3-6 was estimated as good. As many times noticed, the code RELAP5/MOD3 is really convenient in qualified simulation and estimating of a wide variety of operational and accident transients.

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   LOFT Input Dataset Reference Document for RELAP5 Validation Studies. Winfrith Technology Centre. NUREG/IA-0072.

4. A.H. Scriven.
   Application of the RELAP5/MOD2 Code to the LOFT Tests L3-5 and L3-6. Winfrith Technology Centre. NUREG/IA-0060.

5. C.M. Allison et al.
   SCDAP/RELAP5/MOD3.1 Code Manual. Volume V: Developmental Assessment (Draft). EG&G Idaho. NUREG/CR-6150.

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Appendix A

```
                    INPUT DATA SET

                    STEADY-STATE RUN


=LOFT Small Break Experiment L3-6
*
*-----------------------------------------------------
*       Assesment of RELAP5/MOD3.1
*       Against LOFT Small Break Experiment L3-6
*
*-----------------------------------------------------
*               Initial Conditions
*-----------------------------------------------------
*       Power Level             50.00 ± 1.00 MW
*       Mass Flow Rate          483.30 ± 2.60 kg/s
*       Hot leg Presssure       14.87 ± 0.14 MPa
*
*            Intact Loop
*       Cold leg Temperature    557.90 ± 1.10 K
*       Hot leg Temperature     577.10 ± 1.80 K
*
*            Broken Loop
*       Cold leg Temperature    557.60 ± 2.60 K
*       Hot leg Temperature     561.40 ± 2.60 K
*
*            Pressurizer
*       Pressure                14.90 ± 0.25 MPa
*       Liquid Level            1.18 ± 0.11 m
*       Steam Volume            0.29 ± 0.06 m3
*       Liquid Volume           0.64 ± 0.06 m3
*       Liquid Temperature      614.70 ± 1.40 K
*
*           Steam Generator
*       Pressure                5.57 ± 0.06 MPa
*       Liquid Level            0.22 ± 0.03 m
*       (the liquid level is defined as 0.0 at 2.95 m
*       above the top of the tube sheet)
*       Liquid Temperature      542.80 ± 0.80 K
*       Mass Flow Rate          27.80 ± 0.10 kg/s
*-----------------------------------------------------
*
*  The Input deck is based on the LOFT facility informations,
*  on the Dataset devoloped by INEL for use with RELAP5/MOD1
*  and LOFT Input Dataset Reference Document for RELAP5
*  Validation Studies prepaired by Winfrith Technology Center.
*
*
*           Modifications to the standard model:
*           ------------
* 1. The Downcomer model was changed to a split (2 - channel)
* downcomer model and was renodalized to allow volume
* boundaries to have the same elevation as core volume
* boundaries.
*
* 2. The Break offtake was modelled with a cross-flow junction
* from the main loop piping feeding into horizontal volume.
* At the end of the horizontal volume a valve was included
* disharging directly into a time dependent volume.
*
*
*-----------------------------------------------------
*
*
100       new       stdy-st
*
*crdno    gas_type
110      nitrogen
*
*crdno    mas_fraction
115       1.0
*
*crdno  vol_no   elev  liq_type  system_name
120   100010000  0.0    h2o     Primary
121   530010000  6.5269 h2o     Second
*
*crdno time  min_dt   max_dt   ctrl  minor major restart
201   30.0  1.0-7    0.01    14003 10000 10000  10000
*
*-----------------------------------------------------
*
*          Trip Input Data
*          ---------------
*
*     401 - Auxiliary trip, always true
*     402 - Auxiliary trip, always false
*
*          403 - SCRAM  Reactivity Table no 609
*                Main Steam Valve no 541 Close
*                Feed Water Valve no 566 Close
*          404 - Break time
*     405 & 601 - PCP off
*     406 & 602 - HPIS Start (Set Point P <=13.16 MPa)
*     407 & 603 - Aux. Feed Water Start
*     604 - on while PRZ pressure set to steady-state
*          610 - MSCV Open trip  (6.98 < P > 7.12)
*          613 - MSCV Close trip (6.57 < P < 6.50)
*-----------------------------------------------------
*
*          Auxiliary Trips :
* no var   code     rel  var code   const  lin time on
401 time   0       ge   null 0     -1.0  1   0.0
*
* no var   code     rel  var code   const  lin time on
402  time   0       lt   null 0     -1.0  1  -1.0
*
*            SCRAM
* no var   code     rel  var code   const  lin time_on
403  time   0       lt   null 0     -1.0  1 -1.0
*
*            BREAK
* no var   code     rel  var   code  const  lin time_on
404  time   0       ge   timeof 403   6.0    n  -1.0
*
*            PCP off
* no var   code     rel  var   code .const  lin time_on
405  p   100010000   le   null   0   2.15+6  n  -1.0
*
* no trip_no  rel  trip_no  lin  time_on
601   404    and   405    n    -1.0
*
*            ECCS Control Logic
* no var   code     rel  var code  const  lin time_on
406   p  610010000   le   null 0   13.16+6  n  -1.0
*
* no trip_no  rel  trip_no  lin  time_on
602   404    and   406    1    -1.0
*
*          Auxiliary Feed Water Logic
* no var   code     rel  var code  const  lin time_on
407  time   0       ge timeof 403   6.0    1  -1.0
*
* no trip_no  rel  trip_no  lin  time_on
603   404    and   407    1    -1.0
*
*          Pressurizer Stady state controller
* no trip_no  rel  trip_no  lin  time_on
604   -403   and   -403    n     0.0
*
*          PCP Injection
* no var   code     rel  var code  const  lin time_on
408  p   100010000  ge   null 0   2.15+6  1  -1.0
*
* no trip_no  rel  trip_no  lin  time_on
605   -408   and   -408    1    0.0
*
*          Main Steam Control Valve
*
```

```
* no trip_no  rel  trip_no  lin  time_on
606 -403   and  -403    n   0.0
*
* no trip_no  rel  trip_no  lin  time_on
607 -606   and  -606    n   -1.0
*
* no var  code    rel  var code  const  lin time_on
409  p   530010000 ge   null 0   7.12+6  n  -1.0
*
* no var  code    rel  var code  const  lin time_on
410  p   530010000 ge   null 0   6.98+6  n  -1.0
*
* no var  code    rel  var code  const  lin time_on
411  p   530010000 le   null 0   6.50+6  n  -1.0
*
* no var  code    rel  var code  const  lin time_on
412  p   530010000 le   null 0   6.57+6  n  -1.0
*
* no var  code    rel  var code  const  lin time_on
413  time  0      ge timeof 403  94.0   1  -1.0
*
* no var  code    rel  var code  const  lin time_on
414 vlvarea 540    ge   null 0    0.15  1  -1.0
*
*       Open trip
* no trip_no  rel  trip_no  lin  time_on
608  609    and  410    n   -1.0
*
* no trip_no  rel  trip_no  lin  time_on
609  409    or   608    n   -1.0
*
* no trip_no  rel  trip_no  lin  time_on
*610  403    and  609    n   -1.0
610  -414   and  413    n   -1.0 * MSCV triggered on the noise
*
*       Close trip
* no trip_no  rel  trip_no  lin  time_on
611  612    and  412    n   -1.0
*
* no trip_no  rel  trip_no  lin  time_on
612  411    or   611    n   -1.0
*
* no trip_no  rel  trip_no  lin  time_on
*613  403    or   612    n   -1.0
613  403    and  414    n   -1.0
*-------------------------------------------
*
*-------------------------------------
*       Intact Loop (Primary Side)
*-------------------------------------
*
*       Component no 100
* Reactor Vessel nozzle Intact Loop Hot Leg
*
*crdno     name      type
1000000   IHL-1     branch
*crdno    no.juns.   icc
1000001     3        1
*crdno area   length  volume  h-ang v-ang  delz
1000101 0.0    1.4458  0.09274  0.0  0.0   0.0
*crdno rough   dhy  pvbfe
1000102 4.0-5   0.  11000
*crdno ebt  pressure  temp
1000200 003  14.8816+6  579.371
*crdno  from     to     area  floss  rloss  fvcahs
1001101 252010003  100010001 0.0634  0.1   0.1  010000
* RPV->IHL
1002101 100010002 105010001 0.0634 0.085 0.085 010000
* IHL2->IHL2
1003101 100010001 185010002 0.0634 7200.0 7200.0 000000
* IHL->ICL
*crdno  flowf   flowg  velj
1001201 471.00   0.0    0.0
1002201 482.99   0.0    0.0
1003201 -11.998  0.0    0.0
*-------------------------------------------
*
*       Component no 105
* Intact Loop Hot leg to Pressurizer Tee
*
*crdno     name      type
1050000   IHL-2     snglvol
*crdno area   length  volume  h-ang v-ang  delz
1050101 0.06416 1.0866   0.0    0.0   0.0   0.0
*crdno rough   dhy  pvbfe
1050102 4.0e-5  0.0  11000
*crdno ebt  pressure  temp
1050200 003  14.8742+6  579.368
*-------------------------------------------
*
*       Component no 107
* Intact Loop Hot leg Pressurizer Tee
*  (V107 = 0.25*F105+0.25*F110)
*
*crdno     name      type
1070000   IHL-PRZ    branch
*crdno    no.juns.   icc
1070001     3        1
*crdno area   length  volume  h-ang v-ang  delz
1070101 0.0    0.5    0.03057  0.0   0.0   0.0
*crdno rough   dhy  pvbfe
1070102  4.0e-5  0.  11000
*crdno ebt  pressure  temp
1070200 003  14.8661+6  579.364
*crdno  from     to     area  floss  rloss  fvcahs
1071101 105010002 107010001  0.0    0.06   0.06  010000
1072101 107010002 110010001  0.0    0.06   0.06  010000
1073101 107010003 400010001  1.45-3  0.93   0.93  010000
*crdno  flowf   flowg  velj
1071201  482.99  0.0    0.0
1072201  483.16  0.0    0.0
1073201  0.0     0.0    0.0
*-------------------------------------------
*
*       Component no 110
* Intact Loop Hot leg from Pressurizer Tee
*
*crdno     name      type
1100000   IHL-3     branch
*crdno    no.juns.   icc
1100001     1        1
*crdno area   length  volume  h-ang v-ang  delz
1100101 0.0    0.8561  0.049782  0.0   0.0   0.0
*crdno rough   dhy  pvbfe
1100102  4.0e-5  0.  11000
*crdno ebt  pressure  temp
1100200 003  14.8570+6  579.360
*crdno  from     to     area  floss  rloss  fvcahs
1101101 110010002 112010001  0.0    0.15   0.15  010000
*crdno  flowf   flowg  velj
1101201  483.16  0.0    0.0
*-------------------------------------------
*
*       Component no 112
* Intact Loop Hot leg elbow and half of Reducer
*
*crdno     name      type
1120000   IHL-4      pipe
*crdno  numb_vol
1120001    2
*crdno  area   vol.
1120101   0.0    2
*crdno  length  vol.
1120301   1.3889   1
1120302   0.70769  2
*crdno  volume    vol.
1120401   0.079697   1
1120402   0.057961   2
*crdno  v-ang   vol.
1120601   0.0    1
1120602   90.0   2
*crdno  elev    vol.
```

```
1120701 0.0      1
1120702 0.246    2
*crdno  rgh      dhy      vol.
1120801 4.0-5    0.0      2
*crdno  floss    rloss    jun
1120901   0.2    0.2      1
*crdno  pvbfe    vol.
1121001 11000    2
*crdno  fvcahs   jun.
1121101 000000   1
*crdno  ebt pressure  temp  a4   a5   a6  vol.no
1121201 003 14.8456+6 579.355 0.0  0.0  0.0  1
1121202 003 14.8581+6 579.362 0.0  0.0  0.0  2
*crdno  ctl
1121300 1
*crdno  flowf    flowg    velj   jun
1121301 483.15    0.0      0.0    1
*-------------------------------------
*
*         Component no 114
* Intact Loop SG Inlet Plenum
*
*crdno     name      type
1140000    IHL-SGIn  branch
*crdno    no.juns.   icc
1140001     2        1
*crdno  area   length   volume   h-ang v-ang  delz
1140101 0.0    0.63    0.3227   0.0  90.0   0.513
*crdno  rough  dhy     pvbfe
1140102 4.0-5  1.022-2 11000
*crdno  ebt  pressure  temp
1140200 003  14.7721+6 579.334
*crdno  from      to       area    floss  rloss  fvcahs
1141101 112020002 114010001 0.0512 0.0    0.0    000100
1142101 114010002 115010001 0.0    0.0    0.0    000100
*crdno  flowf  flowg  velj
1141201  483.15  0.0   0.0
1142201  483.12  0.0   0.0
*-------------------------------------
*
*         Component no 115
* Intact Loop SG Tubes
*
*crdno     name      type
1150000    SG-Tubes  pipe
*crdno  numb_vol
1150001    10
*crdno  area   vol.
1150101 0.1513  10
*crdno  length  vol.
1150301  0.5972  1
1150302  0.3048  2
1150303  0.6096  4
1150304  0.4612  6
1150305  0.6096  8
1150306  0.3048  9
1150307  0.5972  10
*crdno  volume   vol.
1150401  0.0      10
*crdno  v-ang   vol.
1150601  90.0    5
1150602 -90.0    10
*crdno  elev    vol.
1150701  0.5972   1
1150702  0.3048   2
1150703  0.6096   4
1150704  0.4612   5
1150705 -0.4612   6
1150706 -0.6096   8
1150707 -0.3048   9
1150708 -0.5972   10
*crdno  rgh      dhy     vol.
1150801 2.50-6   1.022-2  10
*crdno  floss    rloss   jun
1150901  0.0     0.0     9
*crdno  pvbfe    vol.
1151001 00000    10
*crdno  fvcahs   jun.
1151101 000000   9
*crdno  ebt pressure  temp  a4   a5   a6  vol.no
1151201 003 14.7552+6 577.375 0.0  0.0  0.0  1
1151202 003 14.7470+6 575.605 0.0  0.0  0.0  2
1151203 003 14.7387+6 572.561 0.0  0.0  0.0  3
1151204 003 14.7276+6 569.922 0.0  0.0  0.0  4
1151205 003 14.7179+6 568.018 0.0  0.0  0.0  5
1151206 003 14.7128+6 566.269 0.0  0.0  0.0  6
1151207 003 14.7109+6 564.198 0.0  0.0  0.0  7
1151208 003 14.7087+6 562.288 0.0  0.0  0.0  8
1151209 003 14.7071+6 561.321 0.0  0.0  0.0  9
1151210 003 14.7055+6 560.282 0.0  0.0  0.0  10
*crdno  ctl
1151300 1
*crdno  flowf    flowg    velj   jun
1151301  483.11   0.0      0.0    1
1151302  483.11   0.0      0.0    2
1151303  483.11   0.0      0.0    3
1151304  483.10   0.0      0.0    4
1151305  483.10   0.0      0.0    5
1151306  483.10   0.0      0.0    6
1151307  483.10   0.0      0.0    7
1151308  483.09   0.0      0.0    8
1151309  483.09   0.0      0.0    9
*-------------------------------------
*
*         Component no 116
* Intact Loop SG outlet Plenum
*
*crdno     name      type
1160000    IHL-SGOu  branch
*crdno    no.juns.   icc
1160001     2        1
*crdno  area   length   volume   h-ang v-ang  delz
1160101 0.0    0.63    0.335    0.0 -90.0  -0.513
*crdno  rough  dhy     pvbfe
1160102 4.0-5  1.022-2 11000
*crdno  ebt  pressure  temp
1160200 003  14.7087+6 560.281
*crdno  from      to       area    floss  rloss  fvcahs
1161101 115100002 116010001 0.0    0.0    0.0    000100
1162101 116010002 118010001 0.0    0.0    0.0    000100
*crdno  flowf  flowg  velj
1161201  483.09  0.0   0.0
1162201  483.09  0.0   0.0
*-------------------------------------
*
*         Component no 118
* Intact Seal Loop #1
*  52 degree elbow, half of Reducer, 90 degree elbow
*
*crdno     name      type
1180000    ISL-1     pipe
*crdno  numb_vol
1180001    3
*crdno  area   vol.
1180101 0.0    2
1180102 0.0634 3
*crdno  length  vol.
1180301  0.547   1
1180302  0.689   2
1180303  0.550   3
*crdno  volume   vol.
1180401  0.0437   1
1180402  0.0462   2
1180403  0.0      3
*crdno  v-ang   vol.
1180601 -90.0    3
*crdno  elev    vol.
1180701 -0.498   1
1180702 -0.689   2
1180703 -0.356   3
*crdno  rgh      dhy     vol.
1180801 4.0-5    0.0     3
```

```
*
*crdno   floss   rloss   jun
1180901   0.083   0.083   1
1180902   0.104   0.104   2
*crdno  pvbfe    vol.
1181001 11000    3
*crdno  fvcahs   jun.
1181101 000000   2
*crdno  ebt pressure  temp  a4   a5   a6  vol.no
1181201 003 14.6787+6 560.269  0.0   0.0  0.0  1
1181202 003 14.6692+6 560.264  0.0   0.0  0.0  2
1181203 003 14.6640+6 560.261  0.0   0.0  0.0  3
*crdno  ctl
1181300  1
*crdno  flowf   flowg   velj   jun
1181301  483.09    0.0     0.0    2
*-----------------------------------
*
*          Component no 120
* Intact Seal Loop #2: Pipe, Inlet to pump suction
*
*crdno      name       type
1200000    ISL-2      branch
*crdno     no.juns.    icc
1200001      3         1
*crdno  area    length   volume   h-ang v-ang  delz
1200101 6.34-2   0.76     0.0     0.0   0.0   0.0
*crdno  rough   dhy    pvbfe
1200102  4.0-5   0.0    11000
*crdno  ebt  pressure  temp
1200200 003  14.6602+6  560.257
*crdno   from     to      area    floss   rloss  fvcahs
1201101 118030002  120010001  0.0   0.1   0.1   000000
1202101 120010002  125010001  0.0317  0.4   0.4   000000
* PCP #1
1203101 120010002  155010001   0.0317  0.4   0.4   000000
* PCP #2
*crdno   flowf   flowg   velj
1201201  483.09    0.0    0.0
1202201  232.15    0.0    0.0
1203201  250.94    0.0    0.0
*-----------------------------------
*
*          Component no 125
* Intact Loop : Half of Pump Suction, elbow
*
*crdno      name       type
1250000    PCP1_Suc   branch
*crdno     no.juns.    icc
1250001      1         1
*crdno  area    length   volume   h-ang v-ang  delz
1250101 0.0     1.003   0.0613    0.0  90.0   0.521
*crdno  rough   dhy    pvbfe
1250102 4.0-5    0.   11000
*crdno  ebt  pressure  temp
1250200 003   14.6725+6 560.257
*crdno   from     to      area    floss   rloss  fvcahs
1251101 125010002 130010001  0.0 0.13  0.13  000000
*crdno   flowf   flowg   velj
1251201  232.15    0.0    0.0
*-----------------------------------
*
*          Component no 130
* Intact Loop : Half of Reducer, PCP 1 inlet
*
*crdno      name       type
1300000    PCP1-In    snglvol
*crdno  area    length   volume   h-ang v-ang  delz
1300101  0.0    0.457    0.0189    0.0  90.0  0.457
*crdno  rough  dhy   pvbfe
1300102 4.0e-5 0.0  11000
*crdno  ebt  pressure  temp
1300200 003   14.6543+6 560.249
*-----------------------------------
*
*          Component no 135
* PCP #1
*
*crdno      name       type
1350000    PCP-1      pump
*crdno  area  length  volume  h-ang v-ang  delz    pvbfe
1350101 0.0366 0.0   0.099   0.0   90.0   0.319    00000
*crdno    from     area    floss   rloss  fvcahs
1350108  130010002  0.0     0.017   0.017 000000
*crdno    to       area    floss   rloss  fvcahs
1350109  140010001  0.0     0.05    0.05  000000
*crdno  ebt  pressure  temp
1350200 003   14.8996+6  560.383
*crdno   flag   flowf   flowg   velj
1350201    1    232.15    0.0    0.0
1350202    1    232.15    0.0    0.0
*crdno    id   2faz  2fazd  torq  pvel  ptrip  rvrs
1350301    0    0     0     -1    -1    601    0
*crdno   rpvel  initv   rflo   rhead   rtorq   momi
1350302  369.  0.889   0.3155   96.    500.6  1.431
*crdno   rdens  rpmtorq  tf2    tf0    tf1    tf3
1350303  613.6  0.0    207.433  0.004  19.598  0.0
*crdno   rspeed   I3     I2     I1     I0
1350308 0.212465  0.0   -25.0  29.5   6.28
*crdno   time-stop  max_fvel  max_rvel
1350310    0.0      0.0       0.0
*-----------------------------------
*          Pump Data

*          Single Phase Head Curves
*-----------------------------------
*
* head curve no 1
*
*crdno   curve type  curve regime
1351100      1          1
*         g/gnom      h/hnom
1351101    0.00000     1.4036
1351102    0.19061     1.3636
1351103    0.38963     1.3186
1351104    0.59396     1.2328
1351105    0.79020     1.1336
1351106    1.00000     1.0000
*
* head curve no 2
*
*crdno   curve type  curve regime
1351200      1          2
*         g/gnom      h/hnom
1351201    0.00000    -0.67000
1351202    0.20000    -0.50000
1351203    0.40000    -0.25000
1351204    0.57554     0.00000
1351205    0.74432     0.25830
1351206    0.77348     0.37780
1351207    0.86313     0.63260
1351208    1.00000     1.00000
*
*          head curve no 3
*
*crdno   curve type  curve regime
1351300      1          3
*         g/gnom     h/hnom
1351301   -1.00000    2.4722
1351302   -0.80574    2.0474
1351303   -0.60690    1.8310
1351304   -0.40683    1.6240
1351305   -0.20017    1.4705
1351306    0.00000    1.4036
*
*          head curve no 4
*
*crdno   curve type  curve regime
1351400      1          4
*         g/gnom     h/hnom
1351401   -1.00000    2.472200
1351402   -0.82297    1.996800
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1351403   -0.63332    1.589700
1351404   -0.45534    1.327900
1351405   -0.27109    1.194900
1351406   -0.17716    1.060500
1351407   -0.090730   1.015600
1351408    0.000000   0.934279
*
*         head curve no 5
*
*crdno    curve type   curve regime
1351500      1          5
*         g/gnom     h/hnom
1351501    0.000000   0.2500
1351502    0.200000   0.2800
1351503    0.400000   0.3400
1351504    0.411800   0.2768
1351505    0.597630   0.4584
1351506    0.793467   0.6992
1351507    0.000000   1.0000
*
*         head curve no 6
*
*crdno    curve type   curve regime
1351600      1          6
*         g/gnom     h/hnom
1351601    0.000000   0.934279
1351602    0.091099   0.922900
1351603    0.186509   0.896300
1351604    0.271762   0.875000
1351605    0.455872   0.843300
1351606    0.574406   0.835000
1351607    0.740576   0.846600
1351608    0.766619   0.846900
1351609    0.871471   0.883800
1351610    1.000000   1.000000
*
*         head curve no 7
*
*crdno    curve type   curve regime
1351700      1          7
*         g/gnom     h/hnom
1351701   -1.0000    -1.0000
1351702   -0.8000    -0.6300
1351703   -0.6000    -0.3000
1351704   -0.4000    -0.0500
1351705   -0.2000     0.1500
1351706    0.0000     0.2500
*
*         head curve no 8
*
*crdno    curve type   curve regime
1351800      1          8
*         g/gnom     h/hnom
1351801   -1.00000   -1.00000
1351802   -0.80000   -0.97000
1351803   -0.60000   -0.95000
1351804   -0.40000   -0.88000
1351805   -0.20000   -0.80000
1351806    0.00000   -0.67000
*-----------------------------------------
*+---------------------------------------+
*|        Single Phase Torque Data       |
*+---------------------------------------+
*
*         torque curve no 1
*
*crdno    curve type   curve regime
1351900      2          1
*         g/gnom     h/hnom
1351901    0.00000    0.60320
1351902    0.19300    0.63250
1351903    0.39300    0.73690
1351904    0.59552    0.83310
1351905    0.79782    0.92290
1351906    1.00000    1.00000
*
*         torque curve no 2
*
*crdno    curve type   curve regime
1352000      2          2
*         g/gnom     h/hnom
1352001    0.00000   -0.670000
1352002    0.40000   -0.250000
1352003    0.50000    0.150000
1352004    0.73725    0.526586
1352005    0.76804    0.606594
1352006    0.86723    0.743660
1352007    1.00000    1.000000
*
*         torque curve no 3
*
*crdno    curve type   curve regime
1352100      2          3
*         g/gnom     h/hnom
1352101   -1.00000    1.98430
1352102   -0.80096    1.39400
1352103   -0.60638    1.09750
1352104   -0.40686    0.82200
1352105   -0.19928    0.66480
1352106    0.00000    0.60320
*
*         torque curve no 4
*
*crdno    curve type   curve regime
1352200      2          4
*         g/gnom     h/hnom
1352201   -1.000000   1.98430
1352202   -0.822340   1.83080
1352203   -0.633710   1.68240
1352204   -0.458530   1.55700
1352205   -0.267023   1.43620
1352206   -0.176107   1.38790
1352207   -0.089310   1.34810
1352208    0.000000   1.23361
*
*         torque curve no 5
*
*crdno    curve type   curve regime
1352300      2          5
*         g/gnom     h/hnom
1352301    0.00000   -0.45000
1352302    0.40000   -0.25000
1352303    0.50000    0.00000
1352304    1.00000    0.35690
*
*         torque curve no 6
*
*crdno    curve type   curve regime
1352400      2          6
*         g/gnom     h/hnom
1352401    0.000000   1.23361
1352402    0.090643   1.19650
1352403    0.188569   1.10960
1352404    0.273470   1.04160
1352405    0.458669   0.89580
1352406    0.574480   0.78070
1352407    0.738160   0.61340
1352408    0.768520   0.58490
1352409    0.870057   0.48770
1352410    1.000000   0.35690
*
*         torque curve no 7
*
*crdno    curve type   curve regime
1352500      2          7
*         g/gnom     h/hnom
1352501   -1.00000   -1.00000
1352502   -0.30000   -0.90000
1352503   -0.10000   -0.50000
1352504    0.00000   -0.45000
*
*         torque curve no 8
```

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*
*crdno    curve type  curve regime
1352600      2          8
*          g/gnom    h/hnom
1352601    -1.00000  -1.00000
1352602    -0.25000  -0.90000
1352603    -0.08000  -0.80000
1352604     0.00000  -0.67000
*-------------------------------------
*        Two - Phase Multiplier Data
*          Head Curve
*-------------------------------
*crdno    extr.ind
1353000      0
*          voidg      head_mult
1353001     0.000      0.000000
1353002     0.020      0.020000
1353003     0.060      0.050000
1353004     0.100      0.100000
1353005     0.200      0.460000
1353006     0.240      0.800000
1353007     0.300      0.960000
1353008     0.400      0.980000
1353009     0.600      0.970000
1353010     0.800      0.900000
1353011     0.900      0.800000
1353012     0.960      5.000000
1353013     1.000      0.000000
*-------------------------------------
*        Torque Curve
*-------------------------------------
*crdno    extr.ind
1353100      0
*          voidg    torq_mult
1353101     0.00000    0.00000
1353102     0.12500    0.07000
1353103     0.16500    0.12500
1353104     0.24000    0.56000
1353105     0.80000    0.56000
1353106     0.96000    0.45000
1353107     1.00000    0.00000
*-------------------------------------
*        Pump 2-Phase Difference Data
*-------------------------------------
*       head curve no 1
*
*crdno    curve type  curve regime
1354100      1          1
*          g/gnom    h/hnom
1354101     0.00000    0.00000
1354102     0.10000    0.83000
1354103     0.20000    1.09000
1354104     0.50000    1.02000
1354105     0.70000    1.01000
1354106     0.90000    0.94000
1354107     1.00000    1.00000
*
*          head curve no 2
*
*crdno    curve type  curve regime
1354200      1          2
*          g/gnom    h/hnom
1354201     0.00000    0.00000
1354202     0.10000   -0.04000
1354203     0.20000    0.00000
1354204     0.30000    0.10000
1354205     0.40000    0.21000
1354206     0.80000    0.67000
1354207     0.90000    0.80000
1354208     1.00000    1.00000
*
*          head curve no 3
*
*crdno    curve type  curve regime
1354300      1          3
*          g/gnom    h/hnom
1354301    -1.00000  -1.16000
1354302    -0.90000  -1.24000
1354303    -0.80000  -1.77000
1354304    -0.70000  -2.36000
1354305    -0.60000  -2.79000
1354306    -0.50000  -2.91000
1354307    -0.40000  -2.67000
1354308    -0.25000  -1.69000
1354309    -0.10000  -0.50000
1354310     0.00000   0.00000
*
*          head curve no 4
*
*crdno    curve type  curve regime
1354400      1          4
*          g/gnom    h/hnom
1354401    -1.00000  -1.16000
1354402    -0.90000  -0.78000
1354403    -0.80000  -0.50000
1354404    -0.70000  -0.31000
1354405    -0.60000  -0.17000
1354406    -0.50000  -0.08000
1354407    -0.35000   0.00000
1354408    -0.20000   0.05000
1354409    -0.10000   0.08000
1354410     0.00000   0.11000
*
*          head curve no 5
*
*crdno    curve type  curve regime
1354500      1          5
*          g/gnom    h/hnom
1354501     0.00000   0.00000
1354502     0.20000  -0.34000
1354503     0.40000  -0.65000
1354504     0.60000  -0.93000
1354505     0.80000  -1.19000
1354506     1.00000  -1.47000
*
*          head curve no 6
*
*crdno    curve type  curve regime
1354600      1          6
*          g/gnom    h/hnom
1354601     0.00000   0.110000
1354602     0.10000   0.130000
1354603     0.25000   0.150000
1354604     0.40000   0.130000
1354605     0.50000   0.070000
1354606     0.60000  -0.040000
1354607     0.70000  -0.230000
1354608     0.80000  -0.510000
1354609     0.90000  -0.910000
1354610     1.00000  -1.470000
*
*          head curve no 7
*
*crdno    curve type  curve regime
1354700      1          7
*          g/gnom    h/hnom
1354701    -1.00000   0.0000
1354702     0.00000   0.0000
*
*          head curve no 8
*
*crdno    curve type  curve regime
1354800      1          8
*          g/gnom    h/hnom
1354801    -1.00000   0.0000
1354802     0.00000   0.0000
*
*          torque curve no 1
*
*crdno    curve type  curve regime
1354900      2          1
*          g/gnom    h/hnom
```

```
1354901   0.00000   0.60320
1354902   0.19300   0.63250
1354903   0.39300   0.73690
1354904   0.59552   0.83310
1354905   0.79782   0.92290
1354906   1.00000   1.00000
*
*       torque curve no 2
*
*crdno   curve type  curve regime
1355000     2         2
*       g/gnom    h/hnom
1355001   0.000000  -0.670000
1355002   0.400000  -0.250000
1355003   0.500000   0.150000
1355004   0.737255   0.526586
1355005   0.768049   0.606594
1355006   0.867230   0.743660
1355007   1.000000   1.000000
*
*       torque curve no 3
*
*crdno   curve type  curve regime
1355100     2         3
*       g/gnom    h/hnom
1355101   -1.00000   1.98430
1355102   -0.80096   1.39400
1355103   -0.60638   1.09750
1355104   -0.40686   0.82200
1355105   -0.19928   0.66480
1355106    0.00000   0.60320
*
*       torque curve no 4
*
*crdno   curve type  curve regime
1355200     2         4
*       g/gnom    h/hnom
1355201   -1.000000  1.98430
1355202   -0.822340  1.83080
1355203   -0.633710  1.68240
1355204   -0.458530  1.55700
1355205   -0.267023  1.43620
1355206   -0.176107  1.38790
1355207   -0.089310  1.34810
1355208    0.000000  1.23361
*
*       torque curve no 5
*
*crdno   curve type  curve regime
1355300     2         5
*       g/gnom    h/hnom
1355301    0.00000  -0.4500
1355302    0.40000  -0.2500
1355303    0.50000   0.0000
1355304    1.00000   0.3569
*
*       torque curve no 6
*
*crdno   curve type  curve regime
1355400     2         6
*       g/gnom    h/hnom
1355401   0.000000   1.23361
1355402   0.090643   1.19650
1355403   0.188569   1.10960
1355404   0.273470   1.04160
1355405   0.458669   0.89580
1355406   0.574480   0.78070
1355407   0.738160   0.61340
1355408   0.768520   0.58490
1355409   0.870057   0.48770
1355410   1.000000   0.35690
*
*       torque curve no 7
*
*crdno   curve type  curve regime
1355500     2         7
*       g/gnom    h/hnom
1355501   -1.00000  -1.00000
1355502   -0.30000  -0.90000
1355503   -0.10000  -0.50000
1355504    0.00000  -0.45000
*
*       torque curve no 8
*
*crdno   curve type  curve regime
1355600     2         8
*       g/gnom    h/hnom
1355601   -1.00000  -1.00000
1355602   -0.25000  -0.90000
1355603   -0.08000  -0.80000
1355604    0.00000  -0.67000
*
*-------------------------------------
*
*       Component no 140
* Intact Loop: Pump 1 outlet pipe, elbow
*
*crdno     name      type
1400000    PCP1-dsh   snglvol
*crdno  area length  volume  h-ang v-ang  delz
1400101 0.0366 0.502   0.0    0.0   0.0   0.0
*crdno  rough  dhy   pvbfe
1400102 4.0-5  0.0   11000
*crdno  ebt  pressure  temp
1400200 003  15.1535+6  560.384
*-------------------------------------
*
*       Component no 145
* Intact Loop: Pipe, Reducer, PCP1 outlet
*
*crdno     name      type
1450000    PCP1-out   branch
*crdno    no.juns.    icc
1450001      2         1
*crdno  area length  volume  h-ang v-ang  delz
1450101 0.0  1.4084   0.0633   0.0   0.0   0.0
*crdno  rough   dhy   pvbfe
1450102 4.0e-5  0.0102  11000
*crdno  ebt  pressure  temp
1450200 003  15.1251+6  560.384
*crdno   from     to      area   floss  rloss  fvcahs
1451101 140010002 145010001   0.0 0.0   0.0   000000
1452101 145010002 150010001   0.0 0.1   0.1   000000
*crdno  flowf  flowg  velj
1451201 232.24   0.0    0.0
1452201 232.24   0.0    0.0
*-------------------------------------
*
*       Component no 150
* Intact Loop: PCP outlet tee
*
*crdno     name      type
1500000    PCP-out    branch
*crdno    no.juns.    icc
1500001      2         1
*crdno  area  length volume h-ang v-ang  delz
1500101 0.0634 0.4966 0.0    0.0   0.0   0.0
*crdno  rough  dhy   pvbfe
1500102 4.0-5  0.0   11000
*crdno  ebt  pressure  temp
1500200 003  15.0673+6  560.403
*crdno   from     to      area   floss  rloss  fvcahs
1501101 170010002 150010001 0.0183  0.1  0.1   000000
1502101 150010002 175010001 0.0000  0.0  0.0   000000
*crdno  flowf  flowg  velj
1501201  250.94   0.0    0.0
1502201  483.18   0.0    0.0
*-------------------------------------
*
*       Component no 155
* Intact Loop: Hulf of PCP2 Suction, elbow
*
```

```
*crdno     name      type
1550000    PCP1_Suc  branch
*crdno     no.juns.  icc
1550001    1         1
*crdno area length volume h-ang v-ang delz
1550101 0.0 1.003  0.0613  0.0  90.0 0.521
*crdno rough dhy  pvbfe
1550102 4.0-5 0.0  11000
*crdno ebt  pressure  temp
1550200 003  14.6685+6  560.261
*crdno  from    to    area floss rloss fvcahs
1551101 155010002 160010001 0.0  0.13  0.13  000000
*crdno  flowf  flowg  velj
1551201  250.94   0.0    0.0
*-------------------------------------
*
*         Component no 160
* Intact Loop : Half of Reducer, PCP 2 inlet
*
*crdno     name      type
1600000    PCP2-in   snglvol
*crdno area   length   volume    h-ang v-ang  delz
1600101  0.0    0.457    0.0189    0.0   90.0  0.457
*crdno rough dhy  pvbfe
1600102 4.0-5 0.0  11000
*crdno ebt  pressure  temp
1600200 003  14.6478+6  560.252
*-------------------------------------
*
*         Component no 165
* PCP #2
*
*crdno     name      type
1650000    PCP-2     pump
*crdn  area length volume  h-ang v-ang   delz    pvbfe
1650101 0.0366 0.0  0.099   0.0   90.0   0.319   00000
*crdno    from   area  floss  rloss  fvcahs
1650108   160010002 0.0   0.017  0.017  000000
*crdno    to     area  floss  rloss  fvcahs
1650109   170010001  0.0  0.05   0.05   000000
*crdno ebt  pressure  temp
1650200 003  14.8642+6  560.379
*crdno  flag  flowf  flowg  velj
1650201   1   250.94   0.0   0.0
1650202   1   250.94   0.0   0.0
*crdno   id  2faz  2fazd  torq  pvel  ptrip  rvrs
1650301  135   135   135   -1   -1   601    0
*crdno  rpvel initv   rflo   rhead  rtorq  momi
1650302  369. 0.892      0.3155  96.   500.6 1.431
*crdno  rdens rpmtorq tf2   tf0   tf1   tf3
1650303  613.6  0.0  207.433 0.0444  19.5987 0.0
*crdno  rspeed  I3   I2   I1   I0
1650308 0.212465  0.0  -25.0 29.5  6.28
*crdno  time-stop max_fvel max_rvel
1650310    0.0    0.0     0.0
*-------------------------------------
*
*         Component no 170
* Intact Loop: Pump 2 elbow, inlet of PCP outlet
*
*crdno     name      type
1700000    PCP2-out  branch
*crdno     no.juns.  icc
1700001    0         1
*crdno area length volume h-ang v-ang delz
1700101 0.0366 0.514  0.0   0.0  0.0  0.0
*crdno rough dhy  pvbfe
1700102 4.0-5 0.0  11000
*crdno ebt  pressure  temp
1700200 003  15.0879+6  560.455
*-------------------------------------
*
*         Component no 175
* Intact Loop: 90 degree elbow, Pipe section, elbow
*
*crdno     name      type
1750000    ICL-1     pipe
*crdno  numb_vol
1750001    2
*crdno  area  vol.
1750101 0.0634   2
*crdno  length  vol.
1750301  0.559   1
1750302  0.613   2
*crdno  v-ang   vol.
1750601  0.0     2
*crdno  rgh   dhy   vol.
1750801 4.0-5  0.0    2
*crdno  floss  rloss  jun
1750901   0.0    0.0    1
*crdno  pvbfe  vol.
1751001 11000    2
*crdno  fvcahs  jun.
1751101 000000    1
*crdno ebt  pressure  temp  a4   a5   a6  vol.
1751201 003  15.0664+6 560.402 0.0   0.0  0.0  1
1751202 003  15.0654+6 560.400 0.0   0.0  0.0  2
*crdno  ctl
1751300  1
*crdno  flowf  flowg  velj  jun
1751301 483.18   0.0    0.0    1
*-------------------------------------
*
*         Component no 180
* Intact Loop: Pipe to ECC Line
*
*crdno     name      type
1800000    ECC-Tee   branch
*crdno     no.juns.  icc
1800001    2         1
*crdno area length volume h-ang v-ang delz
1800101 0.0  1.01  0.06406 0.0   0.0  0.0
*crdno rough dhy  pvbfe
1800102 4.0-5  0.0  11000
*crdno ebt  pressure  temp
1800200 003  15.0640+6 560.396
*crdno   from    to    area floss rloss fvcahs
1801101 175020002 180010001 0.0   0.0   0.0  000000
1802101 180010002 184010001 0.0   0.0   0.0  000000
*crdno  flowf  flowg  velj
1801201  483.18   0.0    0.0
1802201  483.18   0.0    0.0
*-------------------------------------
*
*         Component no 182
* Break line ID=0.034m (1.3 in) from Break tee to Break orifice
*
*crdno     name      type
1820000    BRK-line  pipe
*crdno  numb_vol
1820001    1
*crdno  area  vol.
1820101 9.0792-4  1
*crdno  length  vol.
1820301  0.544   1
*crdno  v-ang   vol.
1820601  0.0     1
*crdno  rgh   dhy   vol.
1820801 4.0-5  3.4-2  1
*crdno  pvbfe  vol.
1821001 10000    1
*crdno ebt  pressure  temp  a4   a5   a6  vol.
1821201 003  15.0630+6 477.030 0.0   0.0  0.0  1
*-------------------------------------
*
*         Component no 183
* Break orifice - Simulated 4 in break of PWR (F = 205.6 mm2)
*
*crdno     name      type
1830000    brkvlv    valve
*crdno  from    to    area   floss  rloss  fvcahs
1830101 182010002 805000000 205.6-6  0.4   0.4   000100
```

```
*crdno sub-dsh  2ph-dsh

1830102  1.0   0.85   0.6
*crdno  ctl  flowf   flowg    velj
1830201  1    0.0     0.0      0.0
*crdno   name
1830300  mtrvlv
*crdno   open_trip  close_trip vlv_ch.r.  in.pos
1830301    404       402      5.0        0.0
*-----------------------------------------
*
*        Component no 805
* Break Disharge volume
*
*crdno     name     type
8050000    BRK-DSH  tmdpvol
*crdno  area  length  volume h-ang v-ang delz
8050101 3.5-3  1.0    0.0 0.0   0.0   0.0
*crdno  rough  dhy  pvbfe
8050102  0.0   0.0  00000
*crdno  ebt
8050200 002
*crdno   time  pressure  quals
8050201   0.0   1.0+5    1.0
*-----------------------------------------
*
*        Component no 184
* Intact Loop: Cold leg break Tee
*
*crdno     name      type
1840000    ICL-BTee  branch
*crdno    no.juns.    icc
1840001     1         1
*crdno  area  length  volume   h-ang v-ang delz
1840101  0.0  0.284   0.01805   0.0   0.0  0.0
*crdno  rough  dhy  pvbfe
1840102 4.0-5  0.0  11000
*crdno  ebt  pressure  temp
1840200 003  15.0630+6  560.395
*crdno   from    to      area   floss  rloss  fvcahs
1841101 184010003 182010001 9.0792-4 0.5   0.5   000100
*crdno   flowf  flowg  velj
1841201   0.0    0.0    0.0
*-----------------------------------------
*
*        Component no 185
* Intact Loop: Pipe from ECC line, nozzle
*
*crdno     name      type
1850000    ICL-Vin    branch
*crdno    no.juns.    icc
1850001     3         1
*crdno  area  length  volume   h-ang v-ang  delz
1850101 0.0  1.152   0.07349   0.0   0.0    0.0
*crdno  rough  dhy  pvbfe
1850102 4.0-5  0.0  11000
*crdno  ebt  pressure  temp
1850200 003  15.0621+6  560.392
*crdno   from    to      area   floss  rloss  fvcahs
1851101 184010002 185010001  0.0     0.0  0.0  000000
1852101 185010002 202010003  0.0634  2.8  2.8  000000
1853101 185010002 208010001  0.0     52.0 52.0 000000
*crdno   flowf  flowg  velj
1851201  483.18  0.0    0.0
1852201  426.45  0.0    0.0
1853201  44.736  0.0    0.0
*
*-----------------------------------------
*        PCP Injection

*        Component no 910
* PCP Injection Tank
*
*crdno     name      type
9100000    PCP-WAT   tmdpvol
*crdno  area  length volume h-ang v-ang  delz
9100101 7.-3  1.0    0.0  0.0   0.0    0.0
*crdno  rough  dhy  pvbfe
9100102 4.0-5  0.0  00000
*crdno  ebt
9100200 001
*crdno  time   temp   quals
9100201  0.0   305.0    0.0
*-----------------------------------------
*
*        Component no 911
* PCP Injection Pump
*
*crdno     name      type
9110000    PCP-INJ   tmdpjun
*crdno    from      to      area
9110101  910000000 140010001  0.0
*crdno  ctl  trip
9110200  1   605
*crdno     time   flowf  flowg  velj
9110201    -1.     0.0    0.0   0.0
9110202     0.0    0.094  0.0   0.0
*
*-----------------------------------------
*            Reactor Vessel
*-----------------------------------------
*
*        Component no 200
* Reactor Vessel: Inlet Annulus, Upper (from intact loop (3/4))
*
*crdno     name      type
2000000    RV-In3-1    annulus
*crdno    no.vol
2000001     1
*crdno  area   vol.
2000101 0.00    1
*crdno  lenght  vol.
2000301 0.1874  1
*crdno  volume  vol.
2000401 0.03766 1
*crdno  angle   vol.
2000601 90.0    1
*crdno  rgh     dhy   vol.
2000801 4.0-5   0.172 1
*crdno  pvbfe   vol.
2001001 11000   1
*crdno  ebt  pressure  temp  a4   a5   a6  vol.
2001201 003 15.0132+6 558.966 0.0  0.0  0.0  1
*-----------------------------------------
*
*        Component no 202
* Reactor Vessel: Inlet Annulus, middle (from intact loop (3/4))
*
*crdno     name      type
2020000    RV-In3-2    branch
*crdno    no.juns.    icc
2020001     2         1
*crdno  area  length  volume   h-ang v-ang  delz
2020101 0.0  0.2852  0.05733   0.0  -90.0 -0.2852
*crdno  rough  dhy  pvbfe
2020102 4.0-5 0.178 11000
*crdno  ebt  pressure  temp
2020200 003 15.0149+6 560.372
*crdno   from    to      area   floss  rloss  fvcahs
2021101 202010001 200010001  0.0  0.0   0.0   000000
2022101 202010002 204010001  0.0  0.0   0.0   000000
*crdno   flowf  flowg   velj
2021201  0.13167 0.0     0.0
2022201  319.80  0.0     0.0
*-----------------------------------------
*
*        Component no 204
* Reactor Vessel: Inlet Annulus, lower (from intact loop (3/4))
*
*crdno     name      type
2040000    RV-In3-3    annulus
*crdno    no.vol
```

```
2040001     1
*crdno  area   vol.
2040101  0.0     1
*crdno  lenght  vol.
2040301 0.2814   1
*crdno  volume  vol.
2040401 0.05656  1
*crdno  angle   vol.
2040601 -90.0    1
*crdno  rgh     dhy   vol.
2040801  4.0-5   0.172  1
*crdno  pvbfe   vol.
2041001 11000    1
*crdno  ebt pressure  temp  a4   a5   a6  vol.
2041201 003 15.0153+6 560.370 0.0   0.0  0.0  1
*-------------------------------------
*
*         Component no 205
* Reactor Vessel: Inlet Unnulus to Downcomer junction
*
*crdno      name       type
2050000     In-Dw     sngljun
*crdno    from      to      area     floss rloss  fvcahs
2050101  204010002 206010001  0.0   0.0  0.0  000000
*crdno  ctl  flowf    flowg    velj
2050201  1   319.82     0.0      0.0
*-------------------------------------
*
*         Component no 206
* Reactor Vessel: Downcomer (from intact loop (3/4))
*
*crdno      name       type
2060000    DWC-3/4    annulus
*crdno    no.vol
2060001      6
*crdno  area    vol.
2060101 0.1065   6
*crdno  lenght  vol.
2060301 0.958    1
2060302 0.579    2
2060303 0.657    3
2060304 0.559    5
2060305 0.520    6
*crdno  vol     vol.
2060401 0.0      6
*crdno  angle   vol.
2060601 -90.     6
*crdno  rgh     dhy   vol.
2060801  4.0-5   0.102  6
*crdno  floss   rloss   jun
2060901   0.0     0.0    5
*crdno  pvbfe   vol.
2061001 11000    6
*crdno  fvcahs   jun.
2061101 000000    5
*crdno  ebt pressure  temp  a4   a5   a6  vol.
2061201 003 15.0151+6 560.363 0.0   0.0  0.0  1
2061202 003 15.0200+6 560.361 0.0   0.0  0.0  2
2061203 003 15.0240+6 560.359 0.0   0.0  0.0  3
2061204 003 15.0279+6 560.357 0.0   0.0  0.0  4
2061205 003 15.0315+6 560.355 0.0   0.0  0.0  5
2061206 003 15.0349+6 560.354 0.0   0.0  0.0  6
*crdno  ctl
2061300  1
*crdno  flowf   flowg   velj    jun
2061301 319.82    0.0     0.0     1
2061302 319.82    0.0     0.0     2
2061303 319.81    0.0     0.0     3
2061304 319.81    0.0     0.0     4
2061305 319.81    0.0     0.0     5
*-------------------------------------
*
*         Component no 208
* Reactor Vessel: Vessel Filler Gap  (from intact loop (3/4))
*
*crdno      name       type
2080000    FilG-3/4   annulus
*crdno    no.vol
2080001     4
*crdno  area    vol.
2080101 0.02911  4
*crdno  lenght  vol.
2080301 1.382    1
2080302 1.236    2
2080303 1.118    3
2080304 1.250    4
*crdno  volume  vol.
2080401  0.0     4
*crdno  angle   vol.
2080601 -90.     4
*crdno  rgh     dhy   vol.
2080801 4.0-5    0.0   4
*crdno  floss   rloss   jun
2080901   0.0     0.0    3
*crdno  pvbfe   vol.
2081001 11000    4
*crdno  fvcahs   jun.
2081101 000000    3
*crdno  ebt pressure  temp  a4   a5   a6  vo
2081201 003 15.0216+6 560.215 0.0   0.0  0.0  1
2081202 003 15.0312+6 560.070 0.0   0.0  0.0  2
2081203 003 15.0399+6 559.894 0.0   0.0  0.0  3
2081204 003 15.0486+6 559.758 0.0   0.0  0.0  4
*crdno  ctl
2081300  1
*crdno  flowf   flowg   velj    jun
2081301  42.063   0.0     0.0     1
2081302  38.500   0.0     0.0     2
2081303  43.233   0.0     0.0     3
*-------------------------------------
*
*         Component no 210
* Reactor Vessel: Inlet Annulus, Upper (from broken loop (1/4))
*
*crdno      name       type
2100000   RV-In1-1     annulus
*crdno    no.vol
2100001      1
*crdno  area    vol.
2100101  0.00     1
*crdno  lenght  vol.
2100301 0.1874   1
*crdno  volume  vol.
2100401 0.01255  1
*crdno  angle   vol.
2100601 90.0     1
*crdno  rgh     dhy   vol.
2100801  4.0-5   0.172  1
*crdno  pvbfe   vol.
2101001 11000    1
*crdno  ebt pressure  temp  a4   a5   a6  vol.
2101201 003 15.0132+6 558.160 0.0   0.0  0.0  1
*-------------------------------------
*
*         Component no 212
* Reactor Vessel: Inlet Annulus, middle (from broken loop (1/4))
*
*crdno      name       type
2120000   RV-In1-2     branch
*crdno    no.juns.    icc
2120001      2         1
*crdno  area length volume  h-ang  v-ang   delz
2120101 0.0  0.2852 0.01911 0.0   -90.0  -0.2852
*crdno  rough  dhy   pvbfe
2120102 4.0-5  0.178  11000
*crdno  ebt pressure  temp
2120200 003 15.0149+6 560.364
*crdno  from      to      area  floss rloss fvcahs
2121101 212010001 210010001  0.0  0.0   0.0  000000
2122101 212010002 214010001  0.0  0.0   0.0  000000
*crdno  flowf    flowg     velj
2121201  -0.12890  0.0       0.0
```

```
2122201 106.63     0.0      0.0
*----------------------------------------
*
*          Component no 214
* Reactor Vessel: Inlet Annulus, lower (from broken loop (3/4))
*
*crdno      name      type
2140000    RV-In1-3    annulus
*crdno     no.vol
2140001       1
*crdno   area    vol.
2140101  0.0     1
*crdno  lenght   vol.
2140301 0.2814    1
*crdno  volume   vol.
2140401 0.01885   1
*crdno  angle    vol.
2140601 -90.0     1
*crdno   rgh      dhy    vol.
2140801  4.0-5    0.172   1
*crdno  pvbfe    vol.
2141001 11000     1
*crdno  ebt pressure   temp    a4    a5    a6  vol.
2141201 003 15.0153+6 560.362 0.0   0.0  0.0  1
*----------------------------------------
*
*          Component no 215
* Reactor Vessel: Inlet Unnulus to Downcomer junction
*
*crdno      name       type
2150000     In-Dw      sngljun
*crdno     from      to      area      floss  rloss  fvcahs
2150101  214010002 216010001  0.0    0.0    0.0    000000
*crdno  ctl   flowf     flowg     velj
2150201  1    106.62     0.0       0.0
*----------------------------------------
*
*          Component no 216
* Reactor Vessel: Downcomer (from broken loop (1/4))
*
*crdno      name       type
2160000    DWC-1/4    annulus
*crdno     no.vol
2160001       6
*crdno   area    vol.
2160101 3.55-2    6
*crdno  lenght   vol.
2160301 0.958     1
2160302 0.579     2
2160303 0.657     3
2160304 0.559     5
2160305 0.520     6
*crdno  vol      vol.
2160401 0.0       6
*crdno  angle    vol.
2160601 -90.      6
*crdno   rgh      dhy    vol.
2160801  4.0-5    0.102   6
*crdno  floss   rloss   jun
2160901   0.0     0.0     5
*crdno  pvbfe    vol.
2161001 11000     6
*crdno  fvcahs   jun.
2161101 000000    5
*crdno  ebt pressure   temp    a4    a5    a6  vol.
2161201 003 15.0151+6 560.356 0.0   0.0  0.0  1
2161202 003 15.0200+6 560.354 0.0   0.0  0.0  2
2161203 003 15.0240+6 560.352 0.0   0.0  0.0  3
2161204 003 15.0279+6 560.351 0.0   0.0  0.0  4
2161205 003 15.0315+6 560.349 0.0   0.0  0.0  5
2161206 003 15.0349+6 560.348 0.0   0.0  0.0  6
*crdno  ctl
2161300  1
*crdno  flowf   flowg   velj    jun
2161301  106.62  0.0     0.0     5
*----------------------------------------
*
*          Component no 218
* Reactor Vessel: Vessel Filler Gap  (from intact loop (1/4))
*
*crdno      name      type
2180000    FilG-1/4   annulus
*crdno     no.vol
2180001       4
*crdno   area    vol.
2180101 0.02911   4
*crdno  lenght   vol.
2180301 1.382     1
2180302 1.236     2
2180303 1.118     3
2180304 1.250     4
*
*crdno  volume   vol.
2180401  0.0      4
*crdno  angle    vol.
2180601 -90.      4
*crdno   rgh      dhy    vol.
2180801 4.0-5     0.0    4
*crdno  floss   rloss   jun
2180901   0.0     0.0     3
*crdno  pvbfe    vol.
2181001 11000     4
*crdno  fvcahs   jun.
2181101 000000    3
*crdno  ebt pressure   temp    a4    a5    a6  vo
2181201 003 15.0216+6 559.742 0.0   0.0  0.0  1
2181202 003 15.0312+6 559.746 0.0   0.0  0.0  2
2181203 003 15.0399+6 559.590 0.0   0.0  0.0  3
2181204 003 15.0486+6 559.685 0.0   0.0  0.0  4
*crdno  ctl
2181300  1
*crdno  flowf   flowg   velj    jun
2181301  2.6695  0.0     0.0     1
2181302  6.2288  0.0     0.0     2
2181303  1.4931  0.0     0.0     3
*----------------------------------------
*
*          Component no 219
* Reactor Vessel: Downcomer cross junction
*
*crdno     name    type
2190000  dc-junc  mtpljun
*crdno    jun.no  ctrlw
2190001     13      0
*crdno    from      to       area    floss  rloss  fvcahs
2190011 200010003 210010003  0.0  0.0    0.0    000000
2190021 202010003 212010003  0.0  0.0    0.0    000000
2190031 204010003 214010003  0.0  0.0    0.0    000000
2190041 206010003 216010003  0.0  0.0    0.0    000000
2190051 208010003 218010003  0.0  0.0    0.0    000000
*crdno  subc.d.c. 2ph.d.c. suph.d.c. from_incr to_incr zero jun.no
2190012   1.0      1.0      1.0       0       0      0    1
2190022   1.0      1.0      1.0       0       0      0    2
2190032   1.0      1.0      1.0       0       0      0    3
2190042   1.0      1.0      1.0     10000   10000    0  9
2190052   1.0      1.0      1.0     10000   10000    0 13
*crdno   flowf    flowg    jun.no
2191011   0.12951  0.0       1
2191021   106.51   0.0       2
2191031   -1.18969-2 0.0     3
2191041   -4.21396-4 0.0     4
2191051   2.6724   0.0       5
2191061   -3.70813-4 0.0     6
2191071   3.5619   0.0       7
2191081   -1.94251-4 0.0     8
2191091   -4.7333  0.0       9
2191101   -6.78366-4 0.0     10
2191111   20.528   0.0      11
2191121   9.98058-4 0.0      12
2191131   -4.27175-3 0.0     13
*----------------------------------------
*
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*        Component no 220
* Reactor Vessel: Lower Plenum lower
*
*crdno     name      type
2200000    LWPL-Dw    branch
*crdno    no.juns.    icc
2200001      3         1
*crdno  area  length volume  h-ang v-ang  delz
2200101 0.790 0.370  0.0     0.0   90.0  0.370
*crdno  rough  dhy  pvbfe
2200102 4.0-5  0.0  11000
*crdno  ebt  pressure  temp
2200200 003  15.0346+6  559.842
*crdno   from      to      area  floss  rloss  fvcahs
2201101 208040002 220010001  0.0  45.0   45.0   000000
2202101 218040002 220010001  0.0  45.0   45.0   000000
2203101 220010002 222010001  0.0  0.0    0.0    000000
*crdno   flowf   flowg   velj
2201201   22.702   0.0     0.0
2202201   22.019   0.0     0.0
2203201   44.703   0.0     0.0
*-----------------------------------------
*
*        Component no 222
* Reactor Vessel: Lower Plenum upper
*
*crdno     name      type
2220000    LWPL-Dw    branch
*crdno    no.juns.    icc
2220001      3         1
*crdno  area  length volume  h-ang v-ang  delz
2220101 0.740 0.360  0.0     0.0   90.0  0.360
*crdno  rough  dhy  pvbfe
2220102 4.0-5  0.0  11000
*crdno  ebt  pressure  temp
2220200 003  15.0319+6  560.311
*crdno   from      to      area  floss  rloss  fvcahs
2221101 206060002 222010002  0.0  2.0    2.0    000000
2222101 216060002 222010002  0.0  2.0    2.0    000000
2223101 222010002 225010001  0.15 1.5    1.5    000000
*crdno   flowf   flowg    velj
2221201   319.82   0.0      0.0
2222201   106.61   0.0      0.0
2223201   471.12   0.0      0.0
*-----------------------------------------
*
*        Component no 225
* Reactor Vessel: Lower Core Support
*
*crdno     name      type
2250000    Core_Sup   branch
*crdno    no.juns.    icc
2250001      2         1
*crdno  area  length volume  h-ang v-ang  delz
2250101 0.250 0.520  0.0     0.0   90.0  0.520
*crdno  rough  dhy  pvbfe
2250102 4.0-5  0.095  11000
*crdno  ebt  pressure  temp
2250200 003  15.0163+6  560.304
*crdno   from      to      area  floss  rloss  fvcahs
2251101 225010002 230010001  0.0975 1.5  1.5    000000
2252101 225010002 235010001  0.0    21.0 21.0   000000
*crdno   flowf   flowg    velj
2251201   453.46   0.0      0.0
2252201   17.655   0.0      0.0
*-----------------------------------------
*
*        Component no 230
* Reactor Vessel: Active Core
*
*crdno     name    type
2300000    Core    pipe
*crdno    no.vol
2300001     6
*crdno   area    vol.
2300101  0.1705   6
*crdno   length  vol.
2300301  0.2795   5
2300302  0.3775   6
*crdno   volume  vol.
2300401   0.0     6
*crdno   v-ang   vol.
2300601  90.0     6
*crdno   rgh     dhy     vol.
2300801  4.0-5    0.012   6
*crdno   floss   rloss   jun
2300901   0.0     0.0     1
2300902   0.66    0.66    2
2300903   0.0     0.0     3
2300904   0.66    0.66    4
2300905   0.0     0.0     5
*crdno   pvbfe   vol.
2301001  00100   6
*
*crdno   fvcahs   jun.
2301101  000000   5
*crdno   ebt  pressure  temp  a4  a5  a6  vol
2301201  003  14.9878+6  560.859  0.0  0.0  0.0  1
2301202  003  14.9827+6  563.736  0.0  0.0  0.0  2
2301203  003  14.9745+6  568.584  0.0  0.0  0.0  3
2301204  003  14.9693+6  574.042  0.0  0.0  0.0  4
2301205  003  14.9609+6  578.573  0.0  0.0  0.0  5
2301206  003  14.9548+6  580.588  0.0  0.0  0.0  6
*crdno   ctl
2301300   1
*crdno   flowf    flowg    velj    jun
2301301  453.46    0.0      0.0     5
*-----------------------------------------
*
*        Component no 235
* Reactor Vessel: Core Bypass
*
*crdno     name      type
2350000    Core_byp   pipe
*crdno   no_vol
2350001     3
*crdno   area    vol.
2350101  0.015    3
*crdno   length  vol.
2350301  0.559     2
2350302  0.657     3
*crdno   volume  vol.
2350401   0.0     3
*crdno   v-ang   vol.
2350601  90.0     3
*crdno   rgh     dhy     vol.
2350801  4.-5     0.003   3
*crdno   floss   rloss   jun
2350901   0.0     0.0     2
*crdno   pvbfe   vol.
2351001  00000   3
*crdno   fvcahs   jun.
2351101  000000   2
*crdno   ebt  pressure  temp  a4  a5  a6  vo
2351201  003  14.9906+6  560.305  0.0  0.0  0.0  1
2351202  003  14.9790+6  560.313  0.0  0.0  0.0  2
2351203  003  14.9665+6  560.324  0.0  0.0  0.0  3
*crdno   ctl
2351300   1
*crdno   flowf    flowg    velj    jun
2351301  17.654    0.0      0.0     2
*-----------------------------------------
*
*        Component no 240
* Reactor Vessel: Upper end Box center/support
*
*crdno     name      type
2400000    core_low   branch
*crdno    no.juns.    icc
2400001      2         1
*crdno  area  length volume  h-ang v-ang  delz
2400101 0.297 0.559  0.0     0.0   90.0  0.559
```

```
*crdno rough dhy pvbfe
2400102 4.0-5 0.145 00000
*crdno ebt pressure temp
2400200 003 14.9374+6 579.869
*crdno from to area floss rloss fvcahs
2401101 230060002 240010001 0.120 1.5 1.5 000000
2402101 235030002 240010001 0.0 21.0 21.0 000000
*crdno flowf flowg velj
2401201 453.45 0.0 0.0
2402201 17.653 0.0 0.0
*----------
*
*  Component no 245
* Reactor Vessel: Upper Support X-flow
*
*crdno name type
2450000 Core_SUp branch
*crdno no.juns. icc
2450001 2 1
*crdno area length volume h-ang v-ang delz
2450101 0.297 0.559 0.0 0.0 90.0 0.559
*crdno rough dhy pvbfe
2450102 4.0-5 0.145 00000
*crdno ebt pressure temp
2450200 003 14.9334+6 579.869
*crdno from to area floss rloss fvcahs
2451101 240010002 245010001 0.0 0.0 0.0 000000
2452101 245010002 251010001 0.0 0.0 0.0 000000
*crdno flowf flowg velj
2451201 471.09 0.0 0.0
2452201 -1.38548-3 0.0 0.0
*----------
*
*  Component no 250
* Reactor Vessel: Upper flow skirt vol
*
*crdno name type
2500000 Up-Skirt branch
*crdno no.juns. icc
2500001 1 1
*crdno area length volume h-ang v-ang delz
2500101 0.114 0.7004 0.0 0.0 90.0 0.7004
*crdno rough dhy pvbfe
2500102 4.0-5 0.131 00000
*crdno ebt pressure temp
2500200 003 14.9182+6 579.859
*crdno from to area floss rloss fvcahs
2501101 245010002 250010001 0.0 0.0 0.0 000000
*crdno flowf flowg velj
2501201 471.08 0.0 0.0
*----------
*
*  Component no 251
* Reactor Vessel: Dead End Fuel Modules
*
*crdno name type
2510000 Dead_End snglvol
*crdno area length volume h-ang v-ang delz
2510101 0.183 0.700 0.0 0.0 90.0 0.700
*crdno rough dhy pvbfe
2510102 4.0-5 0.214 00000
*crdno ebt pressure temp
2510200 003 14.9307+6 577.402
*----------
*
*  Component no 252
* Reactor Vessel: Upper Plenum lower
*
*crdno name type
2520000 UpPl-low branch
*crdno no.juns. icc
2520001 2 1
*crdno area length volume h-ang v-ang delz
2520101 0.201 0.2852 0.0 0.0 90.0 0.2852
*crdno rough dhy pvbfe
2520102 4.0-5 0.0 11000
*crdno ebt pressure temp
2520200 003 14.9249+6 579.864
*crdno from to area floss rloss fvcahs
2521101 252010002 255010001 0.0 0.006 0.006 000000
2522101 250010002 252010001 0.0 0.003 0.003 000000
*crdno flowf flowg velj
2521201 2.85066-2 0.0 0.0
2522201 471.07 0.0 0.0
*----------
*
*  Component no 255
* Reactor Vessel: Upper plenum bottom
*
*crdno name type
2550000 UpPl-bot branch
*crdno no.juns. icc
2550001 1 1
*crdno area length volume h-ang v-ang delz
2550101 0.288 0.7114 0.0 0.0 90.0 0.7114
*crdno rough dhy pvbfe
2550102 4.0-5 0.0 11000
*crdno ebt pressure temp
2550200 003 14.9227+6 573.761
*crdno from to area floss rloss fvcahs
2551101 255010002 260010001 0.0 0.03 0.03 000000
*crdno flowf flowg velj
2551201 1.63408-2 0.0 0.0
*----------
*
*  Component no 260
* Reactor Vessel: Upper plenum top
*
*crdno name type
2600000 UpPl-top snglvol
*crdno area length volume h-ang v-ang delz
2600101 0.244 0.712 0.0 0.0 90.0 0.712
*crdno rough dhy pvbfe
2600102 4.0-5 0.0 11000
*crdno ebt pressure temp
2600200 003 14.9177+6 572.721
*----------
*  Broken Loop
*----------
*----------
*
*  Component no 300
* Broken Loop: Vessel nozzle, Hot leg
*
*crdno name type
3000000 BHL-1 branch
*crdno no.juns. icc
3000001 2 1
*crdno area length volume h-ang v-ang delz
3000101 0.0634 0.876 0.0 0.0 0.0 0.0
*crdno rough dhy pvbfe
3000102 4.0-5 0.0 11000
*crdno ebt pressure temp
3000200 003 14.9249+6 561.738
*crdno from to area floss rloss fvcahs
3001101 252010003 300010001 0.0634 0.0 0.0 000000
3002101 300010002 305010001 0.0 0.1 0.1 000000
*crdno flowf flowg velj
3001201 3.95983-2 0.0 0.0
3002201 3.81269-2 0.0 0.0
*----------
*
*  Component no 305
* Broken Loop: BLHL to RABS Tee
*
*crdno name type
3050000 BHL-Tee branch
*crdno no.juns. icc
3050001 1 1
*crdno area length volume h-ang v-ang delz
3050101 0.0634 0.698 0.0 0.0 0.0 0.0
*crdno rough dhy pvbfe
```

```
3050102 4.0-5  0.0  11000
*crdno  ebt pressure  temp
3050200 003  14.9249+6  561.373
*crdno  from  to  area  floss  rloss  fvcahs
3051101 305010002 310010001  0.0  0.1  0.1  000000
*crdno  flowf  flowg  velj
3051201  3.55093-2  0.0  0.0
*-----------------------------------------
*
*       Component no 310
* Broken Loop: BLHL contraction
*
*crdno  name  type
3100000  BHL-Con  branch
*crdno  no.juns.  icc
3100001  2  0
*crdno  area  length  volume  h-ang  v-ang  delz
3100101 0.0  1.5001 0.06785  0.0  0.0  0.0
*crdno  rough  dhy  pvbfe
3100102  4.0-5  0.0  11000
*crdno  ebt pressure  temp
3100200 003  14.9249+6  561.158
*crdno  from  to  area  floss  rloss  fvcahs
3101101 380030002 310010003 0.0388 0.84  0.84  000000
3102101 310010002 315010001 8.365-3 0.0  0.0  000100
*crdno  flowf  flowg  velj
3101201  -2.48442-2  0.0  0.0
3102201  5.27375-3  0.0  0.0
*-----------------------------------------
*
*       Component no 315
* Broken Loop: Pipe to Isolation Valve
*
*crdno  name  type
3150000  BHL-end  pipe
*crdno  numb_vol
3150001  2
*crdno  area  vol.
3150101  0.0  2
*crdno  j_area  vol.
3150201  0.011086  1
*crdno  length  vol.
3150301  0.488  1
3150302  1.6085  2
*crdno  volume  vol.
3150401  0.00541  1
3150402  0.0777  2
*crdno  v-ang  vol.
3150601  0.0  2
*crdno  rgh  dhy  vol.
3150801  4.0-5  0.0  2
*crdno  floss  rloss  jun
3150901  0.0  0.0  1
*crdno  pvbfe  vol.
3151001  11000  2
*crdno  fvcahs  jun.
3151101  000100  1
*crdno  ebt pressure  temp  a4  a5  a6  vol
3151201 003  14.9249+6  559.178 0.0  0.0  0.0  1
3151202 003  14.9249+6  561.476 0.0  0.0  0.0  2
*crdno  ctl
3151300  1
*crdno  flowf  flowg  velj  jun
3151301  3.87772-3 0.0  0.0  1
*-----------------------------------------
*
*       Component no 335
* Broken Loop: Vessel nozzle, Cold leg
*
*crdno  name  type
3350000  BCL-1  branch
*crdno  no.juns.  icc
3350001  2  1
*crdno  area  length  volume  h-ang  v-ang  delz
3350101 0.0634 0.7495  0.0  0.0  0.0  0.0
*crdno  rough  dhy  pvbfe
3350102 4.0-5  0.0  11000
*crdno  ebt pressure  temp
3350200 003  15.0149+6  555.401
*crdno  from  to  area  floss  rloss  fvcahs
3351101 212010003 335010001 0.0634 1.0  1.0  000000
3352101 335010002 340010001 0.0  0.1  0.1  000000
*crdno  flowf  flowg  velj
3351201  9.33549-3  0.0  0.0
3352201  6.78439-3  0.0  0.0
*-----------------------------------------
*
*       Component no 340
* Broken Loop: BCL to RABS Tee
*
*crdno  name  type
3400000  BCL-Tee  branch
*crdno  no.juns.  icc
3400001  1  1
*crdno  area  length  volume  h-ang  v-ang  delz
3400101 0.0634 0.698  0.0  0.0  0.0  0.0
*crdno  rough  dhy  pvbfe
3400102 4.0-5  0.0  11000
*crdno  ebt pressure  temp
3400200 003  15.0149+6  556.004
*crdno  from  to  area  floss  rloss  fvcahs
3401101 340010002 345010001 0.0  0.1  0.1  000000
*crdno  flowf  flowg  velj
3401201  6.79018-3  0.0  0.0
*-----------------------------------------
*
*       Component no 345
* Broken Loop: BCL Contraction
*
*crdno  name  type
3450000  BCL-Con  branch
*crdno  no.juns.  icc
3450001  2  1
*crdno  area  length  volume  h-ang  v-ang  delz
3450101 0.0634 0.974  0.0  0.0  0.0  0.0
*crdno  rough  dhy  pvbfe
3450102 4.0-5  0.0  11000
*crdno  ebt pressure  temp
3450200 003  15.0149+6  556.005
*crdno  from  to  area  floss  rloss  fvcahs
3451101 345010003  370010001 0.0388  0.84  0.84  010000
3452101 345010002  350010001 0.0000  0.0  0.0  000000
*crdno  flowf  flowg  velj
3451201  1.89770-3  0.0  0.0
3452201  4.91399-3  0.0  0.0
*-----------------------------------------
*
*       Component no 350
* Broken Loop: BCL Pipe to Isolation Valve
*
*crdno  name  type
3500000  BCL-end  pipe
*crdno  numb_vol
3500001  2
*crdno  area  vol.
3500101  0.0  2
*crdno  j_area  vol.
3500201  0.011086  1
*crdno  length  vol.
3500301  0.488  1
3500302  1.6085  2
*crdno  volume  vol.
3500401  0.00541  1
3500402  0.0777  2
*crdno  v-ang  vol.
3500601  0.0  2
*crdno  rgh  dhy  vol.
3500801 4.0-5  0.0  2
*crdno  floss  rloss  jun
3500901  0.0  0.0  1
*crdno  pvbfe  vol.
3501001  11000  2
```

```
*crdno fvcahs jun.
3501101 000100 1
*crdno ebt pressure temp a4 a5 a6 vol
3501201 003 15.0149+6 553.227 0.0 0.0 0.0 1
3501202 003 15.0149+6 555.479 0.0 0.0 0.0 2
*crdno ctl
3501300 1
*crdno flowf flowg velj jun
3501301 3.61834-3 0.0 0.0 1
*----------
*
*  Component no 370
* Broken Loop: RABS - BCL side
*
*crdno name type
3700000 RABS-BCL pipe
*crdno numb_vol
3700001 3
*crdno area vol.
3700101 0.0388 2
3700103 0.0776 3
*crdno j_area vol.
3700201 0.0388 2
*crdno length vol.
3700301 0.0 3
*crdno volume vol.
3700401 0.0279 1
3700402 0.0700 2
3700403 0.1165 3
*crdno v-ang vol.
3700601 90.0 1
3700602 0.0 3
*crdno elev vol.
3700701 0.64 1
3700702 0.0 3
*crdno rgh dhy vol.
3700801 4.0-5 0.0 3
*crdno floss rloss jun
3700901 0.28 0.28 1
3700902 0.84 0.84 2
*crdno pvbfe vol.
3701001 11000 3
*crdno fvcahs jun.
3701101 000000 2
*crdno ebt pressure temp a4 a5 a6 vol
3701201 003 15.0126+6 555.207 0.0 0.0 0.0 1
3701202 003 15.0102+6 556.003 0.0 0.0 0.0 2
3701203 003 15.0102+6 556.004 0.0 0.0 0.0 3
*crdno ctl
3701300 1
*crdno flowf flowg velj jun
3701301 -6.51096-5 0.0 0.0 1
3701302 -4.06750-5 0.0 0.0 2
*----------
*
*  Component no 380
* Broken Loop: RABS - HCL side
*
*crdno name type
3800000 RABS-HCL pipe
*crdno numb_vol
3800001 3
*crdno area vol.
3800101 0.0776 1
3800102 0.0388 3
*crdno j_area jun.
3800201 0.0388 2
*crdno length vol.
3800301 0.0 3
*crdno volume vol.
3800401 0.0915 1
3800402 0.0480 2
3800403 0.0489 3
*crdno v-ang vol.
3800601 0.0 1
3800602 -90.0 2
3800603 0.0 3
*crdno elev vol.
3800701 0.0 1
3800702 -0.64 2
3800703 0.0 3
*crdno rgh dhy vol.
3800801 4.0-5 0.0 3
*crdno floss rloss jun
3800901 0.84 0.84 1
3800902 0.28 0.28 2
*crdno pvbfe vol.
3801001 11000 3
*crdno fvcahs jun.
3801101 000000 2
*crdno ebt pressure temp a4 a5 a6 vol
3801201 003 14.9201+6 552.801 0.0 0.0 0.0 1
3801202 003 14.9225+6 555.974 0.0 0.0 0.0 2
3801203 003 14.9249+6 556.052 0.0 0.0 0.0 3
*crdno ctl
3801300 1
*crdno flowf flowg velj jun
3801301 -2.51837-2 0.0 0.0 2
*----------
*
*  Pressurizer
*----------
*
*  Component no 400
* Pressurizer: PRZ Surge line - PCS side
*
*crdno name type
4000000 SURGE-1 snglvol
*crdno area length volume h-ang v-ang delz
4000101 0.00145 2.300 0.0 0.0 90.0 0.54
*crdno rough dhy pvbfe
4000102 4.0-5 0.0 01000
*crdno ebt pressure temp
4000200 003 14.8642+6 578.246
*----------
*
*  Component no 401
* Pressurizer: Surge line pipe junction
*
*crdno name type
4010000 PRZ-J1 sngljun
*crdno from to area floss rloss fvcahs
4010101 400010002 405010001 0.0 0.93 0.93 000000
*crdno ctl flowf flowg velj
4010201 1 0.0 0.0 0.0
*----------
*
*  Component no 405
* Pressurizer: Surge line
*
*crdno name type
4050000 SRG-Lin pipe
*crdno numb_vol
4050001 2
*crdno area vol.
4050101 0.0145 2
*crdno j_area jun.
4050201 0.00145 1
*crdno length vol.
4050301 2.30 2
*crdno volume vol.
4050401 0.0 2
*crdno v-ang vol.
4050601 90.0 2
*crdno elev vol.
4050701 0.30 2
*crdno rgh dhy vol.
4050801 4.00-5 0.0 2
*crdno floss rloss jun
4050901 0.00 0.00 1
*crdno pvbfe vol.
4051001 11000 2
```

```
*crdno  fvcahs    jun.
4051101 000000    1
*crdno  ebt pressure  temp  a4   a5  a6  vol
4051201 003 14.8613+6 578.216 0.0  0.0 0.0 1
4051202 003 14.8592+6 578.320 0.0  0.0 0.0 2
*crdno  ctl
4051300 1
*crdno  flowf   flowg   velj  jun
4051301 0.0     0.0     0.0   1
*-------------------------------------
*
*       Component no 410
* Pressurizer: Surge line Vessel junction
*
*crdno     name      type
4100000   SRG-PRZ   sngljun
*crdno    from      to      area  floss rloss fvcahs
4100101  405010000 415000000  0.0  0.93 0.93  000000
*crdno  ctl  flowf   flowg   velj
4100201  1   0.0     0.0     0.0
*-------------------------------------
*
*       Component no 415
* Pressurizer: Vessel
*
*crdno     name      type
4150000   PRZ       pipe
*crdno  numb_vol
4150001   7
*crdno  area      vol.
4150101  0.0       2
4150102  0.5653    5
4150103  0.0       7
*crdno  length    vol.
4150301  0.1815    1
4150302  0.1524    2
4150303  0.3967    3
4150304  0.5289    4
4150305  0.3967    5
4150306  0.1943    6
4150307  0.1029    7
*crdno  volume    vol.
4150401   0.0684   1
4150402   0.0838   2
4150403   0.0      5
4150404   0.0732   6
4150405   0.0142   7
*crdno  v-ang     vol.
4150601  90.0     7
*crdno  rgh     dhy     vol.
4150801 4.0-5   0.0     7
*crdno  floss  rloss  jun
4150901  0.0    0.0    6
*crdno  pvbfe    vol.
4151001 00000    7
*crdno  fvcahs    jun.
4151101 000000    6
*crdno  ebt pressure   U-liq    U-vap    voidg   a6  vol
4151201 000 14.8575+6 1.35929+6 2.46300+6 0.00000 0.0  1
4151202 000 14.8564+6 1.41666+6 2.46303+6 0.00000 0.0  2
4151203 000 14.8547+6 1.51541+6 2.46307+6 0.00000 0.0  3
4151204 000 14.8521+6 1.56096+6 2.46339+6 0.19875 0.0  4
4151205 000 14.8506+6 1.58069+6 2.46315+6 0.99976 0.0  5
4151206 000 14.8503+6 1.58068+6 2.46316+6 0.99984 0.0  6
4151207 000 14.8501+6 1.58067+6 2.46316+6 0.99983 0.0  7
*crdno  ctl
4151300  1
*crdno  flowf flowg velj jun
4151301  0.0   0.0   0.0  6
*-------------------------------------
*
*       Component no 420
* Pressurizer: PRZ Top
*
*crdno     name      type
4200000   PRZ-Top   branch
*crdno    no.juns.    icc
4200001     1         1
*crdno  area  length volume h-ang v-ang  delz
4200101  0.0   0.1029 0.0142  0.0  90.0  0.1029
*crdno  rough   dhy   pvbfe
4200102  4.5-5   0.0   00000
*crdno  ebt pressure   quals
4200200 002 14.8500+6   1.0
*crdno    from      to      area  floss rloss fvcahs
4201101 415070002 420010001  0.0   0.0   0.0   000000
*crdno  flowf   flowg   velj
4201201  0.0     0.0     0.0
*-------------------------------------
*
*       Component no 421
* Pressurizer Presure stady state controller
*
*crdno     name      type
4210000   PRZ-SS    valve
*crdno   from     to      area   floss rloss fvcahs
4210101 420010002 422000000  0.0    0.0   0.0  000100
*crdno  ctl  flowf    flowg    velj
4210201  1    0.0      0.0      0.0
*crdno    name
4210300  trpvlv
*crdno    trip no
4210301     604
*-------------------------------------
*
*       Component no 422
* Pressurizer Presure stady state controller
*
*crdno     name     type
4220000   PRZ-SS   tmdpvol
*crdno  area  length volume h-ang v-ang delz
4220101 0.0   0.1029  0.0142  0.0   0.0  0.0
*crdno  rough  dhy  pvbfe
4220102  0.0   0.0  00000
*crdno  ebt
4220200 002
*crdno   time  pressure quals
4220201    0.0  14.85+6   1.0
*-------------------------------------
*  Steam Generator Secondary Side
*-------------------------------------
*
*       Component no 500
* Steam Generator: Separator
*
*crdno     name      type
5000000   SG-SPR     branch
*crdno    no.juns.    icc
5000001     3         0
*crdno  area  length volume h-ang v-ang  delz
5000101 0.3063 0.4445  0.0   0.0   90.0  0.444
*crdno  rough   dhy   pvbfe
5000102  1.0-5   0.0   00000
*crdno  ebt pressure   U-liq     U-vap     voidg
5000200 000 5.58347+6  1.18269+6 2.59302+6 0.94546
*crdno    from      to      area  floss rloss fvcahs
5001101 500010000 520000000 0.30630 0.000 0.000 001000
5002101 500000000 505000000 0.14024 0.000 0.000 001000
5003101 515010000 500000000 0.29187 2.404 2.404 001000
*crdno  flowf     flowg     velj
5001201 -0.26663    3.4015     0.0
5002201  14.446   -9.44287-3    0.0
5003201 0.81508    6.2977     0.0
*-------------------------------------
*
*       Component no 502
* Steam Generator: Separator Bypass
*
*crdno     name      type
5020000   SG-SByp   snglvol
*crdno  area  length volume h-ang v-ang  delz
5020101  2.212 0.4445  0.0   0.0   90.0  0.444
```

```
*crdno rough dhy pvbfe
5020102 1.0-5 0.0 11000
*crdno ebt pressure U-liq U-vap voidg
5020200 000 5.58411+6 1.18266+6 2.59323+6 1.00000
*----------
*
*       Component no 505
* Steam Generator: Separator Outlet
*
*crdno name type
5050000 SG-SpOut branch
*crdno no.juns. icc
5050001 2 0
*crdno area length volume h-ang v-ang delz
5050101 0.0 1.2131 1.4850 0.0 -90.0 -1.2131
*crdno rough dhy pvbfe
5050102 1.0-5 1.9048 10000
*crdno ebt pressure U-liq U-vap voidg
5050200 000 5.58563+6 1.18200+6 2.59378+6 0.41630
*5050200 000 5.58563+6 1.18200+6 2.59378+6 0.38630
*crdno from to area floss rloss fvcahs
5051101 505010002 508010001 0.0 0.0 0.0 000100
5052101 505010001 502010001 0.0 0.0 0.0 000100
*crdno flowf flowg velj
5051201 0.34413 -0.34696 0.0
5052201 -0.19447 2.50132-5 0.0
*----------
*
*       Component no 508
* Steam Generator: Feed Water Inlet
*crdno name type
5080000 SG-FWin branch
*crdno no.juns. icc
5080001 1 0
*crdno area length volume h-ang v-ang delz
5080101 0.0 0.6096 0.22107 0.0 -90.0 -0.6096
*crdno rough dhy pvbfe
5080102 1.0-5 0.163697 10000
*crdno ebt pressure U-liq U-vap voidg
5080200 000 5.59452+6 1.14526+6 2.59311+6 0.0000000
*crdno from to area floss rloss fvcahs
5081101 508010002 510010001 0.0 0.0 0.0 000100
*crdno flowf flowg velj
5081201 0.48538 0.61006 0.0
*----------
*
*       Component no 510
* Steam Generator: Downcomer
*
*crdno name type
5100000 SG-DwCom annulus
*crdno no.vol
5100001 3
*crdno area vol.
5100101 0.297 3
*crdno length vol.
5100301 0.6096 3
*crdno volume vol.
5100401 0.0 3
*crdno v-ang vol.
5100601 -90. 3
*crdno elev. vol.
5100701 -0.6096 3
*crdno rgh dhy vol.
5100801 4.0-5 0.10793 3
*crdno floss rloss jun
5100901 0.0 0.0 2
*crdno pvbfe vol.
5101001 10000 3
*crdno fvcahs jun.
5101101 000000 2
*crdno ebt pressure U-liq U-vap voidg a6 vol
5101201 000 5.59914+6 1.14575+6 2.59308+6 0.00000 0.0 1
5101202 000 5.60379+6 1.14548+6 2.59305+6 0.00000 0.0 2
5101203 000 5.60844+6 1.14518+6 2.59301+6 0.00000 0.0 3
*crdno ctl
5101300 0
*crdno flowf flowg velj jun
5101301 0.48549 0.61037 0.0 1
5101302 0.48544 0.61030 0.0 2
*----------
*
*       Component no 513
* Steam Generator: Junction - Downcomer to Boiler
*
*crdno name type
5130000 J510-515 sngljun
*crdno from to area floss rloss fvcahs
5130101 510030002 515010001 0.258 17.5 17.5 000100
*crdno ctl flowf flowg velj
5130201 0 0.51857 0.88711 0.0
*----------
*
*       Component no 515
* Steam Generator: Boiler
*
*crdno name type
5150000 SG-Boil pipe
*crdno numb_vol
5150001 6
*crdno area vol.
5150101 0.278 5
5150102 0.306294 6
*crdno jun.area jun.
5150201 0.258 5
*
*crdno length vol.
5150301 0.9144 2
5150302 1.8288 5
5150303 1.2131 6
*crdno volume vol.
5150401 0.0 6
*crdno v-ang vol.
5150601 60.0 5
5150602 90.0 6
*crdno elev. vol.
5150701 0.3048 2
5150702 0.6096 5
5150703 1.2131 6
*crdno rgh dhy vol.
5150801 1.0-5 0.0234 5
5150802 1.0-5 0.5962 6
*crdno floss rloss jun
5150901 2.0 2.0 2
5150902 4.05 4.05 5
*crdno pvbfe vol.
5151001 10000 6
*crdno fvcahs jun.
5151101 000100 5
*crdno ebt pressure U-liq U-vap voidg a6 vol
5151201 000 5.60791+6 1.17157+6 2.59302+6 0.23792 0.0 1
5151202 000 5.60575+6 1.18170+6 2.59295+6 0.39791 0.0 2
5151203 000 5.60293+6 1.18368+6 2.59297+6 0.54839 0.0 3
5151204 000 5.59822+6 1.18348+6 2.59294+6 0.53026 0.0 4
5151205 000 5.59291+6 1.18318+6 2.59299+6 0.59106 0.0 5
5151206 000 5.58687+6 1.18285+6 2.59302+6 0.53561 0.0 6
*crdno ctl
5151300 0
*crdno flowf flowg velj jun
5151301 0.67248 1.4019 0.0 1
5151302 0.82720 1.9798 0.0 2
5151303 1.0221 3.2469 0.0 3
5151304 0.90457 5.2295 0.0 4
5151305 0.97083 5.9829 0.0 5
*----------
*
*       Component no 520
* Steam Generator: Lower portion of Steam Dome
*
*crdno name type
5200000 SG-StDlw branch
*crdno no.juns. icc
```

```
5200001     1        0
*crdno  area  length volume h-ang v-ang  delz
5200101 0.27871 0.7180  0.0   0.0  90.0   0.718
*crdno  rough   dhy   pvbfe
5200102 1.0-5   1.0827  10000
*crdno  ebt pressure   U-liq    U-vap    voidg
5200200 000 5.58361+6 1.18263+6 2.59306+6  0.99997
*crdno    from      to      area  floss  rloss  fvcahs
5201101 520010002  525010001  0.0   0.0  0.0   000100
*crdno   flowf   flowg   velj
5201201  3.3231     3.5319 0.0
*-----------------------------------------
*
*         Component no 525
* Steam Generator: Upper portion of Steam Dome
*
*crdno      name       type
5250000    SG-StDup    branch
*crdno     no.juns.     icc
5250001      1          0
*crdno  area  length volume h-ang v-ang  delz
5250101 1.5886 0.7620  0.0   0.0   90.0  0.762
*crdno  rough  dhy   pvbfe
5250102 4.0-5 0.64417  11000
*crdno  ebt pressure   U-liq    U-vap    voidg
5250200 000 5.58346+6 1.18262+6  2.59312+6 0.99993
*crdno    from      to      area  floss  rloss  fvcahs
5251101 525010002  530010001  0.0   0.0  0.0   000000
*crdno   flowf   flowg   velj
5251201  17.095     21.224  0.0
*-----------------------------------------
*
*         Component no 530
* Steam Line: from SG to Control valve
*
*crdno      name       type
5300000    St-lin1    snglvol
*crdno  area  length volume h-ang v-ang  delz
5300101 0.04635 25.074   0.0   0.0   0.0    0.0
*crdno  rough   dhy   pvbfe
5300102 4.0-5   0.0   00000
*crdno  ebt pressure   U-liq    U-vap    voidg
5300200 000 5.57198+6 1.18203+6 2.59312+6  0.99988
*-----------------------------------------
*
*         Component no 540
* Steam Line:  Main Steam  Control Valve
* In the L3-6 transient valve opens at 88 sec after SCRAM to 15%
*crdno      name       type
5400000    St-MSCV     valve
*crdno    from      to      area    floss  rloss  fvcahs
5400101 530010002  542000000 3.37-3   0.0   0.0  001100
*crdno   ctl   flowf     flowg     velj
5400201   1     0.0       0.0       0.0
*crdno    name
5400300   mtrvlv
*crdno    open_trip  close_trip   vlv_ch.r.   init.pos
5400301     610        613      0.023333     0.0
*-----------------------------------------
*
*         Component no 542
* Air Cooled Condenser
*
*crdno      name       type
5420000    Condens     branch
*crdno     no.juns.     icc
*5420001     2          1
5420001      1          1
*crdno  area   length   volume   h-ang v-ang  delz
5420101 3.37-3  17.67     0.0     0.0   0.0    0.0
*crdno  rough   dhy   pvbfe
5420102 4.0e-5  0.   00000
*crdno  ebt   pressure   quals
5420200 002    2.0+6      1.0
*crdno    from      to        area    floss  rloss  fvcahs
5421101 542010002 544000000  0.0   0.0  0.0   001000
*crdno   flowf   flowg   velj
5421201    0.0     0.0     0.0
*-----------------------------------------
*
*         Component no 544
* Air Cooled Condenser
*
*crdno      name       type
5440000    Condens     tmdpvol
*crdno  area  length volume h-ang v-ang  delz
5440101 0.21677 17.67  0.0    0.0   0.0    0.0
*crdno  rough   dhy    pvbfe
5440102 4.0-5   0.02    00000
*crdno  ebt
5440200 002
*crdno   time   pressure  quals
5440201   0.0    2.00+6    1.0
*-----------------------------------------
*
*         Component no 545
* Steam Line:  Main Steam  Control Valve
*
*crdno      name       type
5450000    St-MSCV     valve
*crdno    from      to      area    floss  rloss  fvcahs
5450101 530010002  546000000 3.50-2   0.0   0.0  000100
*crdno   ctl   flowf     flowg     velj
5450201   0   10.753     21.268     0.0
*crdno    name
5450300   mtrvlv
*crdno    open_trip  close_trip  vlv_ch.r.  init.pos
5450301     606        607      0.10       1.0
*-----------------------------------------
*
*         Component no 546
* Air Cooled Condenser
*
*crdno      name       type
5460000    Condens     tmdpvol
*crdno  area  length volume h-ang v-ang  delz
5460101 0.21677 17.67  0.0    0.0   0.0    0.0
*crdno  rough   dhy    pvbfe
5460102 4.0-5   0.02    00000
*crdno  ebt
5460200 002
*crdno   time   pressure  quals
5460201   0.0    5.56+6    1.0
*
*-----------------------------------------
*         Simplified Feed Water System
*-----------------------------------------
*
*         Component no 565
* Feed Water Tank
*
*crdno      name       type
5650000    FW-Tank     tmdpvol
*crdno  area  length volume h-ang v-ang  delz
5650101  29.81 3.048   0.0    0.0   0.0    0.0
*crdno  rough   dhy    pvbfe
5650102 4.0-5   0.0   00000
*crdno  ebt
5650200 003
*crdno   time   pressure  temp
5650201   0.0    7.0+6    510.00
*-----------------------------------------
*
*         Component no 566
* Feed Water: Inlet flow
*
*crdno      name       type
5660000    FW-PUMP     tmdpjun
*crdno    from      to      area
5660101   565000000 508010001 0.05
*crdno   ctl   trip
5660200   1    403
```

```
*crdno     time   flowf  flowg  velj
5660201    -1.   27.800  0.0  0.0
5660202     0.0  27.800  0.0  0.0
5660203     4.0   0.000  0.0  0.0
*----------------------------------------
*
*          Component no 568
* Feed Water: Auxiliary Feed Water Storage Tank
*
*crdno     name      type
5680000   FW-AUX     tmdpvol
*crdno  area   length  volume h-ang  v-ang  delz
5680101 29.81   3.048   0.0  0.0   0.0    0.0
*crdno  rough   dhy   pvbfe
5680102 4.0e-5  0.0   00000
*crdno  ebt
5680200 003
*crdno   time   pressure  temp
5680201   0.0    8.0+6    315.00
*----------------------------------------
*
*          Component no 569
* Feed Water: Auxiliary Feed Water Inlet Flow
*
*crdno     name      type
5690000   FW-AuxIn   tmdpjun
*crdno    from     to      area
5690101  568000000 508010001 0.10
*crdno  ctl  trip no
5690200  1     603
*crdno     time   flowf  flowg  velj
5690201    -1.    0.0    0.0   0.0
5690202    73.0   0.0    0.0   0.0
5690203    73.4   0.50364 0.0  0.0
5690204   1856.0  0.50364 0.0  0.0
5690205   1857.0  0.0     0.0  0.0
5690206   2500.0  0.0     0.0  0.0
*----------------------------------------
*          ECC System (ECCS)
*----------------------------------------
*
*          Component no 605
* ECCS: ECC Check Valve
*
*crdno     name      type
6050000   ECC-CHKV   sngljun
*crdno    from     to     area   floss  rloss  fvcahs
6050101 610010002 206010001 5.9896-3 0.935 0.935 001100
*crdno  ctl flowf  flowg  velj
6050201  1  0.0    0.0   0.0
*
*----------------------------------------
*
*          Component no 610
* ECCS: ECC Header to PCS
*
*crdno     name      type
6100000   ECC-Head   snglvol
*crdno  area   length volume h-ang  v-ang  delz
6100101 5.9896--3 5.0148  0.0  0.0   90.0 3.3071202
*crdno  rough   dhy   pvbfe
6100102 4.0-5   0.0   11000
*crdno  ebt pressure temp.
6100200 003 14.870+6  560.
*----------------------------------------
*
*          Component no 615
* HPIS: System A (HPIS A & B)
*
*crdno     name      type
6150000    HPIS     tmdpjun
*crdno    from     to      area
6150101  620000000 610010001  0.009099
*crdno  ctl  trip
6150200  1   602
*crdno   time   flowf  flowg velj
6150201   -1.00  0.00   0.0  0.0
6150202    0.00  0.00   0.0  0.0
6150203   36.40  0.26   0.0  0.0
6150204   54.50  0.44   0.0  0.0
6150205  236.36  0.41   0.0  0.0
6150206  709.09  0.41   0.0  0.0
6150208  712.70  0.44   0.0  0.0
6150209  872.70  0.44   0.0  0.0
6150210  876.36  0.47   0.0  0.0
6150211 1049.17  0.47   0.0  0.0
6150212 1054.00  0.50   0.0  0.0
6150213 1218.00  0.50   0.0  0.0
6150214 1227.00  0.54   0.0  0.0
6150215 1554.00  0.54   0.0  0.0
6150216 1559.00  0.575  0.0  0.0
6150217 1759.00  0.575  0.0  0.0
6150218 1763.00  0.600  0.0  0.0
6150219 2036.00  0.600  0.0  0.0
6150220 2054.54  0.640  0.0  0.0
6150221 2135.80  0.640  0.0  0.0
6150222 2140.00  0.670  0.0  0.0
6150223 2500.00  0.670  0.0  0.0
*
*----------------------------------------
*
*          Component no 620
* HPIS: Borated Water Storage Tank
*
*crdno     name      type
6200000    BWST     tmdpvol
*crdno  area   length  volume h-ang  v-ang  delz
6200101 20.44   5.0     0.0  0.0   90.0   5.0
*crdno  rough   dhy   pvbfe
6200102 4.0-5   0.0   00000
*crdno  ebt
6200200 003
*crdno   time   pressure  temp
6200201   0.0    1.0+5    305.0
*
*----------------------------------------
*          Heat Structures
*----------------------------------------
*
*----------------------------------------
*          Intact Loop
*----------------------------------------
*
*          Heat Structure no 100-1
* Intact loop Piping
*crdno  no.h.s  no.m.p  geo  s.s.flg  left
11001000  14     3     2     1     0.142
*crdno   mesh flg  fmt
11001100    0      1
*crdno   intvl   rt.cor
11001101    2     0.1780
*crdno   comp    intvl
11001201    4      2
*crdno   source  intvl
11001301   0.0     2
*crdno   tempflag
11001400   -1
*crdno     t(1)       t(2)       t(3)
11001401  579.09     569.46     560.80
11001402  579.08     569.46     560.80
11001403  579.09     569.47     560.81
11001404  579.10     569.48     560.82
11001405  579.10     569.47     560.81
11001406  559.98     550.90     542.74
11001407  559.99     550.91     542.75
11001408  559.99     550.91     542.75
11001409  560.13     551.05     542.88
11001410  560.13     551.05     542.88
11001411  560.13     551.05     542.88
11001412  560.13     551.05     542.88
11001413  560.12     551.04     542.87
11001414  560.12     551.04     542.87
```

```
*crdno   left vol    incr  b.c  sacode safac   h.s.no
11001501  100010000  0    1    1   1.44580   1
11001502  105010000  0    1    1   1.08660   2
11001503  107010000  0    1    1   0.50000   3
11001504  110010000  0    1    1   0.85610   4
11001505  112010000  0    1    1   1.38893   5
11001506  118020000  0    1    1   0.68900   6
11001507  118030000  0    1    1   0.55900   7
11001508  120010000  0    1    1   0.76000   8
11001509  150010000  0    1    1   0.49660   9
11001510  175010000  0    1    1   0.55900   10
11001511  175020000  0    1    1   0.61300   11
11001512  180010000  0    1    1   1.01000   12
11001513  185010000  0    1    1   1.15200   13
11001514  184010000  0    1    1   0.28400   14
*crdno   rt vol      incr  b.c  sacode  safac   h.s.no
11001601  -939        0   3949   1    1.44580   1
11001602  -939        0   3949   1    1.08660   2
11001603  -939        0   3949   1    0.50000   3
11001604  -939        0   3949   1    0.85610   4
11001605  -939        0   3949   1    1.38893   5
11001606  -939        0   3949   1    0.68900   6
11001607  -939        0   3949   1    0.55900   7
11001608  -939        0   3949   1    0.76000   8
11001609  -939        0   3949   1    0.49660   9
11001610  -939        0   3949   1    0.55900   10
11001611  -939        0   3949   1    0.61300   11
11001612  -939        0   3949   1    1.01000   12
11001613  -939        0   3949   1    1.15200   13
11001614  -939        0   3949   1    0.28400   14
*crdno   s.type    mult   dir.left  dir.rt   h.s.no
11001701   0       0.0     0.0      0.0      14
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss rloss boil-f h.s.no
11001801 0.0  30.0  30.0  0.0  0.0   0.0   0.0   1.    14
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss rloss boil-f h.s.no
11001901 0.0  30.0  30.0  0.0  0.0   0.0   0.0   1.    14
*-------------------------------------------------------
*
*          Heat Structure no 100-2
* Steam Generator Connections
*
*crdno  no.h.s  no.m.p  geo  s.s.flg  left
11002000  2      5      2    1        0.1625
*crdno   mesh flg   fmt
11002100   0        1
*crdno   intvl   rt.cor
11002101   4     0.20300
*crdno   comp    intvl
11002201   4       4
*crdno   source  intvl
11002301  0.0      4
*crdno   tempflag
11002400   -1
*crdno    t(1)      t(2)      t(3)      t(4)      t(5)
11002401  579.01    573.51    568.29    563.34    558.62
11002402  559.94    554.75    549.83    545.16    540.71
*crdno   left vol    incr  b.c  sacode safac   h.s.no
11002501  112020000    0    1    1   0.70769   1
11002502  118010000    0    1    1   0.54700   2
*crdno   rt vol      incr  b.c  sacode  safac   h.s.no
11002601  -939        0   3949   1    0.70769   1
11002602  -939        0   3949   1    0.54700   2
*crdno   s.type    mult   dir.left  dir.rt   h.s.no
11002701   0       0.0     0.0      0.0      2
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss rloss boil-f h.s.no
11002801 0.0  30.0  30.0  0.0  0.0   0.0   0.0   1.    2
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss rloss boil-f h.s.no
11002901 0.0  30.0  30.0  0.0  0.0   0.0   0.0   1.    2
*-------------------------------------
*
*          Heat Structure no 100-3
* Intact Loop: 0.216 m dia Piping
*
*crdno  no.h.s  no.m.p  geo  s.s.flg  left
11003000  7      3      2    1        0.108
*crdno   mesh flg   fmt
11003100   0        1
*crdno   intvl   rt.cor
11003101   2     0.1365
*crdno   comp    intvl
11003201   5       2
*crdno   source  intvl
11003301  0.0      2
*crdno   tempflag
11003400   -1
*crdno    t(1)      t(2)      t(3)
11003401  559.76    557.01    554.57
11003402  559.90    557.15    554.71
11003403  560.07    557.32    554.87
11003404  560.30    557.55    555.10
11003405  560.12    557.37    554.92
11003406  559.92    557.17    554.73
11003407  560.16    557.41    554.96
*crdno   left vol    incr  b.c  sacode safac   h.s.no
11003501  125010000    0    1    1   1.00000   1
11003502  130010000    0    1    1   0.45700   2
11003503  140010000    0    1    1   0.50200   3
11003504  145010000    0    1    1   1.40840   4
11003505  150010000    0    1    1   1.00300   5
11003506  160010000    0    1    1   0.45700   6
11003507  170010000    0    1    1   0.51400   7
*crdno   rt vol      incr  b.c  sacode  safac   h.s.no
11003601  -939        0   3949   1    1.00000   1
11003602  -939        0   3949   1    0.45700   2
11003603  -939        0   3949   1    0.50200   3
11003604  -939        0   3949   1    1.40840   4
11003605  -939        0   3949   1    1.00300   5
11003606  -939        0   3949   1    0.45700   6
11003607  -939        0   3949   1    0.51400   7
*crdno   s.type    mult   dir.left  dir.rt   h.s.no
11003701   0       0.0     0.0      0.0      7
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss rloss boil-f h.s.no
11003801 0.0  30.0  30.0  0.0  0.0   0.0   0.0   1.    7
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss rloss boil-f h.s.no
11003901 0.0  30.0  30.0  0.0  0.0   0.0   0.0   1.    7
*-------------------------------------------------------
*
*          Heat Structure no 100-4
* Steam Generator: Plena
*
*crdno  no.h.s  no.m.p  geo  s.s.flg  left
11004000  2      5      3    1        0.6858
*crdno   mesh flg   fmt
11004100   0        1
*crdno   intvl   rt.cor
11004101   4     0.7747
*crdno   comp    intvl
11004201   5       4
*crdno   source  intvl
11004301  0.0      4
*crdno   tempflag
11004400   -1
*crdno    t(1)      t(2)      t(3)      t(4)      t(5)
11004401  578.55    573.96    569.64    565.59    561.76
11004402  559.50    555.23    551.22    547.44    543.88
*crdno   left vol    incr  b.c  sacode safac   h.s.no
11004501  114010000    0    1    1   0.25      1
11004502  116010000    0    1    1   0.25      2
*crdno   rt vol      incr  b.c  sacode  safac   h.s.no
11004601  -939        0   3949   1    0.25      1
11004602  -939        0   3949   1    0.25      2
*crdno   s.type    mult   dir.left  dir.rt   h.s.no
11004701   0       0.0     0.0      0.0      2
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss rloss boil-f h.s.no
11004801 0.0  30.0  30.0  0.0  0.0   0.0   0.0   1.    2
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss rloss boil-f h.s.no
11004901 0.0  30.0  30.0  0.0  0.0   0.0   0.0   1.    2
*-------------------------------------------------------
*
*          Heat Structure no 115-0
* Steam Generator Tubing
*
```

```
*crdno  no.h.s no.m.p geo s.s.flg left
11150000 10    5    2    1  5.1054-3
*crdno   mesh flg  fmt
11150100    0      1
*crdno    intvl   rt.cor
11150101    4    6.34898-3
*crdno    comp  intvl
11150201   6     4
*crdno    source  intvl
11150301   0.0 .  4
*crdno    tempflag
11150400   -1
*crdno      t(1)       t(2)       t(3)       t(4)       t(5)
11150401   568.55   563.60    558.89    554.41    550.13
11150402   567.61   563.13    558.87    554.83    550.97
11150403   565.64   561.78    558.12    554.64    551.32
11150404   563.91   560.56    557.39    554.37    551.50
11150405   562.50   559.43    556.52    553.75    551.12
11150406   561.18   558.36    555.68    553.14    550.71
11150407   559.64   557.11    554.71    552.43    550.26
11150408   558.07   555.73    553.52    551.42    549.41
11150409   557.05   554.68    552.44    550.31    548.29
11150410   555.68   553.13    550.71    548.41    546.23
*crdno    left vol     incr  b.c  sacode  safac  h.s.no
11150501  115010000    0     1    1     562.360  1
11150502  115020000    0     1    1     562.360  2
11150503  115030000    0     1    1     1124.710  3
11150504  115040000    0     1    1     1124.710  4
11150505  115050000    0     1    1     849.063  5
11150506  115060000    0     1    1     849.063  6
11150507  115070000    0     1    1     1124.710  7
11150508  115080000    0     1    1     1124.710  8
11150509  115090000    0     1    1     562.360  9
11150510  115100000    0     1    1     562.360  10
*crdno    rt vol      incr  b.c  sacode  safac  h.s.no
11150601  515010000    0     1    1     562.360  1
11150602  515020000    0     1    1     562.360  2
11150603  515030000    0     1    1     1124.710  3
11150604  515040000    0     1    1     1124.710  4
11150605  515050000    0     1    1     849.063  5
11150606  515050000    0     1    1     849.063  6
11150607  515040000    0     1    1     1124.710  7
11150608  515030000    0     1    1     1124.710  8
11150609  515020000    0     1    1     562.360  9
11150610  515010000    0     1    1     562.360  10
*crdno    s.type    mult    dir.left  dir.rt   h.s.no
11150701   0       0.0      0.0      0.0      10
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss rloss boil-f h.s.no
11150801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   10
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss rloss boil-f h.s.no
11150901 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   10
*
*-----------------------------------------------------
*          Reactor Vessel
*-----------------------------------------------------
*
*         Heat Structure no 230-0
* Active Core
*
*crdno  no.h.s no.m.p geo s.s.flg left  refl b.ind ax.int
12300000 6     11    2    1     0.0  2    1    16
*crdno    mesh flg  fmt
12300100    0      1
*crdno    intvl   rt.cor
12300101    6    4.647-3
12300102    1    4.742-3
12300103    3    5.359-3
*crdno    comp  intvl
12300201   1     6
12300202  -2     7
12300203  -3     10
*crdno    source  intvl
12300301   1.0    6
12300302   0.0    10
*crdno    tempflag
12300400   -1
*crdno      t(1)       t(2)       t(3)       t(4)       t(5)
12300401  678.6    676.88     671.74     663.25     651.54
+       636.75     619.07     569.78     568.18     566.64
+       565.15
*
12300402 1281.8   1267.1     1223.6     1153.6     1059.5
+       949.73     828.33     608.57     600.63     592.95
+       585.53
*
12300403 1934.7   1904.1     1812.9     1663.8     1464.9
+       1232.1     982.62     643.08     630.04     617.40
+       605.12
*
12300404 2199.7   2163.9     2056.2     1876.6     1633.3
+       1344.9     1042.0     659.71     644.75     630.21
+       616.08
*
12300405 1907.2   1877.3     1788.7     1643.6     1450.4
+       1224.4     981.26     650.49     637.84     625.57
+       613.66
*
12300406 939.48   933.15     914.35     883.66     841.99
+       791.15     732.54     604.99     600.60     596.37
+       592.29
*
*crdno    left vol     incr  b.c  sacode  safac  h.s.no
12300501   0        0     0    1     363.35  5
12300502   0        0     0    1     490.75  6
*crdno    rt vol      incr  b.c  sacode  safac  h.s.no
12300601  230010000    10000 1    1     363.35  5
12300602  230060000    0     1    1     490.75  6
*crdno    s.type    mult    dir.left  dir.rt   h.s.no
12300701   1000   0.027100270  0.0      0.0      1
12300702   1000   0.138211380  0.0      0.0      2
12300703   1000   0.233062330  0.0      0.0      3
12300704   1000   0.271002710  0.0      0.0      4
12300705   1000   0.227642280  0.0      0.0      5
12300706   1000   0.102981030  0.0      0.0      6
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss rloss boil-f h.s.no
12300901 1.25-2 30.0  30.0  0.0  0.0   0.0  0.0   1.   6
*-----------------------------------------------------
*
*         Heat Structure no 200-0
* Filler Blocks Inlet Annulus Top Volumes
*
*crdno  no.h.s no.m.p geo s.s.flg left
12000000 4     5    2    1    0.508
*crdno    mesh flg  fmt
12000100    0      1
*crdno    intvl   rt.cor
12000101    4    0.7264
*crdno    comp  intvl
12000201   4     4
*crdno    source  intvl
12000301   0.0    4
*crdno    tempflag
12000400   -1
*crdno      t(1)       t(2)       t(3)       t(4)       t(5)
12000401   553.06   530.53    509.72    490.36    472.23
12000402   552.26   529.79    509.04    489.74    471.66
12000403   559.14   536.12    514.87    495.09    476.56
12000404   559.13   536.12    514.86    495.08    476.56
*crdno    left vol     incr  b.c  sacode  safac  h.s.no
12000501  200010000    0     1    1     0.14055  1
12000502  210010000    0     1    1     0.04685  2
12000503  202010000    0     1    1     0.2139   3
12000504  212010000    0     1    1     0.0713   4
*crdno    rt vol      incr  b.c  sacode  safac  h.s.no
12000601  -939       0     3949 1     0.14055  1
12000602  -939       0     3949 1     0.04685  2
12000603  -939       0     3949 1     0.2139   3
12000604  -939       0     3949 1     0.0713   4
*crdno    s.type    mult    dir.left  dir.rt   h.s.no
12000701   0       0.0      0.0      0.0      4
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss rloss boil-f h.s.no
12000801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   4
```

```
*crdno   dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12000901 0.0 30.0 30.0 0.0 0.0   0.0   0.0   1.   4
*-----------------------------------------------------------
*
*          Heat Structure no 200-1
* Filler Blocks Inlet Annulus middles Volumes
*
*crdno  no.h.s no.m.p geo s.s.flg left
12001000 18     5    2   1     0.381
*crdno  mesh flg  fmt
12001100 0      1
*crdno  intvl  rt.cor
12001101 4     0.419
*crdno  comp  intvl
12001201 4    4
*crdno  source  intvl
12001301 0.0    4
*crdno  tempflag
12001400 -1
*crdno    t(1)     t(2)     t(3)     t(4)     t(5)
12001401  538.26   542.24   546.12   549.90   553.57
12001402  537.50   541.47   545.34   549.10   552.77
12001403  543.68   547.74   551.69   555.53   559.28
12001404  543.67   547.73   551.68   555.53   559.27
12001405  544.12   548.19   552.14   555.99   559.75
12001406  544.11   548.18   552.14   555.99   559.74
12001407  544.38   548.45   552.41   556.27   560.03
12001408  544.38   548.45   552.41   556.26   560.02
12001409  544.38   548.45   552.41   556.27   560.02
12001410  544.38   548.45   552.41   556.26   560.02
12001411  544.38   548.45   552.41   556.27   560.02
12001412  544.37   548.44   552.40   556.26   560.01
12001413  544.38   548.45   552.41   556.26   560.02
12001414  544.37   548.44   552.40   556.26   560.01
12001415  544.38   548.45   552.41   556.26   560.02
12001416  544.37   548.44   552.40   556.26   560.01
12001417  544.38   548.45   552.41   556.26   560.02
12001418  544.37   548.44   552.40   556.26   560.01
*crdno   left vol   incr  b.c  sacode  safac   h.s.no
12001501 -939      0     3949  1     0.14025  1
12001502 -939      0     3949  1     0.04675  2
12001503 -939      0     3949  1     0.21375  3
12001504 -939      0     3949  1     0.07125  4
12001505 -939      0     3949  1     0.21075  5
12001506 -939      0     3949  1     0.07025  6
12001507 -939      0     3949  1     0.7185   7
12001508 -939      0     3949  1     0.2395   8
12001509 -939      0     3949  1     0.43525  9
12001510 -939      0     3949  1     0.14475  10
12001511 -939      0     3949  1     0.49275  11
12001512 -939      0     3949  1     0.16425  12
12001513 -939      0     3949  1     0.41925  13
12001514 -939      0     3949  1     0.13975  14
12001515 -939      0     3949  1     0.41925  15
12001516 -939      0     3949  1     0.13975  16
12001517 -939      0     3949  1     0.39000  17
12001518 -939      0     3949  1     0.13000  18
*crdno   rt vol     incr  b.c  sacode  safac   h.s.no
12001601 200010000  0     1    1     0.14025  1
12001602 210010000  0     1    1     0.04675  2
12001603 202010000  0     1    1     0.21375  3
12001604 212010000  0     1    1     0.07125  4
12001605 204010000  0     1    1     0.21075  5
12001606 214010000  0     1    1     0.07025  6
12001607 206010000  0     1    1     0.7185   7
12001608 216010000  0     1    1     0.2395   8
12001609 206020000  0     1    1     0.43525  9
12001610 216020000  0     1    1     0.14475  10
12001611 206030000  0     1    1     0.49275  11
12001612 216030000  0     1    1     0.16425  12
12001613 206040000  0     1    1     0.41925  13
12001614 216040000  0     1    1     0.13975  14
12001615 206050000  0     1    1     0.41925  15
12001616 216050000  0     1    1     0.13975  16
12001617 206060000  0     1    1     0.39000  17
12001618 216060000  0     1    1     0.13000  18
*crdno   s.type  mult  dir.left  dir.rt  h.s.no
12001701 0       0.0   0.0       0.0     18
*crdno   dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12001801 0.0 30.0 30.0 0.0 0.0   0.0   0.0   1.   18
*crdno   dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12001901 0.0 30.0 30.0 0.0 0.0   0.0   0.0   1.   18
*-----------------------------------------------------------
*
*          Heat Structure no 210-0
* Interactive
*
*crdno  no.h.s no.m.p geo s.s.flg left
12100000 16     5    2   1     0.470
*crdno  mesh flg  fmt
12100100 0      1
*crdno  intvl  rt.cor
12100101 4     0.7264
*crdno  comp  intvl
12100201 4    4
*crdno  source  intvl
12100301 0.0    4
*crdno  tempflag
12100400 -1
*crdno    t(1)     t(2)     t(3)     t(4)     t(5)
12100401  560.36   560.32   560.28   560.25   560.22
12100402  560.35   560.19   560.04   559.91   559.79
12100403  560.36   560.28   560.20   560.13   560.07
12100404  560.35   560.18   560.03   559.89   559.77
12100405  560.36   560.27   560.20   560.13   560.07
12100406  560.35   560.18   560.03   559.89   559.77
12100407  560.36   560.22   560.10   559.99   559.90
12100408  560.35   560.13   559.94   559.77   559.62
12100409  560.35   560.22   560.10   559.99   559.90
12100410  560.35   560.13   559.94   559.77   559.62
12100411  560.35   560.18   560.03   559.89   559.76
12100412  560.35   560.16   559.99   559.83   559.70
12100413  560.24   560.10   559.98   559.86   559.76
12100414  560.23   560.07   559.93   559.81   559.69
12100415  559.83   559.81   559.79   559.77   559.76
12100416  559.82   559.78   559.75   559.72   559.69
*crdno   left vol   incr  b.c  sacode  safac   h.s.no
12100501 206010000  0     1    1     0.7185   1
12100502 216010000  0     1    1     0.2395   2
12100503 206020000  0     1    1     0.43425  3
12100504 216020000  0     1    1     0.14475  4
12100505 206030000  0     1    1     0.49275  5
12100506 216030000  0     1    1     0.16425  6
12100507 206040000  0     1    1     0.41925  7
12100508 216040000  0     1    1     0.13975  8
12100509 206050000  0     1    1     0.41925  9
12100510 216050000  0     1    1     0.13975  10
12100511 206060000  0     1    1     0.360    11
12100512 216060000  0     1    1     0.130    12
12100513 222010000  0     1    1     0.270    13
12100514 222010000  0     1    1     0.090    14
12100515 220010000  0     1    1     0.2775   15
12100516 220010000  0     1    1     0.0925   16
*crdno   rt vol     incr  b.c  sacode  safac   h.s.no
12100601 208010000  0     1    1     0.7185   1
12100602 218010000  0     1    1     0.2395   2
12100603 208020000  0     1    1     0.43425  3
12100604 218020000  0     1    1     0.14475  4
12100605 208020000  0     1    1     0.49275  5
12100606 218020000  0     1    1     0.16425  6
12100607 208030000  0     1    1     0.41925  7
12100608 218030000  0     1    1     0.13975  8
12100609 208030000  0     1    1     0.41925  9
12100610 218030000  0     1    1     0.13975  10
12100611 208040000  0     1    1     0.360    11
12100612 218040000  0     1    1     0.130    12
12100613 208040000  0     1    1     0.270    13
12100614 218040000  0     1    1     0.090    14
12100615 208040000  0     1    1     0.2775   15
12100616 218040000  0     1    1     0.0925   16
*crdno   s.type  mult  dir.left  dir.rt  h.s.no
12100701 0       0.0   0.0       0.0     16
```

```
*crdno  dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12100801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   16
*crdno  dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12100901 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   16
*---------------------------------------------------------
*
*       Heat Structure no 204-0
* Interactive
*
*crdno  no.h.s no.m.p geo s.s.flg left
12040000 2     5   2   1   0.5010
*crdno  mesh flg  fmt
12040100  0     1
*crdno  intvl  rt.cor
12040101  4    0.7264
*crdno  comp  intvl
12040201  4    4
*crdno  source  intvl
12040301  0.0   4
*crdno  tempflag
12040400  -1
*crdno      t(1)     t(2)     t(3)     t(4)     t(5)
12040401  560.37   560.32   560.29   560.25   560.22
12040402  560.36   560.20   560.05   559.92   559.80
*crdno  left vol    incr  b.c  sacode safac   h.s.no
12040501 204010000    0    1    1   0.21105    1
12040502 214010000    0    1    1   0.07035    2
*crdno  rt vol      incr  b.c  sacode  safac  h.s.no
12040601 208010000    0    1    1   0.21105    1
12040602 218010000    0    1    1   0.07035    2
*crdno  s.type  mult  dir.left  dir.rt  h.s.no
12040701  0     0.0     0.0     0.0     2
*crdno  dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12040801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   2
*crdno  dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12040901 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   2
*---------------------------------------------------------
*
*       Heat Structure no 220-0
* Interactive
*crdno  no.h.s no.m.p geo s.s.flg left
12200000 1     5   1   1   0.0
*crdno  mesh flg  fmt
12200100  0     1
*crdno  intvl  rt.cor
12200101  4    0.092
*crdno  comp  intvl
12200201  5    4
*crdno  source  intvl
12200301  0.0   4
*crdno  tempflag
12200400  -1
*crdno      t(1)     t(2)     t(3)     t(4)     t(5)
12200401  554.03   550.51   546.99   543.47   539.95
*crdno  left vol    incr  b.c  sacode safac   h.s.no
12200501 220010000    0    1    1   1.68       1
*crdno  rt vol      incr  b.c  sacode  safac  h.s.no
12200601 -939         0  3949   1   1.68       1
*crdno  s.type  mult  dir.left  dir.rt  h.s.no
12200701  0     0.0     0.0     0.0     1
*crdno  dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12200801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   1
*crdno  dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12200901 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   1
*---------------------------------------------------------
*
*       Heat Structure no 223-1
* Interactive
*
*crdno  no.h.s no.m.p geo s.s.flg left
12231000 4     5   2   1   0.7328
*crdno  mesh flg  fmt
12231100  0     1
*crdno  intvl  rt.cor
12231101  4    0.8725
*crdno  comp  intvl
12231201  5    4
*crdno  source  intvl
12231301  0.0   4
*crdno  tempflag
12231400  -1
*crdno      t(1)     t(2)     t(3)     t(4)     t(5)
12231401  559.36   553.24   547.39   541.79   536.42
12231402  553.30   547.33   541.62   536.15   530.91
12231403  559.17   553.05   547.20   541.61   536.24
12231404  554.56   548.54   542.79   537.29   532.02
*crdno  left vol    incr  b.c  sacode safac   h.s.no
12231501 208010000    0    1    1   1.0365     1
12231502 218010000    0    1    1   0.3455     2
12231503 208020000    0    1    1   0.6015     3
12231504 218020000    0    1    1   0.2005     4
*crdno  rt vol      incr  b.c  sacode  safac  h.s.no
12231601 -939         0  3949   1   1.0365     1
12231602 -939         0  3949   1   0.3455     2
12231603 -939         0  3949   1   0.6015     3
12231604 -939         0  3949   1   0.2005     4
*crdno  s.type  mult  dir.left  dir.rt  h.s.no
12231701  0     0.0     0.0     0.0     4
*crdno  dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12231801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   4
*crdno  dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12231901 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   4
*---------------------------------------------------------
*
*       Heat Structure no 223-2
* Interactive
*
*crdno  no.h.s no.m.p geo s.s.flg left
12232000 6     5   2   1   0.7328
*crdno  mesh flg  fmt
12232100  0     1
*crdno  intvl  rt.cor
12232101  4    0.8247
*crdno  comp  intvl
12232201  5    4
*crdno  source  intvl
12232301  0.0   4
*crdno  tempflag
12232400  -1
*crdno      t(1)     t(2)     t(3)     t(4)     t(5)
12232401  559.19   555.23   551.38   547.65   544.02
12232402  554.67   550.77   546.99   543.32   539.75
12232403  559.02   555.06   551.22   547.49   543.87
12232404  553.95   550.07   546.30   542.65   539.09
12232405  558.72   554.77   550.93   547.21   543.59
12232406  557.34   553.41   549.59   545.89   542.28
*crdno  left vol    incr  b.c  sacode safac   h.s.no
12232501 208020000    0    1    1   0.3255     1
12232502 218020000    0    1    1   0.1085     2
12232503 208030000    0    1    1   0.8385     3
12232504 218030000    0    1    1   0.2795     4
12232505 208040000    0    1    1   0.9375     5
12232506 218040000    0    1    1   0.3125     6
*crdno  rt vol      incr  b.c  sacode  safac  h.s.no
12232601 -939         0  3949   1   0.3255     1
12232602 -939         0  3949   1   0.1085     2
12232603 -939         0  3949   1   0.8385     3
12232604 -939         0  3949   1   0.2795     4
12232605 -939         0  3949   1   0.9375     5
12232606 -939         0  3949   1   0.3125     6
*crdno  s.type  mult  dir.left  dir.rt  h.s.no
12232701  0     0.0     0.0     0.0     6
*crdno  dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12232801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   6
*crdno  dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12232901 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   6
*---------------------------------------
*
*       Heat Structure no 225-0
* Interactive
*
*crdno  no.h.s no.m.p geo s.s.flg left
```

```
12250000 10    5   2    1   0.300
*crdno   mesh flg  fmt
12250100   0     1
*crdno   intvl  rt.cor
12250101   4    0.380
*crdno   comp  intvl
12250201   4     4
*crdno   source  intvl
12250301  0.0    4
*crdno   tempflag
12250400   -1
*crdno     t(1)     t(2)     t(3)     t(4)     t(5)
12250401  559.69    550.03   540.88   532.20   523.93
12250402  560.55    550.86   541.69   532.99   524.69
12250403  563.42    553.65   544.39   535.60   527.23
12250404  568.27    558.34   548.94   540.01   531.51
12250405  573.72    563.62   554.06   544.98   536.33
12250406  578.25    568.01   558.32   549.11   540.34
12250407  580.26    569.96   560.21   550.95   542.12
12250408  579.06    568.80   559.08   549.86   541.06
12250409  579.06    568.80   559.08   549.85   541.06
12250410  579.49    569.22   559.49   550.25   541.44
*crdno   left vol    incr  b.c  sacode  safac   h.s.no
12250501 225010000    0    1    1    0.5200     1
12250502 230010000    0    1    1    0.2795     2
12250503 230020000    0    1    1    0.2795     3
12250504 230030000    0    1    1    0.2795     4
12250505 230040000    0    1    1    0.2795     5
12250506 230050000    0    1    1    0.2795     6
12250507 230060000    0    1    1    0.3775     7
12250508 240010000    0    1    1    0.5590     8
12250509 245010000    0    1    1    0.5590     9
12250510 250010000    0    1    1    0.8430     10
*crdno   rt vol     incr  b.c  sacode   safac  h.s.no
12250601  -939        0   3949   1     0.5200   1
12250602  -939        0   3949   1     0.2795   2
12250603  -939        0   3949   1     0.2795   3
12250604  -939        0   3949   1     0.2795   4
12250605  -939        0   3949   1     0.2795   5
12250606  -939        0   3949   1     0.2795   6
12250607  -939        0   3949   1     0.3775   7
12250608  -939        0   3949   1     0.5590   8
12250609  -939        0   3949   1     0.5590   9
12250610  -939        0   3949   1     0.8430   10
*crdno   s.type   mult   dir.left  dir.rt   h.s.no
12250701  0      0.0      0.0      0.0      10
*crdno  dth  hl-f  hl-r  gs-lf  gs-lr  floss  rloss  boil-f  h.s.no
12250801 0.0  30.0  30.0  0.0   0.0    0.0    0.0    1.    10
*crdno  dth  hl-f  hl-r  gs-lf  gs-lr  floss  rloss  boil-f  h.s.no
12250901 0.0  30.0  30.0  0.0   0.0    0.0    0.0    1.    10
*-----------------------------------
*
*          Heat Structure no 225-1
* Interactive
*
*crdno  no.h.s  no.m.p  geo  s.s.flg  left
12251000  1       5      2     1      0.282
*crdno   mesh flg  fmt
12251100   0     1
*crdno   intvl  rt.cor
12251101   4    0.300
*crdno   comp  intvl
12251201   4     4
*crdno   source  intvl
12251301  0.0    4
*crdno   tempflag
12251400   -1
*crdno     t(1)     t(2)     t(3)     t(4)     t(5)
12251401  559.72   557.62    555.55   553.51   551.49
*crdno   left vol    incr  b.c  sacode  safac   h.s.no
12251501 225010000    0    1    1    0.520    1
*crdno   rt vol     incr  b.c  sacode  safac   h.s.no
12251601  -939        0   3949   1    0.520    1
*crdno   s.type   mult   dir.left  dir.rt   h.s.no
12251701  0      0.0      0.0      0.0      1
*crdno  dth  hl-f  hl-r  gs-lf  gs-lr  floss  rloss  boil-f  h.s.no
12251801 0.0  30.0 30.0  0.0   0.0    0.0    0.0    1.    1
*crdno  dth  hl-f  hl-r  gs-lf  gs-lr  floss  rloss  boil-f  h.s.no
12251901 0.0  30.0  30.0  0.0   0.0    0.0    0.0    1.    1
*-----------------------------------
*
*          Heat Structure no 240-0
* Interactive
*
*crdno  no.h.s  no.m.p  geo  s.s.flg  left
12400000  2       5      2     1      0.282
*crdno   mesh flg  fmt
12400100   0     1
*crdno   intvl  rt.cor
12400101   4    0.310
*crdno   comp  intvl
12400201   4     4
*crdno   source  intvl
12400301  0.0    4
*crdno   tempflag
12400400   -1
*crdno     t(1)     t(2)     t(3)     t(4)     t(5)
12400401  579.10   575.60    572.17   568.81   565.53
12400402  579.10   575.60    572.17   568.81   565.53
*crdno   left vol    incr  b.c  sacode  safac   h.s.no
12400501 240010000    0    1    1    0.559    1
12400502 245010000    0    1    1    0.559    2
*crdno   rt vol     incr  b.c  sacode  safac   h.s.no
12400601  -939        0   3949   1    0.559    1
12400602  -939        0   3949   1    0.559    2
*crdno   s.type   mult   dir.left  dir.rt   h.s.no
12400701  0      0.0      0.0      0.0      2
*crdno  dth  hl-f  hl-r  gs-lf  gs-lr  floss  rloss  boil-f  h.s.no
12400801 0.0  30.0  30.0  0.0   0.0    0.0    0.0    1.    2
*crdno  dth  hl-f  hl-r  gs-lf  gs-lr  floss  rloss  boil-f  h.s.no
12400901 0.0  30.0  30.0  0.0   0.0    0.0    0.0    1.    2
*-----------------------------------
*
*          Heat Structure no 251-0
* Interactive
*
*crdno  no.h.s  no.m.p  geo  s.s.flg  left
12510000  1       5      1     1      0.0
*crdno   mesh flg  fmt
12510100   0     1
*crdno   intvl  rt.cor
12510101   4    0.010
*crdno   comp  intvl
12510201   4     4
*crdno   source  intvl
12510301  0.0    4
*crdno   tempflag
12510400   -1
*crdno     t(1)     t(2)     t(3)     t(4)     t(5)
12510401  579.80    579.61    579.41   579.21   579.01
*crdno   left vol    incr  b.c  sacode  safac   h.s.no
12510501 250010000    0    1    1    1.80     1
*crdno   rt vol     incr  b.c  sacode  safac   h.s.no
12510601  251010000    0    1    1    1.80     1
*crdno   s.type   mult   dir.left  dir.rt   h.s.no
12510701  0      0.0      0.0      0.0      1
*crdno  dth  hl-f  hl-r  gs-lf  gs-lr  floss  rloss  boil-f  h.s.no
12510801 0.0  30.0  30.0  0.0   0.0    0.0    0.0    1.    1
*crdno  dth  hl-f  hl-r  gs-lf  gs-lr  floss  rloss  boil-f  h.s.no
12510901 0.0  30.0  30.0  0.0   0.0    0.0    0.0    1.    1
*-----------------------------------
*
*          Heat Structure no 255-1
* Interactive
*
*crdno  no.h.s  no.m.p  geo  s.s.flg  left
12551000  3       5      1     1      0.0
*crdno   mesh flg  fmt
12551100   0     1
*crdno   intvl  rt.cor
12551101   4    0.005
*crdno   comp  intvl
```

```
12551201  4    4
*crdno   source  intvl
12551301  0.0    4
*crdno   tempflag
12551400  -1
*crdno     t(1)      t(2)      t(3)      t(4)      t(5)
12551401  578.67  578.08    577.48    576.88    576.28
12551402  567.71  567.13    566.55    565.97    565.39
12551403  566.68  566.11    565.53    564.95    564.37
*crdno   left vol    incr  b.c  sacode safac  h.s.no
12551501 252010000    0    1    1   0.30    1
12551502 255010000    0    1    1   0.70    2
12551503 260010000    0    1    1   1.00    3
*crdno   rt vol     incr  b.c  sacode safac  h.s.no
12551601 -939         0  3949    1   0.30    1
12551602 -939         0  3949    1   0.70    2
12551603 -939         0  3949    1   1.00    3
*crdno   s.type   mult   dir.left  dir.rt   h.s.no
12551701  0      0.0      0.0      0.0      3
*crdno   dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12551801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   3
*crdno   dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12551901 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   3
*-----------------------------------------------------
*
*          Heat Structure no 255-2
* Interactive
*
*crdno  no.h.s  no.m.p  geo  s.s.flg  left
12552000  1      5      2    1    0.381
*crdno   mesh flg   fmt
12552100   0       1
*crdno   intvl   rt.cor
12552101   4     0.474
*crdno   comp   intvl
12552201   5     4
*crdno   source   intvl
12552301   0.0     4
*crdno   tempflag
12552400   -1
*crdno     t(1)      t(2)      t(3)      t(4)      t(5)
12552401  566.93    562.44    558.21    554.20    550.39
*crdno   left vol    incr  b.c  sacode safac  h.s.no
12552501 255010000    0    1    1   0.854   1
*crdno   rt vol     incr  b.c  sacode safac  h.s.no
12552601 -939         0  3949    1   0.854   1
*crdno   s.type   mult   dir.left  dir.rt   h.s.no
12552701  0      0.0      0.0      0.0      1
*crdno   dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12552801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   1
*crdno   dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12552901 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   1
*-----------------------------------------------------
*
*          Heat Structure no 260-1
* Interactive
*crdno  no.h.s  no.m.p  geo  s.s.flg  left
12601000  1      5      2    1    0.381
*crdno   mesh flg   fmt
12601100   0       1
*crdno   intvl   rt.cor
12601101   4     0.728
*crdno   comp   intvl
12601201   5     4
*crdno   source   intvl
12601301   0.0     4
*crdno   tempflag
12601400   -1
*crdno     t(1)      t(2)      t(3)      t(4)      t(5)
12601401  564.64    545.38    529.38    515.70    503.76
*crdno   left vol    incr  b.c  sacode safac  h.s.no
12601501 260010000    0    1    1   0.712   1
*crdno   rt vol     incr  b.c  sacode safac  h.s.no
12601601 -939         0  3949    1   0.712   1
*crdno   s.type   mult   dir.left  dir.rt   h.s.no
12601701  0      0.0      0.0      0.0      1
*crdno   dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12601801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   1
*crdno   dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12601901 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   1
*-----------------------------------------------------
*
*          Heat Structure no 260-2
* Interactive
*
*crdno  no.h.s  no.m.p  geo  s.s.flg  left
12602000  1      5      1    1    0.0
*crdno   mesh flg   fmt
12602100   0       1
*crdno   intvl   rt.cor
12602101   4     0.474
*crdno   comp   intvl
12602201   5     4
*crdno   source   intvl
12602301   0.0     4
*crdno   tempflag
12602400   -1
*crdno     t(1)      t(2)      t(3)      t(4)      t(5)
12602401  567.72    552.22    536.73    521.23    505.74
*crdno   left vol    incr  b.c  sacode safac  h.s.no
12602501 260010000    0    1    1   0.712   1
*crdno   rt vol     incr  b.c  sacode safac  h.s.no
12602601 -939         0  3949    1   0.712   1
*crdno   s.type   mult   dir.left  dir.rt   h.s.no
12602701  0      0.0      0.0      0.0      1
*crdno   dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12602801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   1
*crdno   dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
12602901 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   1
*-----------------------------------------------------
*-------------------------------
*          Broken Loop
*-------------------------------
*
*          Heat Structure no 300-0
* Broken Loop: Hot leg
*
*crdno  no.h.s  no.m.p  geo  s.s.flg  left
13000000  3      3      2    1    0.142
*crdno   mesh flg   fmt
13000100   0       1
*crdno   intvl   rt.cor
13000101   2     0.178
*crdno   comp   intvl
13000201   4     2
*crdno   source   intvl
13000301   0.0     2
*crdno   tempflag
13000400   -1
*crdno     t(1)      t(2)      t(3)
13000401  560.57    551.47    543.29
13000402  560.20    551.12    542.95
13000403  560.14    551.06    542.89
*crdno   left vol    incr  b.c  sacode safac  h.s.no
13000501 300010000    0    1    1   0.876   1
13000502 305010000    0    1    1   0.698   2
13000503 310010000    0    1    1   1.424   3
*crdno   rt vol     incr  b.c  sacode safac  h.s.no
13000601 -939         0  3949    1   0.876   1
13000602 -939         0  3949    1   0.698   2
13000603 -939         0  3949    1   1.424   3
*crdno   s.type   mult   dir.left  dir.rt   h.s.no
13000701  0      0.0      0.0      0.0      3
*crdno   dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
13000801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   3
*crdno   dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
13000901 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   3
*-----------------------------------------------------
*
*          Heat Structure no 315-1
* Broken Loop: Hot leg
*
```

```
*crdno  no.h.s no.m.p geo s.s.flg left
13151000 1     3   2    1   0.055
*crdno   mesh flg  fmt
13151100   0     1
*crdno   intvl  rt.cor
13151101   2    0.178
*crdno   comp  intvl
13151201  4    2
*crdno   source  intvl
13151301  0.0    2
*crdno   tempflag
13151400   -1
*crdno   t(1)     t(2)     t(3)
13151401  558.16    515.17    489.43
*crdno   left vol    incr  b.c  sacode safac  h.s.no
13151501 315010000    0    1    1   0.488   1
*crdno   rt vol     incr  b.c  sacode safac  h.s.no
13151601  -939        0  3949   1   0.488   1
*crdno   s.type   mult   dir.left  dir.rt   h.s.no
13151701  0      0.0      0.0      0.0      1
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss  rloss boil-f h.s.no
13151801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   1
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss  rloss boil-f h.s.no
13151901 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   1
*-------------------------------------------------------
*
*          Heat Structure no 315-2
* Broken Loop: Hot leg
*
*crdno  no.h.s no.m.p geo s.s.flg left
13152000 1     3   2    1   0.0865
*crdno   mesh flg  fmt
13152100   0     1
*crdno   intvl  rt.cor
13152101   2    0.1095
*crdno   comp  intvl
13152201  4    2
*crdno   source  intvl
13152301  0.0    2
*crdno   tempflag
13152400   -1
*crdno   t(1)     t(2)     t(3)
13152401  560.40    554.41    549.07
*crdno   left vol    incr  b.c  sacode safac  h.s.no
13152501 315020000    0    1    1   1.6085   1
*crdno   rt vol     incr  b.c  sacode safac  h.s.no
13152601  -939        0  3949   1   1.6085   1
*crdno   s.type   mult   dir.left  dir.rt   h.s.no
13152701  0      0.0      0.0      0.0      1
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss  rloss boil-f h.s.no
13152801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   1
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss  rloss boil-f h.s.no
13152901 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   1
*-------------------------------------------------------
*
*          Heat Structure no 335-0
* Broken Loop: Cold leg
*
*crdno  no.h.s no.m.p geo s.s.flg left
13350000 1     3   2    1   0.142
*crdno   mesh flg  fmt
13350100   0     1
*crdno   intvl  rt.cor
13350101   2    0.178
*crdno   comp  intvl
13350201  4    2
*crdno   source  intvl
13350301  0.0    2
*crdno   tempflag
13350400   -1
*crdno   t(1)     t(2)     t(3)
13350401  554.25    545.34    537.32
*crdno   left vol    incr  b.c  sacode safac  h.s.no
13350501 335010000    0    1    1   0.7495   1
*crdno   rt vol     incr  b.c  sacode safac  h.s.no
13350601  -939        0  3949   1   0.7495   1
*crdno   s.type   mult   dir.left  dir.rt   h.s.no
13350701  0      0.0      0.0      0.0      1
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss  rloss boil-f h.s.no
13350801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   1
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss  rloss boil-f h.s.no
13350901 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   1
*-------------------------------------------------------
*
*          Heat Structure no 350-0
* Broken Loop: Cold leg
*
*crdno  no.h.s no.m.p geo s.s.flg left
13500000 1     3   2    1   0.055
*crdno   mesh flg  fmt
13500100   0     1
*crdno   intvl  rt.cor
13500101   2    0.178
*crdno   comp  intvl
13500201  4    2
*crdno   source  intvl
13500301  0.0    2
*crdno   tempflag
13500400   -1
*crdno   t(1)     t(2)     t(3)
13500401  552.23    510.10    484.89
*crdno   left vol    incr  b.c  sacode safac  h.s.no
13500501 350010000    0    1    1   0.488   1
*crdno   rt vol     incr  b.c  sacode safac  h.s.no
13500601  -939        0  3949   1   0.488   1
*crdno   s.type   mult   dir.left  dir.rt   h.s.no
13500701  0      0.0      0.0      0.0      1
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss  rloss boil-f h.s.no
13500801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   1
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss  rloss boil-f h.s.no
13500901 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   1
*-------------------------------------------------------
*
*          Heat Structure no 350-2
* Broken Loop: Cold leg
*
*crdno  no.h.s no.m.p geo s.s.flg left
13502000 1     3   2    1   0.0865
*
*crdno
13502100   0     1
*crdno   intvl  rt.cor
13502101   2    0.1095
*crdno   comp  intvl
13502201  4    2
*crdno   source  intvl
13502301  0.0    2
*crdno   tempflag
13502400   -1
*crdno   t(1)     t(2)     t(3)
13502401  554.69    548.82    543.57
*crdno   left vol    incr  b.c  sacode safac  h.s.no
13502501 350020000    0    1    1   1.6085   1
*crdno   rt vol     incr  b.c  sacode safac  h.s.no
13502601  -939        0  3949   1   1.6085   1
*crdno   s.type   mult   dir.left  dir.rt   h.s.no
13502701  0      0.0      0.0      0.0      1
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss  rloss boil-f h.s.no
13502801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   1
*crdno   dth  hl-f  hl-r  gs-lf gs-lr  floss  rloss boil-f h.s.no
13502901 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   1
*-------------------------------------------------------
*
*          Heat Structure no 370-0
* Broken Loop: Cold leg
*
*crdno  no.h.s no.m.p geo s.s.flg left
13700000 2     3   2    1   0.111
*crdno   mesh flg  fmt
13700100   0     1
*crdno   intvl  rt.cor
13700101   2    0.1365
```

```
*crdno  comp  intvl
13700201  4    2
*crdno  source  intvl
13700301  0.0    2
*crdno  tempflag
13700400  -1
*crdno    t(1)     t(2)     t(3)
13700401  548.43    542.20    536.56
13700402  551.56    545.27    539.57
*crdno  left vol   incr  b.c  sacode safac   h.s.no
13700501  370010000   0    1    1   0.7251    1
13700502  380010000   0    1    1   9.3549    2
*crdno  rt vol     incr  b.c  sacode safac   h.s.no
13700601  -939       0   3949  1   0.7251    1
13700602  -939       0   3949  1   9.3549    2
*crdno  s.type  mult  dir.left  dir.rt  h.s.no
13700701  0     0.0     0.0     0.0     2
*crdno  dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
13700801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   2
*crdno  dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
13700901 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   2
*-----------------------------------------------------------
*      Pressurizer heat structures
*-------------------------------------
*
*          Heat Structure no 415-2
* Pressurizer: Vessel
*
*crdno  no.h.s  no.m.p  geo  s.s.flg  left
14152000  6    3    2    1   0.42291
*crdno  mesh flg  fmt
14152100  0    1
*crdno  intvl  rt.cor
14152101  2    0.49911
*crdno  comp  intvl
14152201  5    2
*crdno  source  intvl
14152301  0.0    2
*crdno  tempflag
14152400  -1
*crdno    t(1)     t(2)     t(3)
14152401   574.00    566.84    560.26
14152402   583.96    576.54    569.71
14152403   599.59    591.75    584.54
14152404   611.29    602.98    595.48
14152405   613.55    605.34    597.79
14152406   613.67    605.47    597.91
*crdno  left vol   incr  b.c  sacode safac   h.s.no
14152501  415010000   0    1    1   0.1815    1
14152502  415020000   0    1    1   0.1524    2
14152503  415030000   0    1    1   0.3967    3
14152504  415040000   0    1    1   0.5289    4
14152505  415050000   0    1    1   0.3967    5
14152506  415060000   0    1    1   0.1943    6
*crdno  rt vol     incr  b.c  sacode safac   h.s.no
14152601  -939       0   3949  1   0.1815    1
14152602  -939       0   3949  1   0.1524    2
14152603  -939       0   3949  1   0.3967    3
14152604  -939       0   3949  1   0.5289    4
14152605  -939       0   3949  1   0.3967    5
14152606  -939       0   3949  1   0.1943    6
*crdno  s.type  mult  dir.left  dir.rt  h.s.no
14152701  0     0.0     0.0     0.0     6
*crdno  dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
14152801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   6
*crdno  dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
14152901 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   6
*-----------------------------------------------------------
*
*          Heat Structure no 415-3
* Pressurizer: Vessel
*
*crdno  no.h.s  no.m.p  geo  s.s.flg  left
14153000  2    3    2    1   0.2032
*crdno  mesh flg  fmt
14153100  0    1
*crdno  intvl  rt.cor
14153101  2    0.3683
*crdno  comp  intvl
14153201  5    2
*crdno  source  intvl
14153301  0.0    2
*crdno  tempflag
14153400  -1
*crdno    t(1)     t(2)     t(3)
14153401  613.68    591.80    575.42
14153402  613.68    591.81    575.43
*crdno  left vol   incr  b.c  sacode safac   h.s.no
14153501  415070000   0    1    1   0.1029    1
14153502  420010000   0    1    1   0.1029    2
*crdno  rt vol     incr  b.c  sacode safac   h.s.no
14153601  -939       0   3949  1   0.1029    1
14153602  -939       0   3949  1   0.1029    2
*crdno  s.type  mult  dir.left  dir.rt  h.s.no
14153701  0     0.0     0.0     0.0     2
*crdno  dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
14153801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   2
*crdno  dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
14153901 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   2
*-----------------------------------------------------------
*
*          Heat Structure no 420-1
* Pressurizer: Vessel
*
*crdno  no.h.s  no.m.p  geo  s.s.flg  left
14201000  1    3    1    1   0.0
*crdno  mesh flg  fmt
14201100  0    1
*crdno  intvl  rt.cor
14201101  2    0.18415
*crdno  comp  intvl
14201201  5    2
*crdno  source  intvl
14201301  0.0    2
*crdno  tempflag
14201400  -1
*crdno    t(1)     t(2)     t(3)
14201401  613.89    597.36    580.82
*crdno  left vol   incr  b.c  sacode safac   h.s.no
14201501  420010000   0    1    1   0.130    1
*crdno  rt vol     incr  b.c  sacode safac   h.s.no
14201601  -939       0   3949  1   0.130    1
*crdno  s.type  mult  dir.left  dir.rt  h.s.no
14201701  0     0.0     0.0     0.0     1
*crdno  dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
14201801 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   1
*crdno  dth hl-f hl-r gs-lf gs-lr floss rloss boil-f h.s.no
14201901 0.0 30.0 30.0  0.0  0.0   0.0  0.0   1.   1
*
*-------------------------------------
*          Secondary Side
*-------------------------------------
*
*          Heat Structure no 500-0
* Secondary Side: Shroud Upper Plenum
*
*crdno  no.h.s  no.m.p  geo  s.s.flg  left
15000000  2    5    2    1   0.3048
*crdno  mesh flg  fmt
15000100  0    1
*crdno  intvl  rt.cor
15000101  4    0.3143
*crdno  comp  intvl
15000201  5    4
*crdno  source  intvl
15000301  0.0    4
*crdno  tempflag
15000400  -1
*crdno    t(1)     t(2)     t(3)     t(4)     t(5)
15000401  543.88    543.88    543.88    543.88    543.87
15000402  543.91    543.91    543.91    543.91    543.91
*crdno  left vol   incr  b.c  sacode safac   h.s.no
```

```
15000501  502010000    0    1    0   0.85127    1
15000502  515060000    0    1    0   2.51199    2
*crdno    rt vol      incr  b.c  sacode  safac     h.s.no
15000601  500010000    0    1    0   0.87780    1
15000602  505010000    0    1    0   2.59028    2
*crdno    s.type   mult   dir.left  dir.rt  h.s.no
15000701  0        0.0    0.0       0.0     2
*crdno    dth  hl-f  hl-r  gs-lf  gs-lr  floss  rloss  boil-f  h.s.no
15000801  0.0  30.0  30.0  0.0    0.0    0.0    0.0    1.      2
*crdno    dth  hl-f  hl-r  gs-lf  gs-lr  floss  rloss  boil-f  h.s.no
15000901  0.0  30.0  30.0  0.0    0.0    0.0    0.0    1.      2
*-----------------------------------------------------------------
*
*          Heat Structure no 510-0
* Secondary Side: Shroud Lower Section
*
*crdno    no.h.s  no.m.p  geo  s.s.flg  left
15100000  5       5       2    1        0.6445
*crdno    mesh flg  fmt
15100100  0         1
*crdno    intvl  rt.cor
15100101  4      0.6572
*crdno    comp  intvl
15100201  5     4
*crdno    source  intvl
15100301  0.0     4
*crdno    tempflag
15100400  -1
*crdno    t(1)      t(2)      t(3)      t(4)      t(5)
15100401  539.18    535.98    532.79    529.61    526.45
15100402  538.60    535.09    531.59    528.10    524.63
15100403  538.66    535.13    531.63    528.14    524.66
15100404  529.32    526.93    524.55    522.18    519.83
15100405  520.68    519.33    518.00    516.68    515.36
*crdno    left vol    incr  b.c  sacode  safac     h.s.no
15100501  515050000    0    1    1    0.646354    1
15100502  515040000    0    1    0    2.46858     2
15100503  515030000    0    1    0    2.46858     3
15100504  515020000    0    1    0    1.23429     4
15100505  515010000    0    1    0    1.23429     5
*crdno    rt vol      incr  b.c  sacode  safac     h.s.no
15100601  508010000    0    1    1    0.646354    1
15100602  510010000    0    1    0    2.51723     2
15100603  510010000    0    1    0    2.51723     3
15100604  510010000    0    1    0    1.25862     4
15100605  510010000    0    1    0    1.25862     5
*crdno    s.type   mult   dir.left  dir.rt  h.s.no
15100701  0        0.0    0.0       0.0     5
*crdno    dth  hl-f  hl-r  gs-lf  gs-lr  floss  rloss  boil-f  h.s.no
15100801  0.0  30.0  30.0  0.0    0.0    0.0    0.0    1.      5
*crdno    dth  hl-f  hl-r  gs-lf  gs-lr  floss  rloss  boil-f  h.s.no
15100901  0.0  30.0  30.0  0.0    0.0    0.0    0.0    1.      5
*-----------------------------------
*
*          Heat Structure no 525-0
* Secondary Side: Vessel Wall
*
*crdno    no.h.s  no.m.p  geo  s.s.flg  left
15250000  8       3       2    1        0.7112
*crdno    mesh flg  fmt
15250100  0         1
*crdno    intvl  rt.cor
15250101  2      0.76397
*crdno    comp  intvl
15250201  5     2
*crdno    source  intvl
15250301  0.0     2
*crdno    tempflag
15250400  -1
*crdno    t(1)      t(2)      t(3)
15250401  543.26    537.76    532.46
15250402  543.25    537.76    532.45
15250403  543.28    537.79    532.48
15250404  542.75    537.26    531.97
15250405  505.94    501.29    496.82
15250406  507.22    502.55    498.05
15250407  507.21    502.55    498.04
15250408  507.05    502.38    497.88
*crdno    left vol    incr  b.c  sacode  safac     h.s.no
15250501  525010000    0    1    1    0.76238     1
15250502  520010000    0    1    1    0.7520      2
15250503  500010000    0    1    1    0.4445      3
15250504  505010000    0    1    1    1.2131      4
15250505  508010000    0    1    1    0.6096      5
15250506  510010000    0    1    1    0.6096      6
15250507  510020000    0    1    1    0.6096      7
15250508  510030000    0    1    1    0.6096      8
*crdno    rt vol      incr  b.c  sacode  safac     h.s.no
15250601  -938         0    3948  1    0.76238     1
15250602  -938         0    3948  1    0.7520      2
15250603  -938         0    3948  1    0.4445      3
15250604  -938         0    3948  1    1.2131      4
15250605  -938         0    3948  1    0.6096      5
15250606  -938         0    3948  1    0.6096      6
15250607  -938         0    3948  1    0.6096      7
15250608  -938         0    3948  1    0.6096      8
*crdno    s.type   mult   dir.left  dir.rt  h.s.no
15250701  0        0.0    0.0       0.0     8
*crdno    dth  hl-f  hl-r  gs-lf  gs-lr  floss  rloss  boil-f  h.s.no
15250801  0.0  30.0  30.0  0.0    0.0    0.0    0.0    1.      8
*crdno    dth  hl-f  hl-r  gs-lf  gs-lr  floss  rloss  boil-f  h.s.no
15250901  0.0  30.0  30.0  0.0    0.0    0.0    0.0    1.      8
*-----------------------------------------------------------------
*-----------------------------------
*   Enviromental Heat Loss Boundary Conditions
*-----------------------------------
*
*          Table no 939
* Enviromental temperature
*
*crdno  table_type
20293900  temp
*
*crdno  time  temp
20293901  0.0  305.0
*-----------------------------------
*
*          Table no 949
* Enviromental Loss Heat XFER Coefficient
*
*crdno  table_type
20294900  htc-t
*
*crdno  time  htc
20294901  0.0  30.0
*-----------------------------------
*
*          Table no 938
* Enviromental Heat Loss boundary temperature
*
*crdno  table_type
20293800  temp
*
*crdno  time  temp
20293801  0.0  305.0
*-----------------------------------
*
*          Table no 948
* Enviromental Loss Heat XFER Coefficient
*
*crdno  table_type
20294800  htc-t
*
*crdno  time  htc
20294801  0.0  40.0
*
*-----------------------------------
*+---------------------------------+
*|          Reactor kinetics       |
*+---------------------------------+
*
* Point kinetics
```

```
*
*crdno   type  ftype
30000000  point separabl
*
*crdno   decay   power in.reac. del.n.fract. fis.f.  U239
30000001 gamma-ac 50.+6 0.      371.875    1.    1.
*
*    delayed neutron constants
*crdno   yield ratio  decay const.
30000101  0.0420       3.01
30000102  0.1150       1.14
30000103  0.3950       3.301
30000104  0.1960       0.301
30000105  0.2190       0.305
30000106  0.0330       0.0124
*
*crdno   power  time   dimens.
30000401 25.+6    9.    hr
30000402 50.+6    66.   hr
*
*crdno   react.curve
30000011  609
*-----------------------
* Reactivity curve table
*-----------------------
*crdno   type  trip-no  ¦
20260900  reac-t  403    *¦
*                  ¦
*crdno   time   reactiv.  ¦
20260901 -1.0     0.0    *¦
20260902  0.1    -2.1    *¦
20260903  0.2    -4.3    *¦
20260904  0.3    -6.8    *¦
20260905  0.4    -9.2    *¦
20260906  0.5   -11.1    *¦
20260907  0.6   -12.2    *¦
20260908  0.7   -12.9    *¦
20260909  0.8   -13.3    *¦
20260910  0.9   -13.6    *¦
20260911  1.0   -13.7    *¦
20260912  1.1   -13.8    *¦
20260913  1.2   -13.9    *¦
20260914  1.8   -14.0    *¦
20260915 2500.  -14.0    *¦
*-------------------------------
*
*    Moderator density reactivity table
*              stdy-st  transnt
*crdno   density  react.  react.
30000501  626.26   0.0 *  -4.4769
30000502  663.96   0.0 *  -3.2923
30000503  716.17   0.0 *  -1.5692
30000504  761.12   0.0 *  -0.1692
30000505  768.37   0.0 *   0.04615
30000506  791.57   0.0 *   0.6923
30000507  811.88   0.0 *   1.2398
30000508  862.63   0.0 *   2.2415
30000509  938.04   0.0 *   3.9231
30000510  997.49   0.0 *   5.1077
*
*    Doppler reactivity table
*              stdy-st  transnt
*crdno   temper  react.  react.
30000601  255.0    0.0 *   1.5
30000602  500.0    0.0 *   0.3
30000603  750.0    0.0 *  -0.7
30000604 1000.0    0.0 *  -1.6
30000605 1250.0    0.0 *  -2.3
30000606 1500.0    0.0 *  -3.0
30000607 1750.0    0.0 *  -3.7
30000608 2000.0    0.0 *  -4.3
30000609 2250.0    0.0 *  -4.9
30000610 2500.0    0.0 *  -5.4
30000611 2750.0    0.0 *  -5.9
30000612 3000.0    0.0 *  -6.3
*
*crdno   vol_no   incr   weight_f Water_temp_coef
30000701 230010000 0     0.15746    0.0
30000702 230020000 0     0.15746    0.0
30000703 230030000 0     0.15746    0.0
30000704 230040000 0     0.15746    0.0
30000705 230050000 0     0.15746    0.0
30000706 230060000 0     0.21270    0.0
*
*crdno   heat_no  incr   weight_f fuel_temp_coef
30000801 2300001  0      0.0170     0.0
30000802 2300002  0      0.3639     0.0
30000803 2300003  0      0.2747     0.0
30000804 2300004  0      0.2379     0.0
30000805 2300005  0      0.0976     0.0
30000806 2300006  0      0.0089     0.0
*
*-----------------------------------------
*+---------------------------------------+
*¦          Material properties          ¦
*+---------------------------------------+
*
*crdno   mater._type  thc-flg  cap_flg
20100100  tbl/fctn     1       1 * 1 - UO2
20100200  tbl/fctn     3       1 * 2 - Gap
20100300  tbl/fctn     1       1 * 3 - Zircaloy-4
20100400  tbl/fctn     1       1 * 4 - S-Steel
20100500  c-steel              * 5 - C-steel
20100600  tbl/fctn     1       1 * 6 - Inconel-600
*-----------------------------------------------------------------
*-------------------------------
*       UO2 Thermal Conductivity
*-------------------------------
*
*crdno      temp.   thc
20100101    273.150  8.440000
20100102    416.670  6.450000
20100103    533.150  5.782385
20100104    699.817  4.633177
20100105    866.483  3.880307
20100106   1033.150  3.357625
20100107   1088.710  3.155129
20100108   1199.820  2.983787
20100109   1283.150  2.836674
20100110   1366.480  2.713792
20100111   1533.150  2.521680
20100112   1616.480  2.448990
20100113   1699.820  2.391875
20100114   1977.590  2.289762
20100115   2255.370  2.307069
20100116   2533.150  2.433413
20100117   2810.930  2.661870
20100118   3088.710  2.994171
*-------------------------------------
*-------------------------------
*       UO2 Volume Heat Capacity
*-------------------------------
*
*crdno      temp.   vol.hcap
20100151    273.15  2.310427+6
20100152    323.15  2.571985+6
20100153    373.15  2.746357+6
20100154    673.15  3.138694+6
20100155   1373.15  3.443844+6
20100156   1773.15  3.531030+6
20100157   1973.15  3.792588+6
20100158   2173.15  4.228518+6
20100159   2373.15  4.882412+6
20100160   2673.15  6.015829+6
20100161   2773.15  6.320980+6
20100162   2873.15  6.582538+6
20100163   2973.15  6.713317+6
20100164   3113.15  6.800503+6
20100165   4699.82  6.800503+6
*
*-------------------------------------
*-----------------------------
```

```
*        Gap Thermal Conductivity
*-----------------------------------
*
*crdno     gaz-type   mole-frac.
20100201      helium      1.00
*-----------------------------------
*+---------------------------------+
*|      Gap Volume Heat Capacity    |
*+---------------------------------+
*
*crdno     temp.   vol.hcap
20100251    273.15    5.4
20100252   5000.00     5.4
*
*-----------------------------------
*-----------------------------------
*     Zircoloy-4 Thermal Conductivity
*-----------------------------------
*
*crdno     temp.    thc
20100301    380.4    13.6
20100302    469.3    14.6
20100303    577.6    15.8
20100304    685.9    17.3
20100305    774.8    18.4
20100306    872.0    19.8
20100307    973.2    21.8
20100308   1073.2    23.2
20100309   1123.2    25.4
20100310   1152.3    24.2
20100311   1232.2    25.5
20100312   1331.2    26.6
20100313   1404.2    28.2
20100314   1576.2    33.0
20100315   1625.2    36.7
20100316   1755.2    41.2
20100317   2273.2    55.0
*-----------------------------------
*-----------------------------------
*     Zircoloy-4 Volume Heat Capacity
*-----------------------------------
*
*crdno     temp.   vol.hcap
20100351    300.00   1.841+6
20100352    400.00   1.978+6
20100353    640.00   2.168+6
20100354   1090.00   2.456+6
20100355   1093.00   3.288+6
20100356   1113.00   3.865+6
20100357   1133.00   4.028+6
20100358   1153.00   4.709+6
20100359   1173.00   5.345+6
20100360   1193.00   5.044+6
20100361   1213.00   4.054+6
20100362   1233.00   3.072+6
20100363   1243.00   2.332+6
20100364   1477.00   2.332+6
*
*-----------------------------------------------
*-----------------------------------
*       S-Steel Thermal Conductivity
*-----------------------------------
*
*crdno     temp.    thc
20100401    273.15   12.98
20100402   1199.82   25.10
*-----------------------------------------------
*-----------------------------------
*       S-Steel Volume Heat Capacity
*-----------------------------------
*
*crdno     temp.   vol.hcap
20100451    273.15   3.830+6
20100452    366.50   3.830+6
20100453    477.59   4.190+6
20100454    588.59   4.336+6
20100455    699.82   4.504+6
20100456    810.93   4.639+6
20100457    922.04   4.773+6
20100458   1144.26    5.076+6
20100459   1366.50    5.376+6
20100460   1477.59    5.546+6
*
*-----------------------------------------------
*-----------------------------------
*     Inconel-600 Thermal Conductivity
*-----------------------------------
*
*crdno     temp.    thc
20100601    366.5   13.85
20100602    477.6   15.92
20100603    588.7   18.17
20100604    700.0   20.42
20100605    810.9   22.50
20100606    922.0   24.92
20100607   1033.2   26.83
20100608   1144.3   29.42
20100609   1477.6   36.06
*-----------------------------------------------
*-----------------------------------
*     Inconel-600 Volume Heat Capacity
*-----------------------------------
*
*crdno     temp.  vol.hcap
20100651    366.5  3.908+6
20100652    477.6  4.084+6
20100653    588.7  4.260+6
20100654    700.0  4.436+6
20100656    810.9  4.665+6
20100657    922.0  4.929+6
20100658   1033.2   5.105+6
20100659   1477.6   5.727+6
*
*-----------------------------------------------
*  ------------------------------------
*          ICAP Assessment Parameters
*  ------------------------------------
*
*               Levels
*               ------
* Cntrlvar No 1 - Downcomer Liquid Level   - LE-1ST-1
* Cntrlvar No 2 - Upper Plenum Liquid Level - LE-3UP-1
* Cntrlvar No 3 - SG Liquid Level          - LD-P004-008B
* Cntrlvar No 4 - Pressurizer Liquid Level  - LT-P139-007
*
*               Pressure
*               --------
* P  420010000 - PRZ Vapor Space   - PE-PC-004
* P  105010000 - Intact Loop Hot leg - PE-PC-002
* P  525010000 - SG Dome           - PE-SGS-001
*
*             Mass Flow Rate
*             ----------------
* mflowj 183000000 - Break Orifice   - FR-PC-SBRK
*
*             Coolant Temperature
*             -------------------
* tempf 105010000 - Intact Loop Hot Leg  - TE-PC-002A
* tempf 206030000 - Downcomer 1 Stalk    - TE-1ST-005
*
*              Fluid Density
*              -------------
*  Fluid Density in Intact Loop Hot leg:
*           DE-PC-002A  - Beam A (Bottom)
*           DE-PC-002C  - Beam C (Upper)
*  rho 105010000 - Fluid Density in the hot leg
*
*-----------------------------------
*      Luiquid Levels Calculations
*-----------------------------------
*
*          Control Variable No 1
```

```
* Downcomer Liquid Level - LE-1ST-1 - Computed variable
*
*crdno   name   type s.fac. in.v in.flg l.cnt min max
20500100 LE-1ST-1 sum  1.0  5.316 0
*crdno  a0     a1     var     code
20500101 0.0   0.1874  voidf  210010000
20500102       0.2852  voidf  212010000
20500103       0.2814  voidf  214010000
20500104       0.9580  voidf  216010000
20500105       0.5790  voidf  216020000
20500106       0.6570  voidf  216030000
20500107       0.5590  voidf  216040000
20500108       0.5590  voidf  216050000
20500109       0.5200  voidf  216060000
20500110       0.3600  voidf  222010000
20500111       0.3700  voidf  220010000
*-----------------------------------------
*
*
*         Control Variable No 2
* Upper Plenum Liquid Level - LE-3UP-1 - Computed variable
*
*crdno   name   type s.fac. in.v in.flg l.cnt min max
20500200 LE-3UP-1 sum   1.  1.7086 0
*crdno  a0     a1     var     code
20500201 0.0   0.2852  voidf  252010000
20500202       0.7114  voidf  255010000
20500203       0.7120  voidf  260010000
*-----------------------------------------
*
*         Control Variable No 3
* Steam Generator: Density Compensated
* Liquid Level LD-P004-008B    Computed variable
*
*crdno   name   type s.fac. in.v in.flg l.cnt min max
20500300 LD-P004 sum   1.  0.0  1
*crdno  a0     a1     var     code
20500301 -2.95 0.6096  voidf  510010000
20500302       0.6096  voidf  510020000
20500303       0.6096  voidf  510030000
20500304       0.6096  voidf  508010000
20500305       1.2131  voidf  505010000
20500306       0.4440  voidf  502010000
20500307       0.7180  voidf  520010000
*-----------------------------------------
*
*         Control Variable No 4
* Pressurizer Liquid Level on the South-West Side LT-P139-007
*
*crdno   name   type s.fac. in.v in.flg l.cnt min max
20500400 LT-P139 sum   1.  0.0  1
*crdno  a0     a1     var     code
20500401 0.0   0.1815  voidf  415010000
20500402       0.1524  voidf  415020000
20500403       0.3967  voidf  415030000
20500404       0.5289  voidf  415040000
20500405       0.3967  voidf  415050000
20500406       0.1943  voidf  415060000
20500407       0.1029  voidf  415070000
*
*-----------------------------------------------------
* Core Average Coolant Density and Fuel Temperature
*-----------------------------------------------------
*
*         Control Variable no 5
* Core Coolant average density
*
*crdno   name   type s.fac.  in.v in.flg l.cnt min max
20500500 Core-RHO sum 0.5633802  0.0  1
*crdno  a0     a1     var     code
20500501 0.0   0.2795   rho   230010000
20500502       0.2795   rho   230020000
20500503       0.2795   rho   230030000
20500504       0.2795   rho   230040000
20500505       0.2795   rho   230050000
20500506       0.3775   rho   230060000
*-----------------------------------------
*
*         Control Variable no 6
* Fuel average Temperature
*
*crdno   name   type s.fac.  in.v in.flg l.cnt min max
20500600 Core-TEM sum 0.5633802  0.0  1
*crdno  a0     a1     var     code
20500601 0.0   0.2795  htvat  2300001
20500602       0.2795  htvat  2300002
20500603       0.2795  htvat  2300003
20500604       0.2795  htvat  2300004
20500605       0.2795  htvat  2300005
20500606       0.3775  htvat  2300006
*
* End of input data file
```

```
        RESTART FILE

        TRANSIENT RUN



=LOFT Small Break Experiment L3-6
*
100      restart     transnt
103     934
*
*crdno time  min_dt   max_dt  ctrl  minor major restart
201   600.0 1.0-7    0.04    14003   50  15000  15000
202   810.0 1.0-7    0.04    14003   50  5250   5250
203   1500.0 1.0-7   0.04    14003   50  17250  17250
204   2400.0 1.0-7   0.04    14003   75  22500  22500
*
*        Component no 183
* Break orifice - Simulated 4 in break of PWR (F = 205.9 mm2)
*
*
1830000    brkvlv     valve
1830101 182010002 805000000 205.9-6 0.4  0.4  000100
1830102  1.0     0.85    0.60
1830201   1     0.0     0.0      0.0
1830300   mtrvlv
1830301     404       402     5.0       0.0
*-----------------------------------------------------
*
*
20800001 florgj 183000000
*
*        Auxiliary Trips
* no var   code     rel  var code   const  lin time on
401 time   0       ge   null 0     -1.0   1   0.0
402  time   0       lt  null 0     -1.0   1   -1.0
*
*           SCRAM
403  time   0       gt   null 0     0.0    1  -1.0
*
*           BREAK
404  time   0       ge   timeof 403   6.0    n  -1.0
*
*           PCP off
405  p   100010000   le   null   0   2.15+6  n   -1.0
* no trip_no  rel  trip_no  lin  time_on
601    404    and    405    n    -1.0
*
*           ECCS Control Logic
* no var   code     rel  var code  const  lin time_on
406   p  610010000   le   null 0   13.16+6  n   -1.0
*
* no trip_no  rel  trip_no  lin  time_on
602    404    and    406    1    -1.0
*
*        Auxiliary Feed Water Logic
* no var   code     rel  var code  const  lin time_on
407  time   0       ge timeof 403   6.0    1  -1.0
*
* no trip_no  rel  trip_no  lin  time_on
603    404    and    407    1    -1.0
*
*        Pressurizer Stady state controller
* no trip_no  rel  trip_no  lin  time_on
604   -403    and   -403    n     0.0
*
*        PCP Injection
* no var   code     rel  var code  const  lin time_on
408  p   100010000  ge   null 0   2.15+6  1   -1.0
*
* no trip_no  rel  trip_no  lin  time_on
605   -408    and   -408    1     0.0
*
*        Main Steam Control Valve
* no trip_no  rel  trip_no  lin  time_on
606  -403    and   -403     n     0.0
* no trip_no  rel  trip_no  lin  time_on
607  -606    and   -606     n    -1.0
* no var   code     rel  var code  const  lin time_on
409  p   530010000  ge   null 0   7.12+6  n   -1.0
* no var   code     rel  var code  const  lin time_on
410  p   530010000  ge   null 0   6.98+6  n   -1.0
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411  p   530010000  le   null 0   6.50+6  n   -1.0
* no var   code     rel  var code  const  lin time_on
412  p   530010000  le   null 0   6.57+6  n   -1.0
* no var   code     rel  var code  const  lin time_on
413  time   0       ge timeof 403   94.0    1   -1.0
* no var   code     rel  var code  const  lin time_on
414 vlvarea 540     ge   null 0     0.15   1   -1.0
*
*        Open trip
* no trip_no  rel  trip_no  lin  time_on
608   609    and    410     n    -1.0
* no trip_no  rel  trip_no  lin  time_on
609   409    or     608     n    -1.0
* no trip_no  rel  trip_no  lin  time_on
610  -414    and    413     n    -1.0
* MSCV triggered on the noise
*
*
*        Close trip
* no trip_no  rel  trip_no  lin  time_on
611   612    and    412     n    -1.0
* no trip_no  rel  trip_no  lin  time_on
612   411    or     611     n    -1.0
* no trip_no  rel  trip_no  lin  time_on
613   403    and    414     n    -1.0
*
*-----------------------------------
*        Reactor kinetics
*-----------------------------------
* Point kinetics
30000000  point separabl
30000001 gamma-ac 50.+6  0.   371.875    1.   1.
*    delayed neutron constants
30000101  0.0420       3.01
30000102  0.1150       1.14
30000103  0.3950       3.301
30000104  0.1960       0.301
30000105  0.2190       0.305
30000106  0.0330       0.0124
30000401  25.+6    9.   hr
30000402  50.+6    66.   hr
30000011  609
*-----------------------------------
* Reactivity curve table
*-------------------
20260900  reac-t  403
20260901 -1.0     0.0
20260902  0.1     -2.1
20260903  0.2     -4.3
20260904  0.3     -6.8
20260905  0.4     -9.2
20260906  0.5     -11.1
20260907  0.6     -12.2
20260908  0.7     -12.9
20260909  0.8     -13.3
20260910  0.9     -13.6
20260911  1.0     -13.7
20260912  1.1     -13.8
20260913  1.2     -13.9
20260914  1.8     -14.0
20260915 2500.    -14.0
```

```
*
*    Moderator density reactivity table
30000501  626.26  -4.4769
30000502  663.96  -3.2923
30000503  716.17  -1.5692
30000504  761.12  -0.1692
30000505  768.37   0.04615
30000506  791.57   0.6923
30000507  811.88   1.2398
30000508  862.63   2.2415
30000509  938.04   3.9231
30000510  997.49   5.1077
*
*    Doppler reactivity table
30000601  255.0    1.5
30000602  500.0    0.3
30000603  750.0   -0.7
30000604 1000.0   -1.6
30000605 1250.0   -2.3
30000606 1500.0   -3.0
30000607 1750.0   -3.7
30000608 2000.0   -4.3
30000609 2250.0   -4.9
30000610 2500.0   -5.4
30000611 2750.0   -5.9
30000612 3000.0   -6.3
30000701 230010000  0    0.15746     0.0
30000702 230020000  0    0.15746     0.0
30000703 230030000  0    0.15746     0.0
30000704 230040000  0    0.15746     0.0
30000705 230050000  0    0.15746     0.0
30000706 230060000  0    0.21270     0.0
30000801 2300001    0    0.0170      0.0
30000802 2300002    0    0.3639      0.0
30000803 2300003    0    0.2747      0.0
30000804 2300004    0    0.2379      0.0
30000805 2300005    0    0.0976      0.0
30000806 2300006    0    0.0089      0.0
*
*
* End of restart file
```

Appendix B

Table 1. Initial conditions of the Experiment L3-6.

Parameters	Measured values	Calculated values
Primary Coolant System:		
Mass flow rate (kg/s)	483.3 ± 2.6	482.42
Hot leg pressure (MPa)	14.87 ± 0.14	14.87
Cold leg temperature (K)	557.9 ± 1.1	560.9
Hot leg temperature (K)	577.1 ± 1.8	579.7
Pressure vessel:		
Power level (MW)	50. ± 1	50.
Pressurizer:		
Liquid temperature (K)	614.7 ± 1.4	614.5
Pressure (MPa)	14.90 ± 0.25	14.85
Liquid Level (m)	1.18 ± 0.11	1.17
Broken Loop:		
Cold Leg Temperature near Reactor Vessel (K)	557.6 ± 2.6	555.2
Hot Leg Temperature near Reactor Vessel (K)	561.4 ± 2.6	561.6
Primary Coolant Pump Injection (kg/s)	0.098 ± 0.016	0.094 (to one pump)
Steam Generator Secondary Side:		
Liquid Level* (m)	0.22 ± 0.03	0.2
Liquid Temperature (K)	542.8 ± 0.8	544.1
Pressure (MPa)	5.57 ± 0.06	5.58
Mass flow rate (kg/s)	27.8 ± 0.1	27.76

* Level is defined as 0.0 at 2.95 m above the tube sheet.

Table 2. Sequence of events in the Experiment L3-6.

Events	Experiment, s	RELAP5/MOD3, s
Reactor scrammed	-5.8 ± 0.2	-6.0
Break initiated	0.0	0.0
HPIS injection initiated	3.6 ± 0.2	3.6
Pressurizer emptied	20.2 ± 0.2	24.
Upper plenum reached saturation pressure	28.5 ± 0.2	25.
Intact loop hot leg voiding begun	29.4 ± 5.0	27.
Intact loop cold leg voiding begun	31.4 ± 5.0	27.
Subcooled break flow ended	44.2 ± 0.2	34.
Secondary system Pressure exceeded Primary side Pressure	930.0 ± 30.0	830.
Primary Coolant Pumps tripped (End of Transient)	2371.4 ± 0.2	not tripped (2400.)

Appendix C

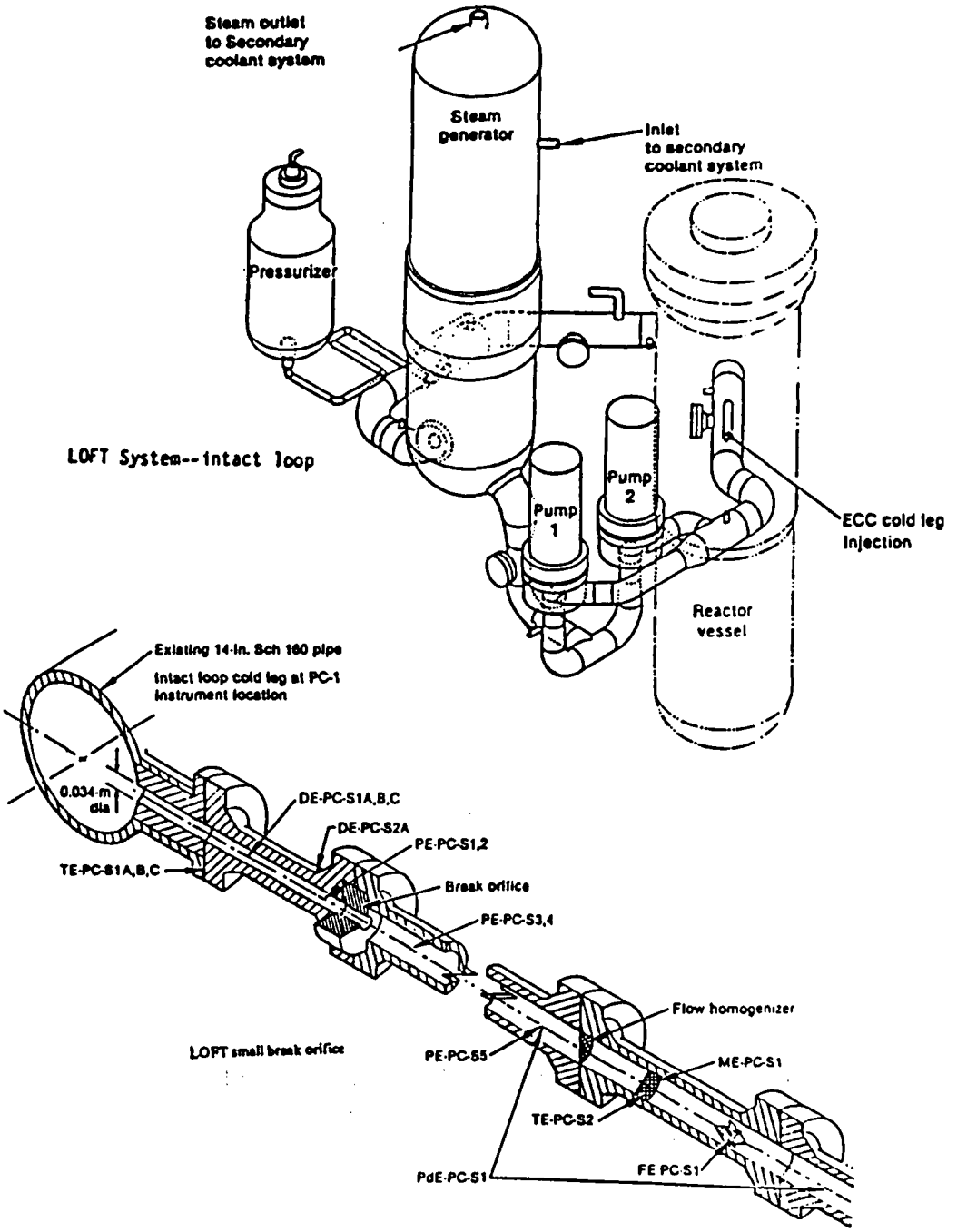

Fig.1. LOFT System and the cold leg break configuration.

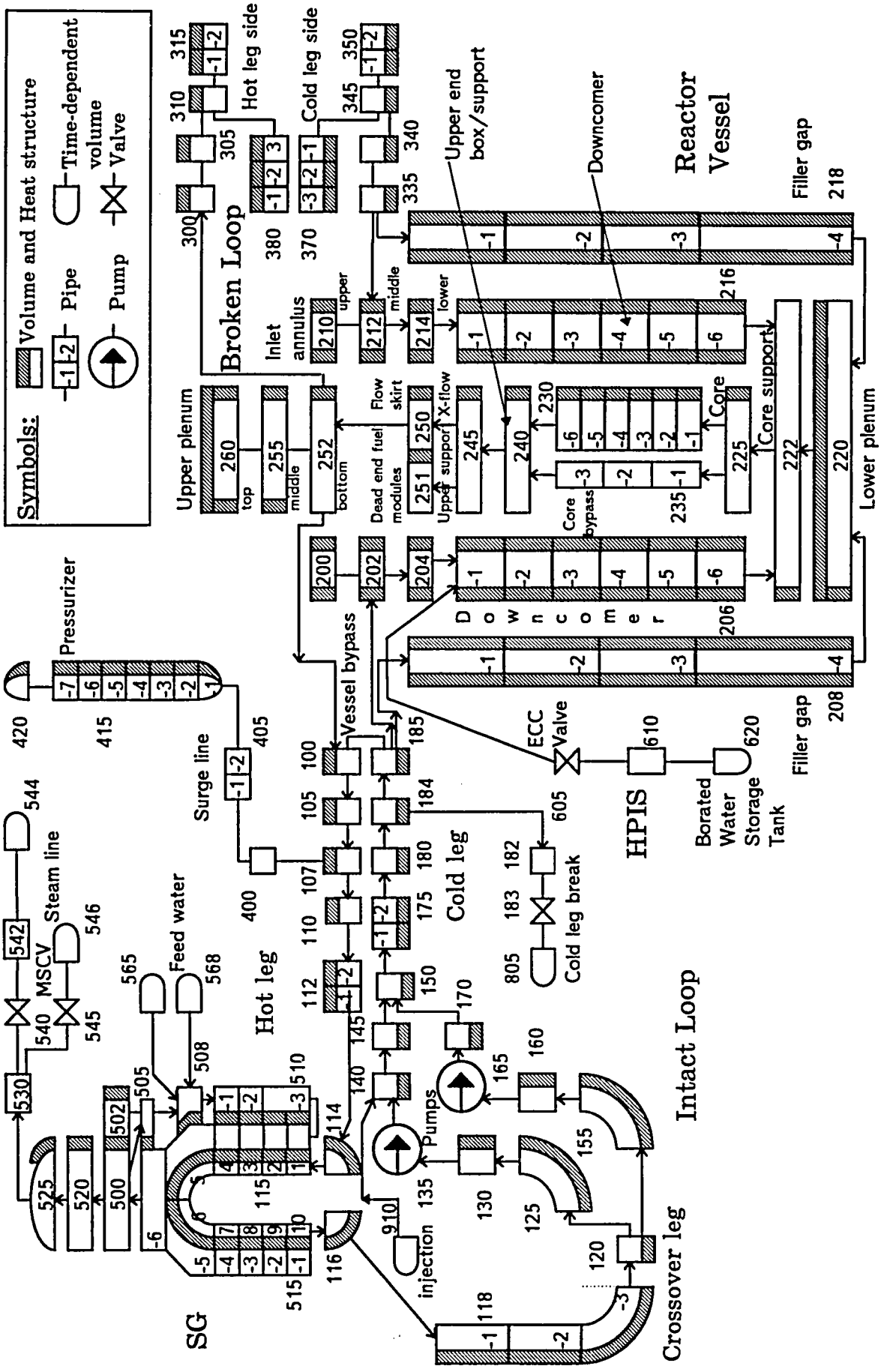

Fig. 2. RELAP5/MOD3 Noding for the LOFT L3-6 calculations.

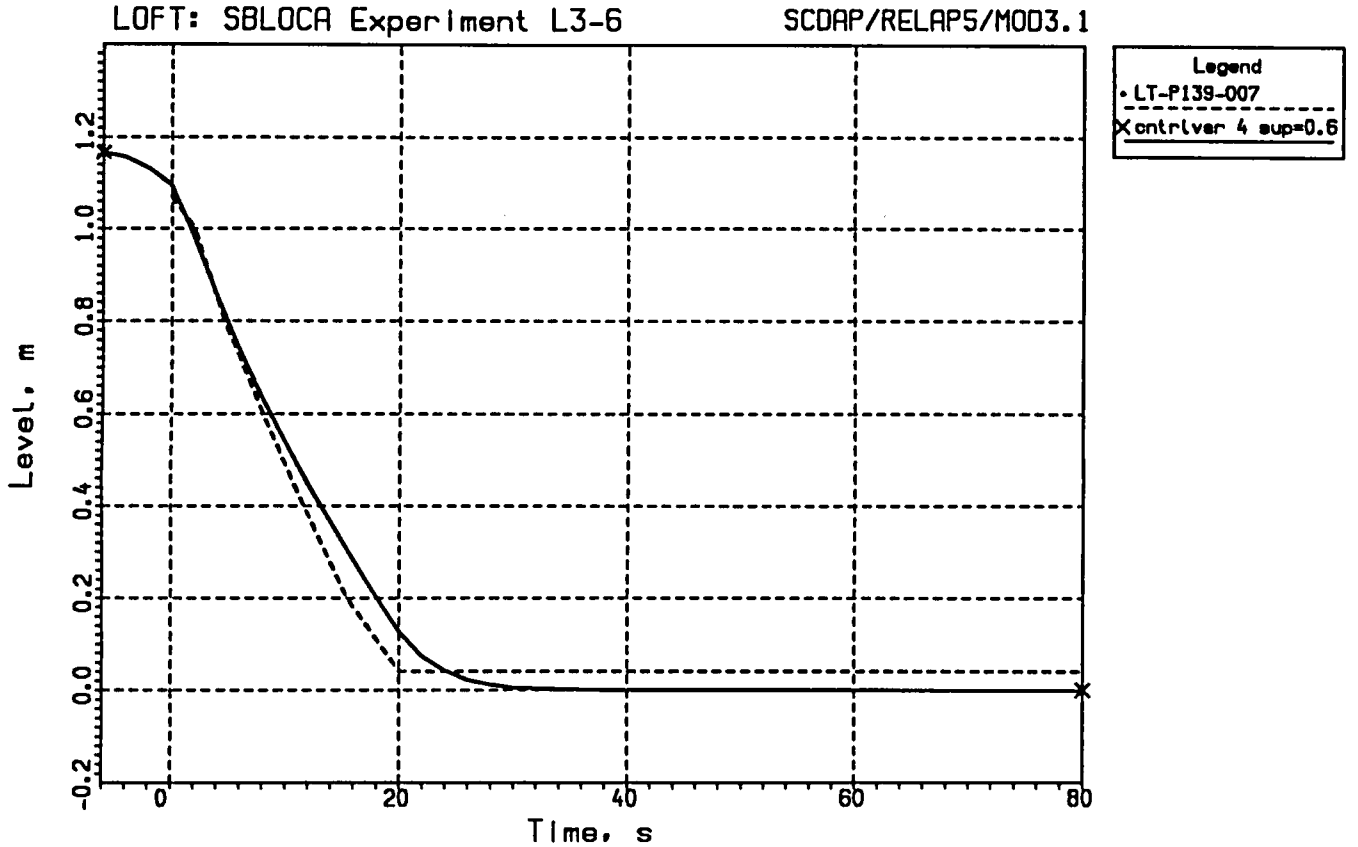

Fig. 3. Liquid Level in the Pressurizer.

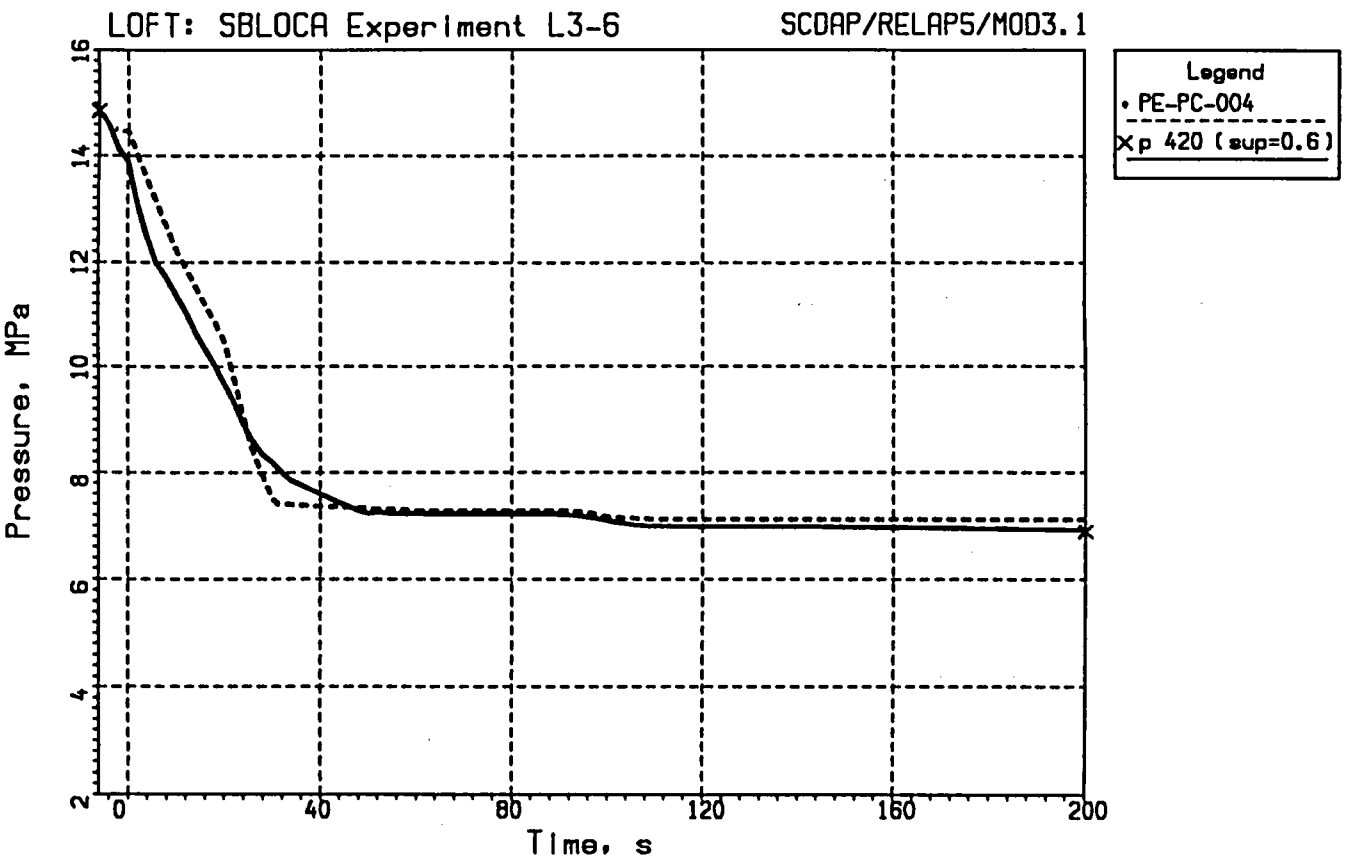

Fig. 4. Pressure in the Pressurizer.

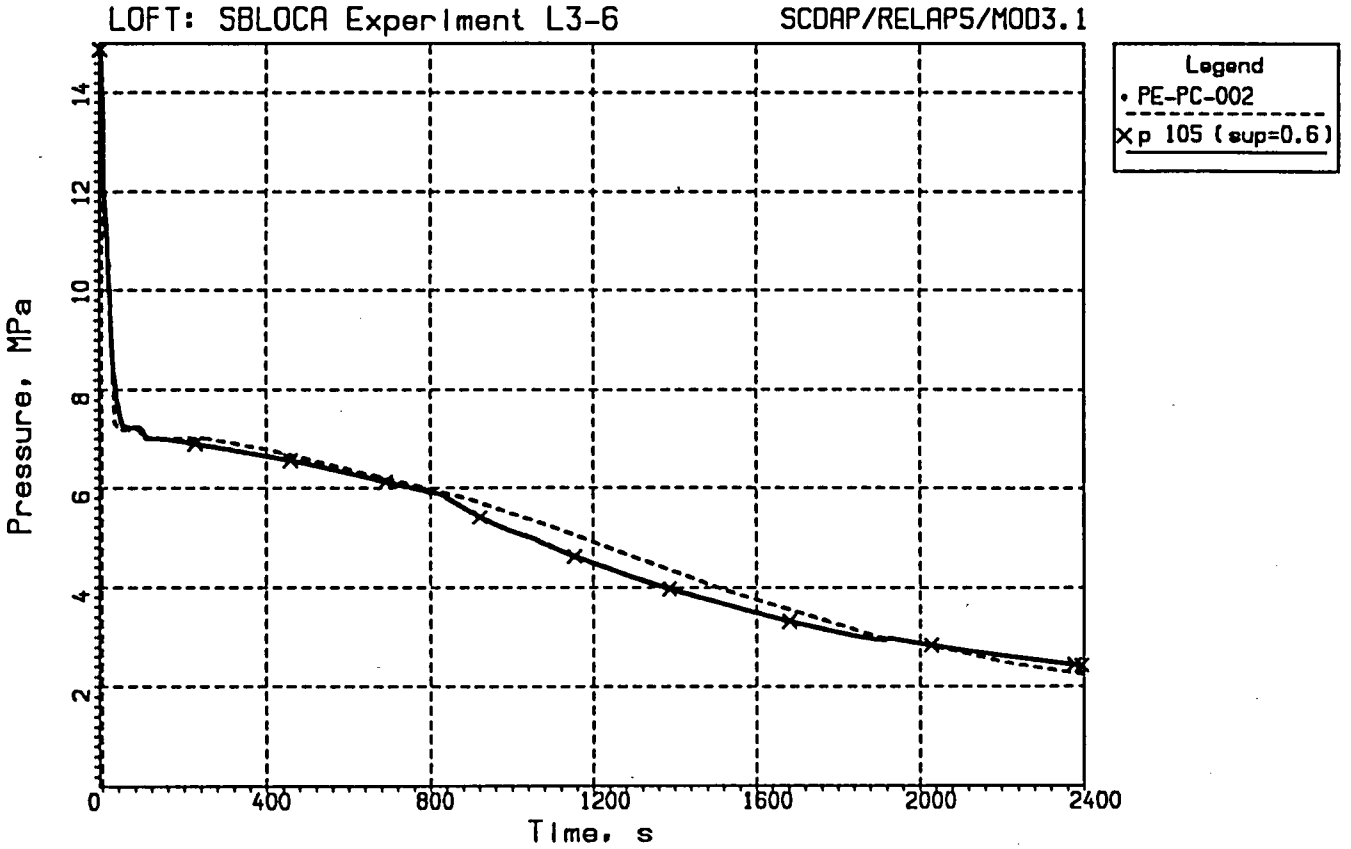

Fig. 5. Pressure in the Intact loop hot leg.

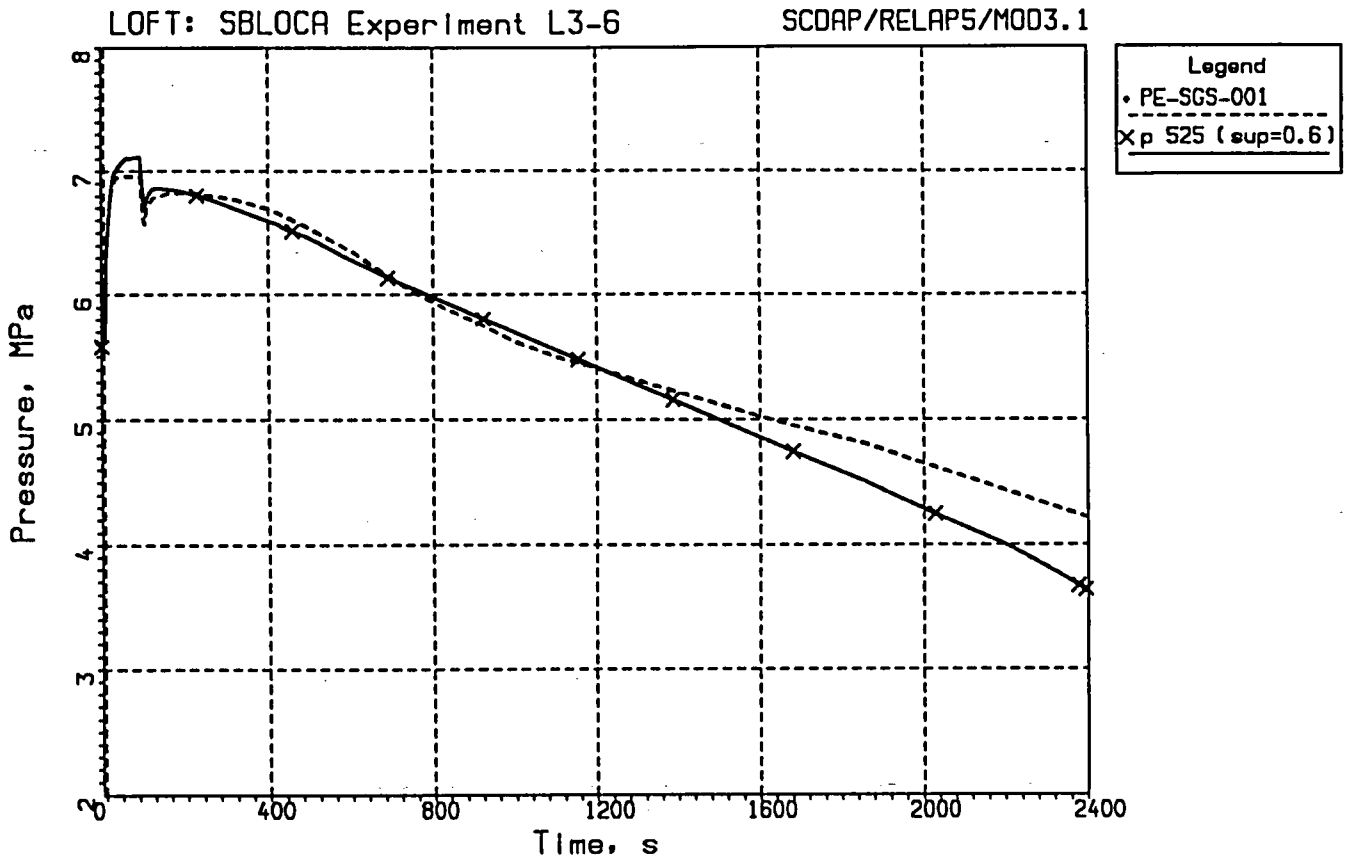

Fig. 6. Pressure in the Steam generator dome.

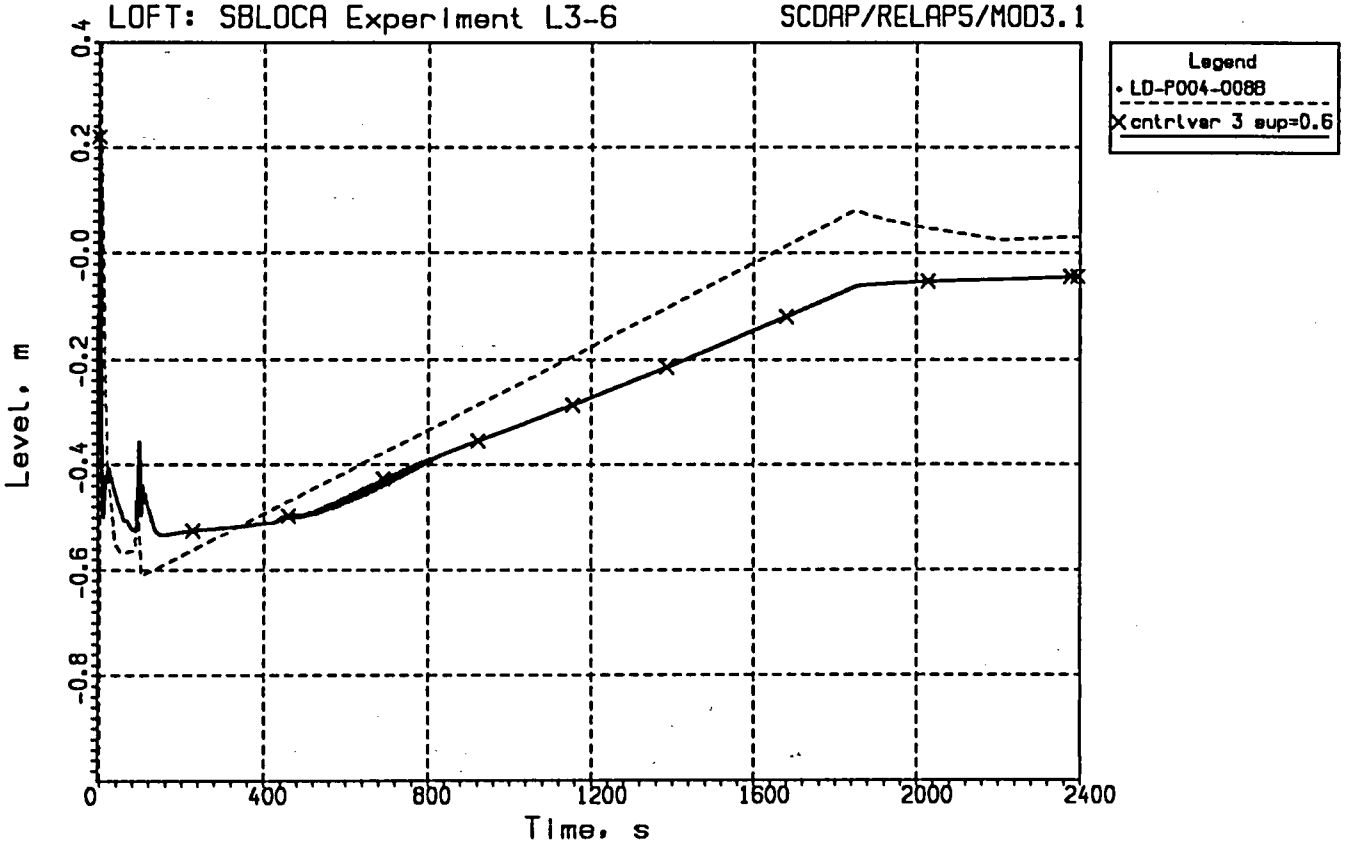

Fig. 7. Liquid level in the Steam generator.

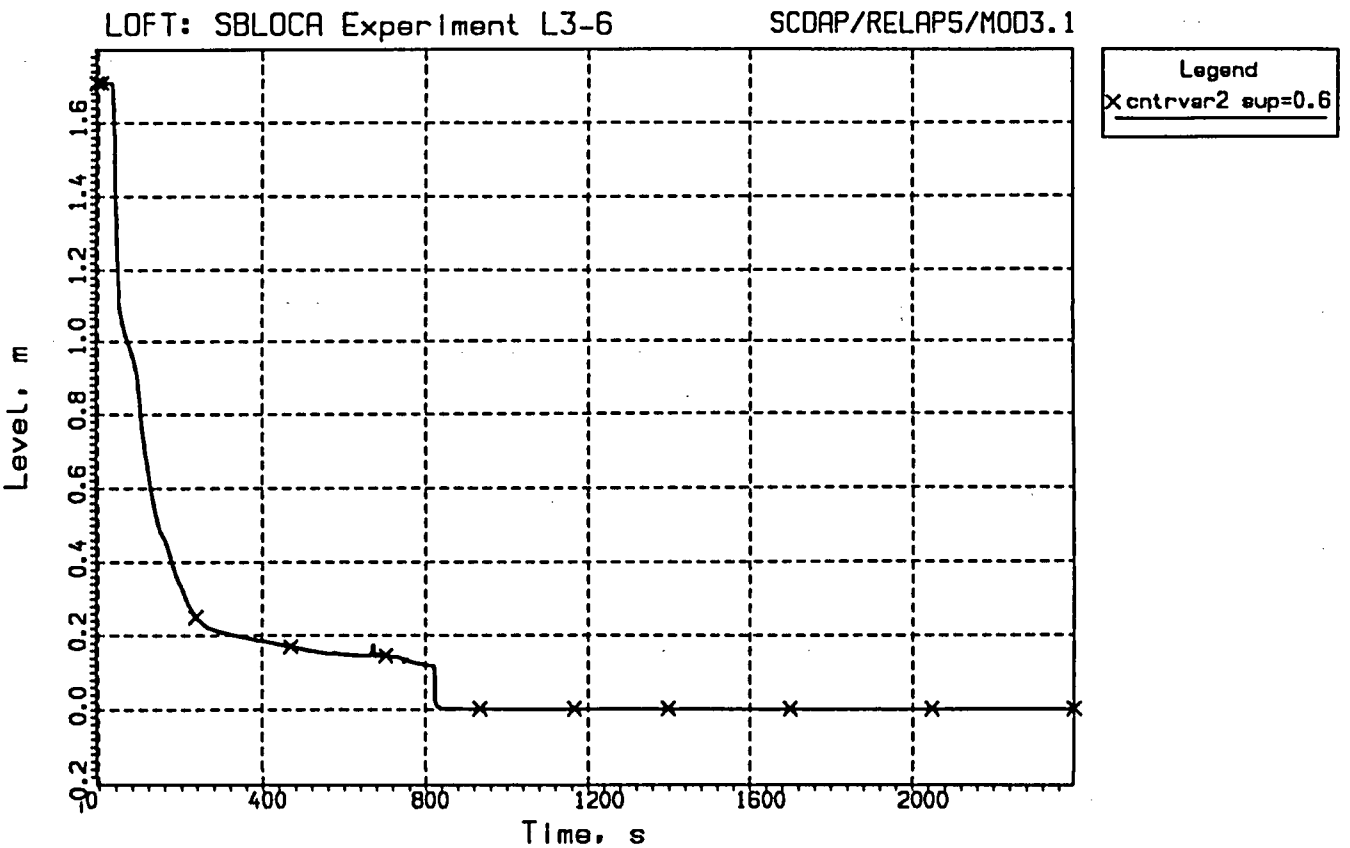

Fig. 8. Liquid level in the Upper plenum.

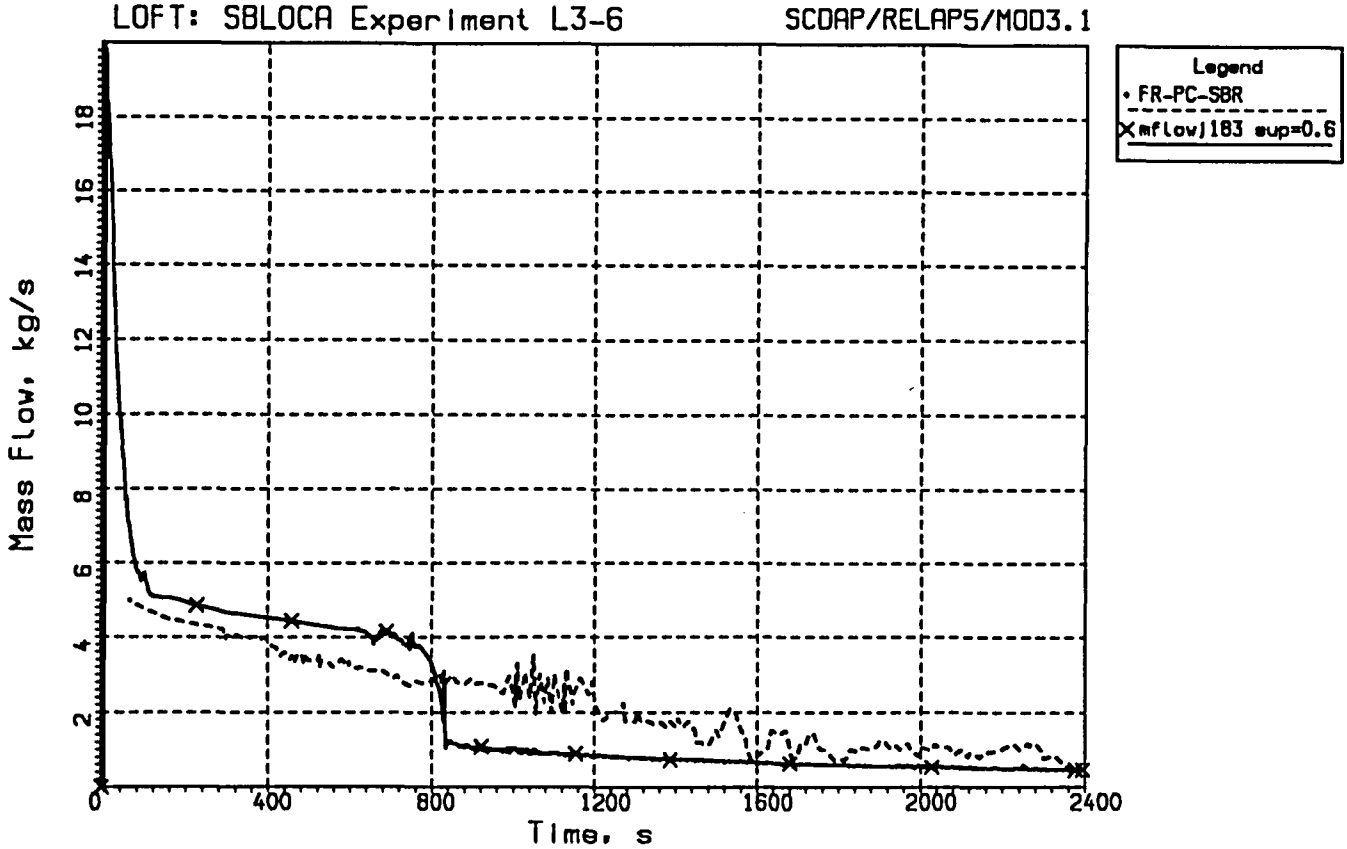

Fig. 9. Break mass flow rate.

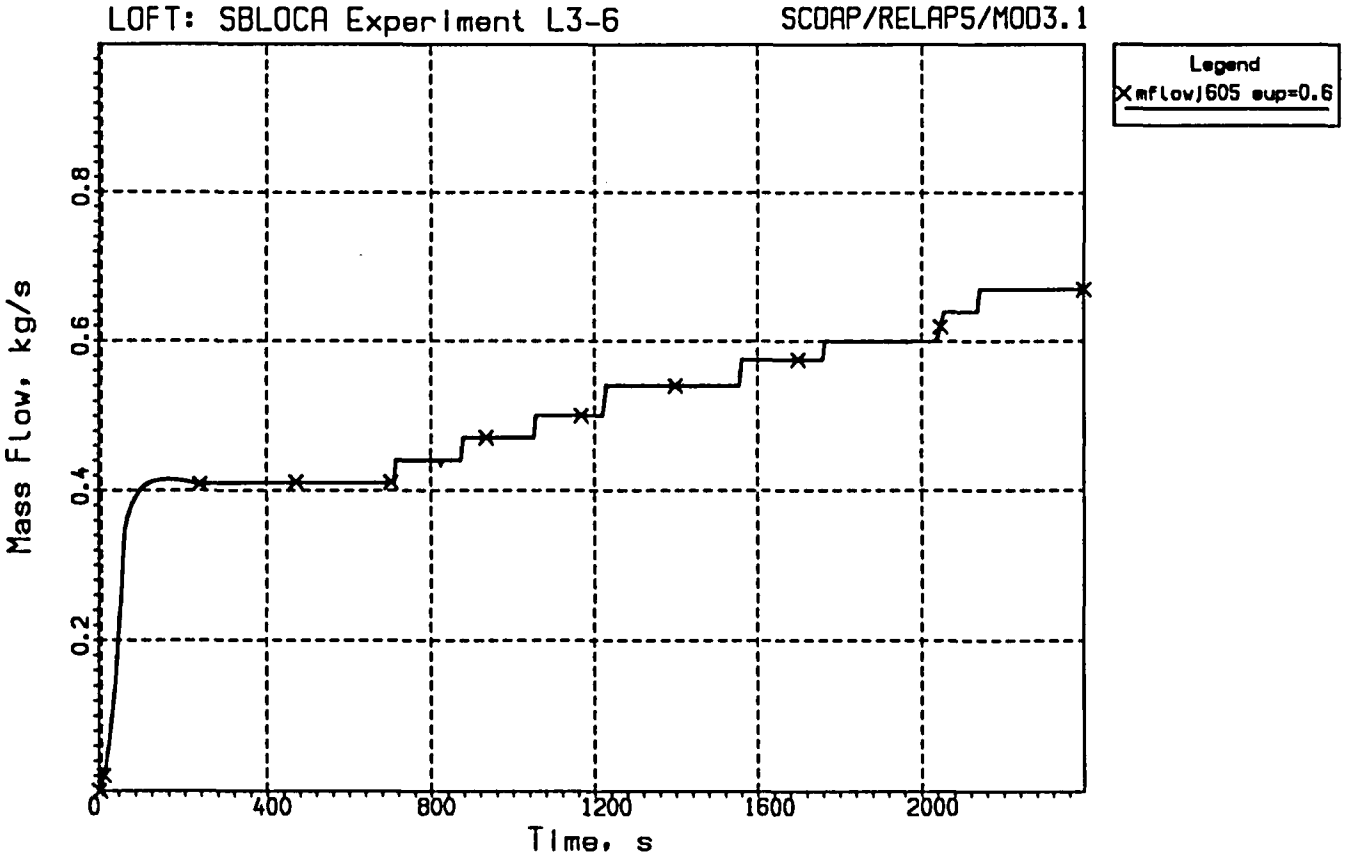

Fig. 10. HPIS mass flow rate.

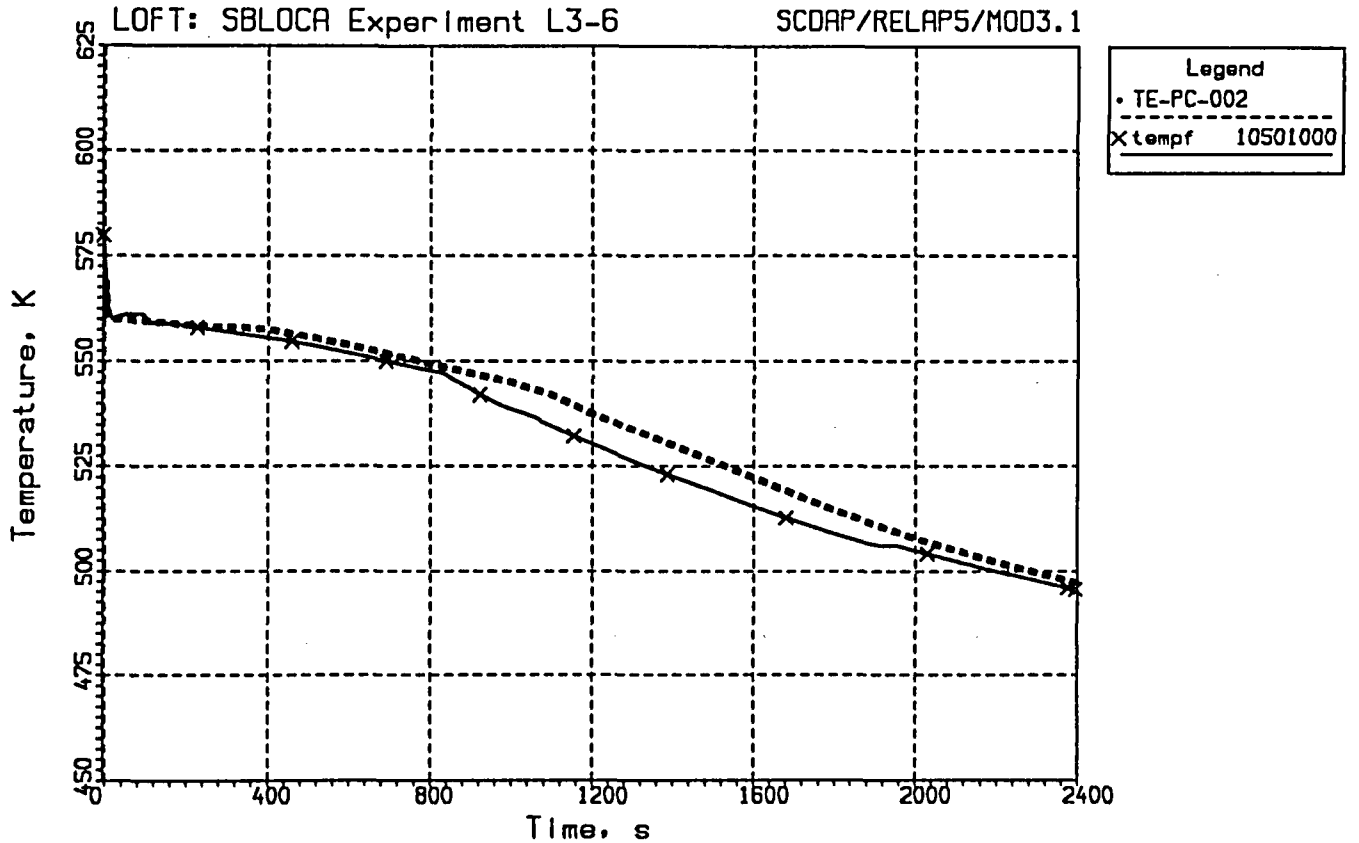

Fig. 11. Fluid temperature in the Intact loop hot leg.

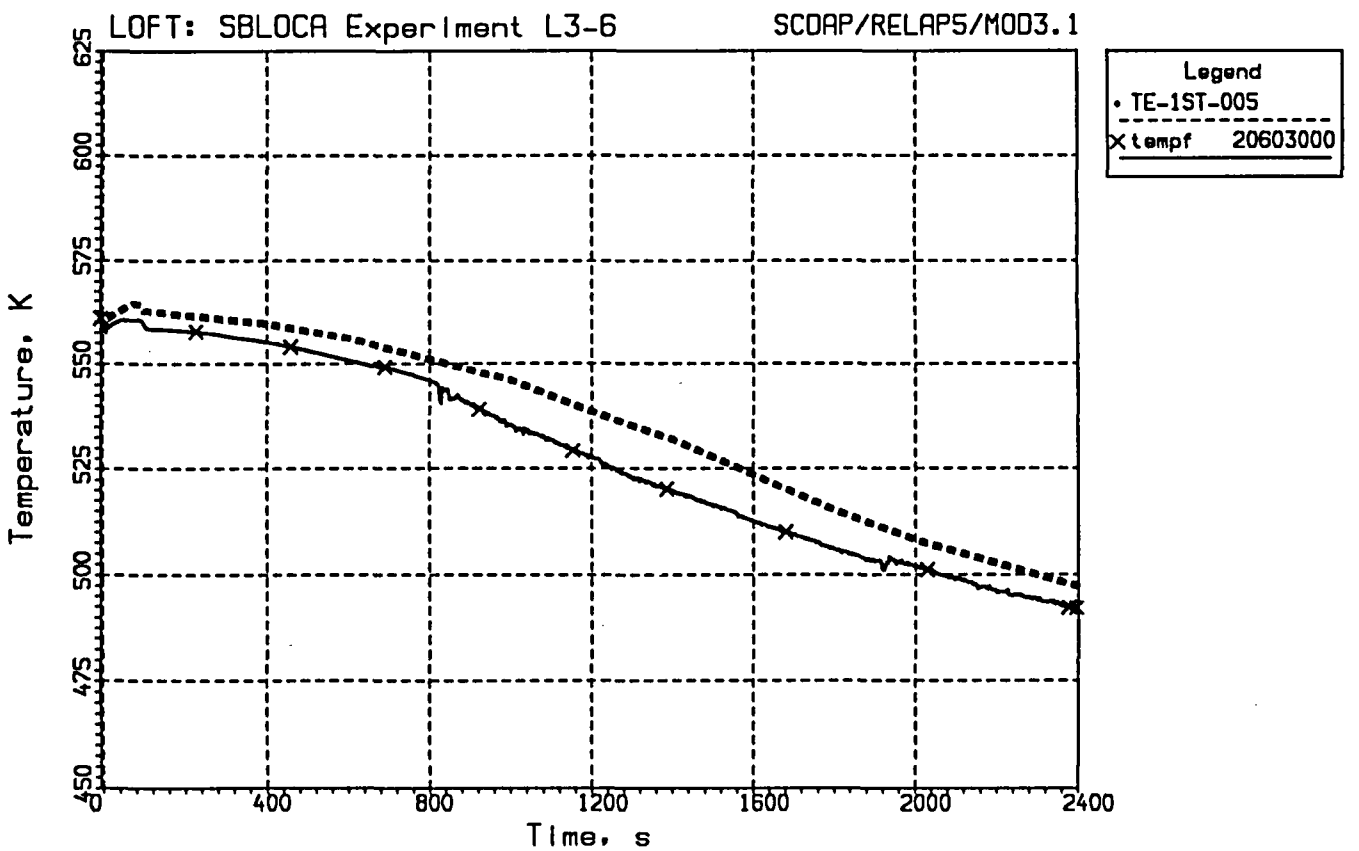

Fig. 12. Fluid temperature in the reactor vessel Downcomer.

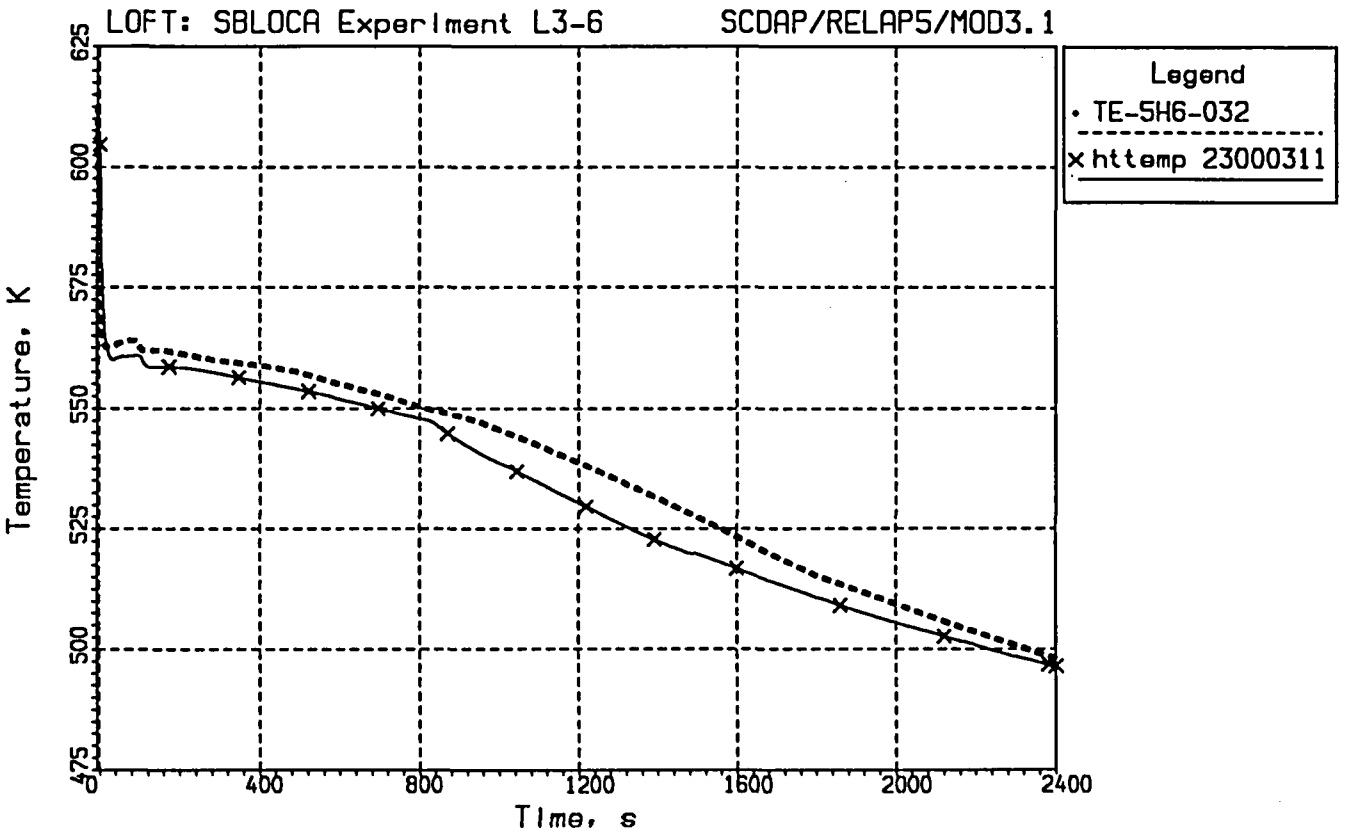

Fig. 13. Cladding temperature at 0.81 m above the core bottom.

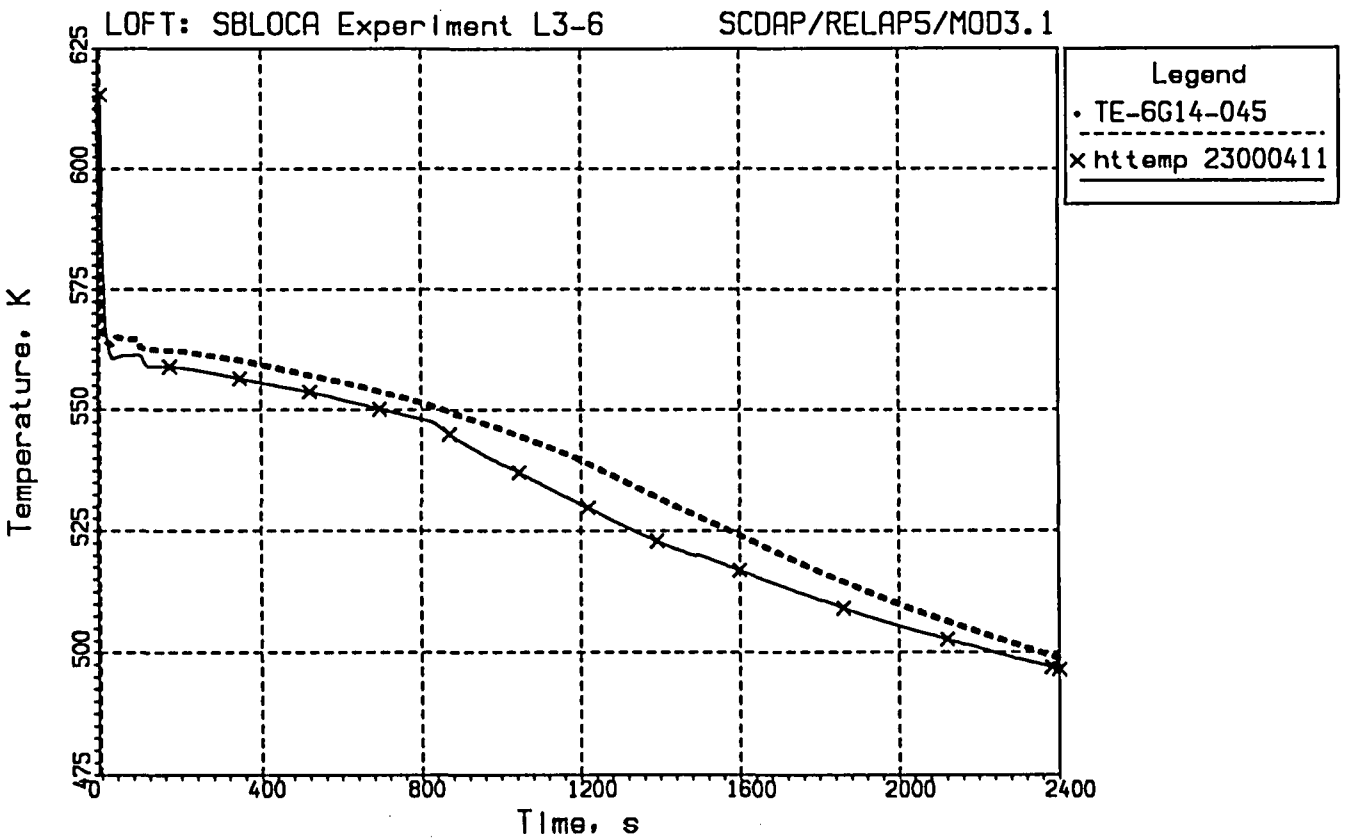

Fig. 14. Cladding temperature at 1.14 m above the core bottom.

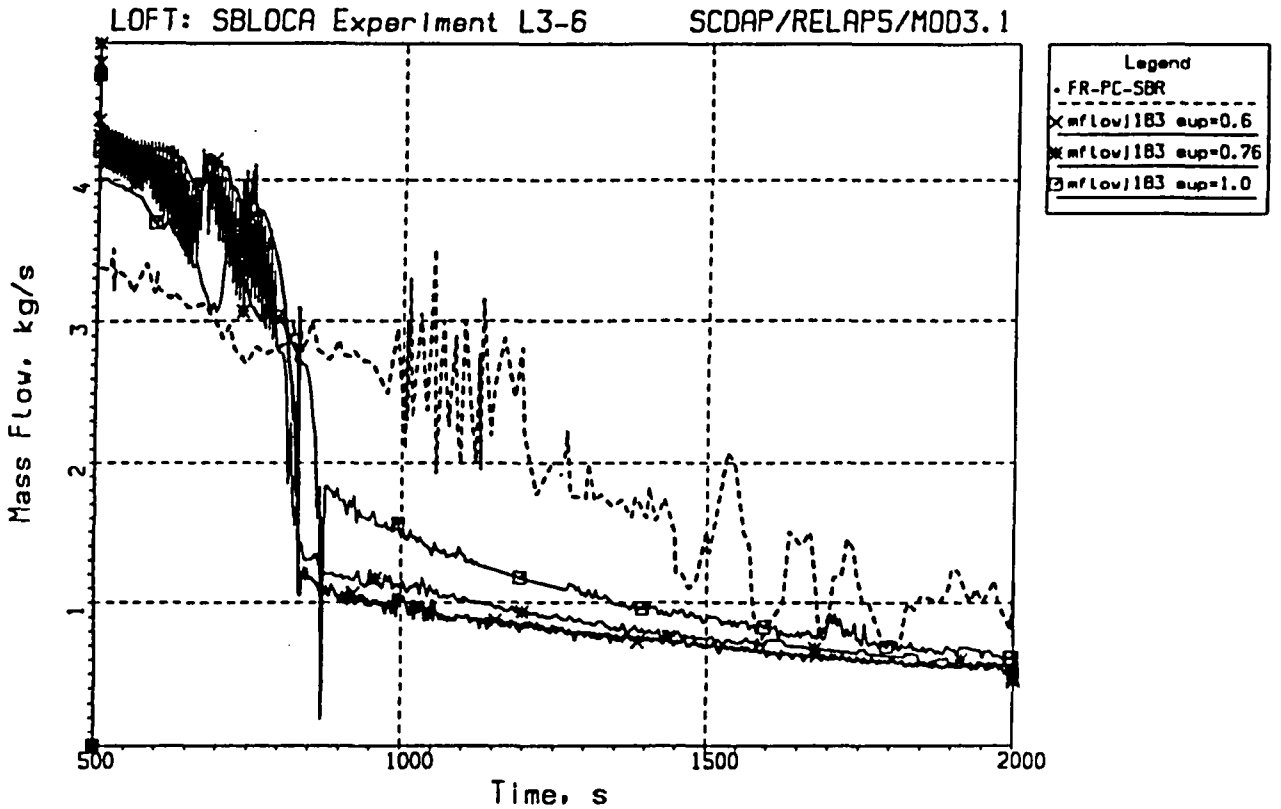

Fig. S-1. Break mass flow rate (for 3 values of superheated coef.)

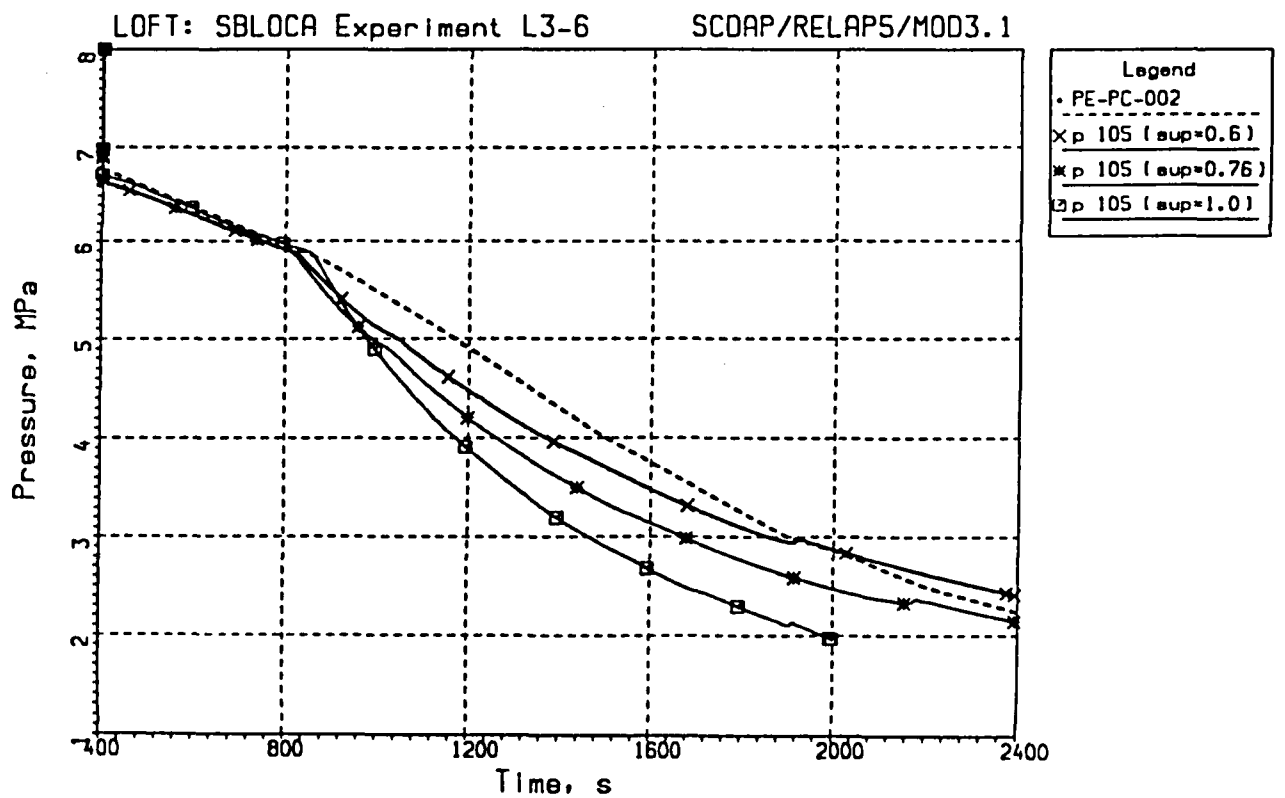

Fig. S-2. Pressure in the hot leg (for 3 values of superheated coef.).

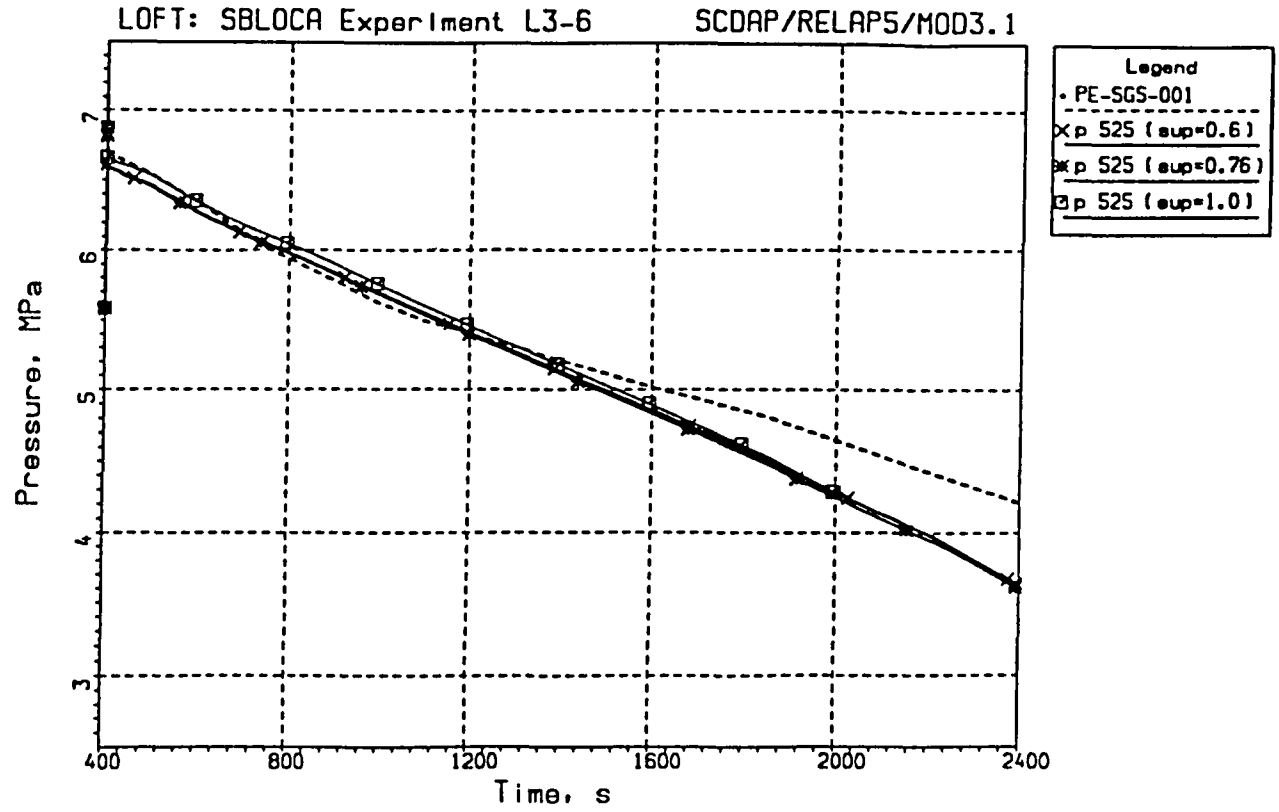

Fig. S-3. Pressure in the SG dome (for 3 values of superheated coef.)

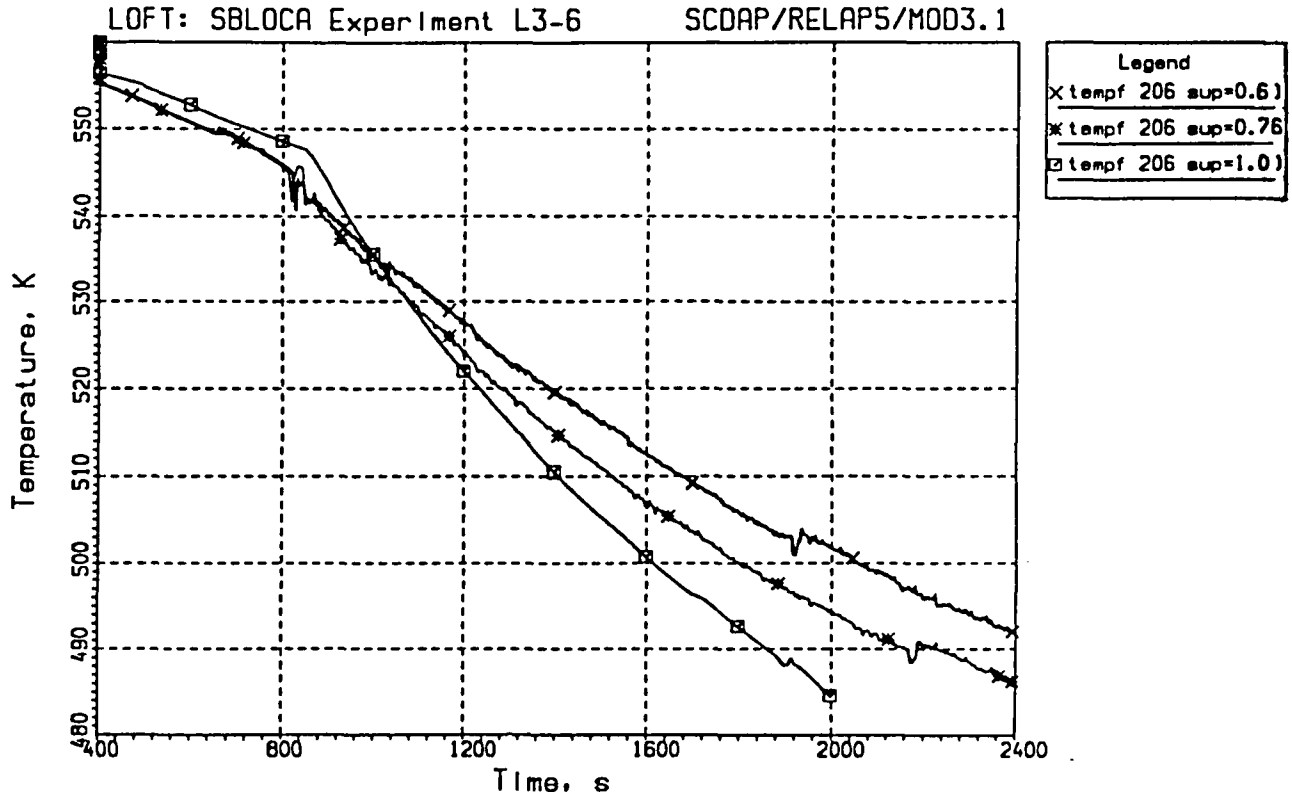

Fig. S-4. Fluid temperature in the reactor vessel Downcomer.

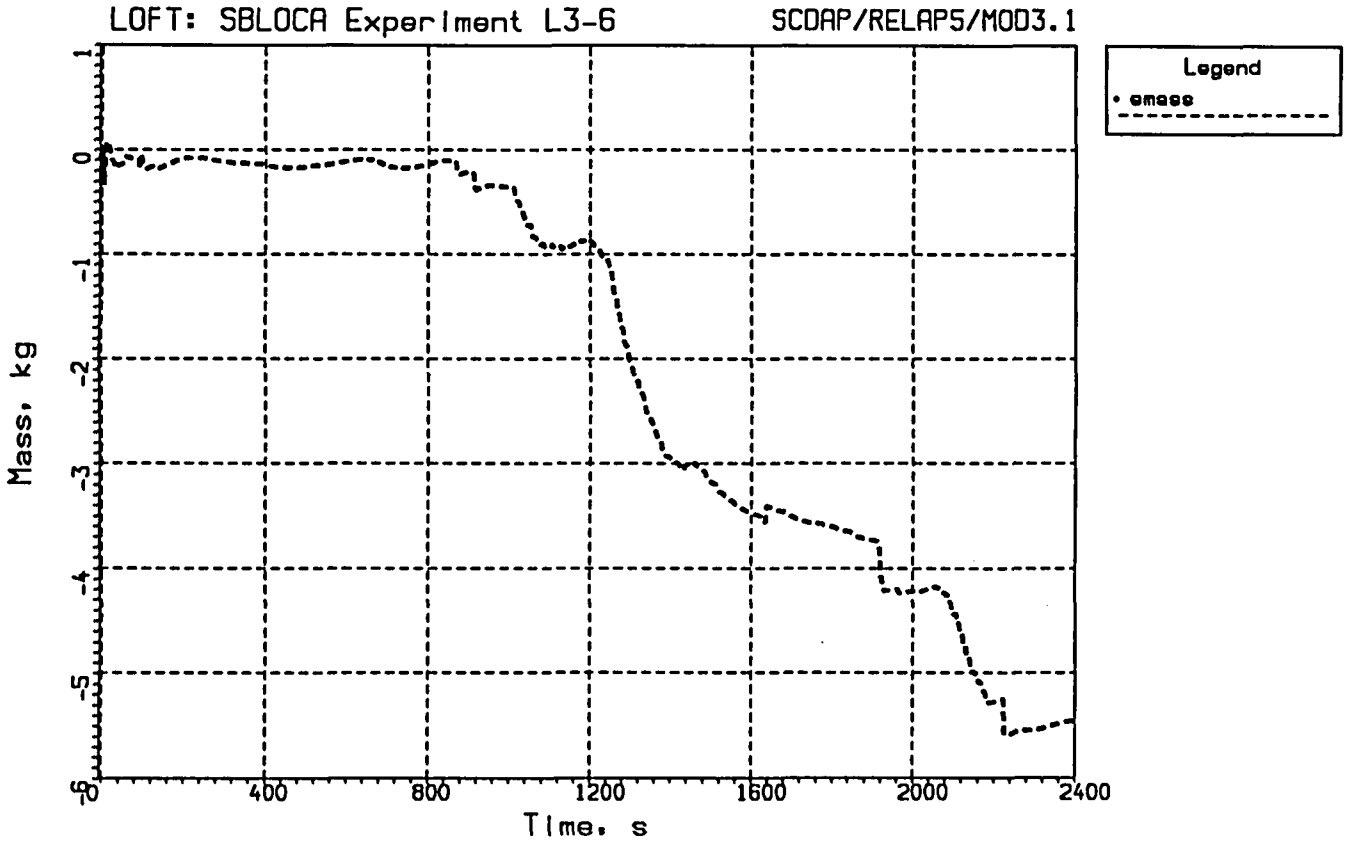

Fig. S-5. Mass error.

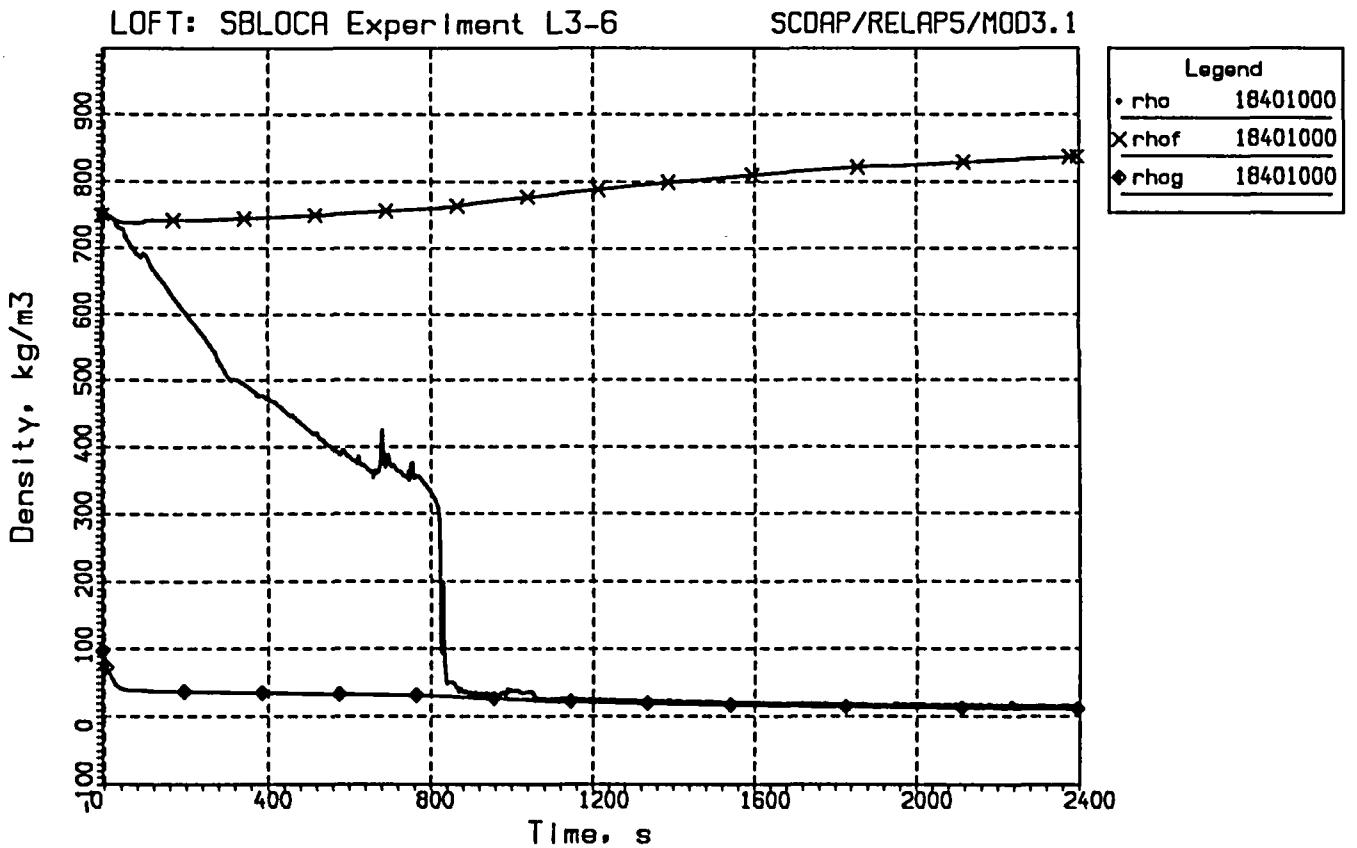

Fig. S-6. Density at the break tee.

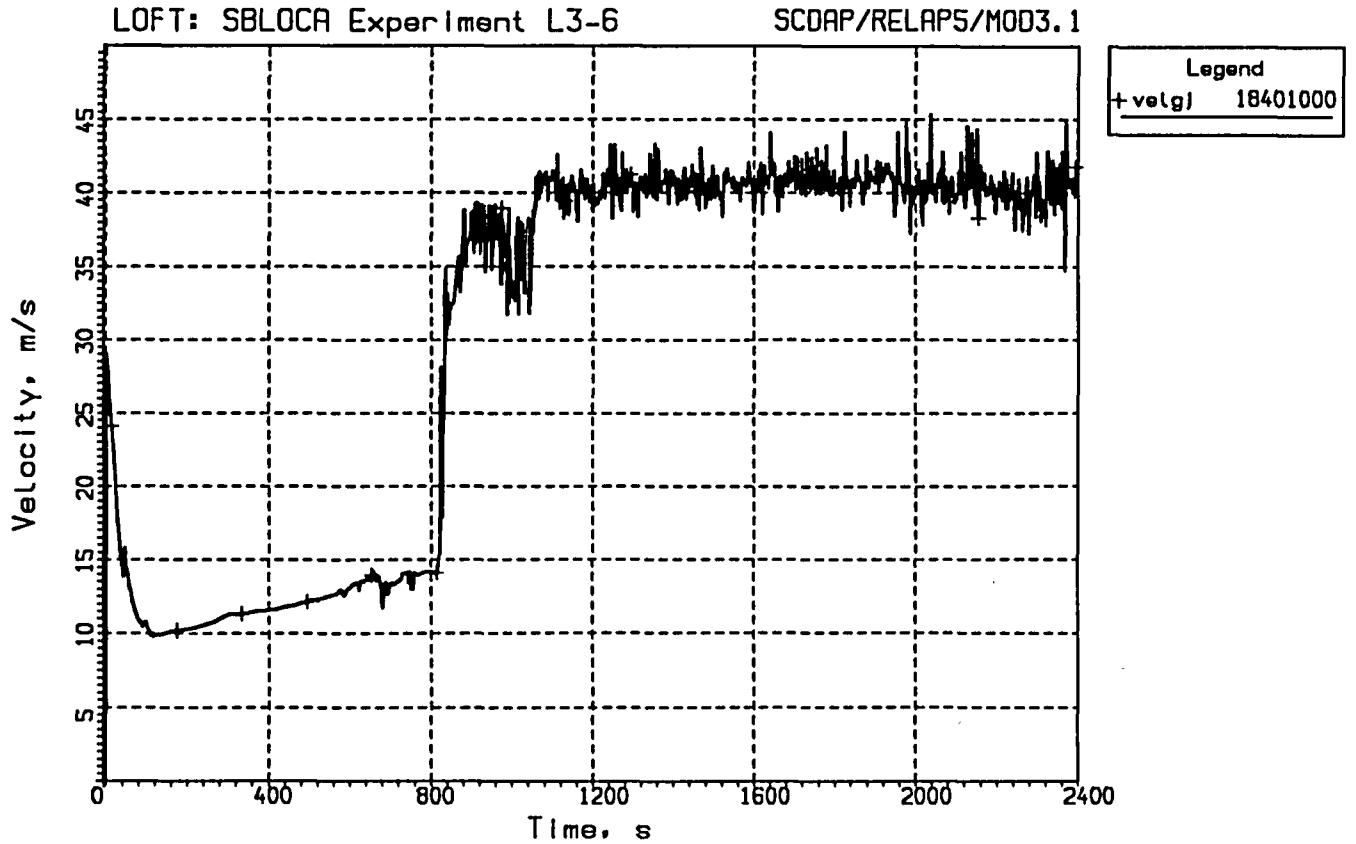

Fig. S-7. Velocity at the break tee.

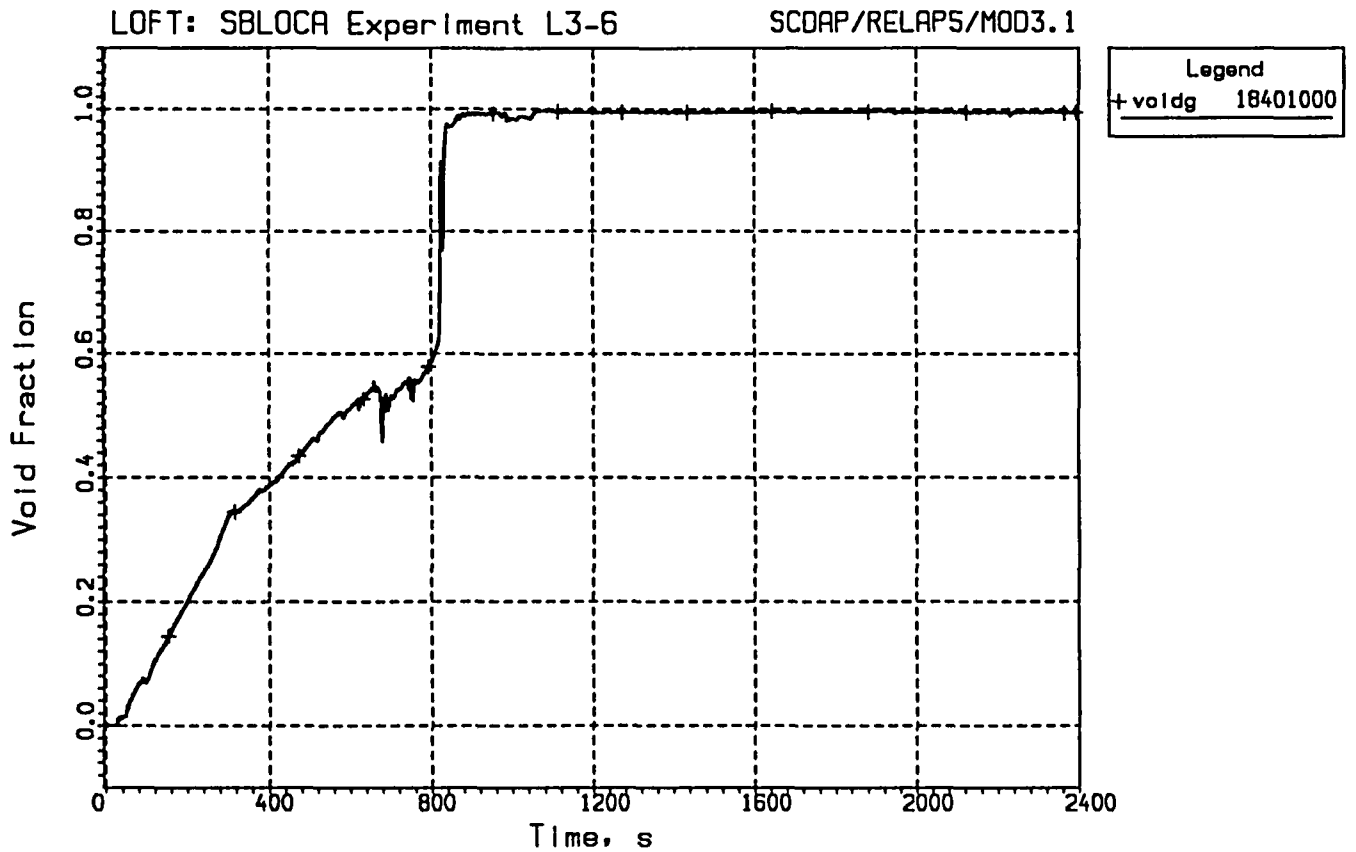

Fig. S-8. Void fraction upstream the break.

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U.S. NUCLEAR REGULATORY COMMISSION

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10. SUPPLEMENTARY NOTES

11. ABSTRACT *(200 words or less)*

A calculation of LOFT Experiment L3-6, a small-break equivalent to a 4-inch diameter rupture in the cold leg of a four-loop commercial pressurized water reactor, has been performed to help validate RELAP5/MOD3.1 for this application. The version of the code to be used is SCDAP/RELAP5/MOD3.1.8d0. Three calculations were carried out in order to study the sensitivity to change of the break nozzle superheated discharge coefficient. Conducted comparative analysis of the LOFT L3-6 experiment shows on the whole a reasonable agreement between calculated and measured data. Some discrepancies in the system pressure do not distort a picture of the transient.

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

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transient

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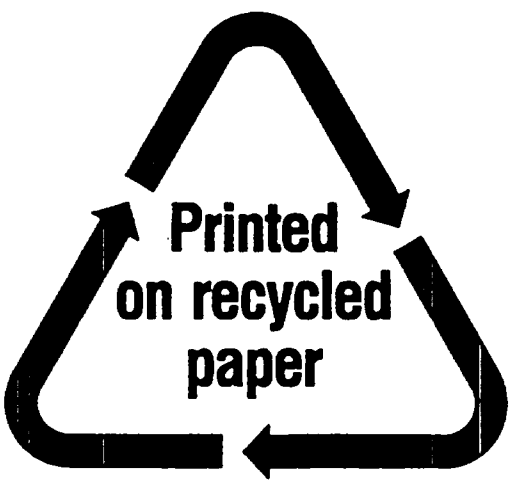

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