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Research Reactor 'MARIA' Primary Cooling Loop Transient Analysis Using RELAP5 Mod 3.3

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ABSTRACT

Although the Research Reactor ‘Maria’ is under operation for a considerable amount of time, the safety analysis of the reactor had been performed using a specialized thermal-hydraulic code adapted to the RR ‘Maria’ requirements only, until the Polish regulatory body – PAA joined CAMP and received access to RELAP and TRACE. This possibility coincided with modernization works in the primary cooling loop of the research reactor that resulted as a consequence of the Global Threat Reduction Initiative (GTRI) which obliged the operator of the research reactor to change the fuel from Highly Enriched Uranium (HEU) to Low Enriched Uranium (LEU). The first version of the analysis was limited to only one fuel channel and was presented in NUREG/IA-0422 published in 2013. A continuation of those works is presented in this report covering an analysis of the whole primary cooling circuit of the research reactor. The steady state results were assessed as satisfactory. The analysis included a number of cases covering a Small Break, Medium Break, Large Break and Double Ended Guillotine Break Loss of Coolant Accident. The results received are presented on graphs and proved that in most cases no danger to fuel integrity exists. However, in case of Medium Break LOCA a fuel degradation risk has been envisaged. This scenario will be analysed more thouroughly in the future. Loss of Fluid and Loss of Heat Sink were also analysed – in these transients no risk to fuel integrity was found. A sensitivity analysis is also included.

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EXECUTIVE SUMMARY

The safety analysis of the Research Reactor ’Maria’ (RR ’Maria’) is an essential part of the continuous oversight process performed by the Polish regulatory body – the PAA.

The aim of this work was to judge whether the RELAP5 code is applicable to the analysis of the RR ‘Maria’ although the design and function of the research reactor differs significantly from a power reactor. An essential aim was to find the weak points of the design and to check - to what extent they might influence the safe operation of the research reactor. Finally, it was important to gain experience in performing analyses using the RELAP5 code.

The development of the model started in 2010 with modelling a single fuel channel with highly enriched fuel (HEU). Fulfilling the international agreement on the Global Threat Reduction Initiative, Poland agreed to change the fuel type in the RR ‘Maria’ from the HEU fuel to Low Enriched Uranium fuel (LEU) and in 2011 a new analysis had to be performed. A new model was prepared in 2012 but it was still limited to only one fuel channel. The model and the results of calculations are available for reading in NUREG/IA-0422 “Transient Analysis of the Research Reactor MARIA MC Fuel Elements Using RELAP5 Mod 3.3” published by US NRC in 2013. Following the modernization of pumps in 2013, further work led to the improvement of the model that covered not only one fuel channel but the whole primary cooling loop. This report may be considered as a continuation of the previous analysis performed and described in the NUREG/IA-0422 report.

The steady state results showed that the RELAP5 code could be used for modelling the research reactor and the results were good and realistic in comparison to the actual reactor operation parameters.

The transient analysis seems good but the qualification of the model is difficult. The RR ‘Maria’ is a unique design, there are only a few similar designs and no integral test facilities nor separate effect test facilities for this types of reactors have been performed. The transient analysis performed covered loss of coolant (small break, medium break, large break, double guillotine break), loss of flow and loss of heat sink scenarios.

In case of a loss of coolant accident, the RR ‘Maria’ has two safety systems:

1) the pressurizer system that supplies the reactor with water using an additional pump and maintains high pressure by means of a water tank filled with helium under high pressure,
2) safety valves that supply the system with water from the reactor pool.

In case of a very small break the pressurizer with an additional pump maintains the reactor working without the necessity for scram.

In case of a small break when the additional pump is not capable to maintain the reactor in operation, the reactor will be tripped due to a low pressure alarm signal or to a low water level signal in the pressurizer. The water supplied by the pressurizer should enable a safe reactor shutdown as well as shutdown cooling following the opening of the safety valves.

In case of medium break LOCA this report indicates that during depressurization when the pressure in the primary circuit is too high to open the safety valves, overheating and even degradation of the fuel can occur. The medium break LOCA scenario results depend on the

location of the break and more severe consequences are possible in places on the high pressure pipes at core channel inlet similarily as in LOCA scenarios in a real nuclear power plant. The medium and large break LOCA scenarios should be analysed additionally using other codes, especially a severe accident code capable to include in the data an aluminium type of fuel and cladding and capable of calculating material interaction phenomena.

The RELAP5 analysis pointed out a weakness of the RR Maria in case of a medium break and indicated that the reactor safety systems are not able to prevent fuel damages in specific cases of loss of coolant and suggests that the behaviour of the research reactor during such an accident especially during depressurization should be analysed in more detail.

In case when all pumps are tripped in the primary and secondary cooling circuits and the accumulator battery cannot supply the pumps with power, water in the fuel channels starts boiling rapidly. After a short period of time natural circulation will appear and sufficient cooling of the fuel will be provided. The process of boiling should in an efficient way help to remove heat from the fuel until stable natural circulation conditions dominate. The temperature increase is too low to create damage to any reactor materials or to cause any release of radionuclides to the cooling circuit. Natural circulation occurrence depends strongly on local losses at the inlet and outlet of fuel pipes gaps. This behaviour and sensitivity of losses should be analysed in more detail using other codes – preferably a CFD code.

The Loss of Heat Sink accident was also analysed however the analysis proved that in this case, the reactor is completely safe. Decay heat from the fuel is safely removed to the reactor pool and no threat to the fuel integrity was calculated.

Not all the persued aims have been reached – the applicability of RELAP5 to the research reactor is difficult to assess and certain doubts arise with respect to the accuracy of the modelling. Large approximations are necessary when modelling fuel elements. On the other hand other numerical tools were even less satisfactory in applying to the safety analysis of the RR ‘Maria’. Several weak points have been found in the design but the results need to be confirmed and further calculations are necessary. Certainly, experience in using RELAP has been gained but the work drew attention to various problems in using the code.

Following an introduction in chapter 1, the report covers a short description of the Research Reactor ‘Maria’ including the fuel channel and the fuel element presented in chapter 2. Additional information concerning the RR Maria is supplied in appendix A.

The nodalization model is presented in chapter 3 and includes a description of the fuel channel and heat structures. The input data file is attached in appendix B.

The steady state analysis is presented in chapter 4 and is followed by transient calculations in chapter 5. The transients comprise loss of coolant, loss of flow and loss of heat sink accidents.

Chapter 6 covers a sensitivity study for medium break LOCA and a brief information on run statistics is presented in chapter 7. Finally a summary of the results is presented in chapter 8.

ABBREVIATIONS

CFD	Computational Fluid Dynamics
CHF	Critical Heat Flux
DEGBLOCA	Doble Ended Guillotine Break LOCA
HEU	Highly Enriched Uranium
LBLOCA	Large Break LOCA
LEU	Low Enriched Uranium
LOCA	Loss of Coolant Accident
LOFA	Loss of Flow Accident
LOHS	Loss of Heat Sink
MBLOCA	Medium Break LOCA
NCBJ	Narodowe Centrum Badań Jądrowych (National Centre for Nuclear Research)
ONBR	Onset of Nucleate Boiling Ratio
PAA	Państwowa Agencja Atomistyki (National Atomic Energy Agency of Poland)
PCT	Peak Cladding Temperature
RR ‘Maria’	Research Reactor ‘Maria’
SBLOCA	Small Break LOCA
SNAP	Symbolic Nuclear Analysis Package

1. INTRODUCTION

The safety analysis of the Research Reactor 'Maria' (RR 'Maria') is an essential part of the ongoing continuous oversight process performed by the Polish regulatory body – the PAA.

PAA has decided to try to apply the RELAP5 code to the safety analysis of the research reactor although the design and function of the RR differs significantly from a power reactor. An additional important aim of this work is to gain experience in performing analyses using RELAP5 and to judge whether the code is applicable and to what extent to the analysis of the RR 'Maria'. Finally, it was very important to find the weak points of the design and to check to what extent they might influence the safe operation of the research reactor.

The development of the model started in 2010 with modelling a single fuel channel with highly enriched fuel (HEU) and collecting data which in certain cases was difficult to obtain. The HEU element was manufactured in Russia and consisted of 36% enriched U-235. Fulfilling the international agreement on the Global Threat Reduction Initiative, Poland agreed to change the fuel type in the RR 'Maria' from the HEU fuel to Low Enriched Uranium fuel (LEU). The new fuel consists of 19,75% enriched U-235. In 2011 due to the change of the fuel type it was necessary to perform a new analysis for the new conditions. At that moment it was not possible to make a model of the whole reactor that could include LOCA scenarios. Such a model was prepared in 2012 but it was limited to the safety analysis of only one fuel channel. The model and the results of calculations were presented in NUREG/IA-0422 "Transient Analysis of the Research Reactor MARIA MC Fuel Elements Using RELAP5 Mod 3.3". Now, the model has been improved and updated following pump modernization in 2013 and covers not only one fuel channel but the whole primary cooling loop. This report may be considered as a continuation of the previous analysis performed and described in the NUREG/IA-0422 report.

This report comprises three essential parts:

(1) model development describing preparing of the RELAP5 model and used data and models,
(2) steady state qualification,
(3) transient analysis and sensitivity analysis for one scenario.

The results of the analysis showed certain problems in the design that in case of pessimistic circumstances might lead to cladding damage. The results indicate a need for further elaboration and additional calculations.

2. GENERAL DESCRIPTION OF FACILITY

2.1. MARIA research reactor technical information

The Maria research reactor is a pool type research reactor with 20-25 closed fuel channels in the core, with a beryllium moderator and graphite reflector. The designed maximum thermal power is 30 MW. The reactor is placed about 30 km from Warsaw in Świerk-Otwock and is operated by the National Centre for Nuclear Research (Polish abbreviation - NCBJ). More technical information including a description of the primary safety systems is provided in Appendix A.

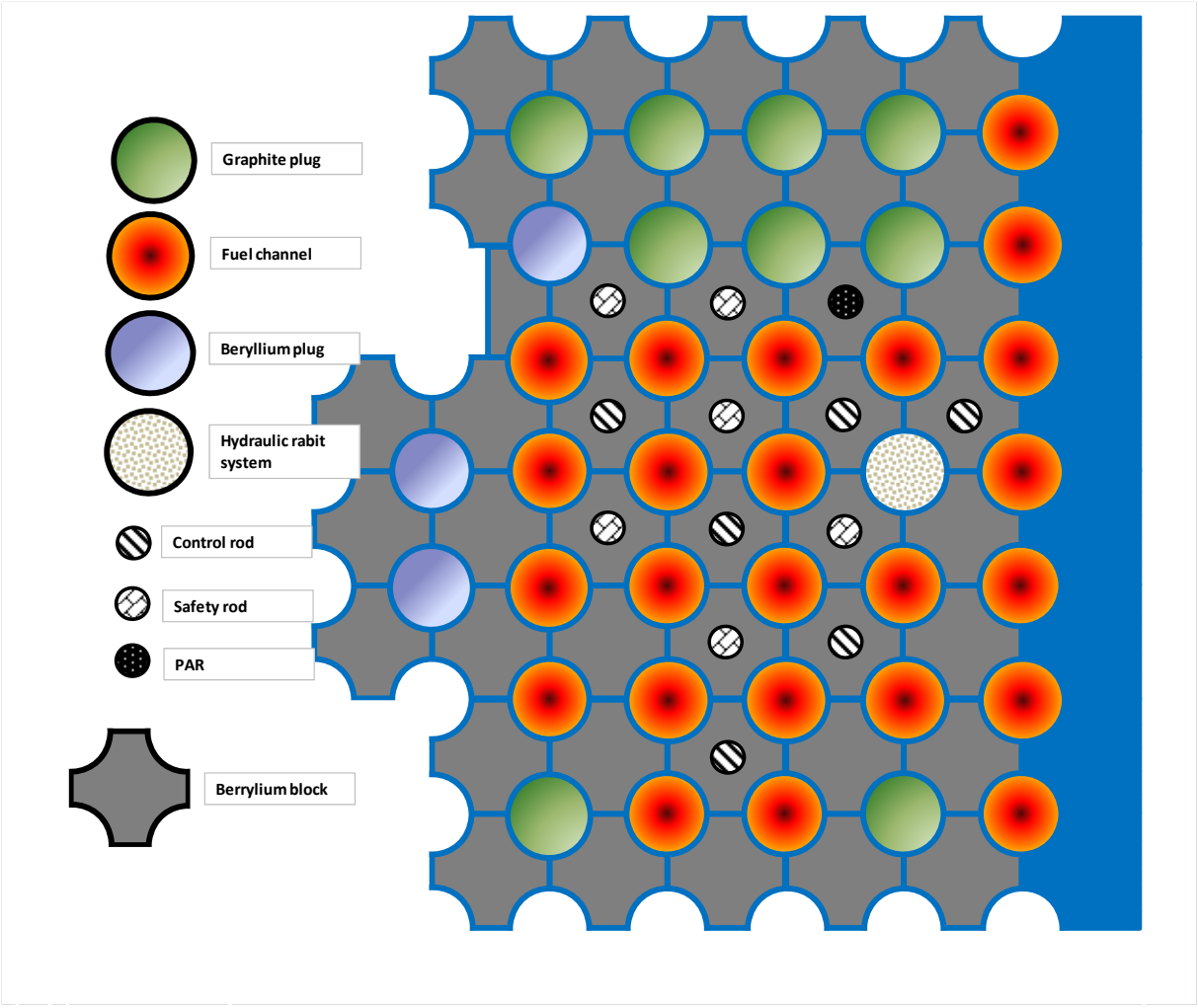

Figure 1. Simplified scheme of the research reactor 'MARIA' core configuration

2.2. Technical information on fuel channel with fuel element

This report assumes that only the new type of fuel – the French LEU fuel MC5-485 with 19.75% of 235U is used. The fuel element is a pipe in pipe construction, consisting of 5 pipes with fuel (Fig.2 with numbers from 2 to 6) and filler. The fuel is a dispersion U_3Si_2-Al with AG3NE alloy as a clad material and SAW alloy (aluminium alloy type) as an outer tube of the fuel channel. Water in the fuel element flows through 6 gaps (numbered from 1 to 6 on the picture) and through a gap in the centre of the fuel element. Fuel elements work with various thermal power levels depending on the position in the core. Usually, fuel elements work in the centre of the core with thermal power at the level of about 1.2-1.6 MW and in the peripheral position of the core with power about 0.3-1.2 MW. The maximum allowed thermal power, equal to the safety limit for this fuel is 1.8 MW and it is forbidden for the reactor to exceed the limit under any conditions.

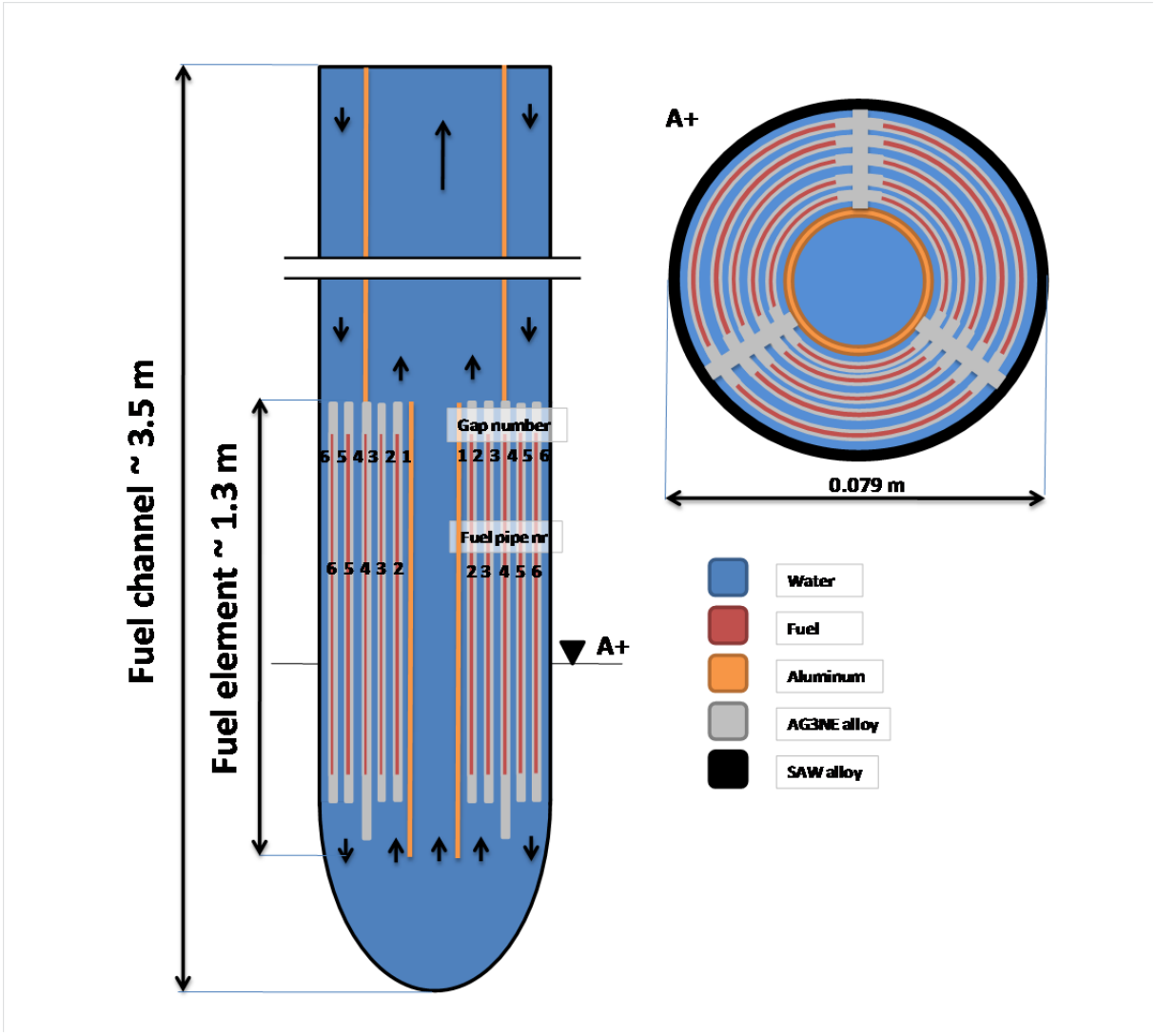

Figure 2. Simplified scheme of the fuel channel with an MC fuel element

3. MODEL DEVELOPMENT

The Research Reactor MARIA can operate with varying operational parameters depending on the type of work – experimental or aimed at radioisotopes production for medical applications. As a result, individually cooled fuel elements can work at different power levels in the range from 0.15 to 1.8 MW. The average total reactor power in 2012 was approximately 22-23MW and the mass flow depended on the placement in the core matrix. For this reason the model of the reactor MARIA was prepared assuming that the most unfavourable operational conditions were reached in one fuel channel (the hot channel): the highest allowed thermal power level - 1.8 MW and lowest allowed coolant flow - 30m^3/h.

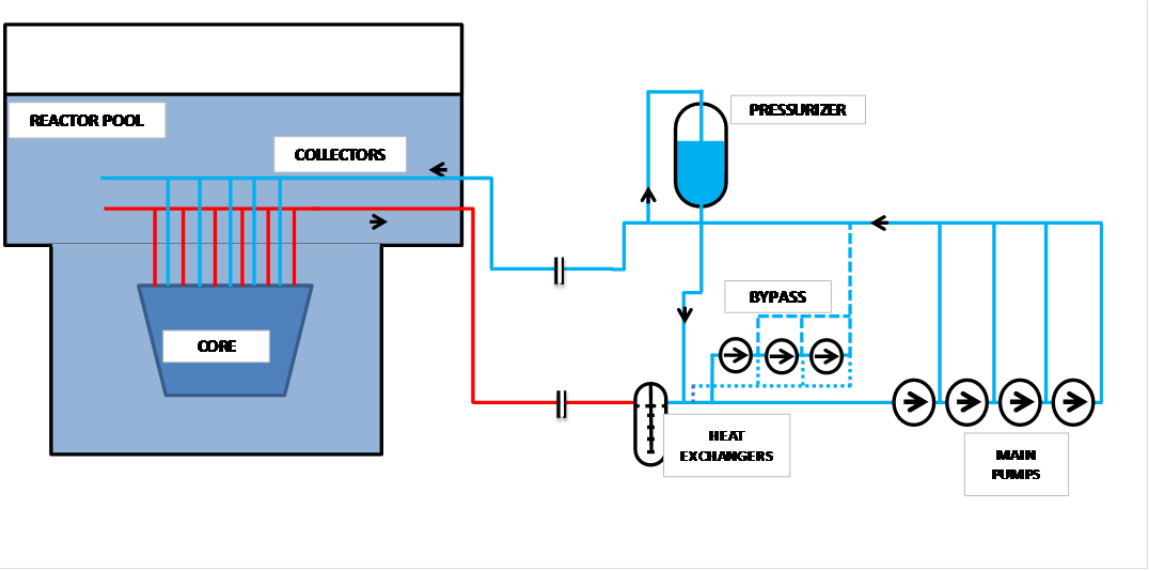

Figure 3. Simplified diagram of the fuel channels primary cooling circuit.

More details about the fuel channels with fuel elements, the main headers with safety valves, the pipe system, pumps and heat exchangers, the pressurizer system, the research reactor control system, the reactor pool system as well as the nodalization applied is presented in the following chapters.

3.1. Fuel channels with fuel elements

Description of system

As already mentioned, the fuel in the MARIA research reactor is enclosed in a channel with the cooling water flowing first on the outside of the fuel plates, reversing and then flowing on the inside of the fuel plates – it's a typical pipe in pipe design. Following the core conversion from HEU to LEU, the fuel enrichment has been decreased to 19.75%. The fuel type is uranium silicide in aluminium dispersion, clad with aluminium alloy. The cladding and the fuel have relatively good heat conductivity and due to this fact, the temperature in the centre of the fuel usually does not exceed the temperature on the outer side of the cladding by more than 30 degrees.

Model development

A simplified model including only a single fuel channel has been developed and successfully used last year. A description of the model and results of calculations have been presented in the report NUREG/IA-0422[1]. The report described an analysis for only one hot fuel channel in short time scopes with no heat transfer between the fuel channel and the reactor pool.

However the model proved not to be fully satisfactory and further works were necessary in order to include a large part of the complexity of the reactor core.

The reactor core usually consists of 22-24 fuel channels with varying power levels in the range of 0.1-1.6 MW(th). The model was prepared to simulate the behaviour of the reactor with 24 fuel channels. Simulating in detail all fuel channels was not necessary and would be a difficult task as well. A good solution was to group the fuel channels according to their power levels. Additionaly in one of the channels called "the hot channel" the power was increased during the transient to maximum power equal to the regulatory operational limit of 1.8 MW. The "medium power channel" was simulated by 19 channels with average thermal power in the transient equal to 0.81 MW. Both – the"hot" and "medium" channels were simulated with a nominal mass flow 30 m^3/h whereas the "low power channel" was simulated with a mass flow of about 15m^3/h.

Table 1 Summary of power levels in fuel channels

Power Group		Number of fuel channels	Power [MW] of individual channel used for:	
			steady state calculations	transient calculations
1	Hot channel	1	1.480	1.800
2	Medium power channel	19	0.748	0.810
3	Low power channel	1	0.246	0.300
4		3	0.157	0.191
Total power [MW]:			16.41	18.063

3.2. Main headers and safety valves

Description of system

Fuel channels are individually cooled by water from the main headers placed in the reactor pool. Each channel is connected at inlet and outlet with the valves by a thin 40 mm internal diameter pipe. All valves are designed according to the fail-safe rule. During failure the valves are open and do not block the flow path.

[1] NUREG/IA-0422, M.Dabrowski, P.Domitr, E.Staron, "Transient Analysis of the Research Reactor MARIA MC Fuel Elements Using RELAP5 Mod 3.3", USNRC 2013

During reactor start-up, the flow in all channels is fixed by partially closing the outlet valves to maintain the flow in the central channels at a level not smaller than 30 m^3/h.

Model development

The valves and pipes were grouped in accordance with the formed power groups. The final model included 4 inlet valves and 4 outlet valves and the same number of pipes connecting the headers with the fuel channels. The distances from the inlet and outlet valves to the headers were averaged and should be a matter of interest for sensitivity studies.

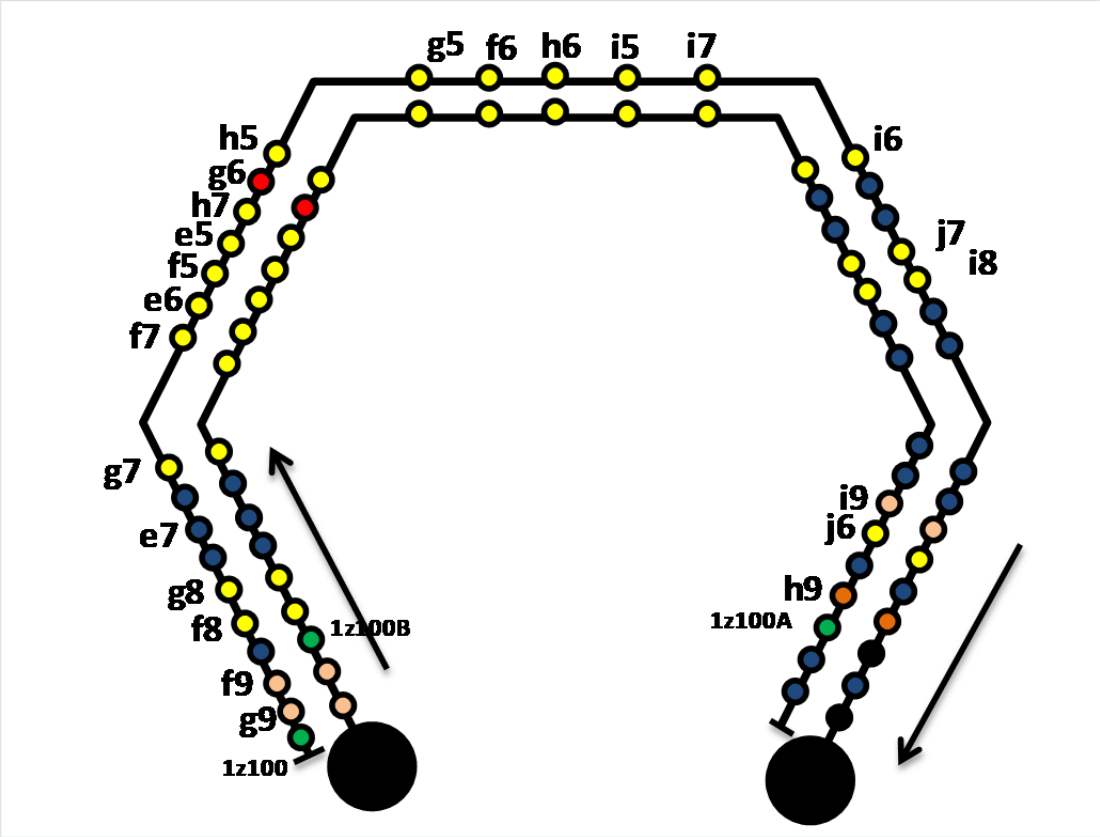

Figure 4. Inlet and outlet fuel channels cooling circuit headers; arrows indicate direction of flow from inlet to outlet header.

A detailed diagram of the inlet and outlet headers connections with the the fuel channels is presented on Figure 4. The arrows show the direction of flow from the inlet header to the outlet header. The green dots (position 1z100, 1z100A and 1z100B) indicate the safety valves. The red dots (position g6) indicate the hot channel and the yellow dots (positions e5, e6, f5, f6, f7, f8, g5, g7, g8, h5, h6, h7, i5, i6, i7, i8, j6, j7) indicate the medium power channels.

Safety features

The valves 1z100A and 1z100B are two check valves placed on the main header. The valve inlet is on level +3.34 and assuming that the water level in the pool is +7.05, the static pressure

on the valve level is 137.5 kPa. The valves are actuated when the pressure difference between the water in the header and the pool is lower than 18.745 kPa. That means that to actuate the valve, the opening pressure in the fuel channel circuit must be lower than 118.755kPa.[2]

3.3. Pipes, pumps and heat exchangers

Description of system

The most important modernization works following the replacement of HEU by LEU elements covered changes in the pumping. Four main cooling pumps in the fuel channels cooling circuit were replaced by four pumps of a different type and supplemented by three additional pumps. Before the modernization, the "old" pumps were used to cool the reactor after shutdown with the pump velocity lowered to 1500 rev/min. After the modernization the role of shutdown cooling was switched to another set of pumps – additional shutdown cooling pumps that had a different pump characteristic than the main cooling pumps.

Under normal operation of the reactor on nominal power, 2 out of 4 main cooling pumps are working whereas 2 out of 3 additional shutdown pumps are in bypass mode. After shutdown, the reactor is still cooled for some time by the main pumps and when they are switched off, the additional shutdown cooling pumps provide adequate cooling of the fuel for the next several hours.

Additionaly, after reactor shutdown in the other cooling circuits i.e. in the secondary circuit and in the reactor pool cooling circuit, the main pumps are stopped and cooling is provided by the other shutdown pumps.

Model development

Two types of pumps were modelled with different characteristics: the main pumps and additional pumps. Based on measurements performed shortly after the manufacturing process, the 4 quadrant pump characteristics were prepared. They were valid only for normal pump operation mode. The other three modes of work of pumps were not simulated because the existing check valves near the pump outlet nozzles prevent fluid backflow. In order to check the necessary RELAP5 option it was assumed that the rest of data was related to the non-normal operation mode.

[2] Safety Analysis Report of the research reactor MARIA, 2013 version

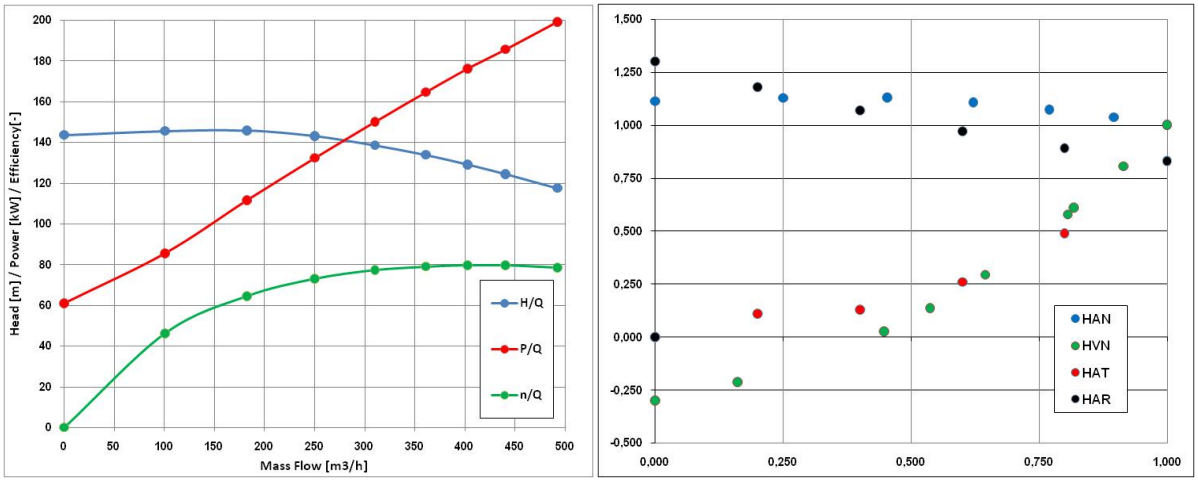

Figure 5. Main pump characteristics (left) and related four-quadrant characteristics (right)

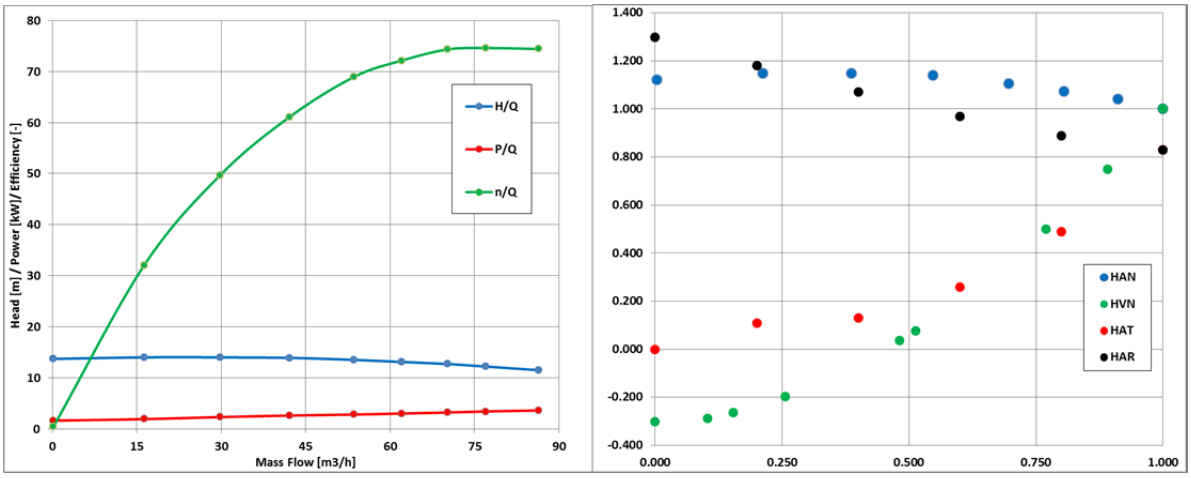

Figure 6. Additional pumps characteristics (left) and related four quadrant characteristics (right).

Pump coastdown characteristics

Following the modernization of the reactor, the characteristics of the main pump coastdown were measured and compared with existing mathematical models based on inertia momentum calculations.

The following equation was used for calculations:

$$WR^2 = WR^2{}_{PUMP} + WR^2{}_{MOTOR} x \left(\frac{N_{MOTOR}}{N_{PUMP}} \right)^2$$

$$WR^2{}_{PUMP} = 1.5x10^7 \left(HP / N^3 \right)^{0.9556}$$

$$WR^2{}_{MOTOR} = 118x\left(HP / N \right)^{1.48}$$

where:

N – Speed [RPM]
HP – Pump Horsepower [KW]
WR2- inertia momentum of pump and motor combined [kgm2]

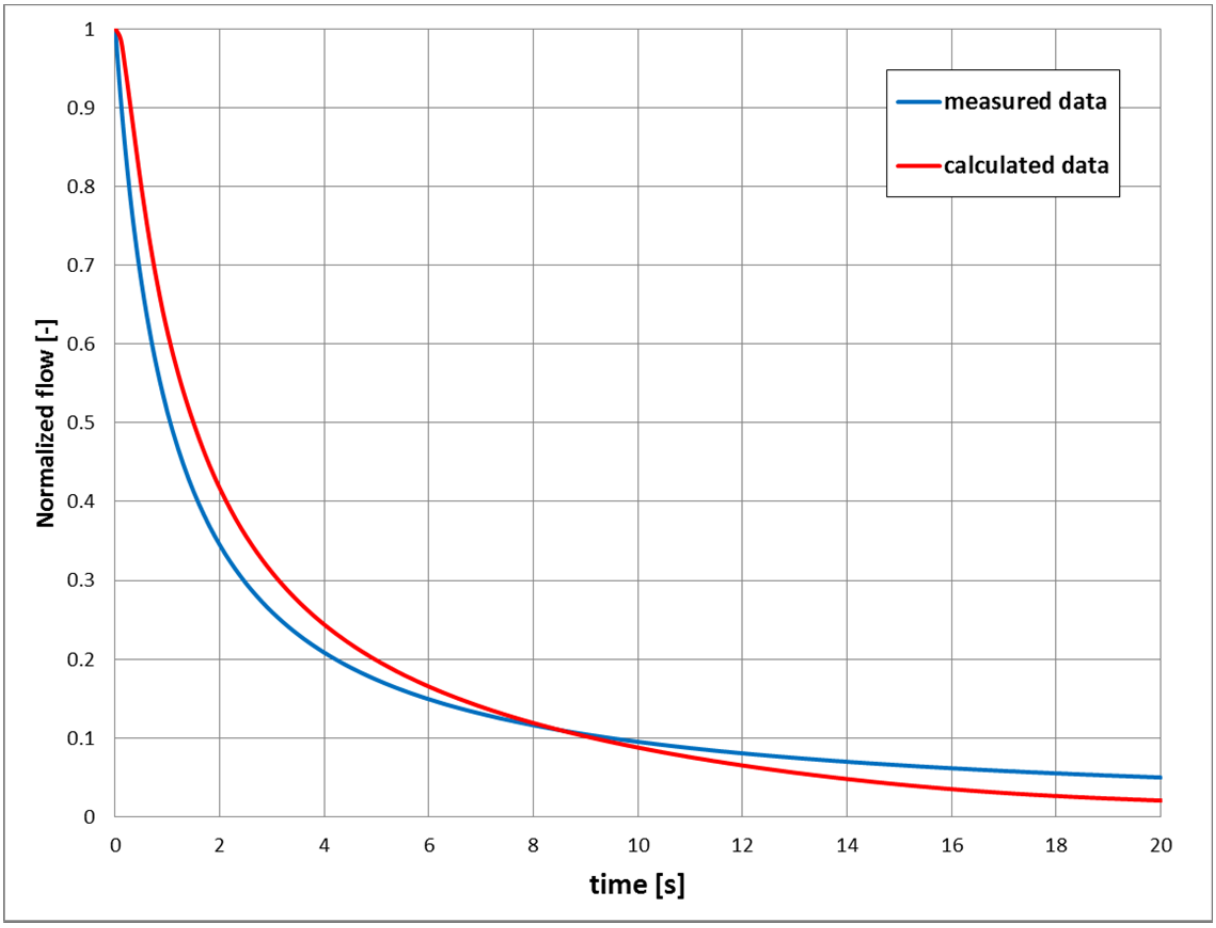

Figure 7. Comparison of measured and calculated normalized flow during pump coastdown.

A comparison of the measured and calculated normalized flow is presented on Figure 7. It is visible that the difference between the curves is very small and it was assumed that the calculated data for pump coastdown could be used for the analysis in this report.

No measurements for the additional pumps were available, so also in this case the calculated data was used in the RELAP5 model.

3.4. Pressurizer

Description of system

The pressurizer in the research reactor was originally designed for four purposes:
(1) to control pressure in the fuel channels cooling circuit,
(2) to collect all radioactive gases,
(3) to maintain the water inventory in the circuit,
(4) to degasify the system.

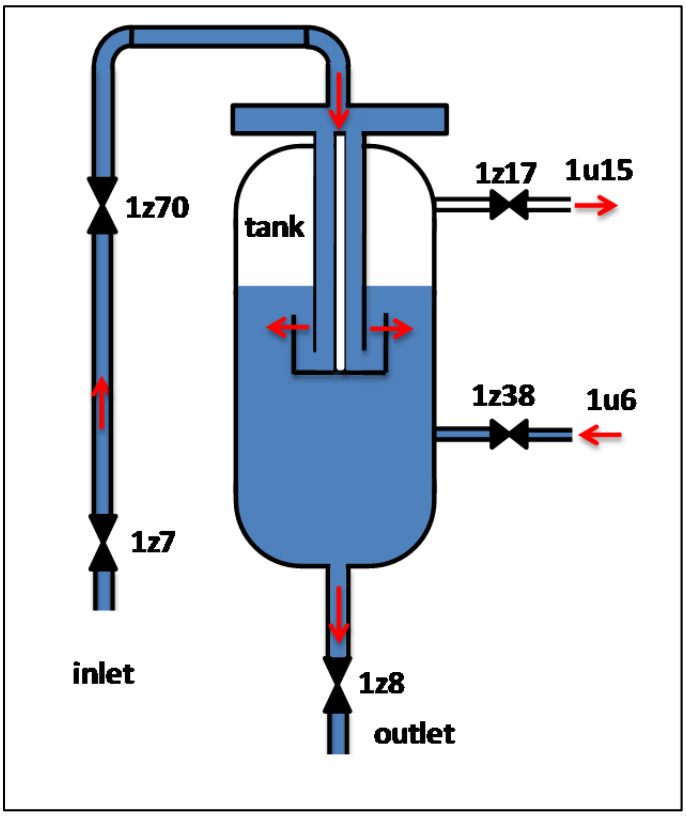

Figure 8. Pressurizer with valves and connections to the safety injection pump 1u6 and helium release tank 1u15.

A schematic diagram of the pressurizer is presented on Figure 8. It is a tank with a volume of about 6.3m^3 filled with water and helium under high pressure. The pressure in the system depends on the static pressure of water in the tank and the pressure of helium that usually is stabilized at the level of 0.5MPa. It is worth mentioning that prior to modernization the pressure was equal to 0.8MPa. All leakages from the fuel channels cooling circuit are made up by the pump 1u6 connected to the pressurizer tank. The pressurizer system consists of five main valves: motor valve 1z7 (to control the flow through the pressurizer), check valve 1z70 (to protect against backflow during an accident), motor valve 1z8 (to isolate the pressurizer after reactor shutdown or during an accident), valve 1z17 (to release helium to the release tank 1u15) and check valve 1z38 (to protect against backflow to pump 1u6).

Model development

The pressurizer system was modelled in detail because it has a very important function in the system during a LOCA scenario. All valves and inlet and outlet pipes presented on Figure 8 were modelled. The valve 1z7 was initially partially closed to achieve a flow through the pressurizer at a level of about 30m^3/h.

Safety features

The pressuriser has a very important role in the safe operation of the reactor. Depending on the tank water level, it is possible to initiate scram or to control the behaviour of all pumps in the fuel channel primary cooling system. The important setpoints of the pressurizer are presented in Table 2. Reactor scram is initiated when the level drops to 6.44 m.

Table 2 Pressurizer set points

water level [m]*	Pressurizer set points
+7.00	high water level - warning signal
+6.76	switching off additional pump 1u6
+6.61	switching on additional pump 1u6
+6.44	**reactor scram !** switching off all main pumps
+5.10	switching off one additional pump, release of helium to tank 1u11, isolation of pressurizer by valve, closure after 30s from helium release.

* outlet nozzle from water tank at level +4.20

3.5. The Control System and Operational Limits

Negative reactivity can be introduced into the core after receiving an alarm signal from the control system by inserting safety rods. An alarm signal can occur in several cases:

- signals from the measurement system: pressure, temperature, water level and mass flow,
- loss of electric supply,
- operator SCRAM signal,
- high neutron flux measurement in the core.

A summary of alarm signal setpoints is presented in Table 3.

Table 3 Alarm signal setpoints

Measurements	Set point of alarm signal
Mass flow Q [kg/s]	
Pool Cooling System	Q < 1120 m^3/h
Fuel channels cooling System	80% of the flow
Individual Fuel Channel	High Power group 1 and 2

	Q < 24 m^3/h Low Power group 3 and 4 Q < 8 m^3/h
Pressure p [MPa]	
Fuel channels cooling System – inlet header	p < 1.4 MPa
Temperature T [K]	
Fuel channels cooling System – outlet header	T > 403.15 K
Water Level h [m]	
Water level in pressurizer	level < +6.44
Water level in reactor pool	level < +6.40

3.6. The Reactor Pool System

Description of system

The reactor pool is a big tank 10.7m high (from level -2.8 to +7.90, the water level during normal operation is about +7.05) filled with water. The mass of water is about 250 tons. The system includes a pool cooling system with a high mass flow maintained by pumps. The system cools the fuel channels and the main core elements – the beryllium blocks serving as the moderator, graphite blocks serving as the reflector, the control rods. The cooling water is finally directed by a 400mm diameter pipe system to the pool heat exchangers system.

Model development

The reactor pool model was simplified in order to simulate mainly:
1) the behaviour of check valves 1z100A and 1z100B;
2) the heat transfer between the fuel channel and pool and main headers.

In order to add precision to the heat transfer model, the interaction between the pool and beryllium and graphite blocks was modelled by additional heat structures. A simplified diagram of the reactor pool and internals is presented on Figure 9. The reactor core region includes the fuel, the graphite reflector and beryllium moderator. The diagram includes also the fuel channels with cooling as well as the reactor pool with water.

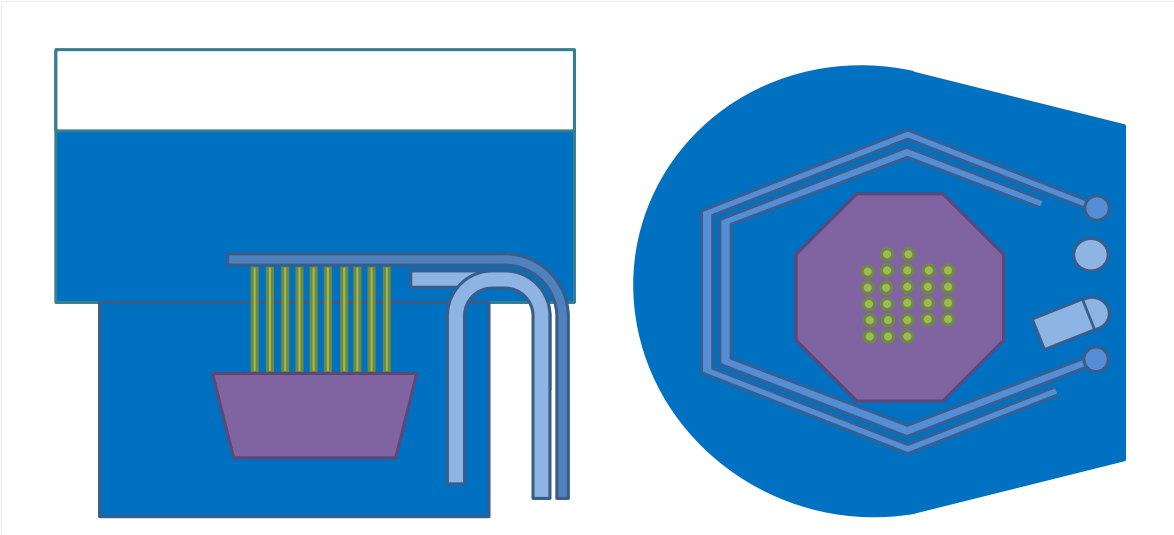

Figure 9. Simplified cross-section of reactor pool with fuel channels. Purple – reactor core region, green - fuel channels and blue - water in the reactor pool

3.7. Heat Generation and Decay Heat

At present the total heat generation in the Maria research reactor amounts to 24 MW. Additionally, the gamma radiation causes an increase of the temperatures of the coolant, moderator and reflector. Most of the generated heat is removed by the channel cooling system and pool cooling system and transferred to the heat exchangers.

The heat generation between: (1) the piping system and environment (2) pool water surface and environment (3) pool water and pool concrete were omitted due to the small temperature differences and computer memory capabilities. Differences in the heat balance were fixed by changes in the heat exchangers system to provide best realistic results.

A summary of the heat generation sources included in the model is presented in Figure 10.

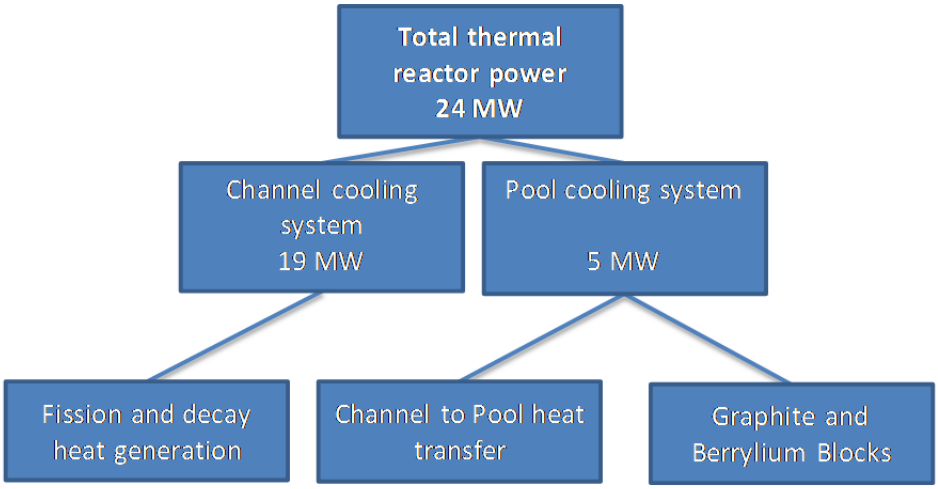

Figure 10. Heat generation summary in case of power generation 24 MW(th).

In order to analyse adequately the model of decay heat, a comparison was made between the heat generation (measured by the reactor measurement system) and the standard RELAP5 ANS model. However the reactor measurement system on low flow parameters proved to have small accuracy and finally the standard RELAP5 decay heat model with fission product decay type "GAMMA-AC" with beta over lambda parameter 45.03 s^{-1} and reactor operation time equal to 10 days. was adopted. The ANS model values of normalized power after scram adopted in the calulations is presented on Figure 11.

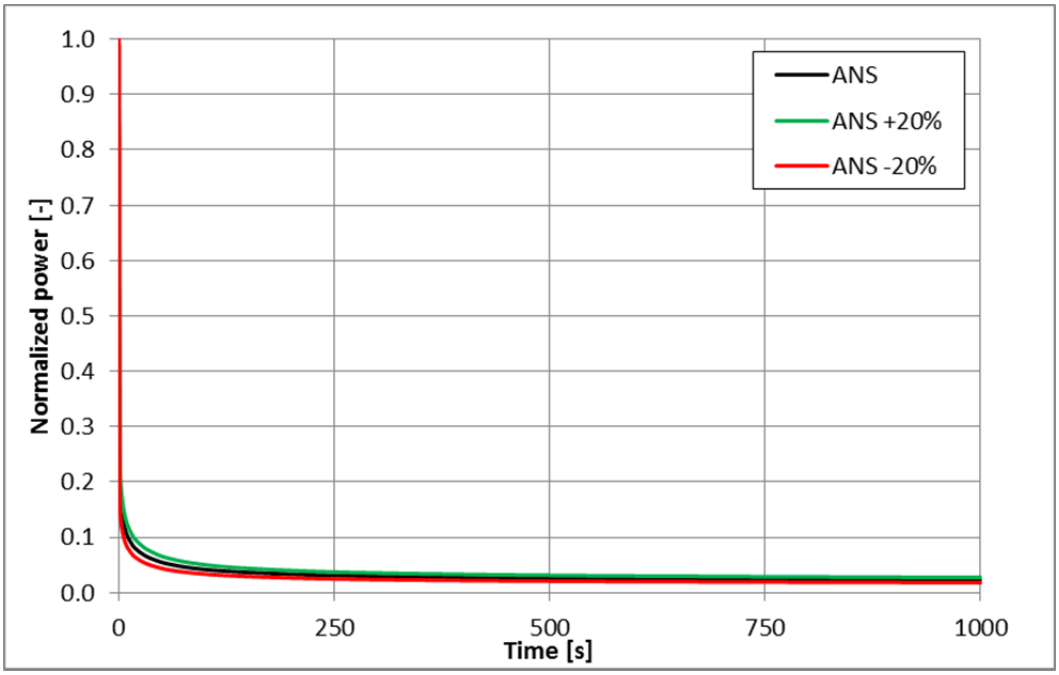

Figure 11. Normalized power after SCRAM.

3.8. Conclusions

The model of the research reactor MARIA was prepared with considerable accuracy in order to simulate in detail LOCA and other accident scenarios. The model was prepared initially in the ASCII code and only at the final stage all components and systems were put together using the SNAP graphic interface. The model was also checked by the SNAP tool but no errors, warnings or alerts were detected. The additional loop closure check was within tolerance and the value of the max error was 9.099E-4 m.

The final nodalization of the reactor is presented on Figure 12 and the number of all components used is summarized in Table 4.

Table 4 Model characteristics - number of elements

Model component	number of elements
Volumes/cells	1077
Hydraulic components	294
pipes	131
branches	49
pumps	4
single junctions	32
single volumes	1
tdv	17
tdj	8
valves	52
Heat structures	57
hs axial cells	578
Control systems	375
control blocks	88
trips	57
signal variables	217
tables	13
Materials	7

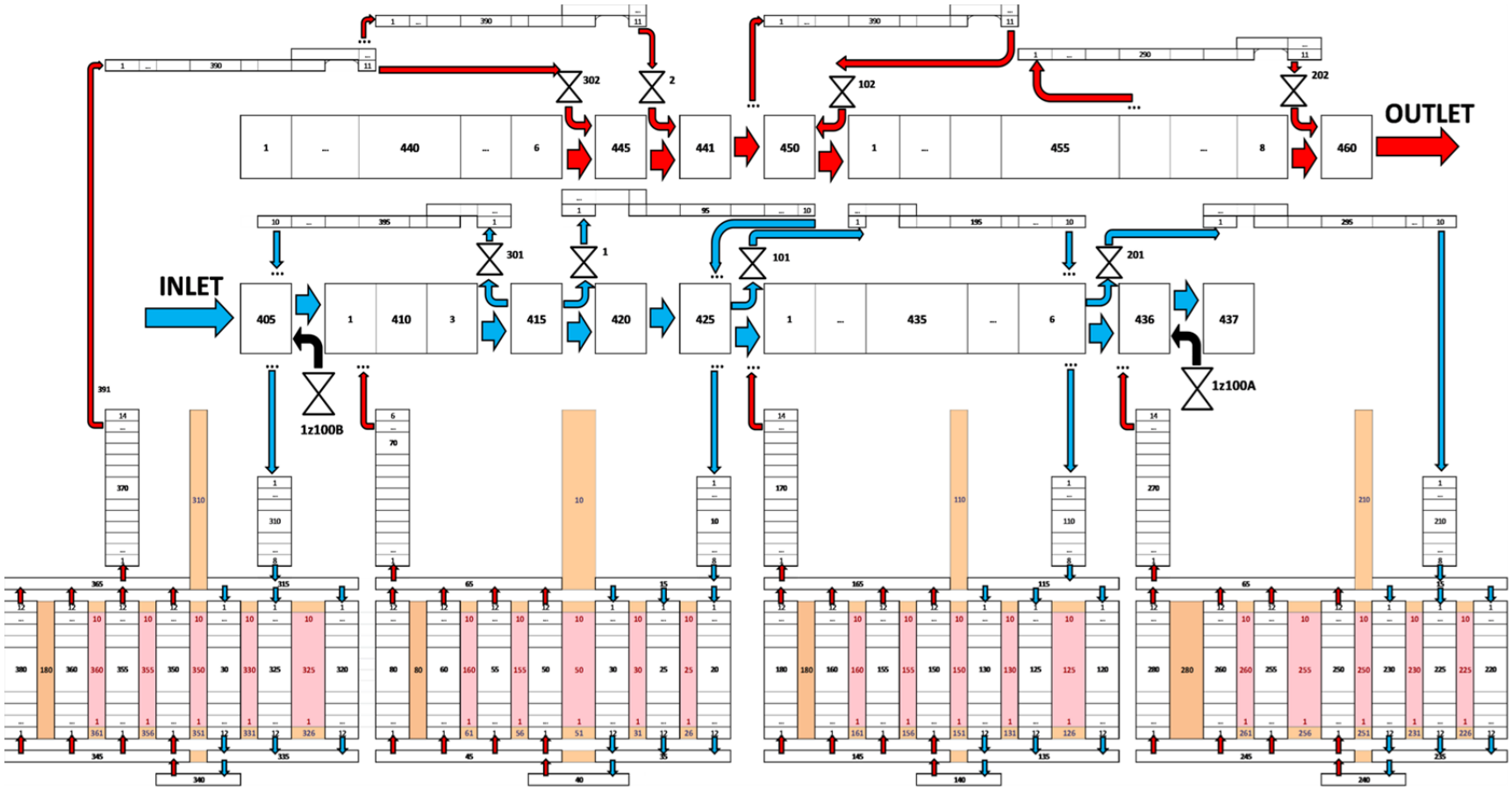

Figure 12. Nodalization diagram for inlet, outlet headers and four fuel channels with flows path (red - hot water, blue - cold water). Heat structures in the fuel channels: light red colour active HS, orange colour passive HS. Heat structures for headers were omitted in this figure. Presented nodalization sketch is only a part of whole nodalization. Valve 1z100A ,1z100B and corresponding black coloured flow paths are during normal operation closed.

4. STEADY-STATE CONDITIONS

The steady state results were compared with operational measurements performed in September 2013 during the first reactor operation cycle following pump modernization.

Due to the relatively fast changes in reactivity during reactor operation, the neutronic safety system maintains the chain reaction at an adequate power level. Some oscillations are possible, however during the operation cycle the power level should not go beyond a requested range. In order to compare the measured and calculated values it is necessary to choose the appropriate values when the reactor operates at the highest power level and the temperature achieves its maximum. Such conditions were achieved on September 9th – the reactor operated with maximum thermal power in the cooling channels - about 16 MW, the pool cooling system - power about 4.2 MW and total fission power measured at the level of 21.3 MW.

In order to compare the parameters, the thermal power in the model and thermal parameters of the secondary circuit was assumed to be fixed and the number of fuel channels set to 24.

4.1. Nodalization Qualification at Steady State Level

The input deck for Relap5 was prepared on the basis of the presented model and assumptions. The necessary steady state simulation was limited to 250 seconds. The pressurizer's control systems i.e. the artificial controllers for water level and pressure, were deactivated after 50 seconds, therefore the null transient calculation lasted for 200 seconds. The trips that were prepared for the transient calculation were not activated. A summary of the results of the steady state calculations is presented in Table 5.

Table 5 Model qualification at steady state

No.	Quantity	Unit	Acceptable error	Expected value	Calculated value	Error
1	Reactor Thermal Power	MW	0.5%	15.735	15.789	0.23%
2	Inlet cooling channel circuit	kPa	2%	175	179.4	2.51%
3	Outlet cooling channel circuit			63	63.9	1.43%
4	Pressurizer			51	50	2.00%
5	Inlet cooling channel circuit	K	1.5%	331.41	332.52	0.33%
6	Outlet cooling channel circuit			353.29	353.28	0.00%

7	ΔT cooling channel circuit			21.88	20.76	-
8	Secondary cooling system			295.35	295.15	0.07%
9	Pool cooling circuit inlet			321.00	320.65	0.11%
10	ΔT pool cooling circuit			2.6	1.95	-
11	Total cooling channel mass flow	m^3/h	2%	670.5	668.21	0.34%
12	Bypass mass flow			-	94.00	-
13	Pressurizer water level	m	0.1	6.67	6.65	0.30%
14	Pool water level			7.00	6.91	1.30%
15	Total water volume in cooling channel circuit	m^3	-	-	24.51	-
16	Total helium volume in the pressurizer tank		-	-	1.37	-
17	Total water volume in reactor pool (without pipes system)		-	-	228.0	-

4.2. Steady-state parameters trends

Presented further are the results of pressure in the pressurizer, temperature of water in header, channel outlet and reactor pool, mass flow in header, pressurizer and bypass, water levels in pressurizer and reactor pool for steady state conditions. The results are presented on Figure 13, Figure 14, Figure 15 and Figure 16 and in Table 6, Table 7, Table 8 and Table 9. Finally the pressure distribution in the primary loop is presented on Figure 17.

The results indicate that the steady state conditions are satisfactory.

Pressure

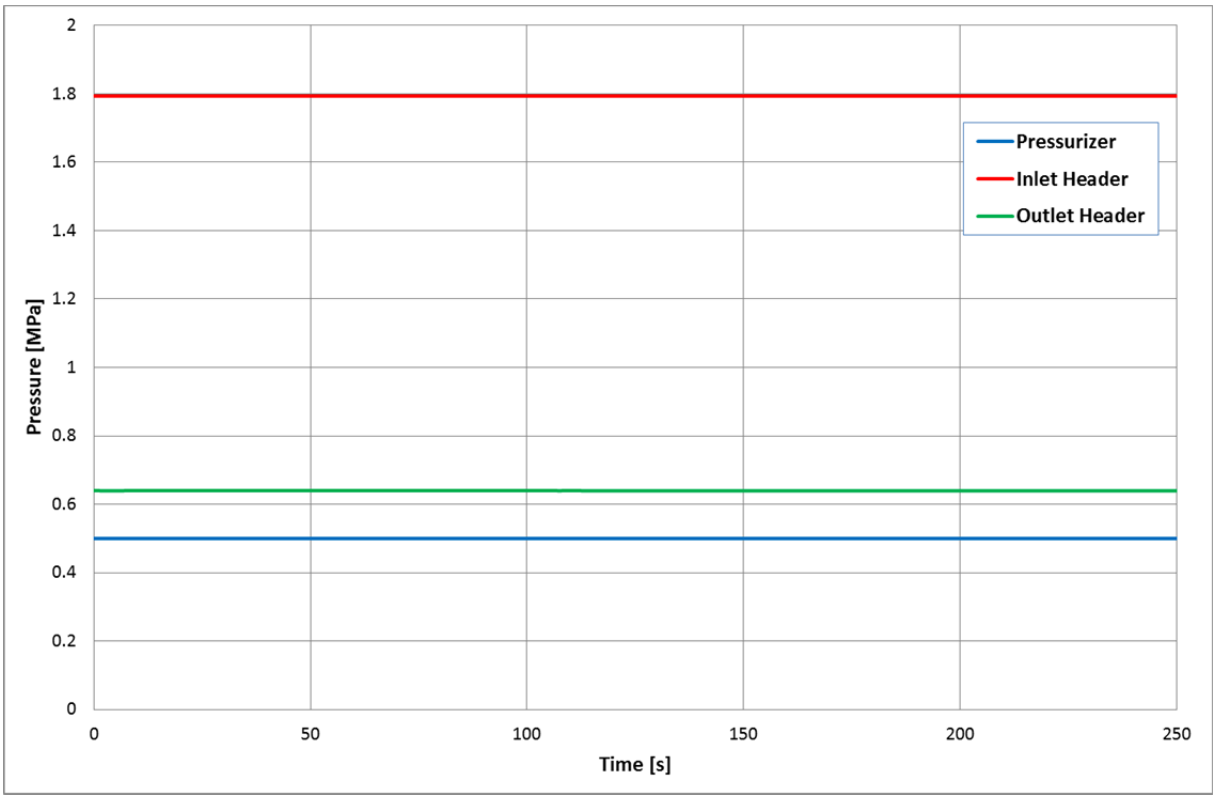

Figure 13. Steady state - pressure in the pressurizer tank (at the top of the tank), inlet and outlet headers of fuel channel.

Table 6 Steady state – values of pressure

	Pressure [kPa]:		
	at 50s	at 250s	Δp
Pressurizer	500.00	499.93	0.014%
Inlet Header	1793.93	1793.86	0.004%
Outlet Header	639.52	639.45	0.011%

Water temperature

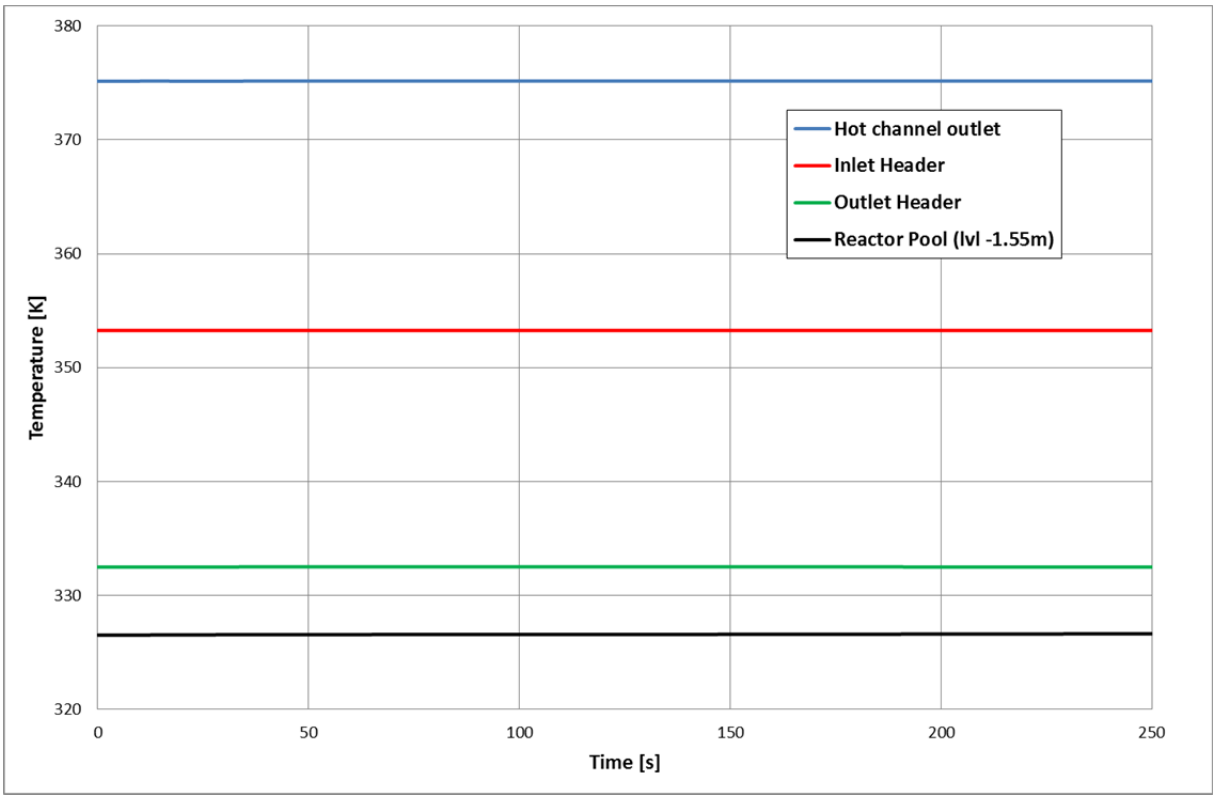

Figure 14. Steady state - temperature at inlet, outlet headers and at hot channel outlet and in the reactor pool under the core

Table 7 Steady state – values of temperature

	Temperature [K]:		
	at 50s	at 250s	ΔT
Hot channel outlet	375.155	375.155	0.000%
Inlet header	353.272	353.274	0.001%
Outlet header	332.516	332.513	0.001%
Reactor pool	326.573	326.645	0.022%

Mass Flow

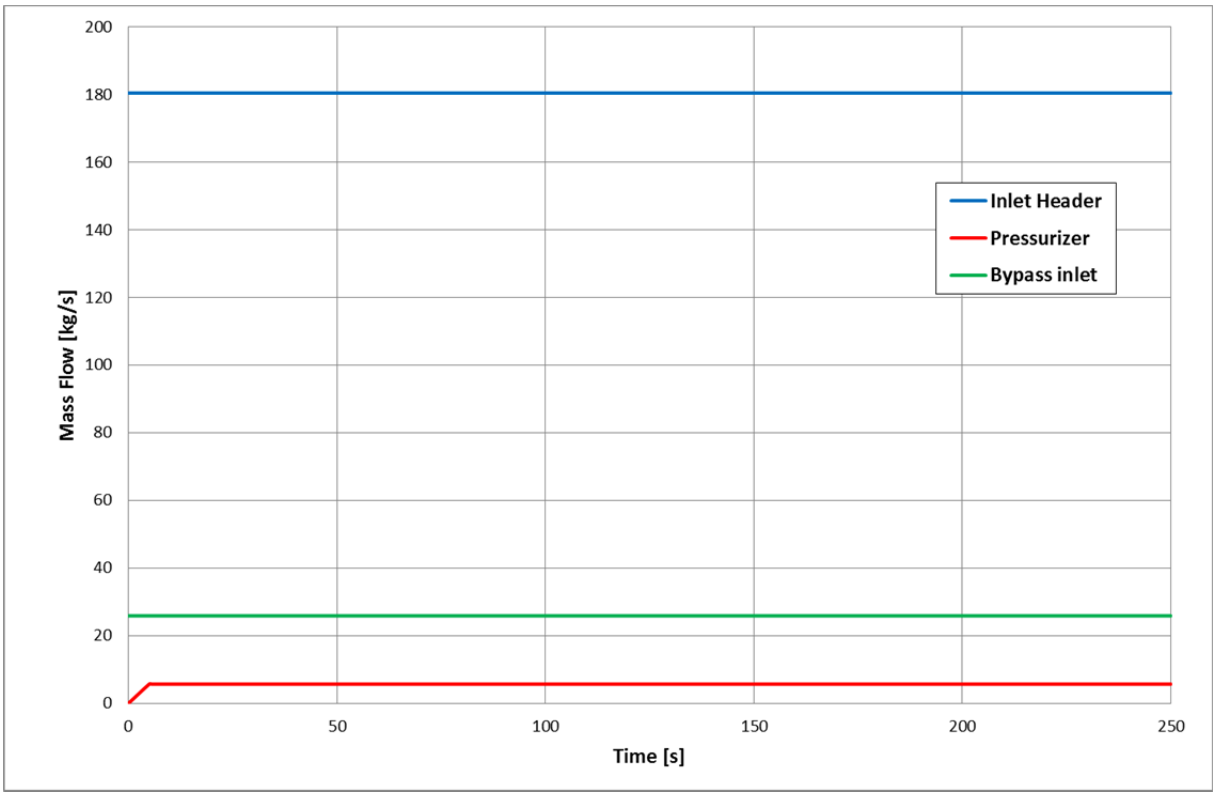

Figure 15. Steady state - mass flow rate in the fuel channel circuit: inlet header, pressurizer inlet and bypass inlet

Table 8 Steady state – values of mass flow

	Mass Flow [kg/s]:		
	at 50s	at 250s	ΔQ
Inlet Header	180.379	180.379	0.000%
Pressurizer	5.692	5.692	0.000%
Bypass inlet	25.851	25.851	0.000%

Water level

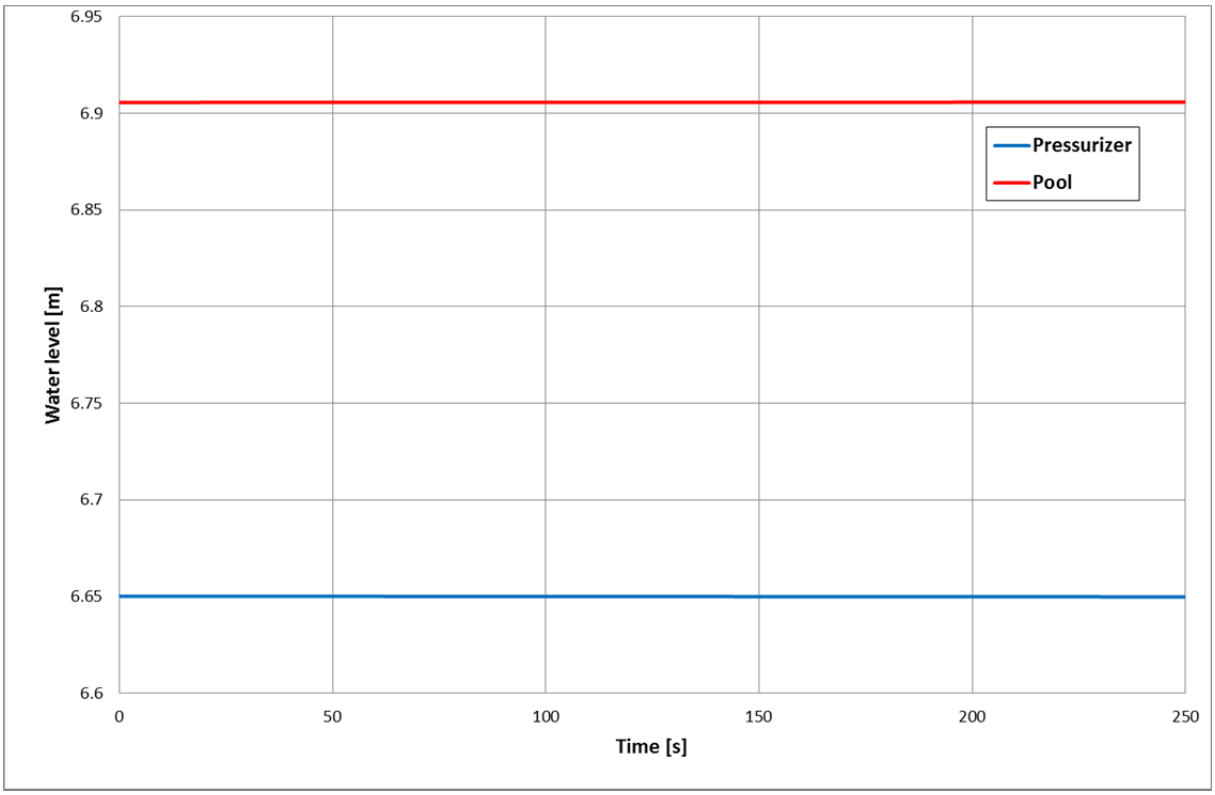

Figure 16. Steady state - water level in the pressurizer tank (tank bottom level: +4.00) and reactor pool (pool bottom level: -2.80)

Table 9 Steady state – values of water level

	Water level [mm]:		
	at 50s	at 250s	Δh
Inlet Header	+6650.00	+6649.73	0.004%
Pressurizer	+6905.56	+6905.68	0.002%

Pressure distribution

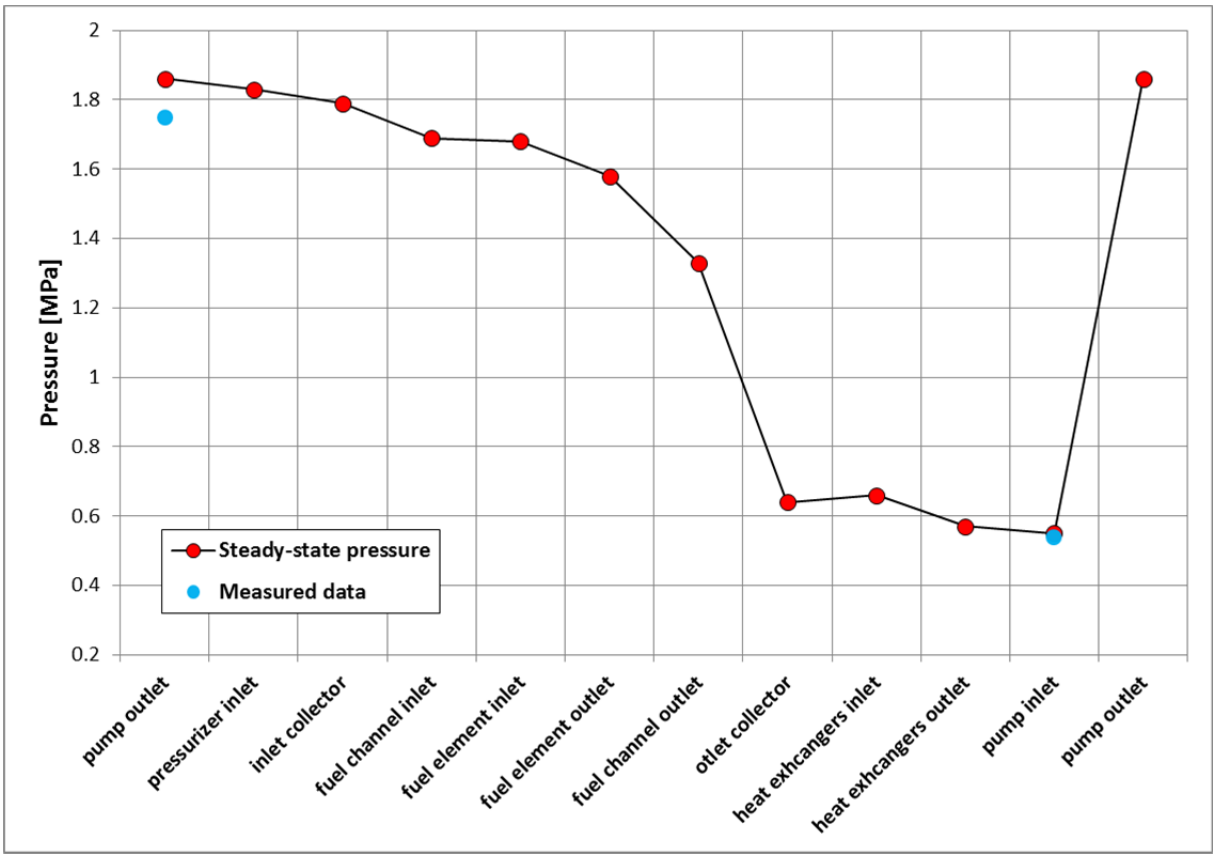

Figure 17. Steady state - pressure distribution in primary cooling system.

The pressure in the primary cooling circuit is measured in three places. On the figure above (Figure 17), measured pressures for steady state and measured data at header inlet and at the inlet to the pumps were compared. The third measurement data is the pressure in pressurizer that was equal to 0.51MPa. This pressure was assumed in the simulation as equal to 0.5 MPa.

4.3. Conclusions

Changes of temperature, pressure, mass flow rates and water levels in most important points during the simulated steady state conditions performed for 200s proved to be practically insignificant. No peaks in the parameter trends were observed. It can be assumed that on the basis of the presented data trends, pressure distribution and comparison with real operational data, the steady state model of the research reactor MARIA was achieved.

5. TRANSIENT ANALYSIS

Three types of transients using the RELAP5 code were performed. The calculations and results should show the potential weaknesses of the 'Maria' research reactor. However, it also should be kept in mind that the configuration of 'Maria' is not constant, it undergoes continuous changes and seldom operates at full power in 'most unfavourable' conditions.

The analysis covered the following transients:

a) Loss of Coolant Accident (LOCA); break of pipe in the primary fuel channels cooling circuit,
b) Loss of Flow Accident (LOFA); loss of flow due to the loss of electric power supply with failure of the accumulator battery or other accident,
c) Loss of Heat Sink (LOHS); completely loss of main and shutdown pumps in the secondary cooling circuit.

The steady state qualification process was prepared on the basis of measurements performed during reactor operation shortly after the pump modernization.

It was assumed that for the transient analysis, data for higher thermal parameters presented in Table 1 with reactor fission power 18.063 MW was used. The reactor was modelled with 24 cooling channels with one fuel channel reaching fission power 1.8 MW – the maximum allowed power for an individual channel.

Additional assumptions for the analysis.

- The additional pump 1u6 connecting the pressurizer tank was not included due to the very low mass flow that the pump could inject into the pressurizer (approximately 4-6 kg/s) and because of the susceptibility to damage.
- The emergency valve 1z100, placed on the outlet header in the fuel channel cooling system was not included. In case of an accident, the valve 1z100 connects the fuel channels cooling circuit with the pool similarily as the valves 1z100A and 1z100B. The valve was neglected because it should be actuated by the operator during an accident otherwise it would stay closed. During a LOCA, when analysing a worst case scenario it could be useful to increase the flow from the reactor pool to the headers. However in such a case the first seconds of the accident would be vital and in such a short timeframe the operator would have no chance to decide to open this valve.
- Limited operator actions. As mentioned in the previous case – the operator actions in the first phase of the accident are completely omitted in the analysed scenarios due to lack of time for response.
- Additional pumps behaviour. In the loss of water accident scenarios, when the water level in the pressurizer drops to +5.10, the system will automatically shutdown one of two additional pumps leaving only one additional pump working. The hydraulic resistance in the broken loop will be higher than during normal operation. Moreover the pump will be working close to the electric current protection system which can give a signal for this

additional pump shutdown. In the analysed scenarios the protection system is not operating and the pump can operate with a non-limited flow.

Safety criteria:

1) Peak cladding temperature (PCT). The nuclear fuel of the "Maria" research reactor is composed of U_3Si_2-Al and is protected by a thin layer of aluminium alloy cladding. The melting point of aluminium in the fuel is about 933K (660˚C), and of U_3Si_2 is relatively high - 1938K (1665˚C). An exothermic reaction between Al and U_3Si_2 occurs at the temperature 893K (620˚C) that generates 300kJ/kg of heat. The cladding aluminium alloy solidus temperature is 855K (582˚C).
   There is no operational limit concerning the temperature of the fuel or cladding.
2) ONBR – Onset of Nucleate Boiling Ratio. This ratio informs when the start of nucleate boiling in the fuel channels occurs.
   According to the reactor Safety Analysis Report it's forbidden to operate the reactor when boiling in fuel channels occurs and an ONBR limit has been imposed determining that ONBR during normal operation mode should be larger than the value 1.2 in order to avoid steam creation on the cladding.

   The model of the research reactor assumes that the ONBR ratio is calculated according to the Forster-Greif correlation:

$$T_{ONB} = T_{SAT} + 0.182 \frac{q^{0.35}}{p^{0.23}}$$

$$ONBR = \frac{T_{ONB} - T_{in}}{T_{PCT} - T_{in}}$$

   where:
   T_{SAT} – saturation temperature,
   T_{PCT} – peak cladding temperature,
   T_{in} – inlet temperature to the fuel element.

5.1. LOCA Analysis

Five possible places for the occurrence of the break in the fuel channels cooling circuit were analysed: two on the hot leg, two on the cold leg and one on a small diameter pipe bypass connecting the fuel channel and header. Three cases of calculations with different size break conditions were performed on the hot and cold leg (a 300 mm diameter pipe):

- 19.63 cm^2 (small break LOCA),
- 78.54 cm^2 (medium break LOCA),
- 314.16 cm^2 (large break LOCA).

All break locations marked on Figure 18 were chosen outside of the reactor pool in order to include the "worst cases" conditions because the pressure differences between the pipes and environment were the largest.

The numbers ‘1’ and ‘2’ apply to the cold leg, numbers ‘3’ and ‘4’ apply to the hot leg and the number ‘5’ applies to the bypass.

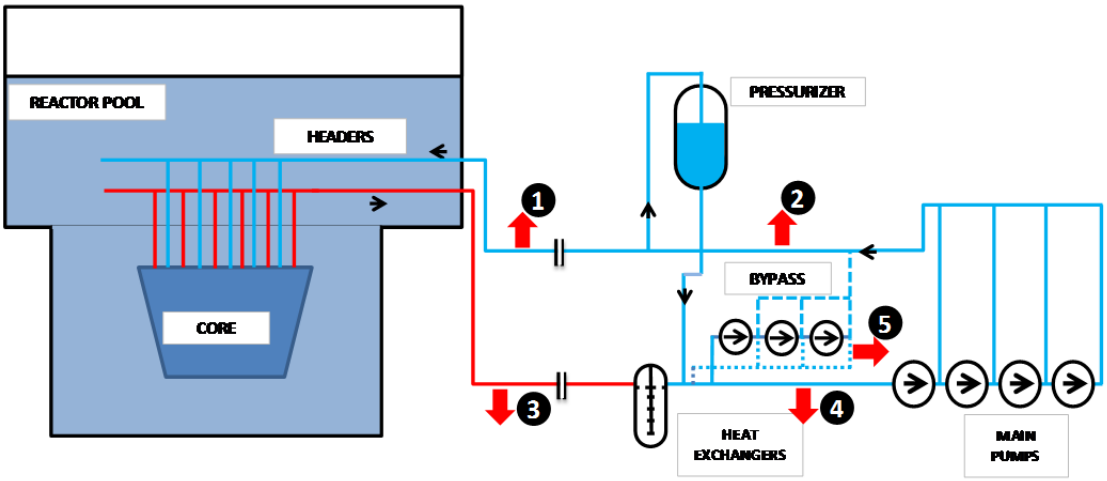

Figure 18. Investigated break locations on the primary fuel channels cooling system numbered from 1 to 5.

Other locations of breaks of pipes in the fuel channels cooling circuit could also be investigated. Such breaks are exemplified on Figure 19 and described in short below.

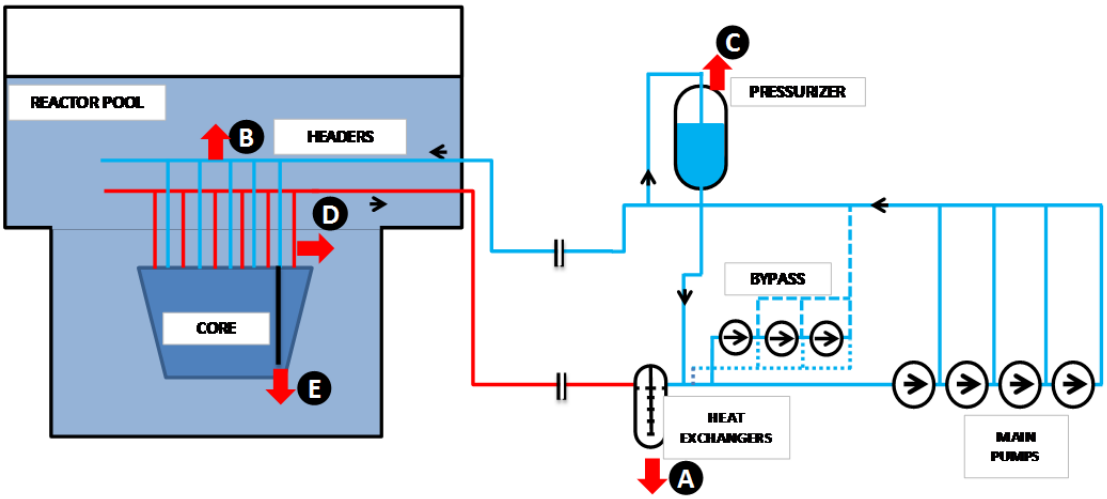

Figure 19. Other possible break locations.

The labels ‘A’, ‘B’, ’C’, ’D’ and ’E’ refer to the descriptions below.

(A) Heat exchangers pipes break– it is a small leakage to the secondary circuit through one pipe with an inner diameter of 16mm. A ‘low water level in the pressurizer’ signal, will cause the reactor to shutdown. Thirty minutes after the reactor scram when natural circulation will be stabilized, it will be possible to close the heat exchangers closure valves.

(B) Inlet headers of fuel channels cooling circuit pipes break- a break in the reactor pool where the pressure differences between the pipes is about 0.8 MPa. The probability of this break is much lower than the break of the cold leg in the analysed scenario and the results of pressure loss and temperature at the beginning of the accident should be similar. However, at a later stage when the pressure stabilizes there should be no leakage through the break.

(C) Pressurizer outlet break. This accident leads to a depressurization of the primary circuit that gives a signal for reactor scram and isolation of the pressurizer. This leads to a safe reactor shutdown.

(D) Break of a 40mm diameter pipe connecting the hot fuel channel and the inlet header. This accident leads to problems in supplying water to the fuel channel and to overheating of fuel. The water flow in the fuel hot channel should change direction and at that moment CHF can occur.

(E) Break in the bottom part of the fuel channel. In this scenario a problem with flow distribution in gaps between the fuel pipes is very probable. Eventually, even a small break can cause a serious accident and local overheating of the cladding.

The first three cases (‘A’, ’B’, ’C’) can be neglected in the analysis because no significant impact on the reactor safety can be foreseen. The last two cases (‘D’ and ‘E’) should be analysed in more detail in another report.

5.2. Small Break LOCA (2.8%)

Prior to performing the calculations of transient scenarios it was necessary to find a place in the reactor primary circuit, where a LOCA could lead to a ‘worst case scenario’ and cause most severe damages. For this reason the Small Break LOCA calculations were performed for all five break locations visible on Figure 18. The cases and results of calulations visible on figures in this chapter were performed for breaks located in the following places,

(1) channel inlet pipe between the header and pressurizer,
(2) channel inlet pipe shortly before the connection with the pressurizer,
(3) channel outlet pipe between the header and heat exchangers,
(4) channel outlet pipe between the heat exchangers and pumps,
(5) 80mm pipe in the bypass system.

All the above mentioned places will be labelled in this report as cases “1” to “5”.

Results

The simulation was performed for 250 seconds untill the beak mass flow and the flow through the safety valves stabilised. The time sequence for SB LOCA is presented in Table 10:

Table 10 SBLOCA time sequence

Case	“1”	“2”	“3”	“4”	“5”
Break	0	0	0	0	0
Scram signal	0.1*	0.1*	0.2*	12.9**	12.1**
+6.44 signal	7.5	8.0	11.3	12.9	12.1
+5.10 signal	124.5	132.4	138.9	140.3	127.0
Safety valve open	143.8	167.9	175.3	176.8	156.8

* Scram ‘low pressure’ signal (p<1.4MPa), ** Scram ‘level +6.44’ signal.

Mass flow at break location

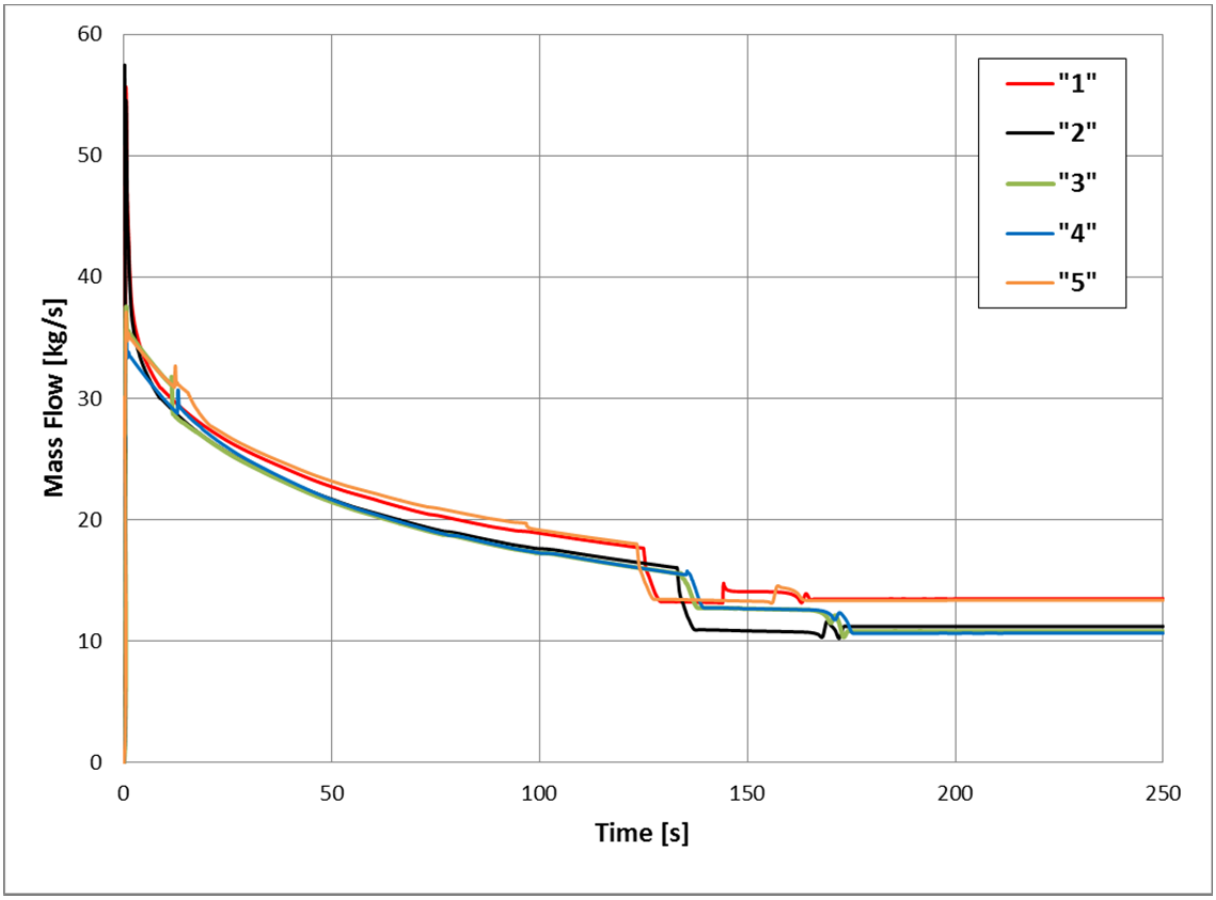

Figure 20. SBLOCA - break mass flow

Table 11 SBLOCA – value of break mass flow

	Break mass flow [kg/s]		
case	initial	maximal	after 250s
1	56.12	56.12	13.49
2	58.89	58.89	11.21
3	28.60	37.58	10.81
4	27.54	35.65	10.66
5	29.89	37.14	13.38

The break mass flow mainly depends on the pressure in the break location. In cases “1” and “2” the break occurs at pump outlet section with the highest pressure in the system about 1.8 MPa. In cases “3”, “4” and “5” the break occurs in sections with lower pressure and as a result the expected initial break mass flow will be lower than in the previous cases.

For cases “1” and “2” scram will be initiated almost immediately following the “low pressure at inlet header” signal. This signal initiates also the automatic shutdown of the main pumps however without any influence on the work of the additional pumps.

In the other cases “3”, “4” and “5” the pressure is lower and the break mass flow will be significantly lower than in the cases “1” and “2”.

Integrated mass flow at break location

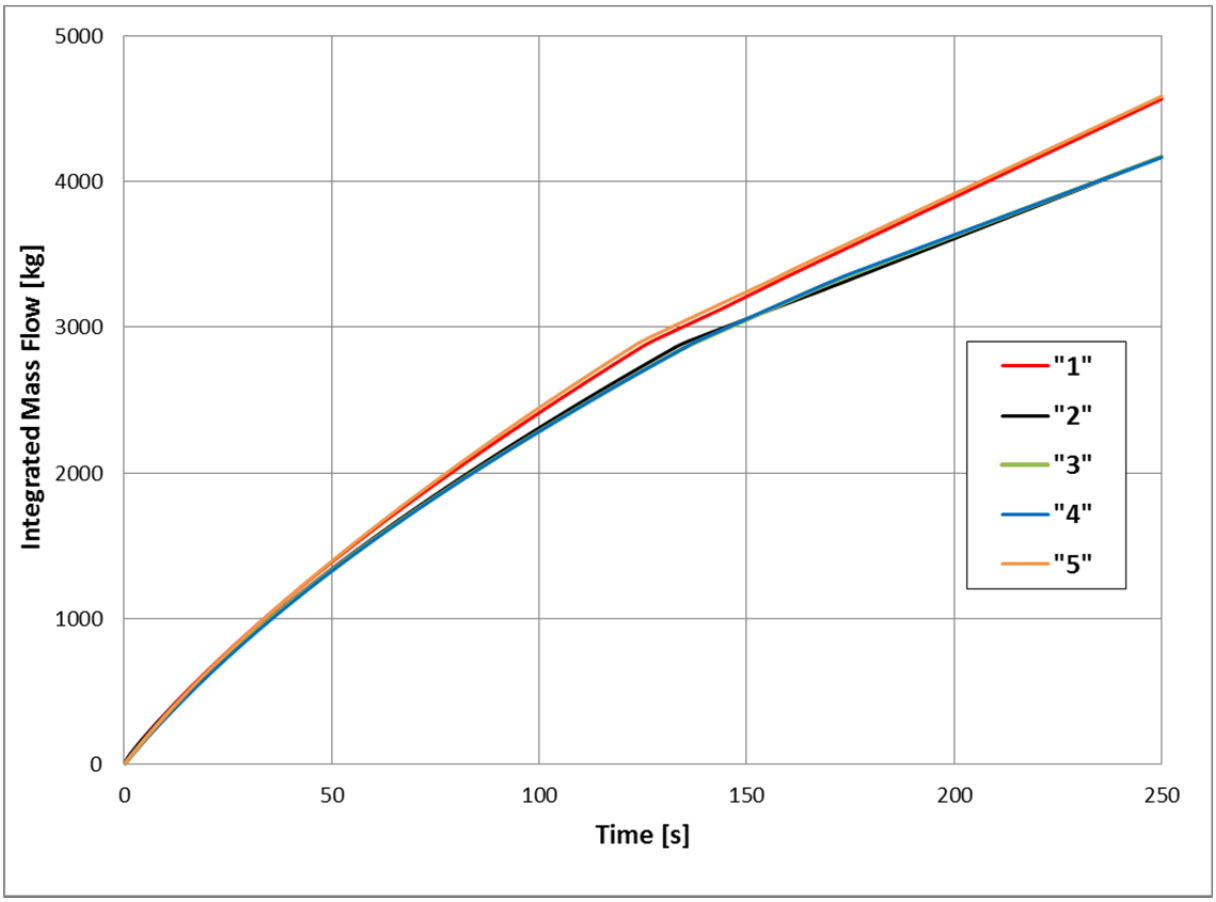

Figure 21. SBLOCA - integrated mass flow

Table 12 SBLOCA – value of integrated mass flow

	Integrated break mass flow [t]		
case	after 50s	after 150s	after 250s
1	1.39	3.21	4.57
2	1.34	3.06	4.17
3	1.33	3.05	4.17
4	1.33	3.06	4.17
5	1.40	3.24	4.58

In all the cases, the integrated break mass flow will be similar and after about at 120-140 s the pressurizer will reach the +5.10 level and in the next 30 second will be isolated. Following the pressurizer isolation, the break mass flow will be supplied by water from the reactor pool through the safety valves 1z100A and 1A100B.

Pressure

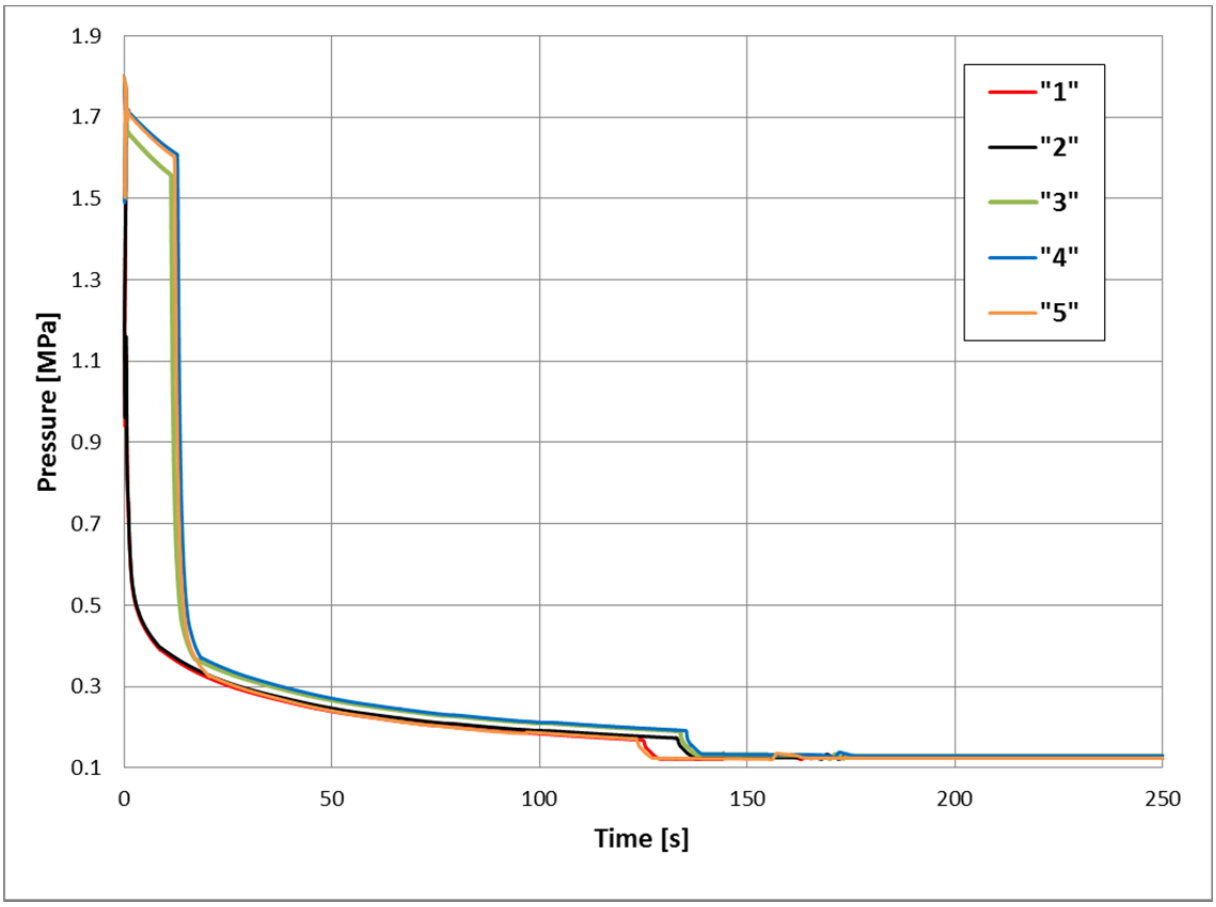

Figure 22. SBLOCA - Pressure in inlet headers in fuel channels cooling circuit

Table 13 SBLOCA - pressure in inlet headers

	Pressure		
case	after 5s	after 15s	after 25s
1	0.44	0.35	0.30
2	0.45	0.35	0.31
3	1.61	0.41	0.33
4	1.67	0.50	0.34
5	1.66	0.44	0.31

In cases “1” and “2” the pressure decrease will occur almost immediately due to the LOCA signal that stops the work of the two main pumps. In cases “3”, “4”, and “5” the pressure drop is slower and the main pumps will be stopped after a slightly longer time. At the time of about 125s and 145s the “+5.10” signal will stop one additional pump and will release helium to the helium tank,

reducing pressure in the pressurizer. Then, after 30 s some oscillations can be observed due to the isolation of the pressurizer by the closure valve.

In all cases a pressure peak can be observed during the first second after the break. In the analysed case no. “3” the peak pressure decreases for a short period below 1.4 MPa causing a LOCA signal, that leads to the reactor scram. In cases “4” and “5” the pressure drop is smaller and does not reach 1.4 MPa. As a consequence no scram occurs and the pump shutdown pressure is reached much later.

Peak cladding temperature (PCT)

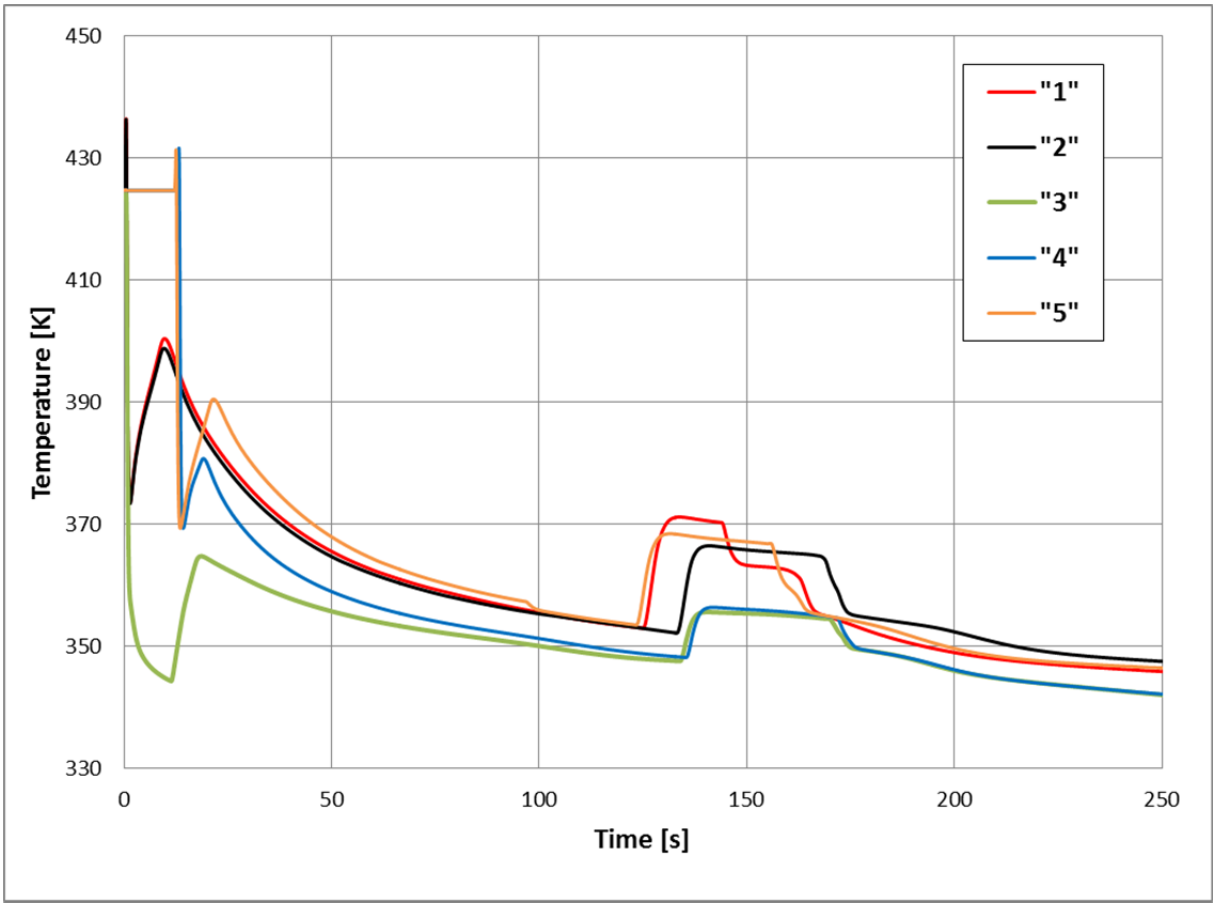

Figure 23. SBLOCA - PCT at inner side of outer pipe of a fuel element in the hot channel

Table 14 SBLOCA - peak cladding temperature

	Peak cladding temperature		
case	First peak	Second peak	Third peak
1	436.3	400.4	371.2
2	436.1	398.8	366.4
3	-	364.7	355.6
4	431.6	380.7	356.4
5	431.3	390.5	368.4

Three temperature peaks can be observed in the calculated time period. The first is caused by the sudden loss of pressure and partial reduction or oscillations of coolant in the fuel channels. The second peak is caused by shutdown of the main pumps and finally the third one by shutdown of one of the additional pumps. The maximum temperature in this scenario reaches 436 K which is not a dangerous situation for the fuel nor for cladding degradation and gas releases. In case “3”, due to the rapid reactor scram and lower break flow, the first peak cannot be observed.

ONBR parameter

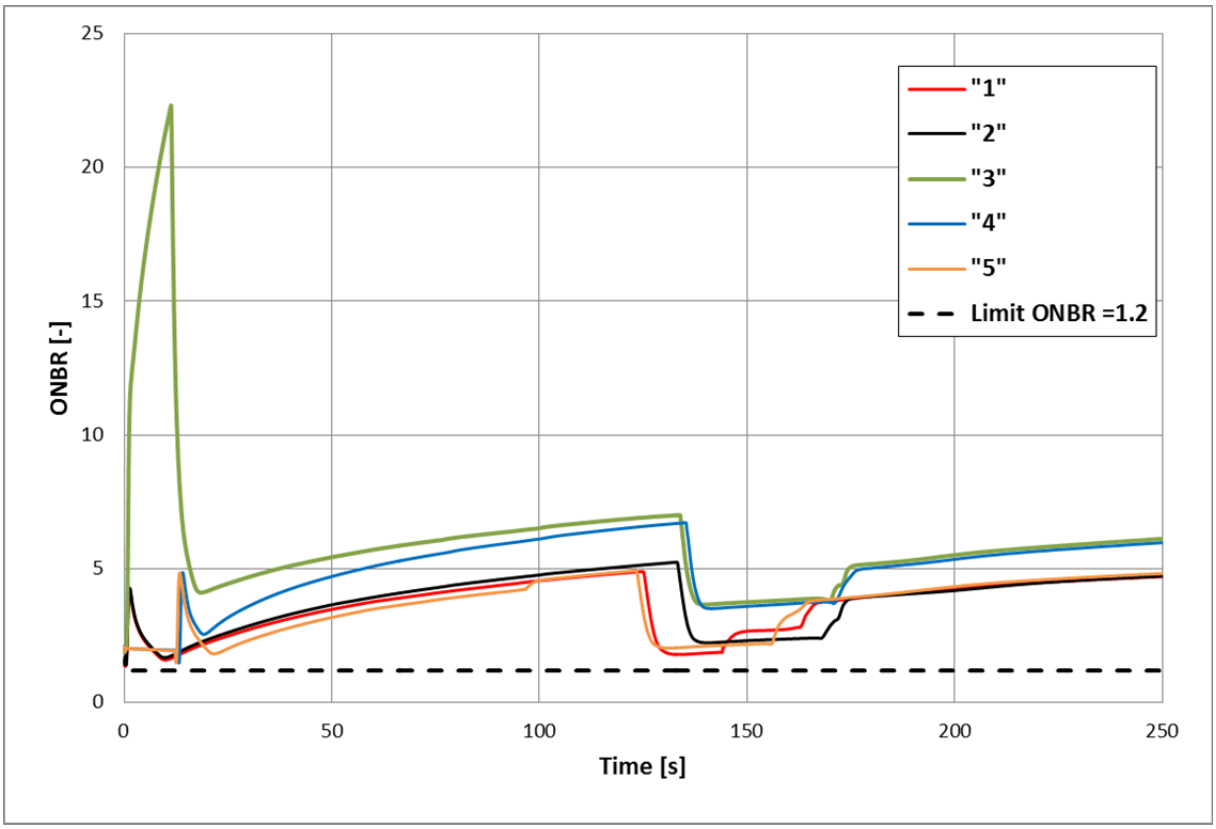

Figure 24. SBLOCA - ONBR parameter

Table 15 SBLOCA - value of ONBR

Case		Lowest value of ONBR [-]	
	First peak	Second peak	Third peak
1	1.36	1.60	1.80
2	1.54	1.68	2.23
3	-	4.11	3.66
4	1.48	2.55	3.51
5	1.49	1.83	2.04

In all cases, the minimum value of the ONBR parameter is higher than 1. Fast depressurization does not lead to the start of nucleate boiling on the fuel pipes cladding surface.

Conclusions

Most severe conditions in the Small Break LOCA analysis occurs in case number “1” located at the inlet to the core headers. This is mainly due to the high local pressure in the header and the development of the accident scenario. After the break, the valves 1z100A and 1z100B open enabling the water to flow from the reactor pool mainly through the headers. Only part of this water can remove the decay heat from the fuel.

The analysis showed that the Small Break LOCA will not cause any damages to the fuel and no radionuclides will be released to the environment. The water escaping through the break will increase the radiation level in the rooms where the break is located. At the end of the analysed period of time, the water loss stabilises at the level of 10.5 to 13.5 kg/s. Such an amount of water will be supplied from the reactor pool. In case of a low water level in the reactor pool, water can be supplied from the water tanks and recirculation system (about 7 kg/s) and from the technical water supply system (about 13 kg/s).

After a few hours after shutdown the decay heat should decrease to such a low level that the break could be isolated.

5.3. Medium Break LOCA (11.1%)

The Medium Break LOCA is defined in this analysis as a 11.1% break of a 300mm pipe. The analysis includes 4 cases – the same as in SBLOCA. However the case no. 5 was omitted due to the fact that the pipe diameter in the bypass is too small. It was expected that the highest impact of the break on the thermal-hydraulics would be for the cases “1” and “2” especially that for those cases the pressure was the highest and the results for SBLOCA showed higher impact than in cases “3” and “4”.

Table 16 MBLOCA - time sequence

	Time sequence for medium break LOCA [s]:			
Case	“1”	“2”	“3”	“4”
Break	0	0	0	0
Scram signal	0.0024	0.0024	0.506	0.505
+6.44 signal	5.0	5.2	5.04	5.02
+5.10 signal	59.8	67.8	58.3	57.8
Safety valve open	12.9 25.7	14.1 30.3	58.5	58.0
Hot channel quenching	62.4	53.3	-	-
PCT	36.2	35.0	0.5	0.5

For cases “1” and “2”, between the 12th and 15th second the safety valves are opened for a short period, however after approximately one second the valves are closed. Such a behaviour is the reason of pressure oscillations but has negligible impact on the scenario. The safety valves are opened fully again between the 25th and 31st second.

Mass flow at break location

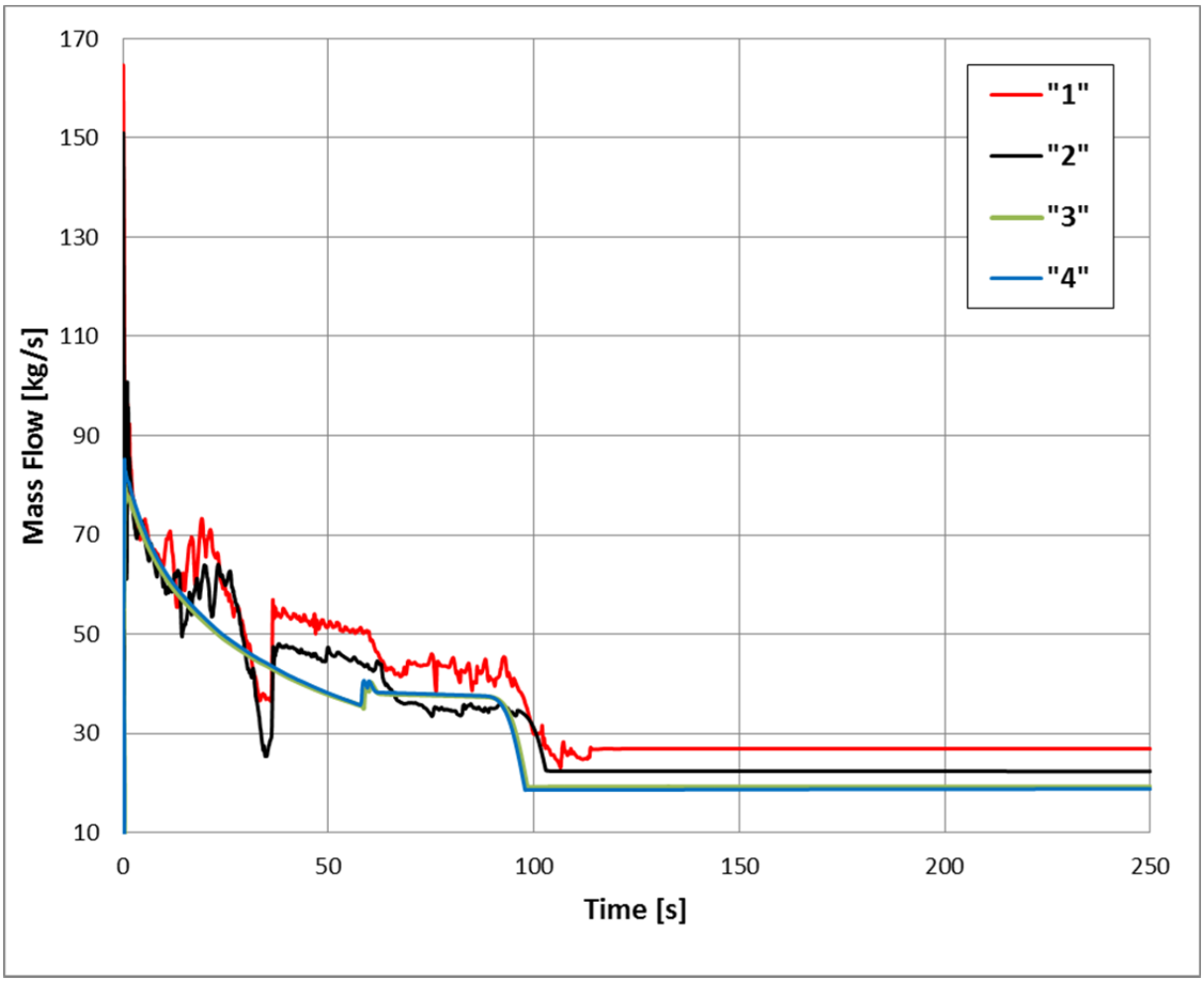

Figure 25. MBLOCA - break mass flow

Table 17 MBLOCA - break mass flow

		Break flow [kg/s]	
case	initial	maximum	after 250s
1	163.0	163.0	26.9
2	147.7	147.7	22.4
3	47.7	79.8	19.2
4	59.0	84.9	18.8

Similar to the SB LOCA the highest flow occurs in cases “1” and “2”. Also in these cases, oscillations from the beginning of the simulation to the 110th second can be observed. The reason of this is boiling in the fuel channels and steam movements.

Integrated mass flow at break location

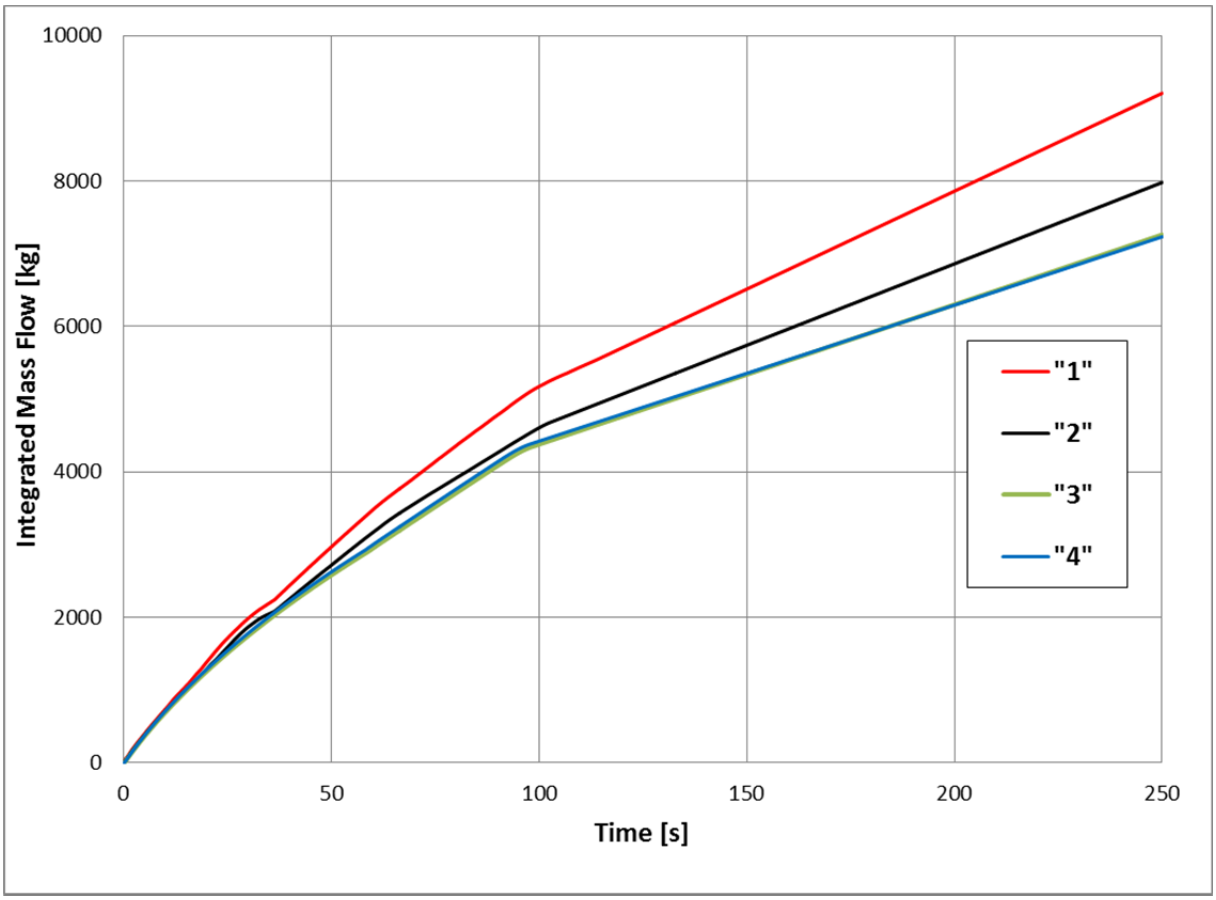

Figure 26. MBLOCA - integrated mass flow

Table 18 MBLOCA - integrated mass flow

	Integrated break flow [t]		
case	after 50s	after 150s	after 250s
1	2.97	6.52	9.21
2	2.72	5.74	7.98
3	2.58	5.34	7.26
4	2.63	5.36	7.23

For the Medium Break LOCA the integrated mass flow after 250 second ranges between 7.2 and 9.2 tons of water for case “1”.

Pressure

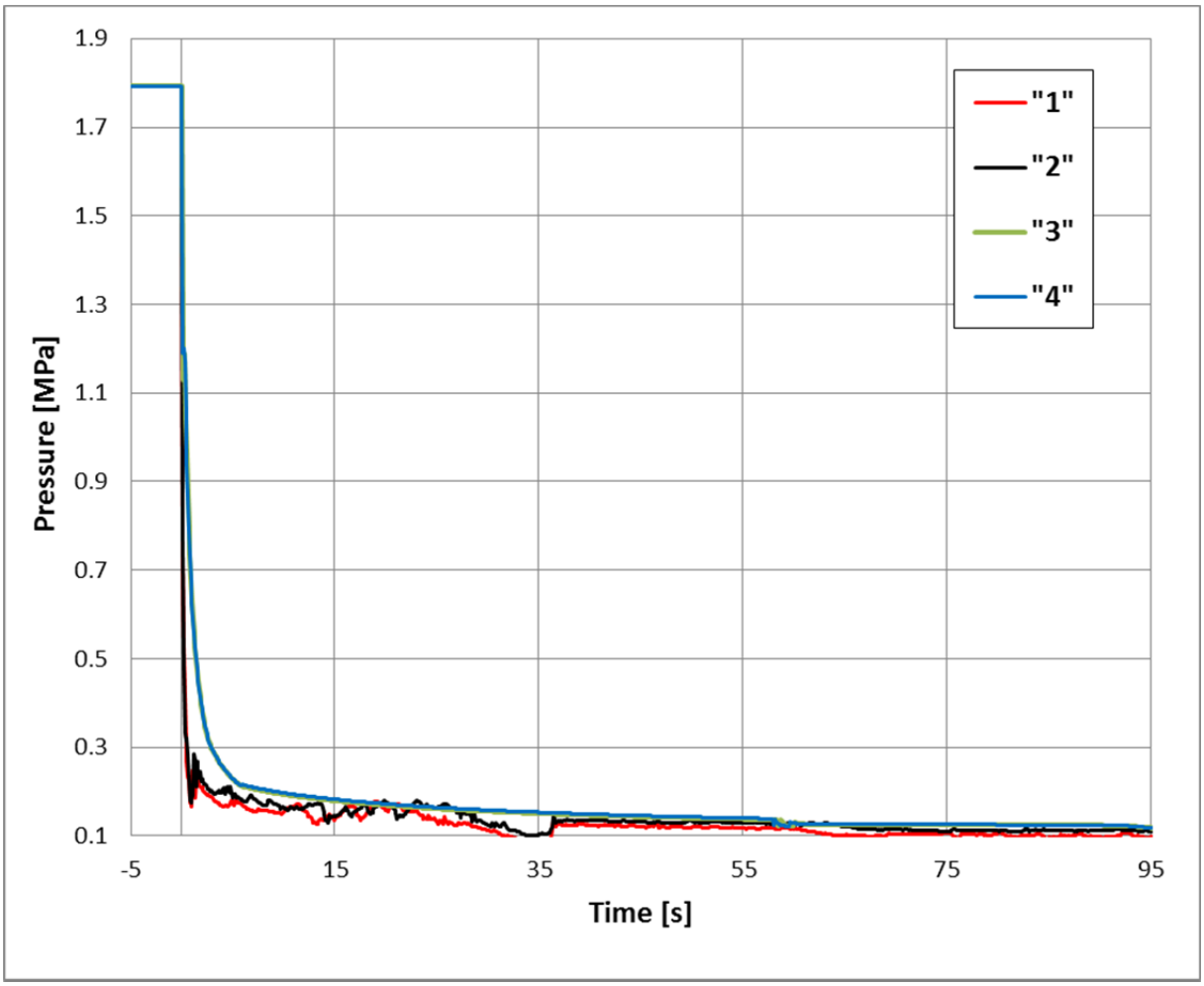

Figure 27. MBLOCA - pressure in inlet headers in the fuel channels cooling circuit

Table 19 MBLOCA - value of pressure

	Pressure [MPa]		
case	after 1s	after 5s	after 10s
1	0.17	0.17	0.15
2	0.18	0.19	0.16
3	0.63	0.23	0.19
4	0.63	0.23	0.20

In all analyzed cases the pressure drop occurs immediately after the break and initiates reactor scram after a “low pressure” (lower than 1.4 MPa) signal.

Peak cladding temperature (PCT)

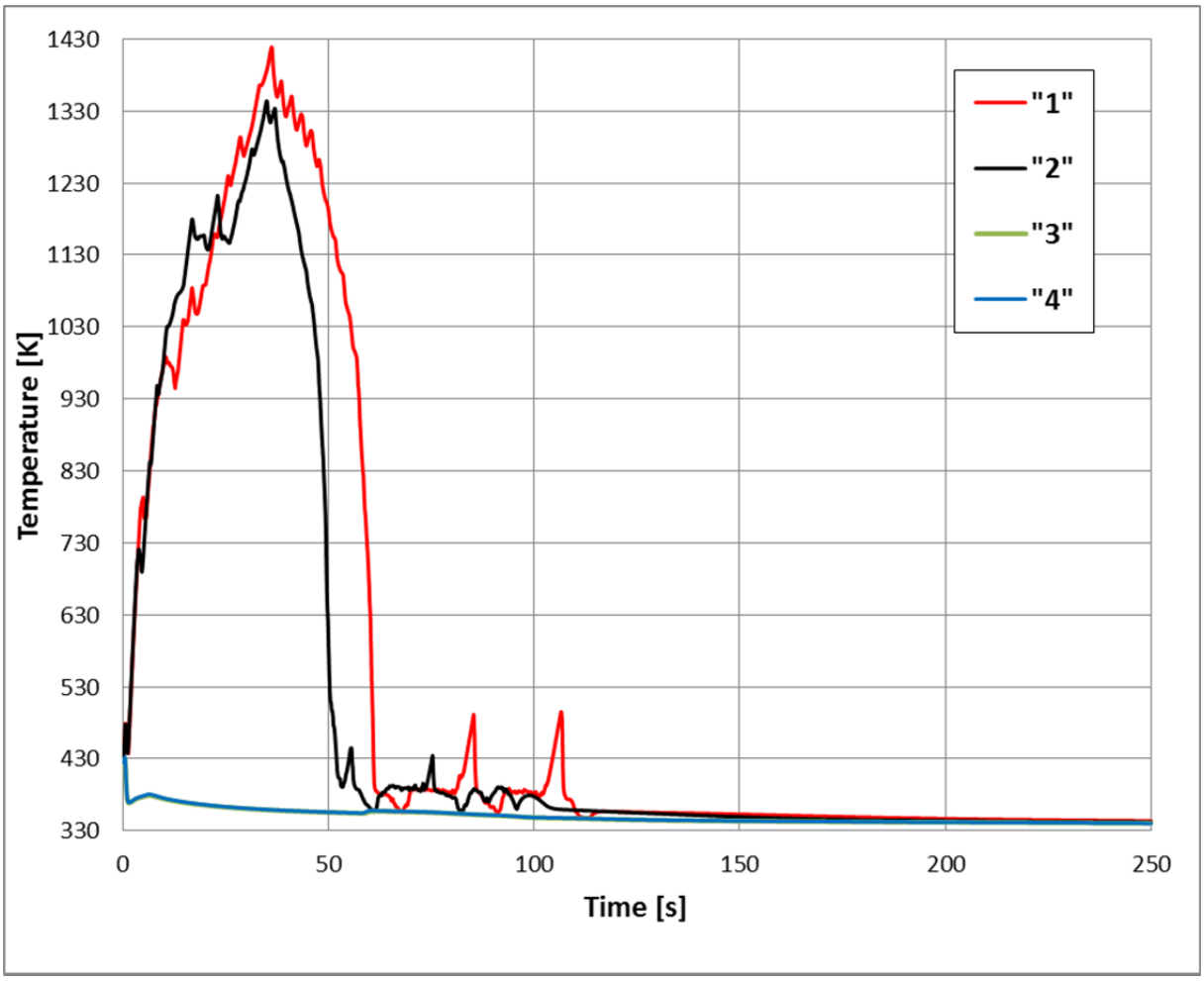

Figure 28. MBLOCA – peak cladding temperatures

Table 20 MBLOCA - peak cladding temperatures

	PCT [K]		
case	First peak	Second peak	Third peak
1	1418.7	-	-
2	1343.6	-	-
3	429.4	-	-
4	432.1	-	-

For cases “1” and “2”, in the first seconds, the temperature of cladding immediately rises, CHF occurs and the melting point of cladding material is exceeded. Approximately 30 seconds later, after the safety valves are opened, the temperature decreases and quenching occurs.

For cases “3” and “4” the temperature does not rise and no boiling occurs. The temperature trend is similar as in the SBLOCA cases.

ONBR parameter

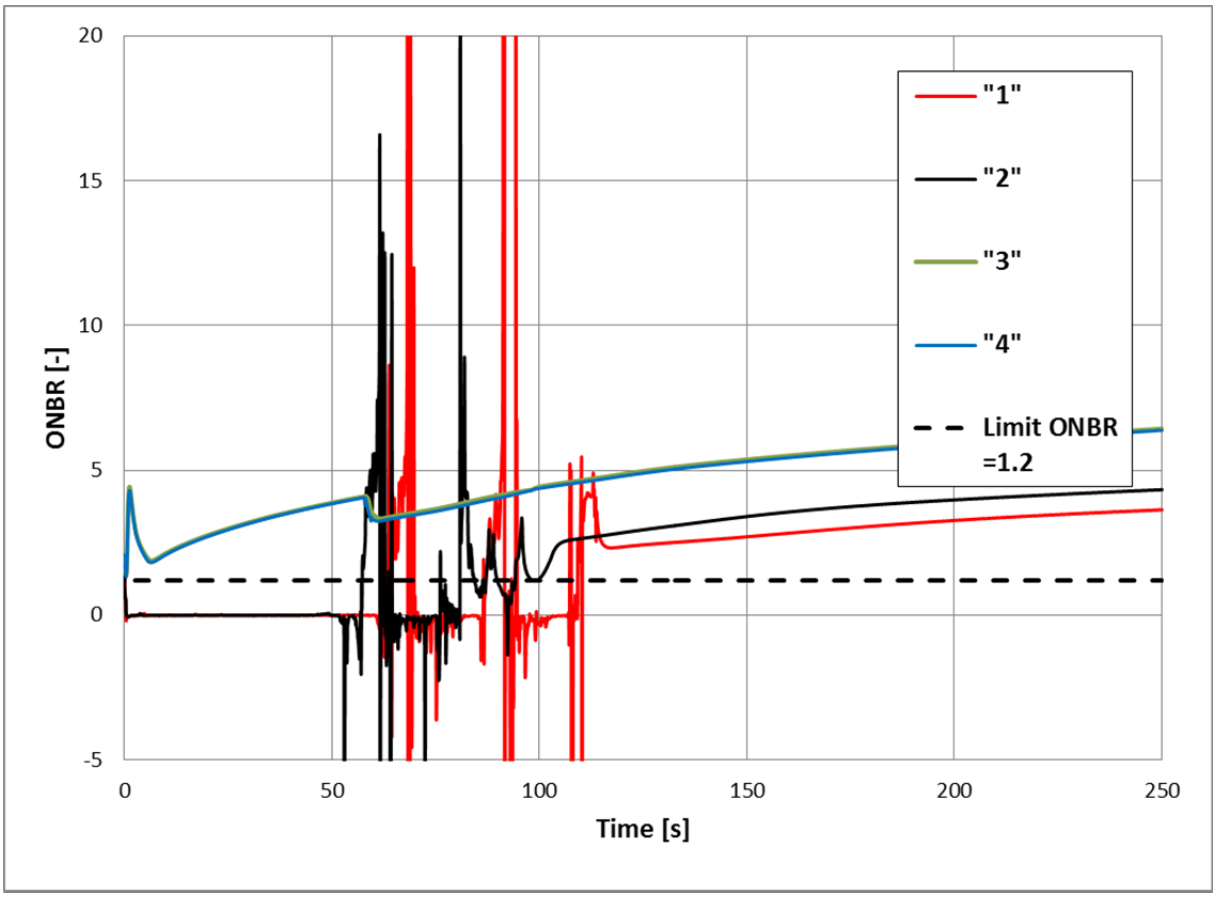

Figure 29. MBLOCA – value of the ONBR parameter

Table 21 MBLOCA - value of ONBR

	Lowest value of ONBR [-]		
case	First peak	Second peak	Third peak
1	-	-	-
2	-	-	-
3	1.40	1.88	3.33
4	1.32	1.82	3.24

The calculations for cases “1” and “2” show that boiling in the fuel channels lasts for about 110 seconds. In cases ”3” and “4” the value of the ONBR parameter remains higher than 1.2 and there is no probability of boiling.

Additionaly in cases “1” and “2”, ONBR for the medium power channels will be lower than one which means that steam generation should be observed also in other channels than the hot channel.

Analysis of overheating for medium LOCA

This subchapter is devoted to a more detailed description of the two cases of MB LOCA scenarios that caused overheating of the fuel elements.

As already mentioned, the cladding solidus temperature is about 855K. In case “1” the temperature peak in the hot channel higher than the solidus line lasts for approximately for 51 seconds and in case “2” - for 41.5s.

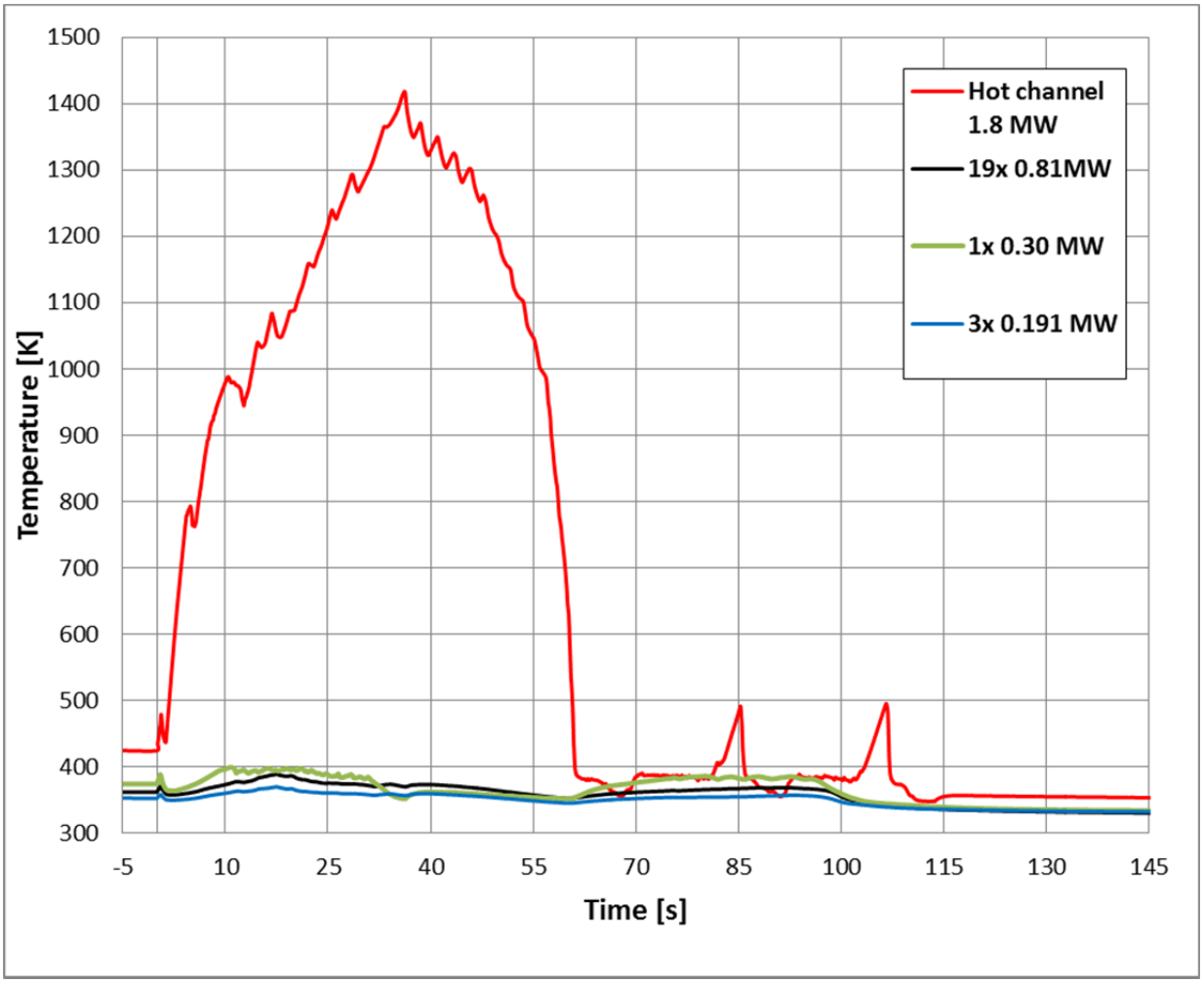

Figure 30. Cladding temperature in middle of channel in different reactor channels according to power levels.

The Critical Heat Flux (CHF) occurs only in the hot channel with the power 1.8 MW. The rest of the fuel channels cladding temperatures are lower and do not reach 400K. At the beginning of LOCA, the temperature in the hot channel wall rises and the heat transfer decreases sharply due to the change in the heat transfer mechanism.

The fuel element consists of five fuel pipes with differing power distribution. The steady state calculations showed that the highest temperature can be observed on the fifth pipe, on the external surface. The SBLOCA calculations confirmed that all PCTs were observed in the same place of the fuel elements. In the case of the Medium Break LOCA scenario, the PCT presented on Figure 28 has been redrawn on Figure 31, Figure 32, Figure 33, Figure 34 and Figure 35 with more details including elevations and information on the pipe number. Due to the high flow oscillations in this scenario, the real PCT is observed in slightly other positions than in other calculations. The numbers -45, -35, …+45 relate to the elevation on the cladding.

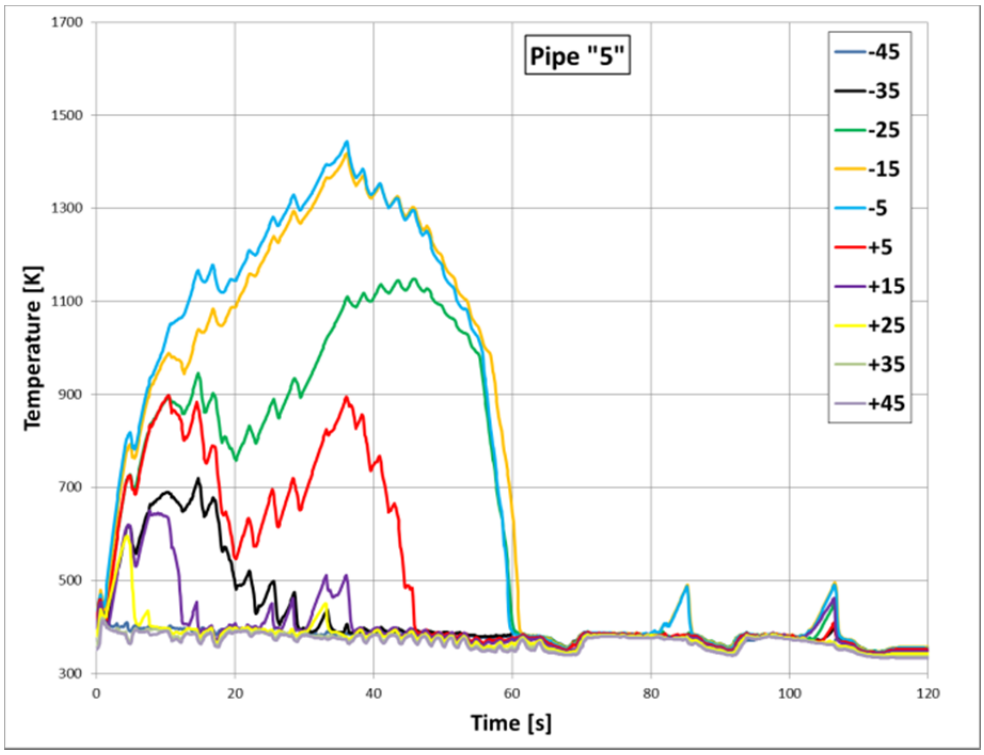

Figure 31. Y-axis inner cladding temperature distributions on fuel pipe no. 5

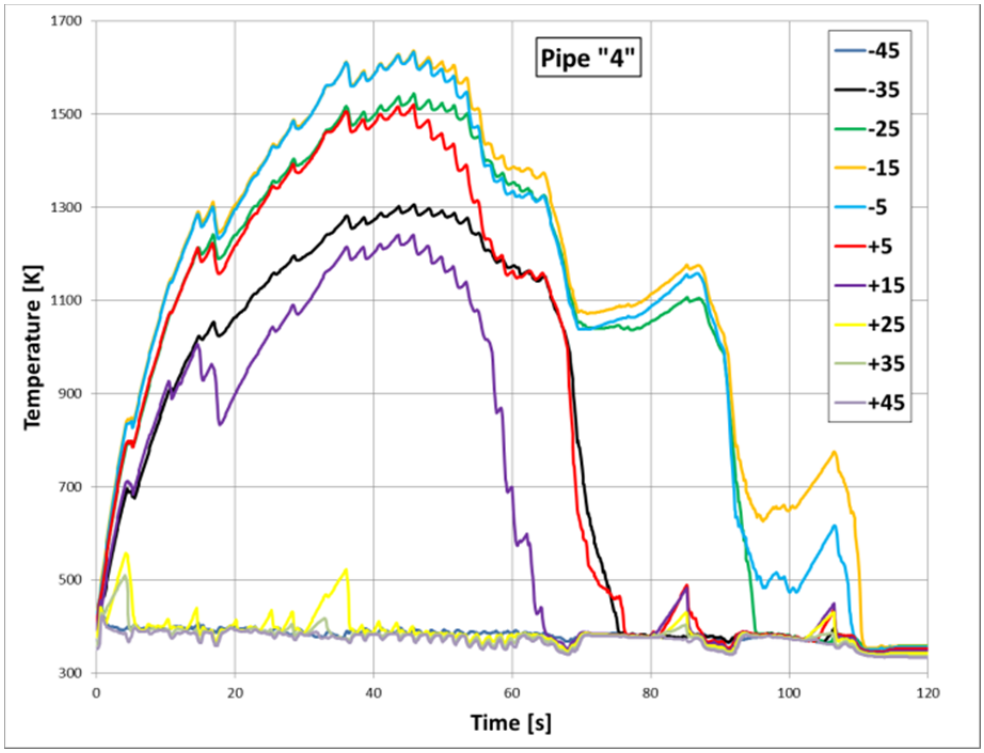

Figure 32. Y-axis inner cladding temperature distributions on fuel pipe no. 4

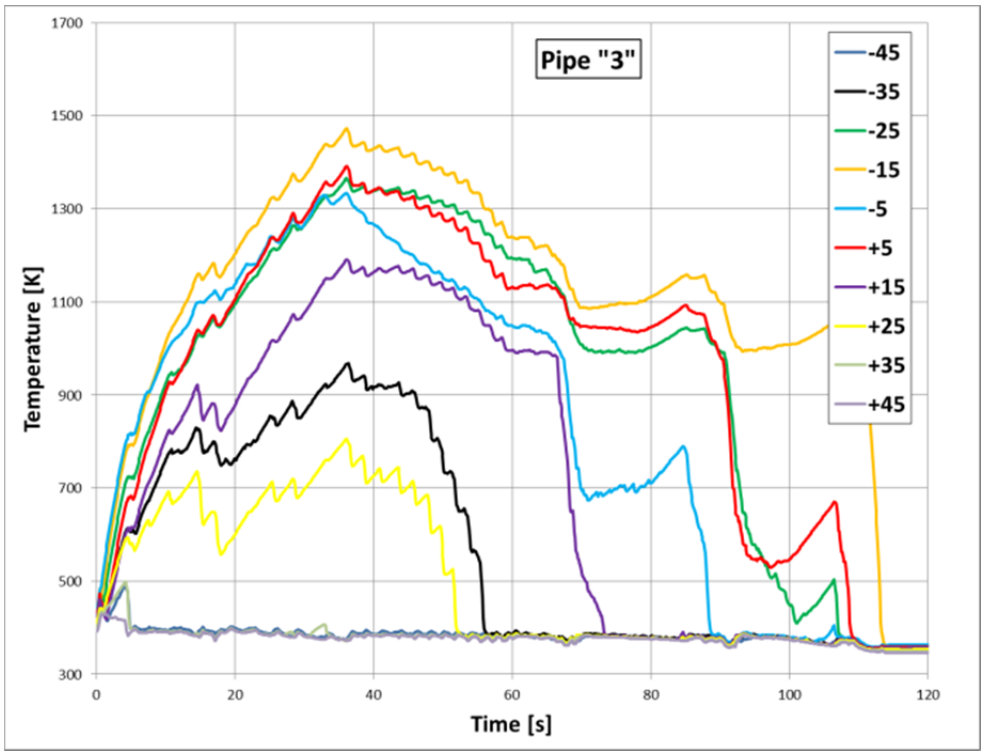

Figure 33. Y-axis inner cladding temperature distributions on fuel pipe no. 3

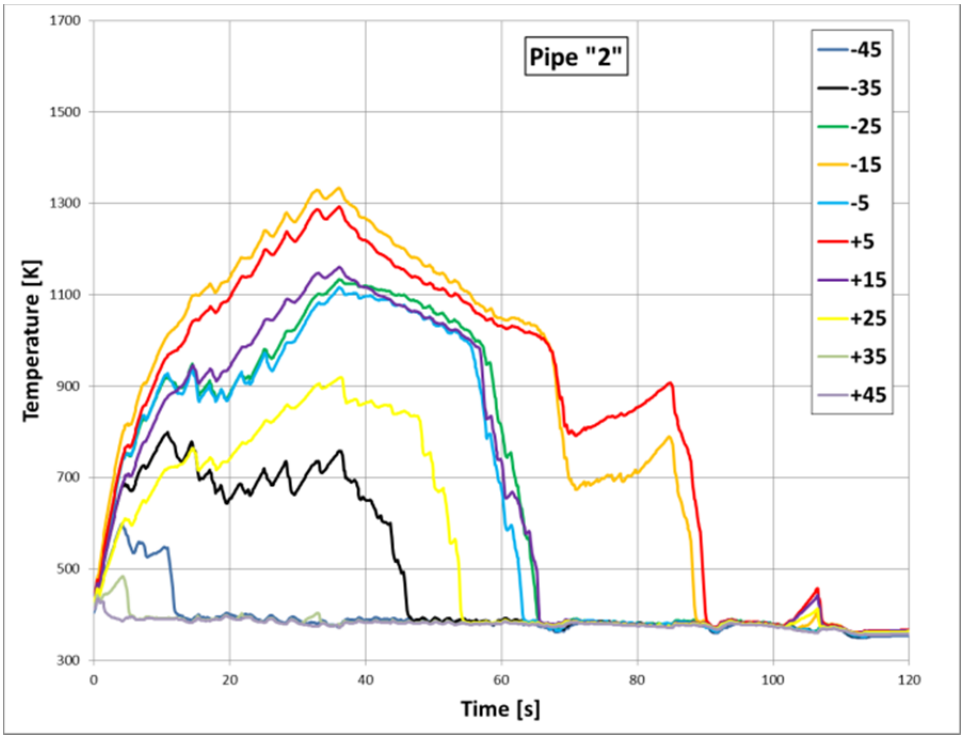

Figure 34. Y-axis inner cladding temperature distributions on fuel pipe no. 2

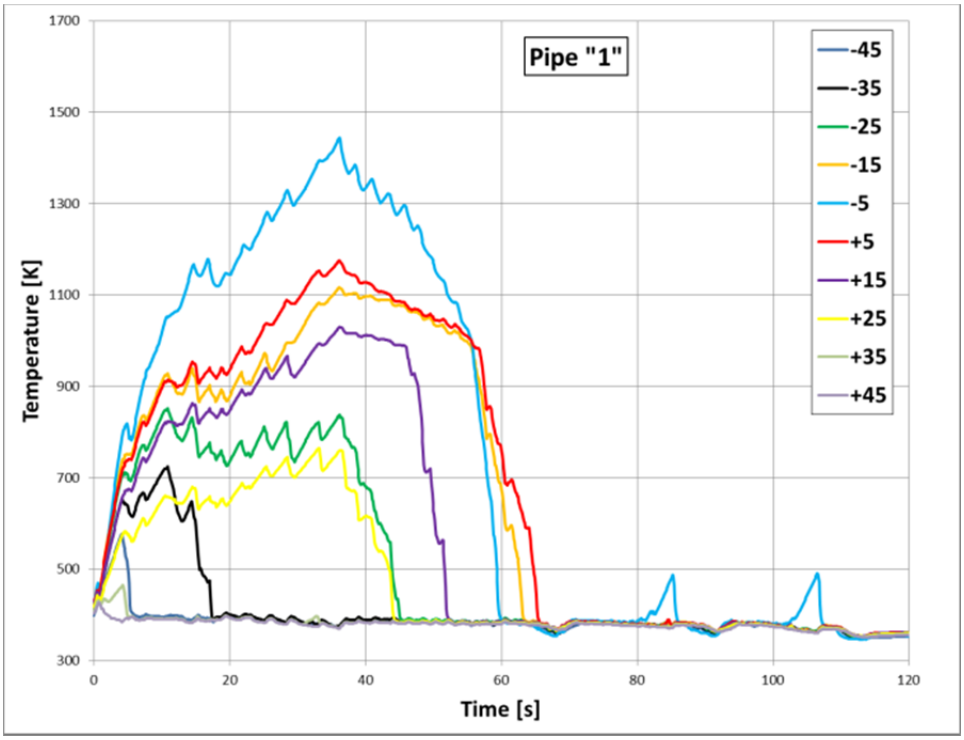

Figure 35. Y-axis inner cladding temperature distribution on fuel pipe no. 1

It can be observed that the temperature of the cladding is higher than the aluminium solidus in all fuel pipes in the hot channel especially in the lower part of the core. The highest PCT value according to the calculations is 1633K on pipe no.4.

As a consequence, the high temperature will cause damage to the cladding i.e. in all pipes melting of the cladding should occur combined with the release of iodine and noble gases from the fuel. Degradation of the fuel is also very likely. A summary of the stress put on the pipes is presented on Figure 36. The numbers indicate the length of time when each pipe was exposed to excessive high temperature (855K). Additionally the exposure time is related to the elevation on the pipe.

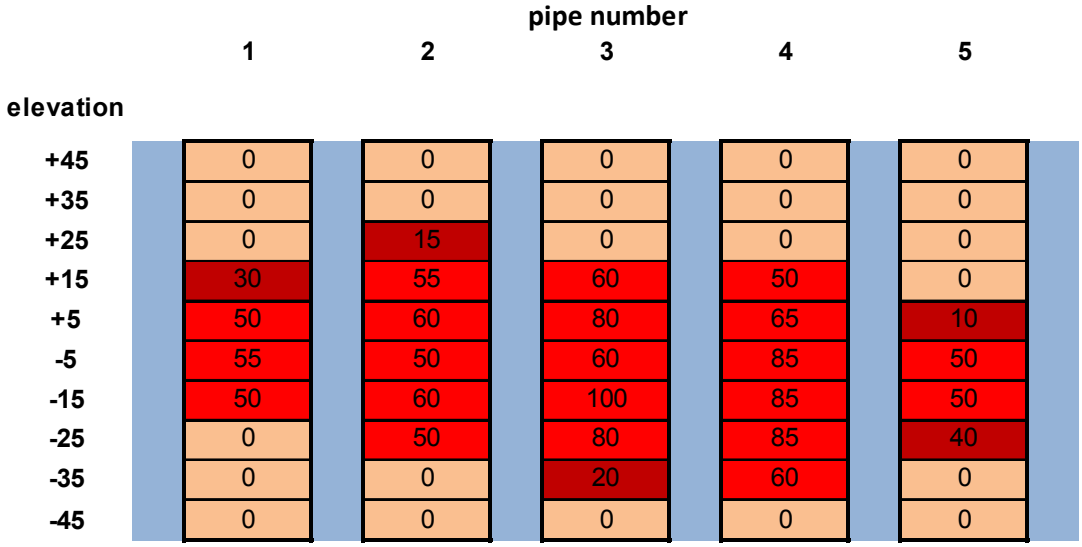

Figure 36. Exposure to excessive high temperature (over 855K) time (in seconds) as a function of elevation for 5 fuel pipes in the hot channel

The excessive temperature indicates high probability of cladding and fuel degradation. A more detailed analysis should be performed with the use of a severe accident code to predict more precisely PCT and the behaviour of overheated elements. The analyses shows that in 30% of the heat structures in the hot channel the temperature was very high, exceeded 855K and most probably the elements were damaged. Furthermore, high temperature of cladding should lead to other consequences including release of radionuclides:

1) iodine 131:
2) noble gases - in temperatures close to 900K the release is 100%.

Table 22 MBLOCA - release of Iodine

Temperature [K]	873	973	1073	1173	1273	1373
Iodine release %	2.5	15	50	70	80	90

The MBLOCA scenario includes the possibility of release of radionuclides. In the case of iodine, the fraction released as function of temperature is presented in Table 22. It has been assumed that the release of iodine - 131 and noble gases into water in the fuel channels cooling circuit will be 100%. Moreover, the scenario indicates that due to the very high temperature of fuel, more fission products should be released. According to the Safety Analysis Report the activity of fission products released from one fuel element are as presented in Table 23.

Table 23 MBLOCA - release of ispotopes from one fuel element

Isotope	Activity [Bq]	Isotope	Activity [Bq]	Isotope	Activity [Bq]
Br-83	1.1E14	**Kr-85m**	**2.6E14**	**Kr-85**	**3.7E12**
Kr-87	**5.1E15**	**Kr-88**	**7.4E14**	Sr-89	1.1E15
Sr-90	2.4E13	Ru-103	6.9E14	Ru-105	2.3E14
Ru-106	4.5E13	Te-131m	8.7E13	Te-131	5.5E14
Te-132	7.0E14	Te-133m	1.1E15	**I-131**	**4.5E14**
I-132	7.3E14	I-133	1.3E15	I-134	1.6E15
I-135	1.3E15	**Xe-131m**	**4.0E12**	**Xe-133m**	**2.5E13**
Xe-133	**9.3E14**	**Xe-135m**	**3.9E14**	**Xe-135**	**9.2E13**
Cs-134	2.8E13	Cs-137	2.5E13		

It can be assumed that all possible radionuclides might escape through the break into the containment. During normal reactor operation, the air from the reactor building is directed to the reactor stack. In the case when a radionuclide content in the venting air is detected, a special valve that directs the vented air to the special Vokes air filters located before the stack, will be automatically actuated. The efficiency of filters for iodine and noble gases is at the level of 0.99. It should be taken into account that some part of the radionuclides will be deposited inside of the reactor building.

Mass flow behaviour

The reason for the hot channel overheating is a rapid loss of the mass flow in the channel. This is caused by (1) the break and (2) the main cooling pumps trip. An additional loss of pressure decreases the saturation temperature and boiling starts rapidly after LOCA not only in the hot channel but also in the medium power channels. In the low power channels, the ONBR parameter is higher than 1 and such a condition is not sufficient to initiate boiling.

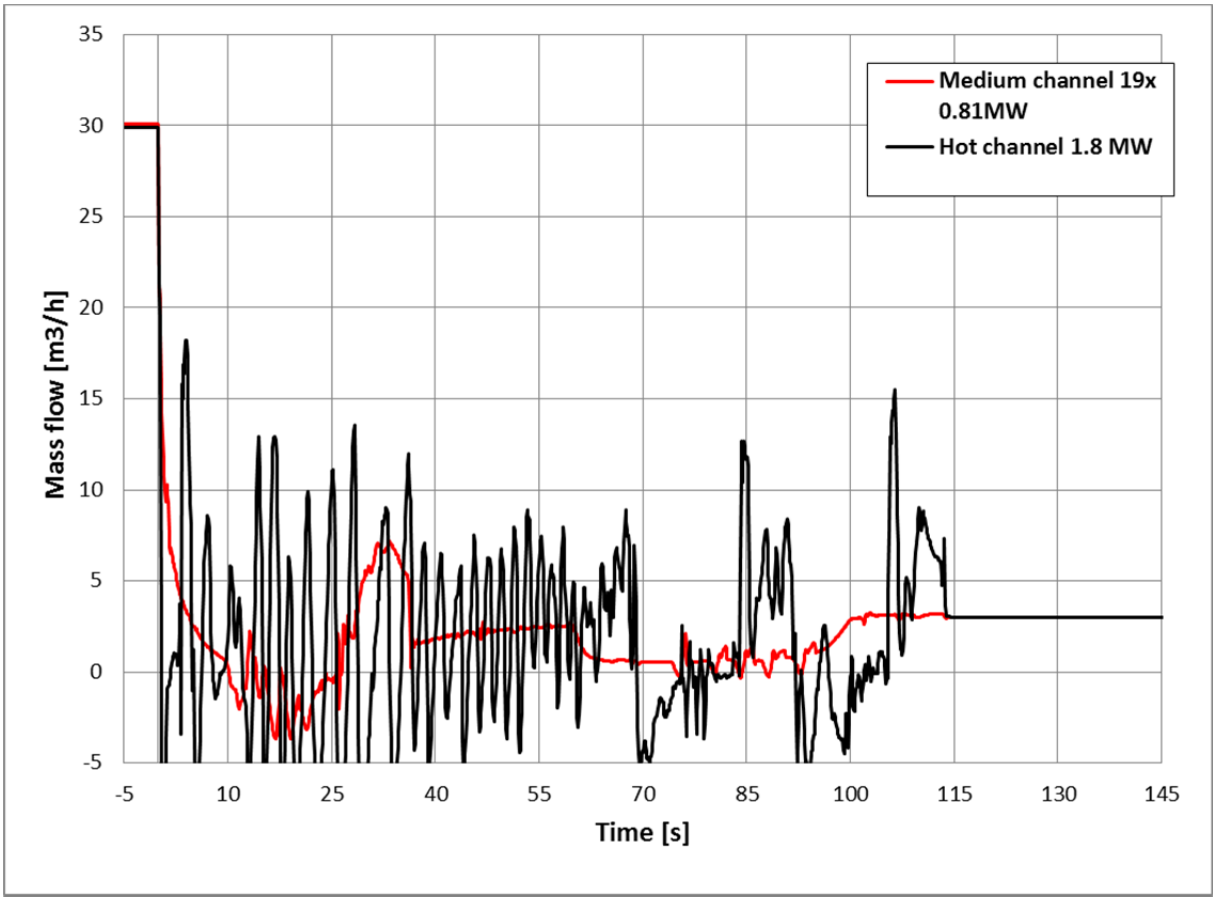

Figure 37. Mass flow in m3/h behaviour during Medium Break LOCA in hot and medium power channel in case "1".

The mass flow behaviour in the hot and medium power channel in case no. "1" is presented in Figure 37. Considerably large oscillations are noticeable, which are a result of boiling in the hot channel. In the medium power channels, boiling starts in about the 10th second and lasts for 15 seconds. Then again boiling starts after 75 seconds when one additional pump is tripped.

Conclusions

In the case of the Medium Break LOCA in the research reactor MARIA, critical heat flux in the channel inlet pipe will occur. The temperature of the cladding will rapidly rise exceeding the melting temperature of materials. It will cause local melting of the cladding material and possible local degradation of the fuel in the hot channel only.

Degradation of the fuel and behaviour of materials should be analysed in more detail using a sever accident code because RELAP5 omits some specific phenomena than can appear during this accident (i.e. interaction of the aluminium cladding with nuclear fuel and oxidation of the materials). The reason of CHF is a very high mass flow through the break in the first seconds without actuation of safety valves. After the safety valves are opened, the reactor is cooled very fast and long term core cooling is provided. Due to high temperature, noble gases and iodine will be releases - first to the primary channel cooling circuit and then into the containment.

In the other cases (“3” and “4”) analysed, MBLOCA will not cause any damage to the fuel and cladding and no boiling on the surfaces of the fuel pipes is predicted.

5.4. Large Break LOCA (44.4%)

The Large Break LOCA is defined in this analysis as a 44.4.1% break of a 300mm pipe cross secion. The analysis includes 4 cases – the same as in MBLOCA.

It was expected that for cases “1” and “2” the results would be similar to the Medium Break LOCA with possible higher temperature. Cases “3” and “4” should be investigated in more detail in view of the expected occurance of CHF.

Table 24 LBLOCA - time sequence

	time sequence [sec]			
Case	“1”	“2”	“3”	“4”
Break	0	0	0	0
Scram signal	0.0127	0.0024	0.507	0.525
+6.44 signal	4.7	4.6	4.6	4.4
+5.10 signal	48.7	52.1	49.7	48.0
Safety valve open	0.023	0.002	5.3	7.0
Hot channel quenching	158.0	53.3	-	15.6
PCT	57.9	30.9	0.5	12.5

The break mass flows and integrated break mass flows for cases 1, 2, 3 and 4 are presented on Figure 38 and Figure 39 respectively. The significant values of the mass flow and integrated mass flow are presented in Table 25 and Table 26.

Presented next are pressure changes (Figure 40) and values (Table 27), followed by peak cladding temperature (Figure 41 and Table 28) and onset of nucleate boiling ratio (Figure 42 and Table 29).

Mass flow at break location

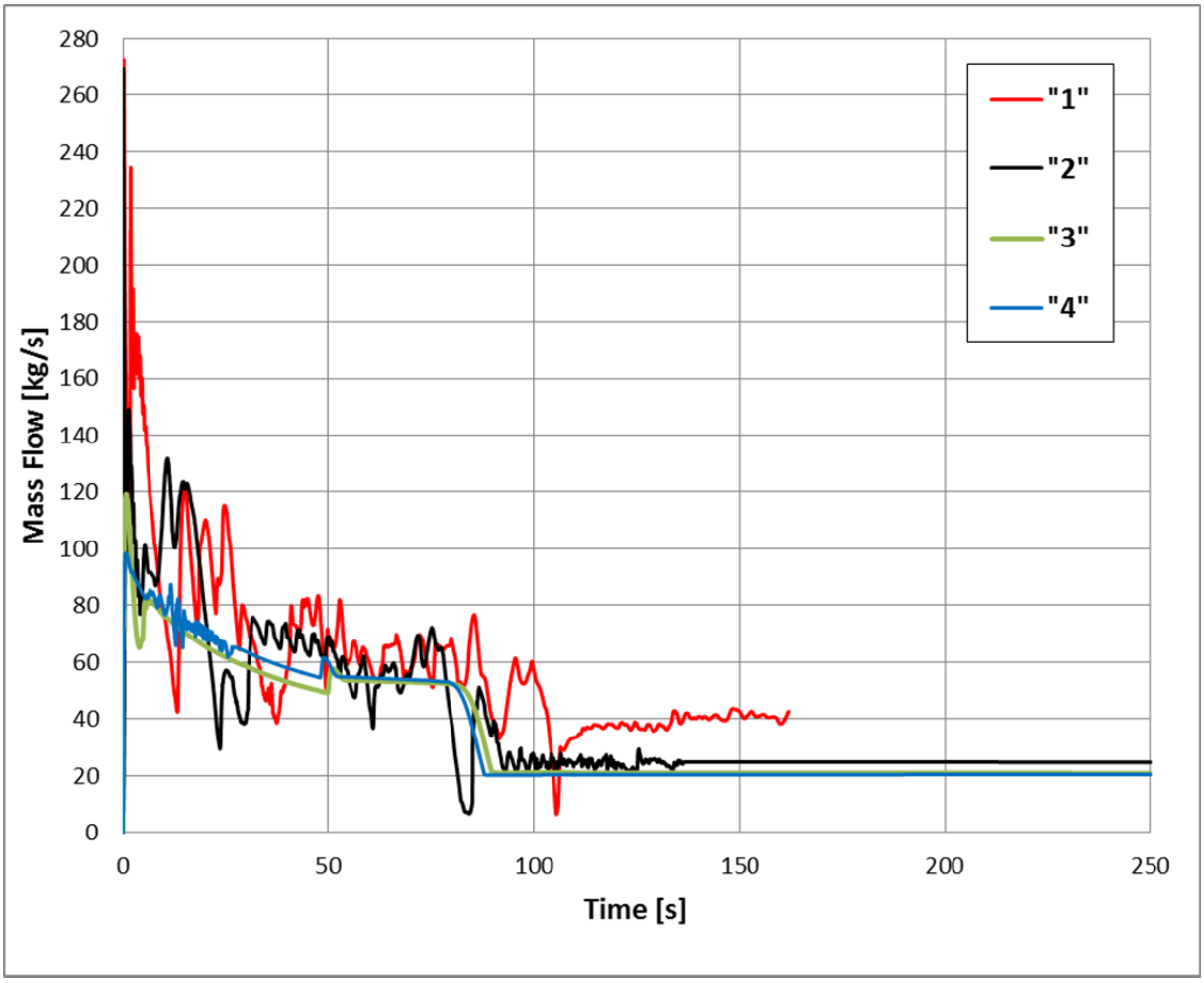

Figure 38. LBLOCA - break mass flow

Table 25 LBLOCA break mass flow

	Break flow [kg/s]		
case	initial	maximum	after 250s
1	156.3	272.2	42.70*
2	264.5	264.5	24.7
3	51.8	119.2.0	20.9
4	46.5	97.6	20.4

*for time 167s

As expected, the break mass flow is larger for LBLOCA than for MBLOCA. The difference reaches nearly the factor 2 between the break mass flow in cases with the break at core inlet and cases with the break at core outlet.

Integrated mass flow at break location

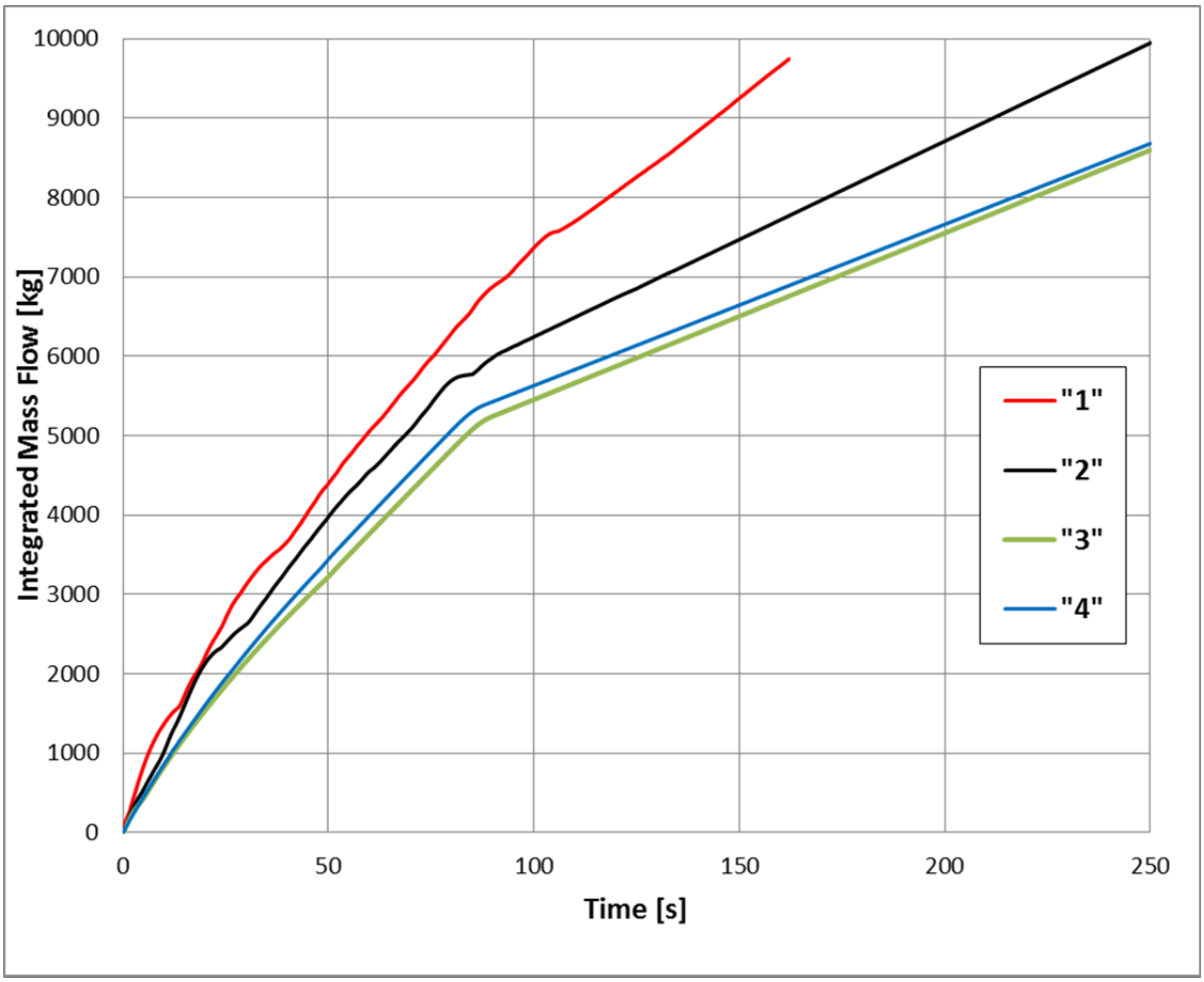

Figure 39. LBLOCA - integrated mass flow

Table 26 LBLOCA - integrated mass flow

	Integrated break flow [t]		
case	after 50s	after 150s	after 250s
1	4.40	9.25	-
2	3.98	7.47	9.95
3	3.22	6.50	8.60
4	3.44	6.65	8.68

Pressure

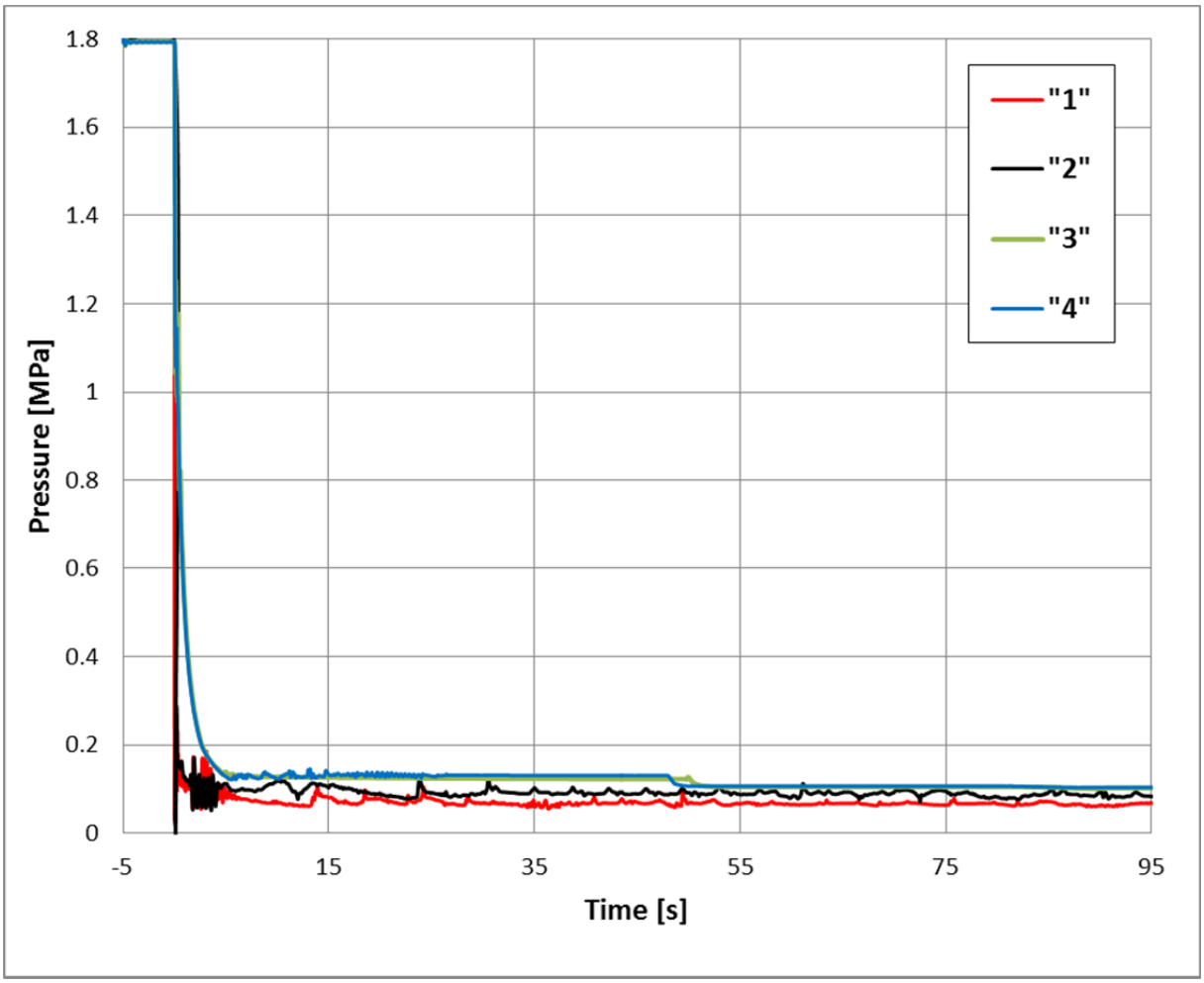

Figure 40. LBLOCA - pressure in inlet headers in the fuel channels cooling circuit

The pressure drop occurs immediately after the break and the “low pressure” signal is the initiating signal for reactor SCRAM.

Table 27 LBLOCA - value of pressure

	Pressure [MPa]		
case	after 1s	after 5s	after 10s
1	0.10	0.09	0.07
2	0.09	0.12	0.10
3	0.13	0.13	0.13
4	0.13	0.12	0.13

Peak cladding temperature (PCT)

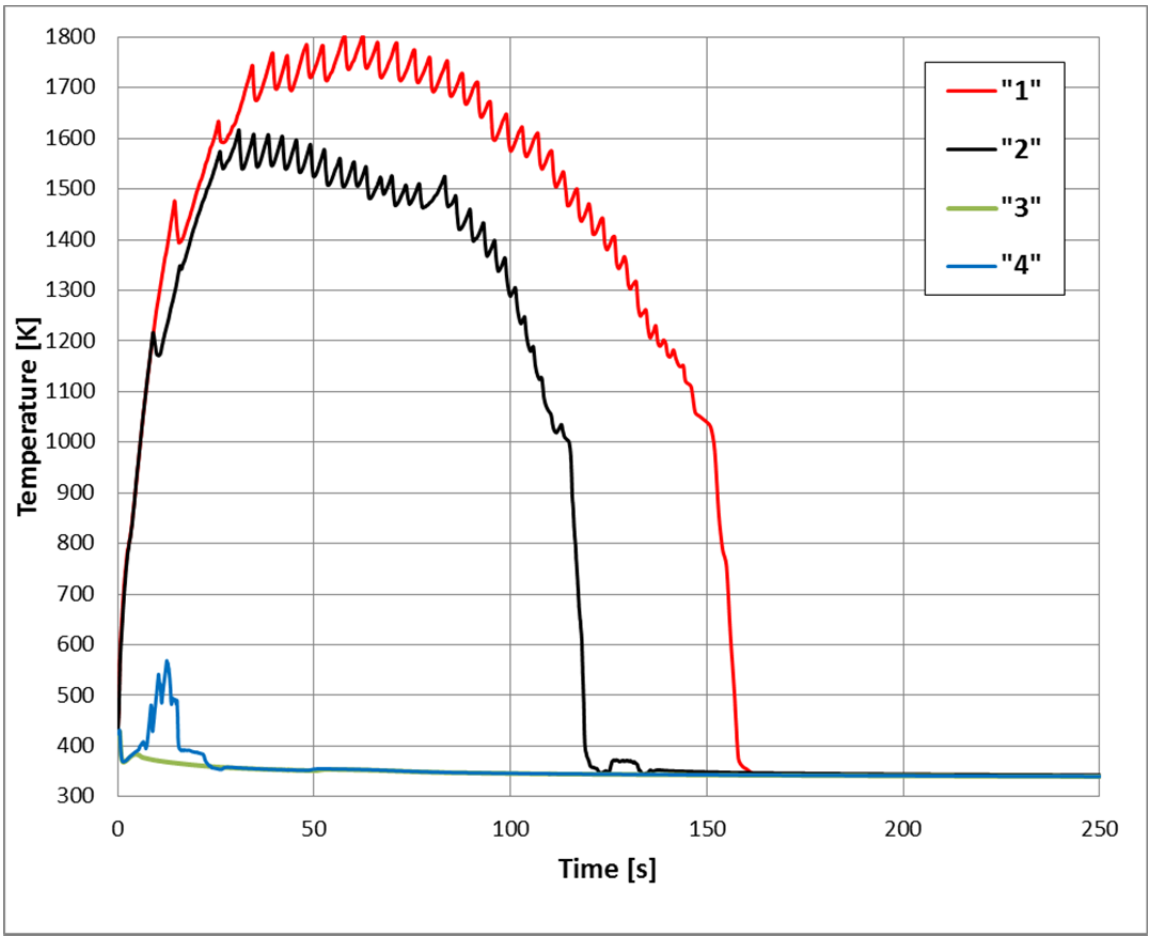

Figure 41. LBLOCA - PCT in inner side of outer pipe of fuel element of hot channel

For cases “1” and “2” similarily as in MBLOCA boiling and CHF occurs. The temperature rise is higher and the cladding temperature for longer time is higher than the solidus temperature in comparison to the previous cases. It can be observed that also in case “4” boiling occurs and the temperature increases to 568.7 K. This temperature is lower than the solidus temperature and shouldn’t cause cladding damage or radionuclide releases.

Table 28 LBLOCA - peak cladding temperature

	PCT [K]
case	First peak
1	1803.3
2	1616.8
3	384.1
4	568.7

ONBR parameter

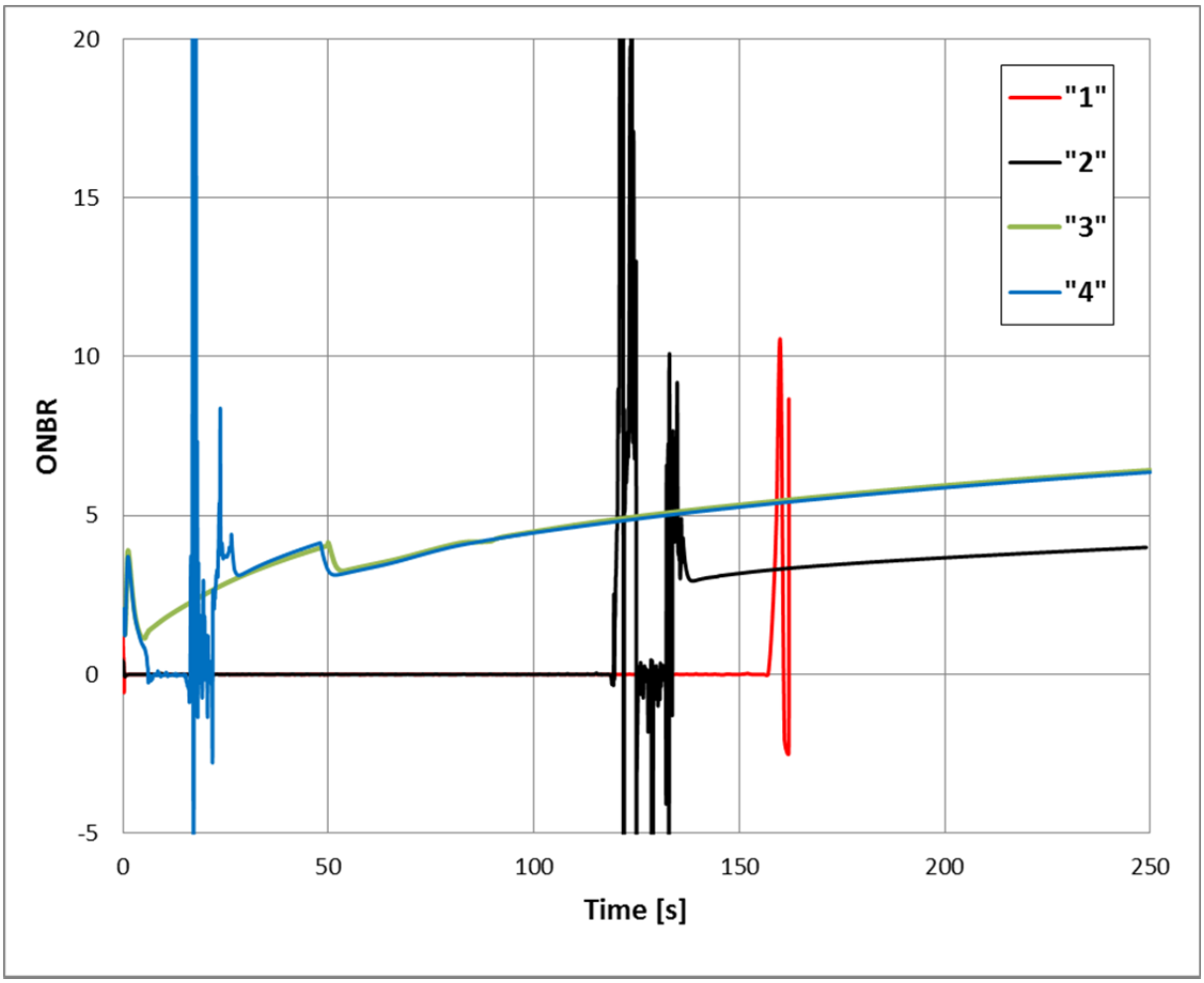

Figure 42. LBLOCA – value of the ONBR parameter in time.

Boiling occurs in cases “1”, “2” and “4” and lasts for different time periods. In case “4” the boiling time is about 10 seconds. In case “3” the ONBR parameter reaches the lowest value 1.15 and is close to boiling.

Table 29 LBLOCA – value of ONBR

	Lowest value of ONBR [-]		
case	First peak	Second peak	Third peak
1	-*	-	-
2	-*	-	-
3	1.25	1.15	3.25
4	1.22	-*	3.13

* Beginning of boiling in the hot channel.

Analysis of overheating for LBLOCA

As it was expected, the Large Break LOCA scenario is similar to the Medium Break LOCA scenario and CHF is observed in cases “1” and “2” with a higher impact especially in case “1”. Additionaly, in case “4” a short increase of temperature in the hot channel can be observed that will cause boiling for short period without any consequences.

For case “1” the PCT is 1803.3K and that is much more than the solidus temperature for aluminium alloy cladding. This temperature peak lasts longer than 100 seconds and in such a case it can be assumed that damage of the fuel will occur not only in the hot channel but also in other parts of the core (in other fuel channels). Fuel degradation is possible only in the hot channel with fission power 1.8 MW. The temperature peaks in other channels are presented on Figure 43.

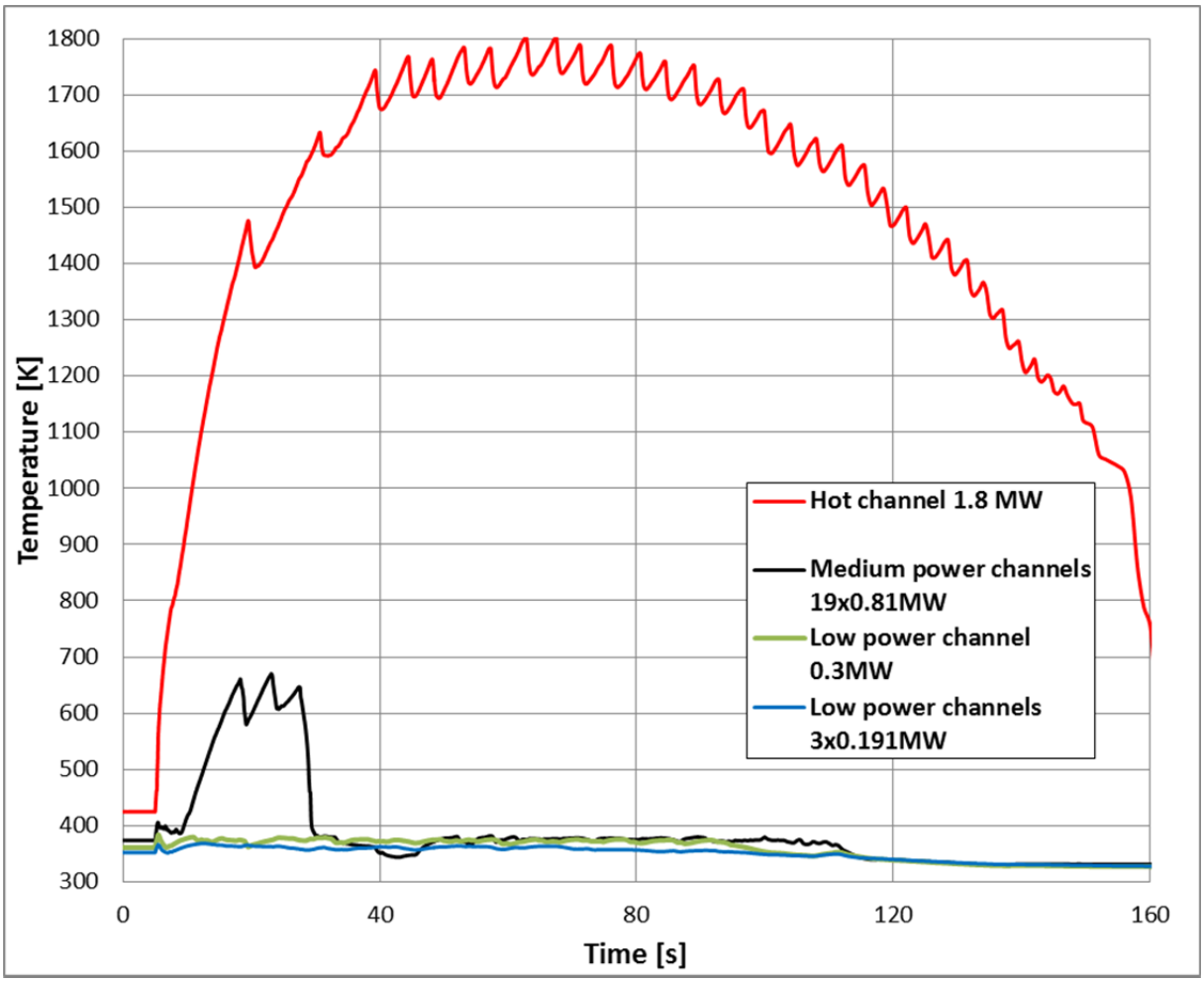

Figure 43. Temperature changes in all fuel channels during LBLOCA for the most severe case no. ’1’

For the fuel channels with power 0.81MW, CHF occurs but the temperature rise (PCT is 670.2K) is lower than 855K and no radionuclide release should follow. However, during normal operaton of the reactor, the power difference between the medium and hot channel might be lower. As a

result several medium power channels might work with power exceeding 1MW and then in case of LBLOCA, the temperature peak will be higher than presented and some radionuclide release is possible.

Conclusions for large break LOCA

Large break LOCA is one of the most severe accidents for the research reactor MARIA. The scenario shows that the temperature will rise immediately in almost all fuel channels. The temperature peak will exceed the solidus temperature of the aluminium cladding alloy causing material relocation and release of fission products to the primary fuel channel cooling circuit and into the reactor building. As with the Medium Break LOCA the fuel and cladding behaviour should be analysed in more detail with the use of a dedicated severe accident code.

After quenching, the flow through the break will stabilize and depending on the location of the break will reach from 20 to 24 kg/s. Even with the assumed water supplying systems working (mentioned in the conclusions of SBLOCA) it is still possible that the water level in the reactor pool might decrease, causing additional increase of radiation in the reactor building.

5.5. Double Ended Guillotine Break (DEGB) LOCA

The Double Ended Guillotine Break LOCA was analysed only for pipes in the bypass system in the primary channel cooling circuit. The postulated break was located on the outlet of one of the additional pumps with two possible combinations: (1) on the outlet of the additional pump that continue to work after the “+5.10” signal and (2) on the outlet of another additional pump that is shutdown when the “+5.10” signal occurs. The first scenarios is marked on Figure 44 as “A” and the second scenario as “B”.

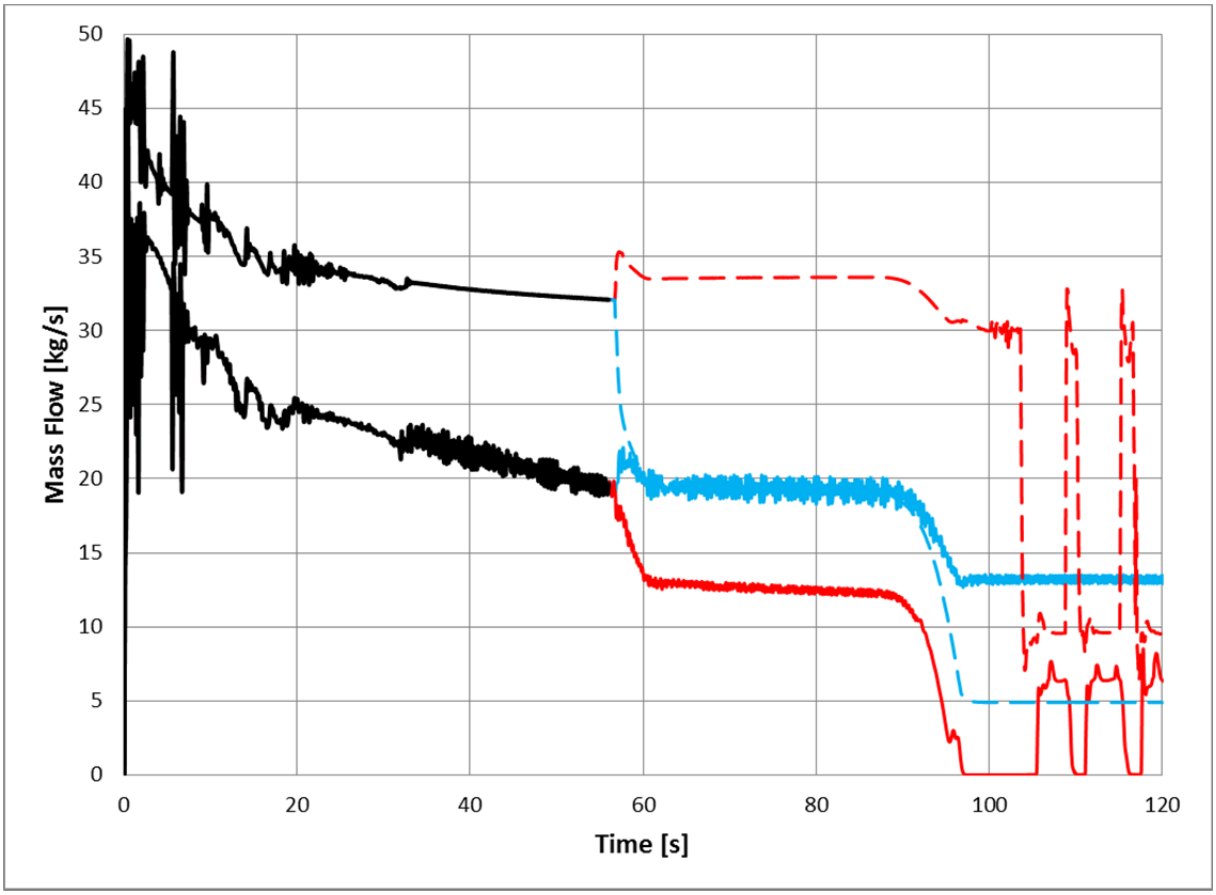

Figure 44. DEGB – break mass flow, red - scenario "A" , blue – scenario "B".

Table 30 DEGB LOCA – break mass flow rate

	Break mass flow rate [kg/s]		
case	maximal	after 70s	after 100s
A	94.3	46.1*	30.0
B	94.3	38.6	17.8

In the 56th second, the pressurizer tank water level will reach level +5.10 causing the shutdown of one of the two additional pumps. Till this moment, the scenario results are the same for the two analysed cases.

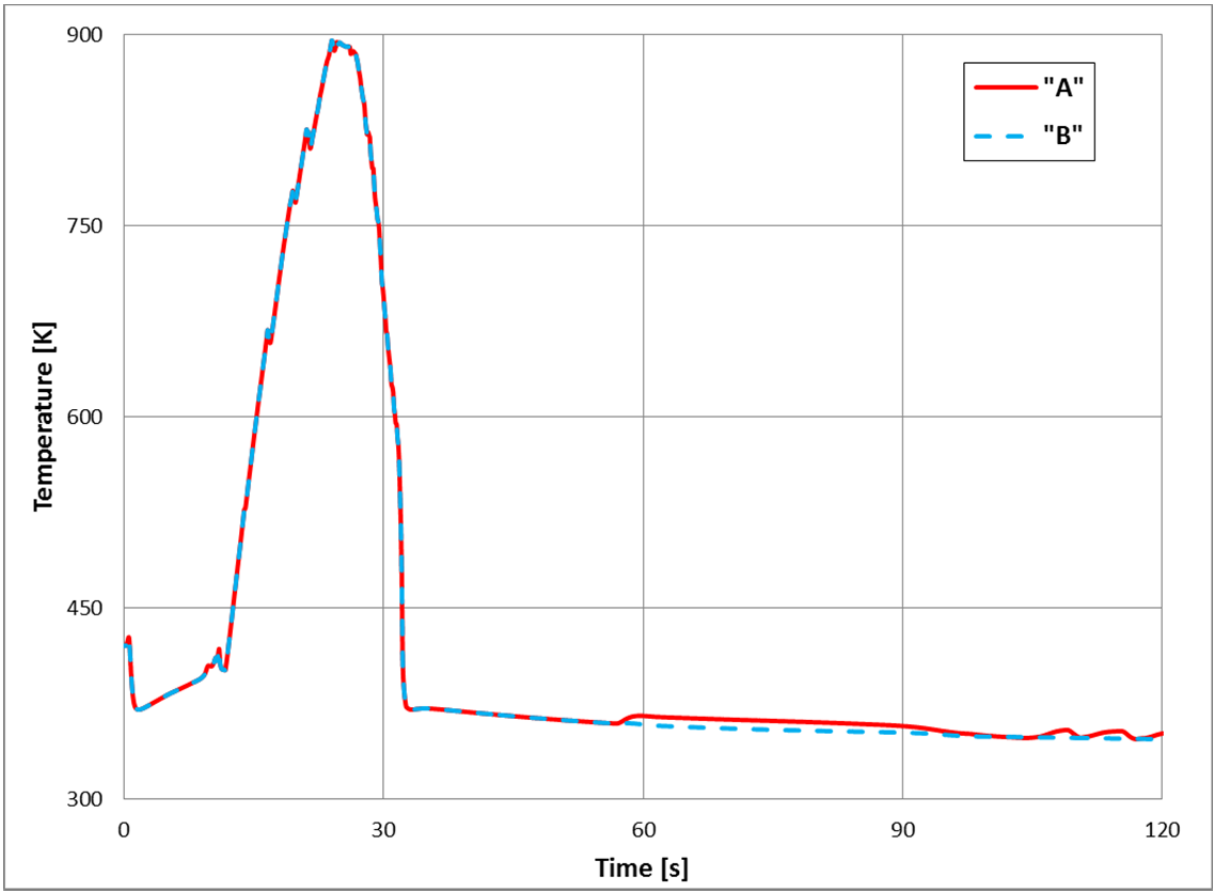

Figure 45. DEGB - PCT calculated on the fuel pipe no. 5.

PCT can be observed in pipe no. 5 and not, as usual, in pipe no. 6. The maximum temperature is 893.7 and exceeds the solidus temperature of the cladding for 5 seconds.

Conclusions

The calculations show big probability of radionuclide release to the cooling circuit, however with no fuel damage. The PCT does not depend on the analysed scenario and the peak can be observed only in the hot channel. The break can be easily isolated soon after the accident by closing the neighbouring motor valves.

5.6. LOCA with Additional Pumps Protection System

The design of the reactor includes a pumps protection system for main and additional pumps. In case when the electric power requested by the pump is too high, the protection system will turn the pumps off. The main task of this system it to prevent pump failure. During the operation of the reactor in case of a shutdown of the main pump, the reactor will be tripped. In case of a shutdown of an additional pump, the control system will turn on the third reserve additional pump without SCRAM. Including the protection system in the accident analysis can cause problems with the control of additional pumps.

The requested electric power for pumps depends on the pump characteristic. The head, power, efficiency and mass flow dependencies are presented in Figure 46. An example when the pumps protection system can cause problems is presented in Figure 47 showing a SB LOCA transient.

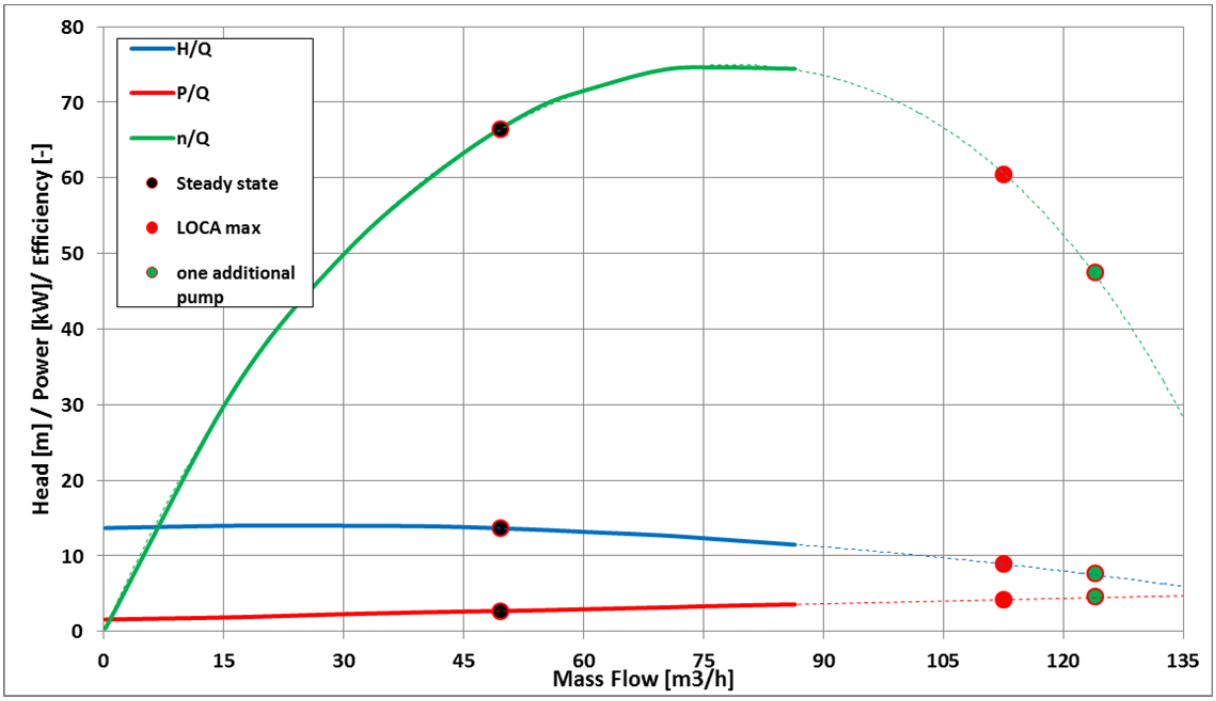

Figure 46. Additional pump characteristic during SBLOCA.

During normal reactor operation, the additional pumps work in bypass mode with the mass flow in the range from 12 to 14 kg/s. During an accident after initiating a LOCA signal, all main pumps will be shutdown and fuel cooling will be provided by two additional pumps. Due to the change of hydraulic resistance on the bypass pipes, the mass flow will increase (marked on Figure 46 as "LOCA max" point) to about 30 kg/s for each pump. When the water level reaches the level +5.10 in the pressurizer tank, one additional pump will be shutdown and only one will be working. This operating pump will try to compensate the loss of the additional pump and will increase the flow to 34 kg/s. Unfortunately, the increased mass flow will actuate the pump protection system and following the "+5.10" signal also this pump will be tripped (marked on the figure as "one additional pump" point).

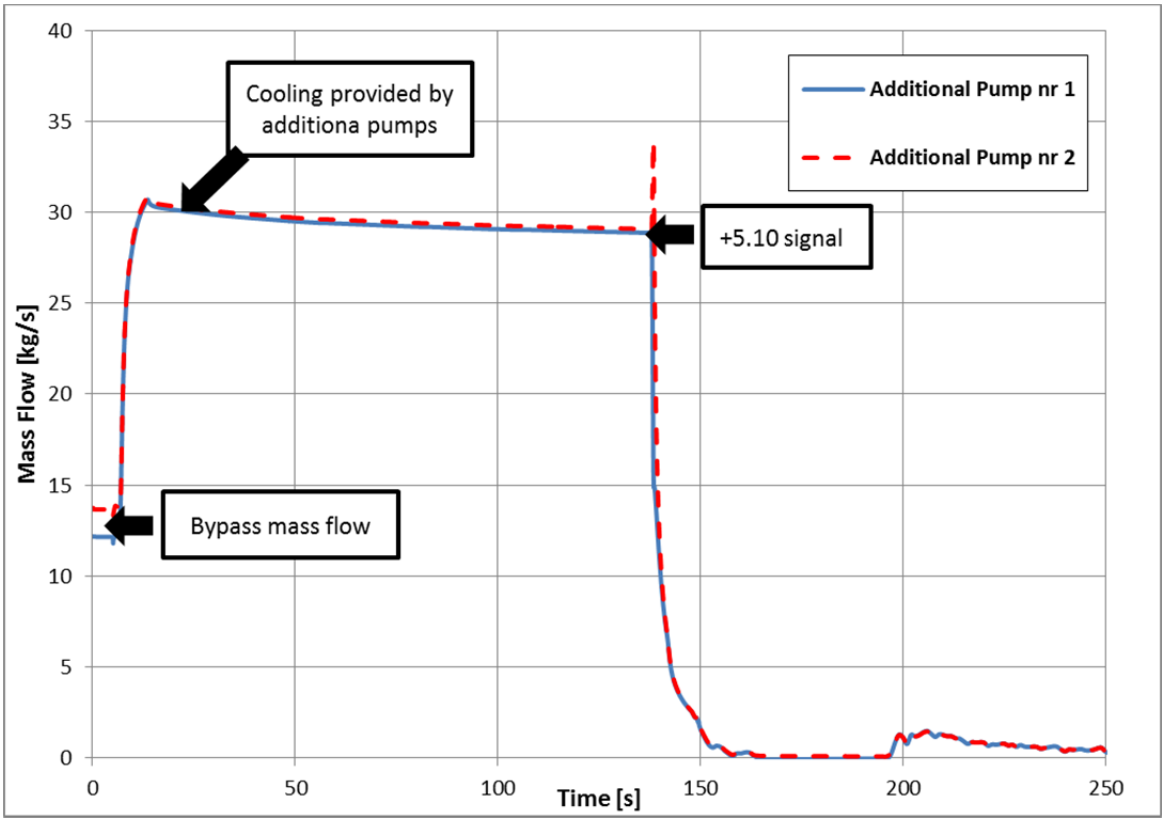

Figure 47. Additional pumps mass flow during SBLOCA (break at time 5s)

After actuation of the pump protection system, the reactor will lose all working pumps in the fuel channel cooling circuit. Loss of cooling will cause increase of the temperature of water and boiling in the hot and medium channels might start.

The boiling process will be similar to the case when boiling occurs in the loss of flow accident. In such a situation steam increases the heat transfer rate and lasts until stabilization of natural circulation. The scenario in this chapter is more difficult because of the existing break.

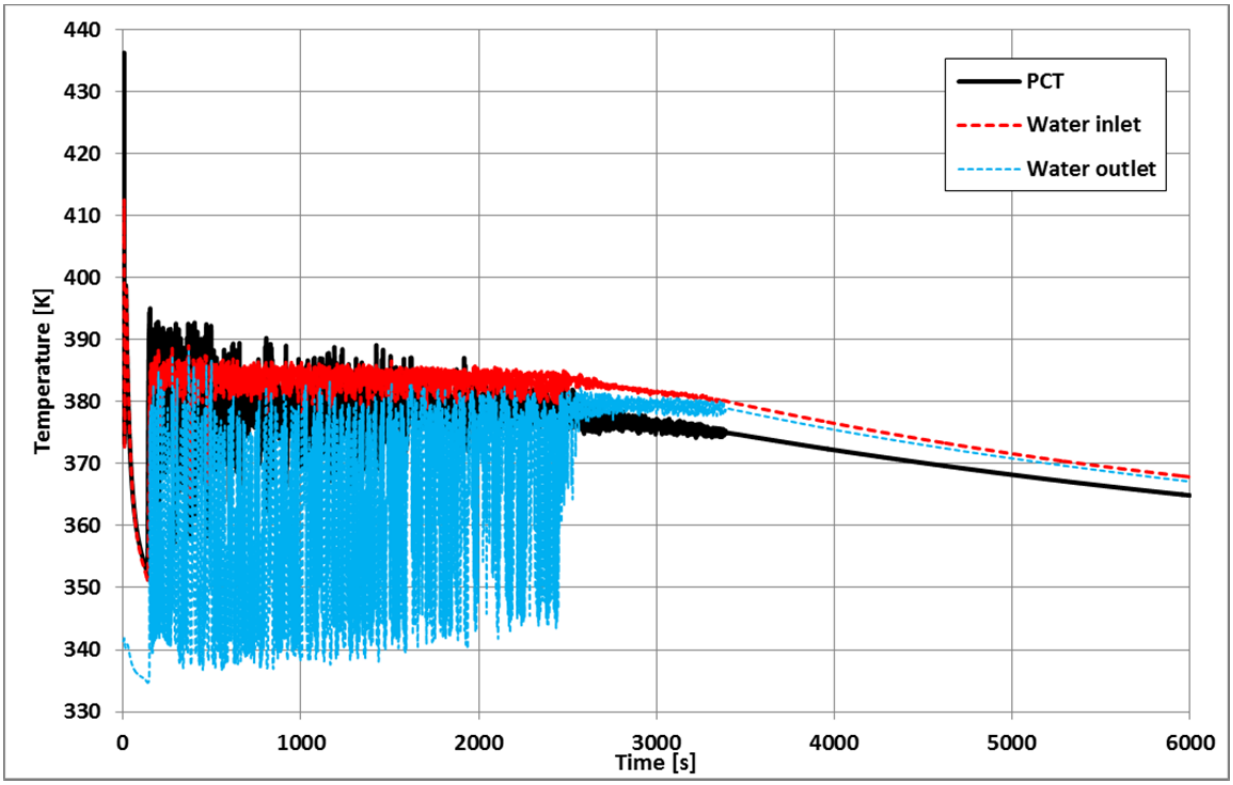

Figure 48. PCT trends during SBLOCA (case 1), temperature of water at fuel element inlet and outlet

The temperature of fuel and water will rise close to water saturation temperature. The oscillations on Figure 48 are due to boiling and the forced steam flow. After approximately one hour, boiling should end. The probability of CHF occurrence is very small.

For Medium and Large Break LOCAs the reactor behaviour after the pump protection system actuation should be similar to the behaviour during SBLOCA. It can be expected that boiling should last until proper natural convection stabilization.

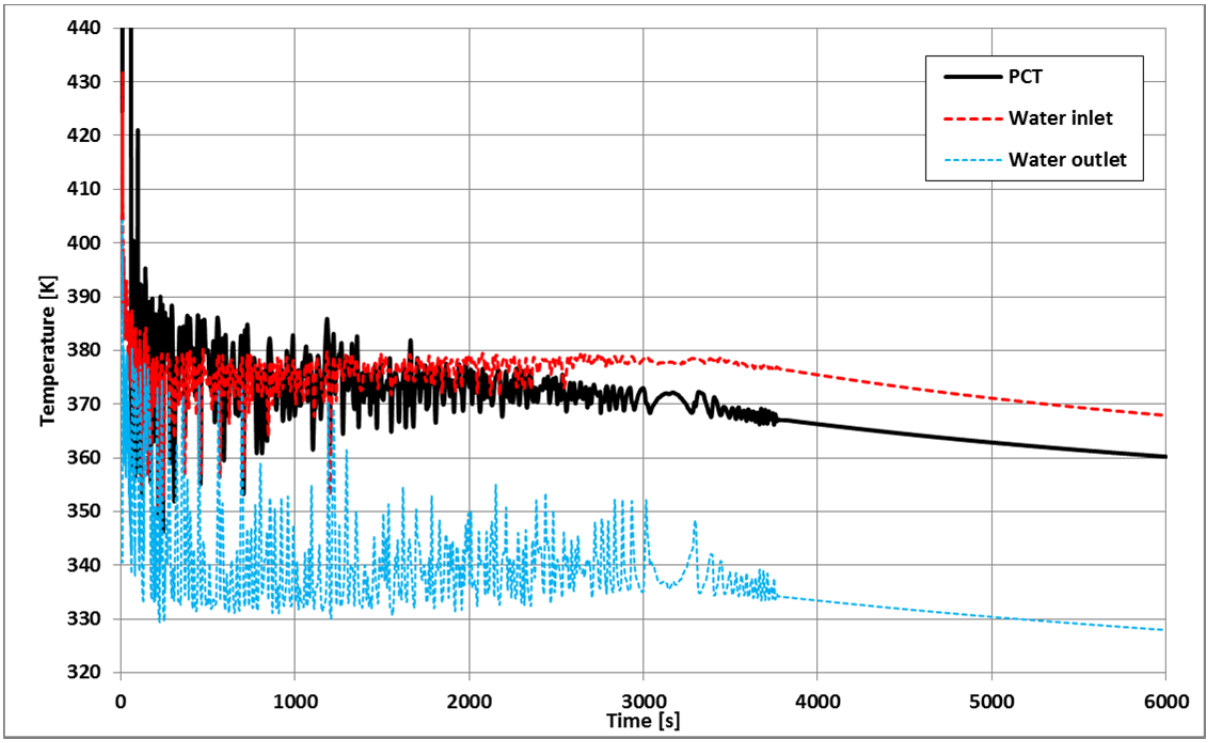

Figure 49. PCT trends during MBLOCA (case 2), temperature of water at fuel element inlet and outlet; PCT peak in the first seconds is cut off

Conclusions

The pump failure protection system is a very useful system during normal reactor operation but accident scenarios indicate problems when reactor safety becomes the priority and pump failure is less important. Due to the loss of all pumps during LOCA, cooling provided by water from the reactor pool might not be enough to keep the temperature of fuel at a low level and as a consequence soon after the last pump trip - boiling might occur.

5.7. Loss of Flow Accident (LOFA)

This chapter is devoted to the analysis of the loss of flow accident in primary and secondary circuits due to the loss of external and internal power supply. During normal operation in case of a complete loss of external power supply, the reactor systems are powered by batteries and then by diesel generators. These internal sources are sufficient to cool the reactor but in this analysis an additional condition was included - that battery accumulators and diesel generators are not sufficient to supply power to all pumps and systems. As a result, the reactor fuel should be cooled by pump coastdown in the first seconds of the accident and later by natural circulation.

A complete loss of external and internal power supply will cause:
in the primary fuel channels cooling circuit:

- main pumps shutdown,
- additional pumps shutdown,

in the secondary cooling system:

- main pumps shutdown followed by the loss of the possibility to remove heat to the environment through the cooling towers,

in the primary pool cooling circuit:

- loss of main pumps.

The time sequence for LOFA in the Research Reactor MARIA:

The transient starts at time 0 seconds, immediately after the “loss of power” signal, the reactor is tripped and the safety and control rods and inserted into the core.

Clad temperature PCT

The results of calculations showing temperature changes in the first 180 seconds of the transient are presented in Figure 50. Two cases are presented: normal decay heat and increased value (120%) of decay heat.

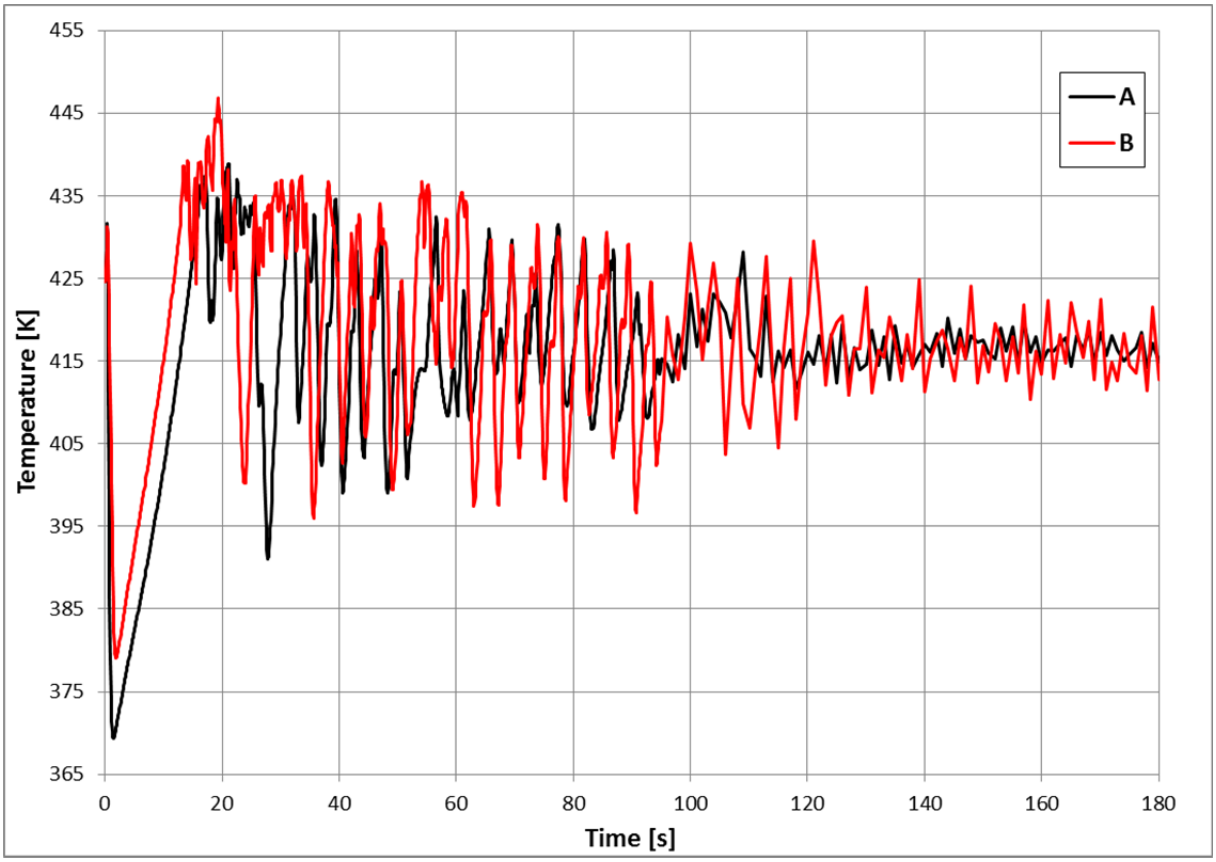

Figure 50. LOFA: temperature vs. time (narrow range), A normal decay heat, B – normal decay heat+20%

Due to the decrease of flow in the primary circuit, the reactor will be tripped and in first few seconds due to pump coastdown, heat removal from the fuel pipes should be sufficient. When the pumps stop completely, the temperatures will rise and boiling between fuel channels should begin. In the ‘normal decay heat’ scenario, boiling lasts for about 200 seconds whereas in the ‘decay heat +20%’ scenario, boiling should last twice as long - 400 seconds. Steam will provide

the increase of heat removal and the temperature during the whole accident for both cases should be lower than 450K.

The results of calculations showing temperature changes in the long run of the transient is presented in Figure 51. Two cases are presented: normal decay heat and increased value (120%) of decay heat.

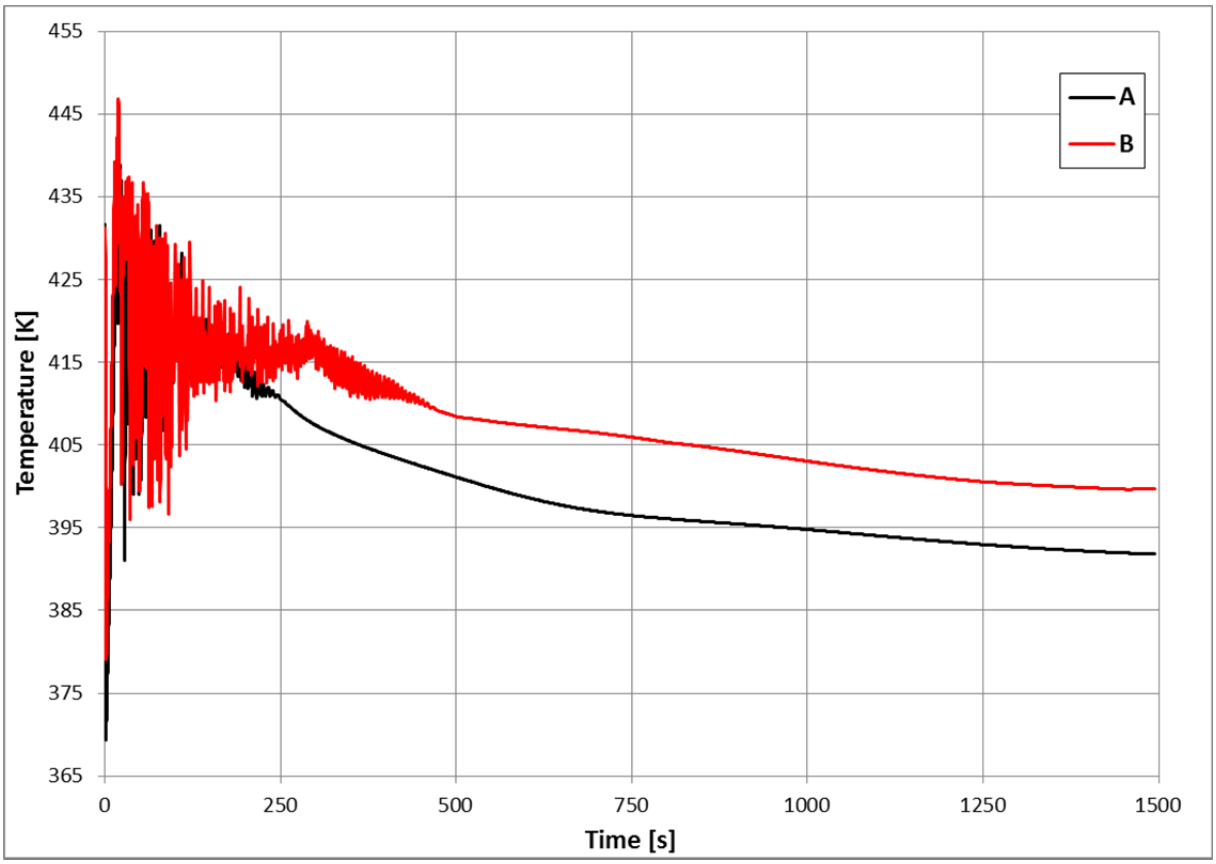

Figure 51. LOFA: temperature vs. time (long run), A – normal decay heat, B – 120% decay heat.

After 250 seconds in the case for normal decay heat and after 450 seconds for normal decay +20%, the flow will become stabilized and cooling will be provided by natural circulation. The created vapour will condense fast in the fuel channel due to the heat exchange with water flowing into the channel and with the reactor pool.

Table 31 LOFA - cladding temperature

case	initial	PCT	after 1500s
A	424.6	447.2	391.8
B	424.6	438.8	399.7

Mass Flow in fuel channels for case with normal decay heat

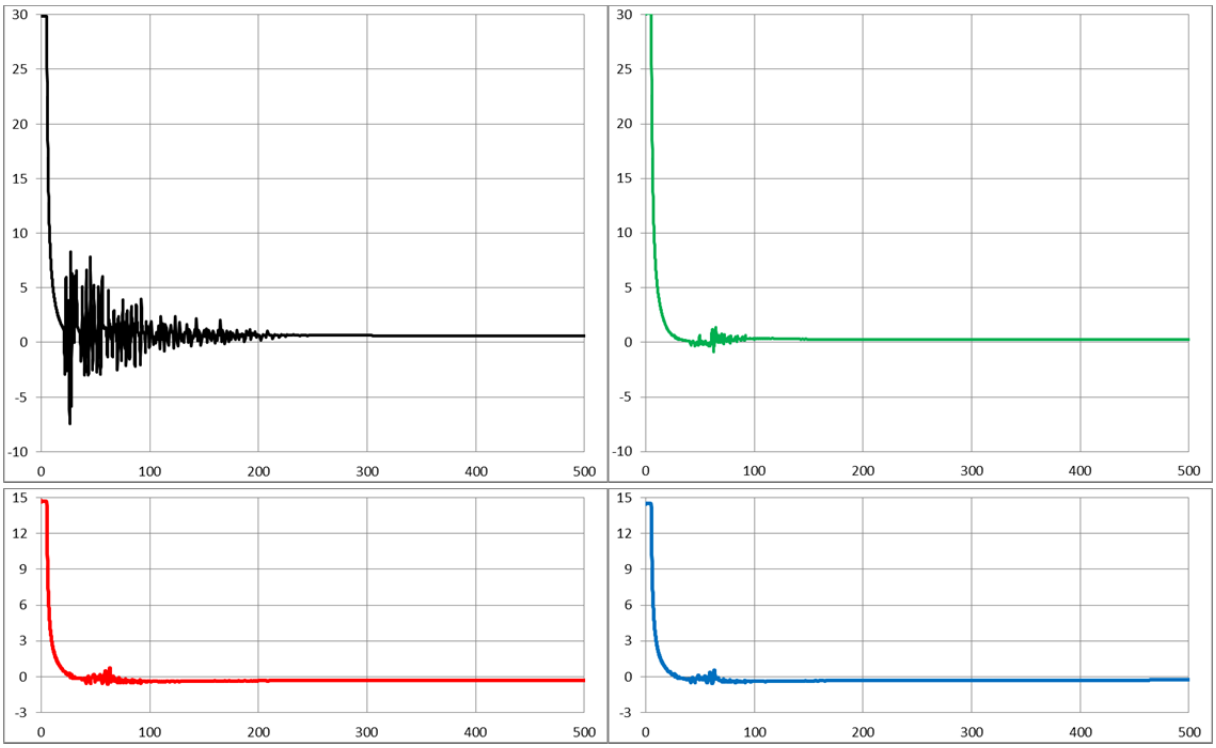

Figure 52. LOFA: mass flow [m^3/h] vs. accident time [s] for four power channel groups; black (top left) – hot channel, green (top right)– medium power, red (bottom left)– low power, blue (bottom right)- very low power.

Table 32 LOFA - mass flow (normal decay heat)

		Mass flow [m3/h]	
Channel:	initial	after 300s	after 500s
Hot	29.88	0.62	0.60
Medium	30.09	0.27	0.27
Low	14.68	-0.32	-0.30
Very low	14.50	-0.30	-0.28

Mass Flow in fuel channels for case with decay heat +20%

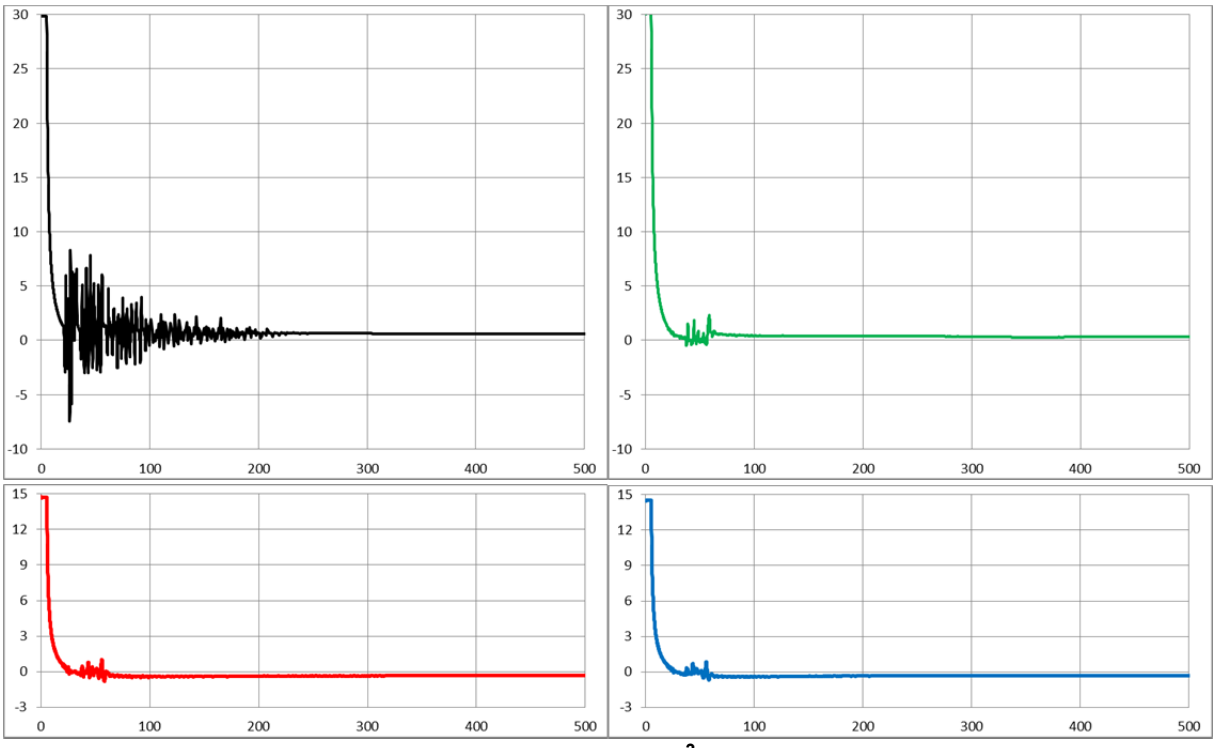

Figure 53. LOFA, decay heat +20%; mass flow [m^3/h] vs. accident time [s] for four power channel groups; black (top left) – hot channel, green (top right)– medium power, red (bottom left)– low power, blue (bottom right)- very low power

Table 33 LOFA- mass flow (decay heat +20%)

		Mass flow [m3/h]	
Channel	initial	after 300s	after 500s
Hot	29.88	0.38	0.66
Medium	30.09	0.34	0.30
Low	14.68	-0.34	-0.32
Very low	14.50	-0.31	-0.28

Conclusions

The complete loss of external and internal power supply is an accident with an extremely low probability that might lead to an increase of the temperature of water and start of boiling. The evaporation time depends on the reactor decay heat and the power level in the fuel elements during operation. In the investigated two cases - with normal and normal decay heat + 20% - boiling occurs but the increase of temperature will not be sufficient to cause melting of the cladding material. During the first hundreds of seconds, the gaps between the fuel pipes will be filled by a water-steam mixture.

Boiling will come to an end after the stabilization of flow and natural convection in the fuel channels should be enough to remove heat from the fuel pipes.

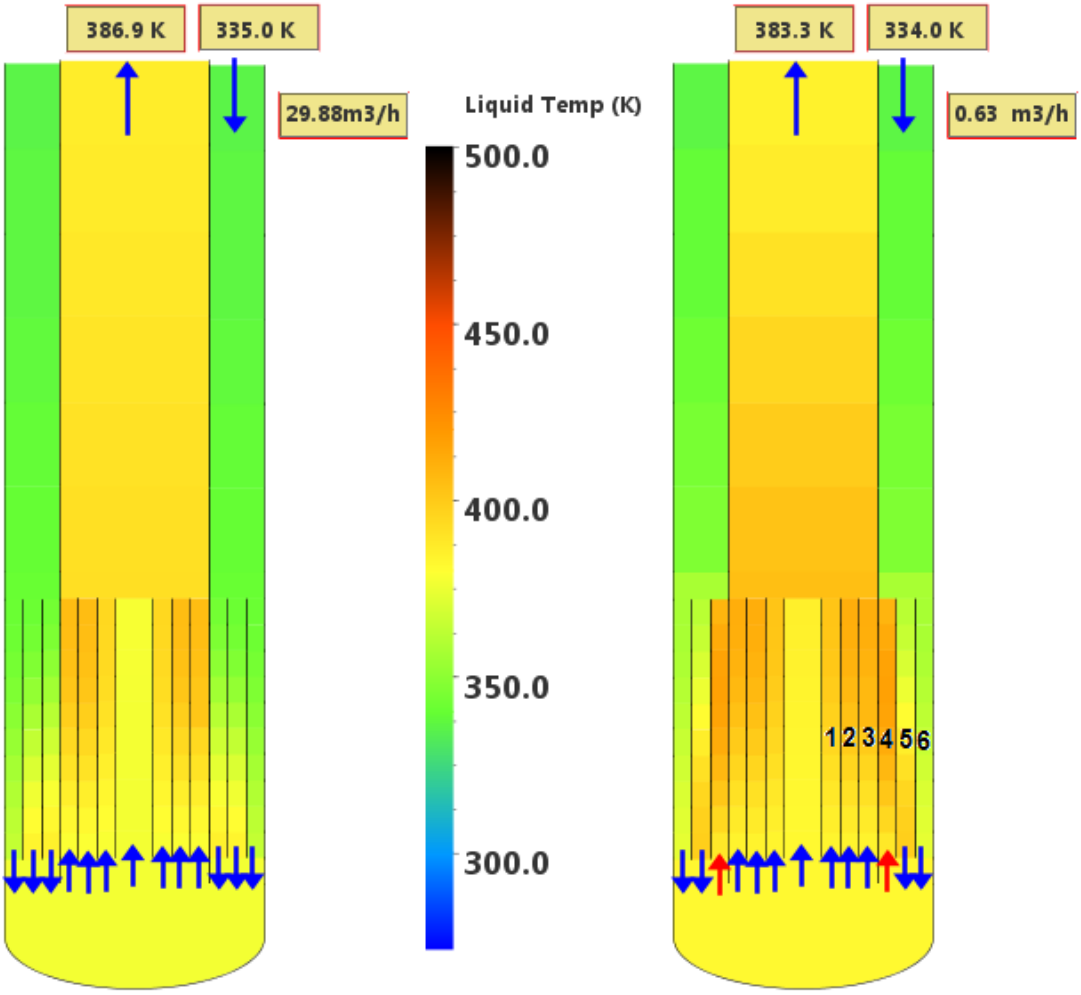

Figure 54. Temperature distribution and flow direction in fuel elements in steady state conditions (left) and after 750s of transient after stabilization of natural circulation (right)

A picture of the steady state and transient conditions is presented on Figure 54. Natural circulation in the hot and medium power fuel channels is similar to forced convection during reactor operation with one exception. Water flows through the inlet into the channel and then through two outer gaps (number 5 and 6) between the fuel pipes. Then, the water flows up through the rest of the gaps. Due to the heat exchange in the fuel pipe between gaps no. 3 and no. 4, the water flow in gap 4 during natural convection changes direction.

Additionaly, during natural convection in the hot and medium power channels the water flows from the inlet to outlet of the fuel channel whereas in the low and very low power channels the water flows in the opposite direction - from outlet to inlet.

The results of this scenario show that this accident can cause boiling for a short time in all channels but the conditions are not sufficient to cause damage of the fuel and release of radionuclides into the primary cooling circuit.

A more detailed analysis is possible but it would require building a model of the whole reactor with all 24 individual channels. The results would allow to perform an investigation of counter flow in the low power channels and to study the influence of this phenomena on this accident. An analysis of the behaviour of water during natural circulation using an analytical tool like a CFD code would also be beneficial.

5.8. Loss of Heat Sink Accident (LHSA)

The Loss of Heat Sink Accident is very unlikely and has to be modelled using various pessimistic conditions.

An assumption can be made that environmental heat losses through the piping system in the research reactor are not significant. The temperature difference between the environment and the water inside pipes is very low but the whole heat transfer balance in the fuel channels cooling circuit can be fixed by reducing the heat transfer area in the heat exchangers to predict plant realistic data.

The scenario is modelled by loss of water flow in the secondary cooling circuit that removes heat from the fuel channels cooling circuit and the pool cooling circuit through the heat exchangers system. After the loss of the heat sink, the reactor will continue to work with all pumps in the primary circuits in operation. The reactor is tripped after the “outlet maximum temperature” signal.

In order to analyse the accident sensitivity on reactor decay heat, a scenario with 20% higher decay heat was modelled that used a standard RELAP5 model. The case with decay heat +20% was marked as “B” and the case with standard decay heat was marked as “A”.

The accident transient time was 1500 seconds (25min). The influence of reactivity coefficients was not taken into account although during this scenario at the beginning when the temperature is increasing, the power should decrease. The reactivity coefficients used give pessimistic results and in reality the increase of temperatures giving a signal for reactor scram should occur later than calculated.

Table 34 LHSA - time sequence

Time sequence for loss of heat sink [s]:		
	“A”	“B”
Secondary cooling circuit pumps trip	0	0
SCRAM signal	44.9	44.9

Water temperature

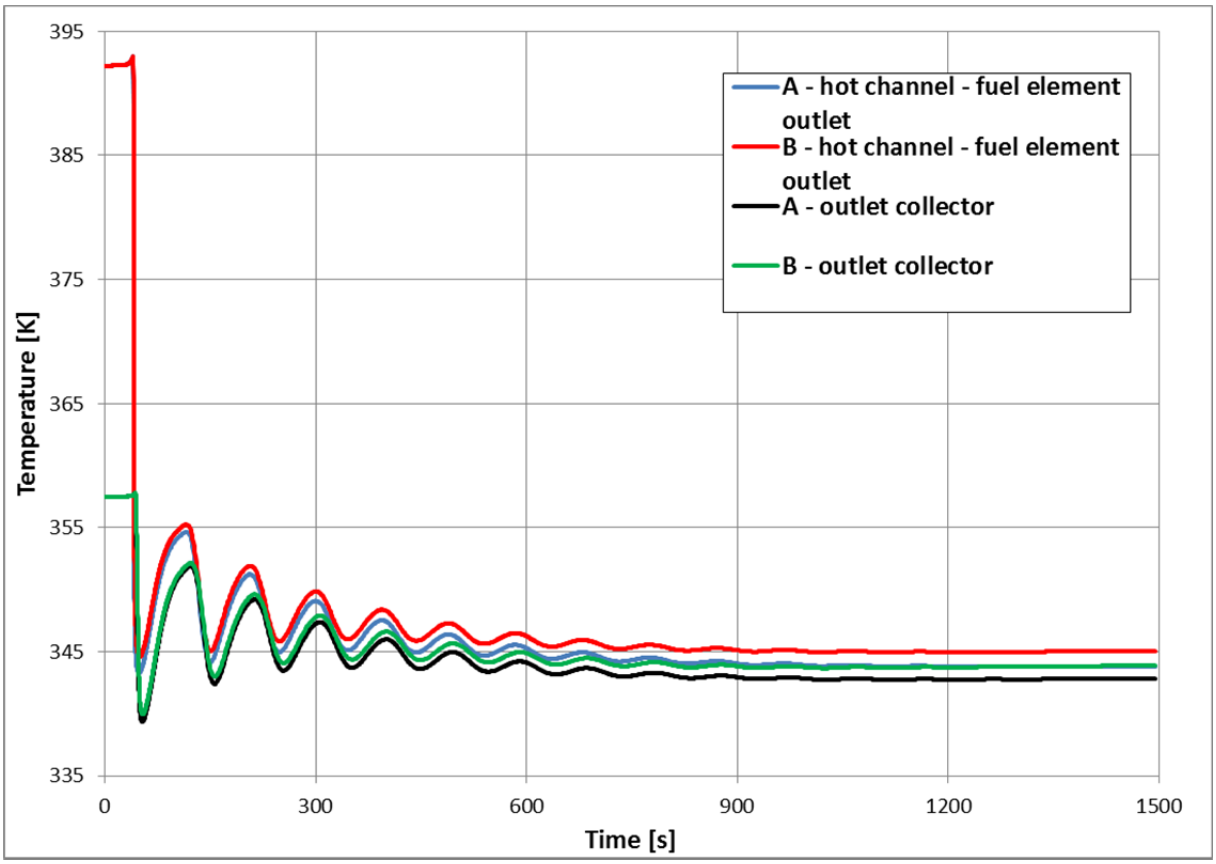

Figure 55. LHSA - temperature of water vs time

Table 35 LHSA - temperature of water

	PWT [K]	
case	First peak	Second peak (121s)
1	392.9	354.6
2	392.9	355.2
3	357.8	351.9
4	357.8	352.1

The reactor will continue work with the temperature rising slowly and the flow in the secondary cooling circuit decreasing. When the temperature alarm limit will be reached, the reactor will be tripped. Cooling of the fuel channels will be provided by the main pumps. Due to the small amount of decay heat in the research reactor, the increase of temperature of the fuel elements will be small. The heat will be removed to the reactor pool and into the environment.

ONBR parameter

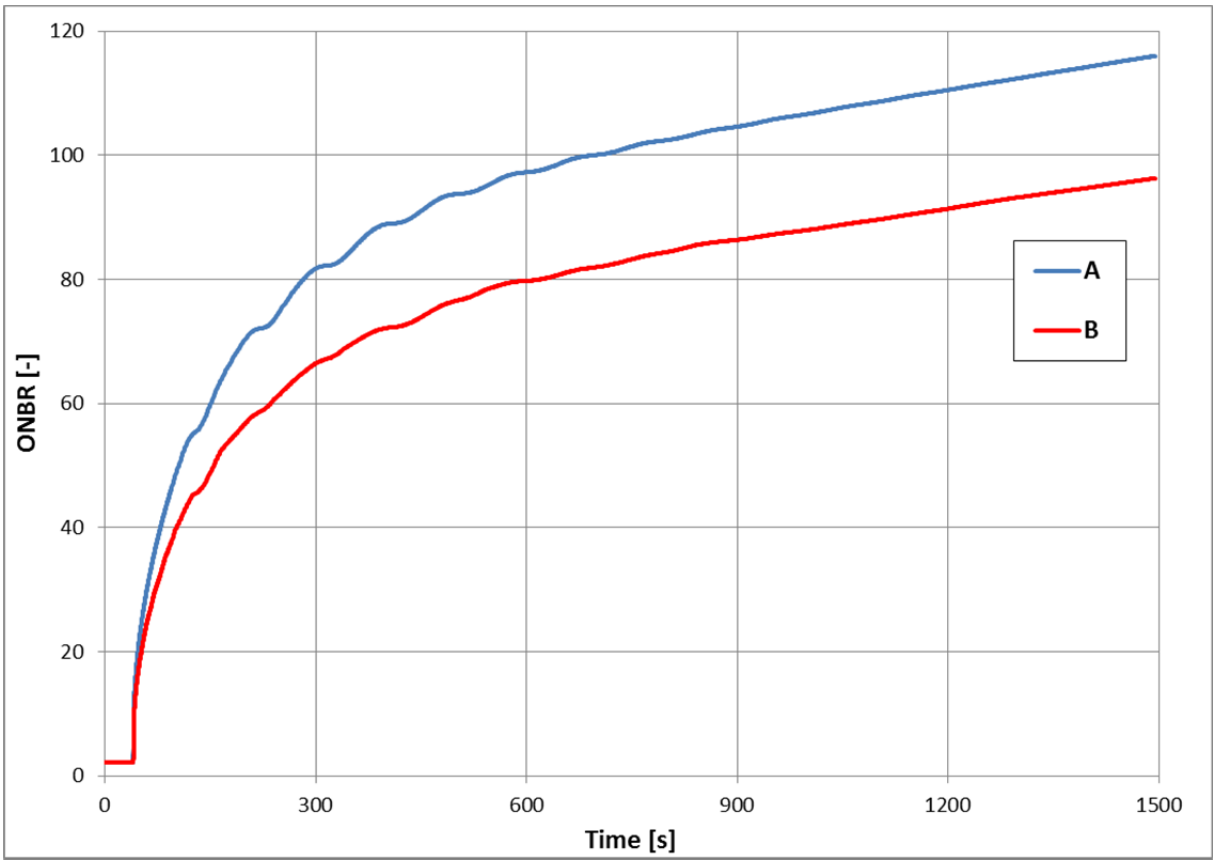

Figure 56. LHSA - ONBR parameter behaviour

As expected in this scenario, there is no danger of water boiling. The ONBR parameter will increase sharply when the reactor will be tripped and the temperature decreases. During the accident, the cooling circuit mass flow and high pressure in the fuel channels will be provided through the main pumps that will continue to work after the reactor trip.

Conclusions

The loss of heat sink due to the loss of secondary cooling circuit has no impact on the research reactor MARIA safety. It also doesn't cause any damages to the fuel or radionuclide release. The reactor will be safely tripped by the temperature alarm in the primary circuit and the temperature will tend to decrease with time. Due to the remaining high pressure in the system no steam will appear. Also in case when the decay heat is 20% higher, no damage of the reactor fuel is possible. After scram, the temperature in the reactor pool should slowly increase but there is no possibility for boiling to start in the reactor pool because of the big water area surface and heat loses to the environment.

6. SENSITIVITY ANALYSIS FOR THE MEDIUM BREAK LOCA

The sensitivity analysis was performed for the MBLOCA marked as case no. “2”. Altogether 16 simulations with varying model parameters important for this case were performed. The values of the parameters ranged from -33% to +33% of the nominal value.

Table 36 Sensitivity analysis for MBLOCA

No.	Sensitivity factor	Relation	Steady state value	Upper band	Lower band
1	**Hot channel position**	Closer to end or inlet position of the inlet header	h-9	-	-
	Explanation: Usually the highest power level is in position h-9, but due to the different fuel configuration it is possible that the highest power level will be in some other core position with a different distance from inlet to the header.				
2	**Total Reactor Power**	+10/-10%	18.062 MW	19.869 MW	16.256 MW
	Explanation*:* Limit for maximum power level for the fuel channel is 1.8 MW, but during reactor operation it is possible for the reactor to exceed this level and work without a warning signal till 110% of the power level.				
3	**Pumps momentum of inertia**	+20/-20%	2.024 kgm^2 0.058 kgm^2	2.429 kgm^2 0.070 kgm^2	1.619 kgm^2 0.046 kgm^2
	Explanation: Possible errors in calculations, models or measurements.				
4	**Thickness of the fuel cladding**	+33.3/-33.3%	0.6 mm	0.8 mm	0.4 mm
	Explanation: According to the fuel manufacturer - the thickness of cladding can vary in a large range.				
5	**Losses on breaks**	no losses/ double losses	abrupt area and K-loss factor: 1; 0.5	abrupt area and K-loss factor: 2; 1	abrupt area
	Explanation: Possible different losses in the analysed breaks.				
6	**Heat conduction of the cladding material**	+20/-20%	130 W/mK	156 W/mK	104 W/mK
	Explanation: Possible varying thermal characteristics of fuel and changing conductivity with temperature.				
7	**Pressure in pressurizer**	+10/-10%	5 bar	5.5 bar	4.5 bar
	Explanation*:* the reactor can work with a varying pressure level in the pressurizer.				

8	**Decay heat**	+20/-20%	ANS model	ANS+20%	ANS-20%
	***Explanation**:* ANS is very good decay heat model for light water reactors with a different type of fuel and different burnup than research reactors.				

Calculations were performed for all listed in Table 36 scenarios. The temperature trends for above mentioned cases during the LOCA accident are presented on Figure 57.

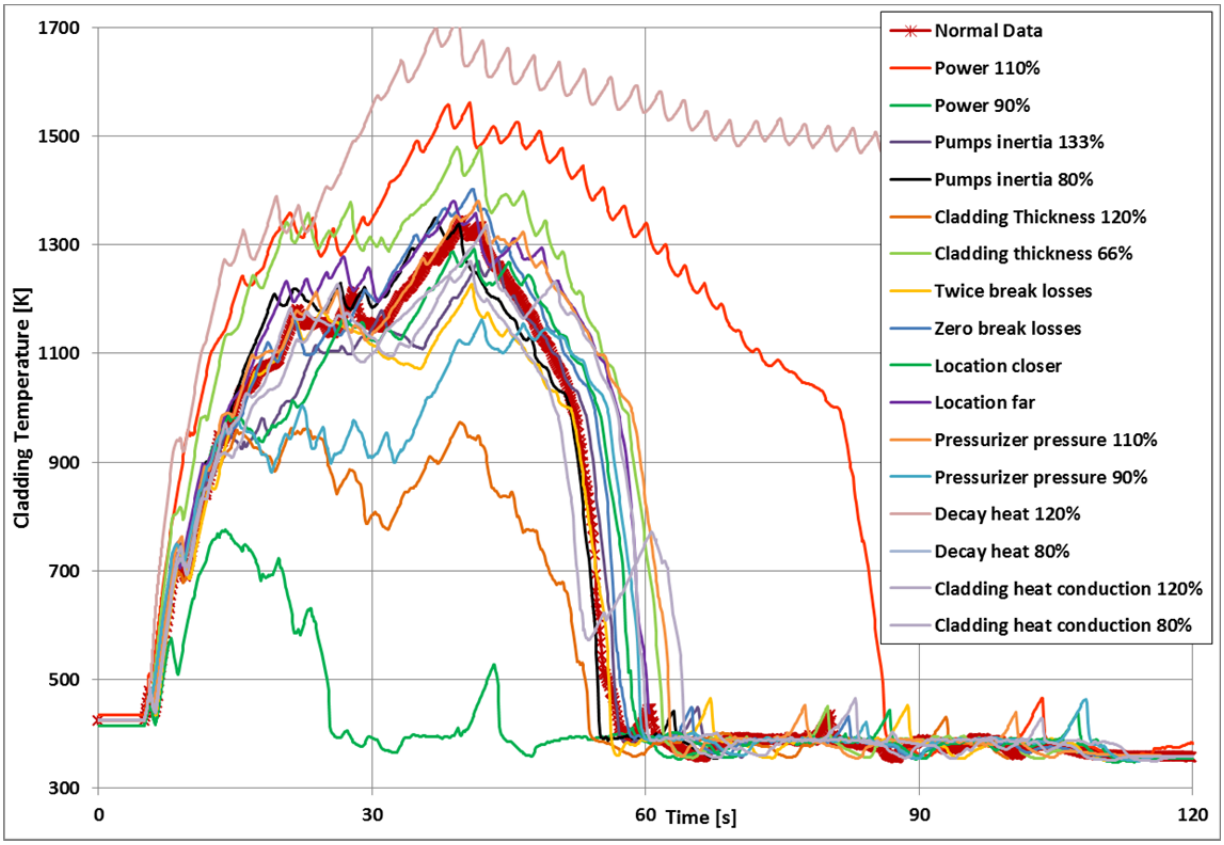

Figure 57. Sensitivity analysis - temperature trends; bold red line (with crosses) represents the temperature peak for calculations used in this report.

Of the seventeen temperature trends the highest cladding temperature is achieved for two scenarios: for (a) decay heat equal to 120% and for (b) 110% of the reactor power.

The sensitivity analysis shows that the highest impact on the calculation results have: (1) - decay heat and (2) - power. Therefore these two input parameters must be very carefully analysed prior to all calculations.

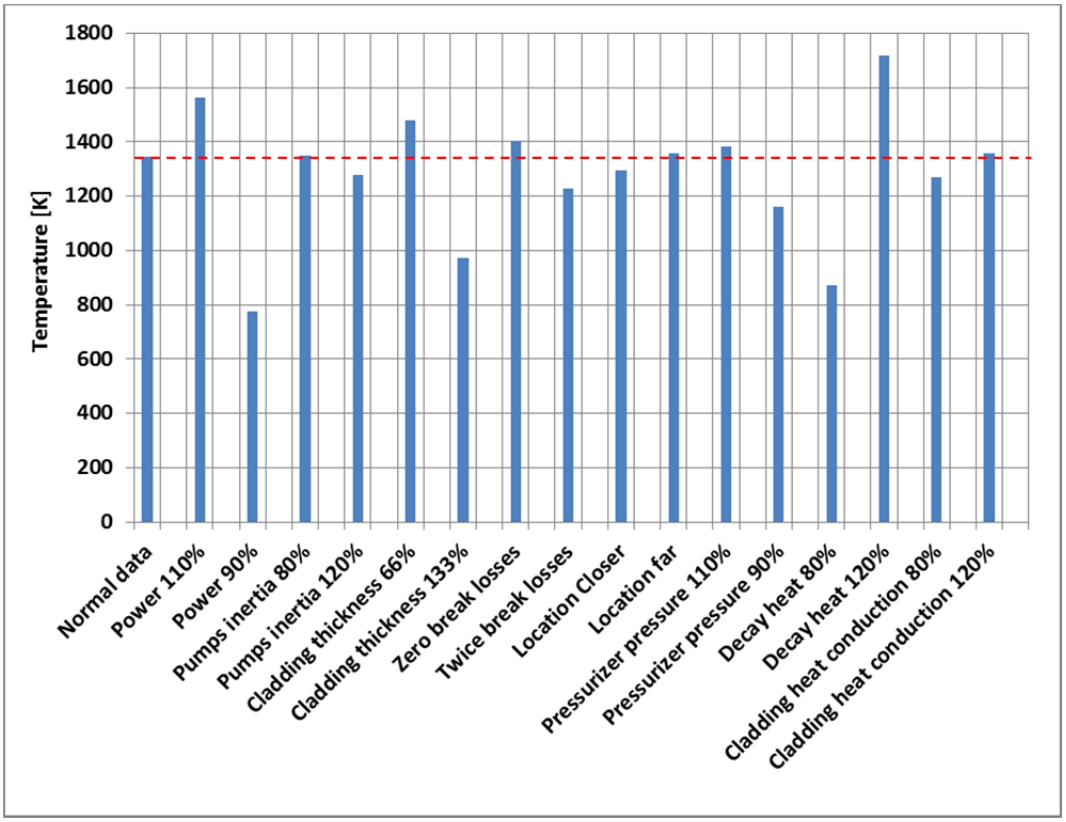

Figure 58. Sensitivity analysis - comparing PCT for different scenarios

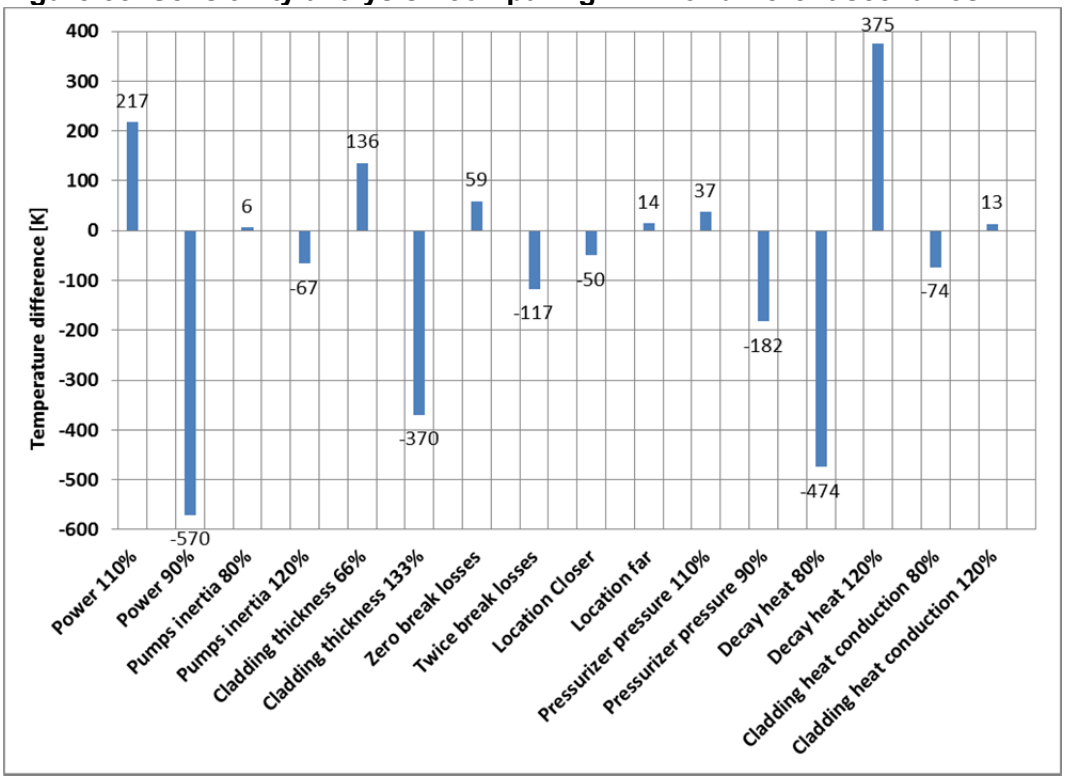

Figure 59. Sensitivity analysis - PCT in comparison to normal transient data for all sensitivity scenarios

7. RUN STATISTICS

The model and the analysed scenarios presented in this report is far more complex than the model and analysis related to a single fuel channel only presented in NUREG/IA-0422.

From the technical point of view, the calculation time of the analysed scenarios showed that RELAP5 has problems with small diameters and small hydraulic diameters.

All analyses were performed on two computer configurations with an identical version of RELAP5 mod3.3.

Computer no. 1:

- Intel(R) Core(TM) i3-2125 CPU @ 3.30 GHz
- RAM memory: 4.00 GB
- Windows 7 Professional – SP1, 64-bit version
- CVF (Compaq Visual Fortran Compiler) for RELAP5

Computer no. 2:

- Intel(R)Core(TM)i5-3450 CPU @ 3.10 GHz
- RAM memory: 8.00 GB
- Windows7 Professional – SP1, 64-bit version
- CVF (Compaq Visual Fortran Compiler) for RELAP5

The run statistics – CPU vs. process time is presented on Figure 60.

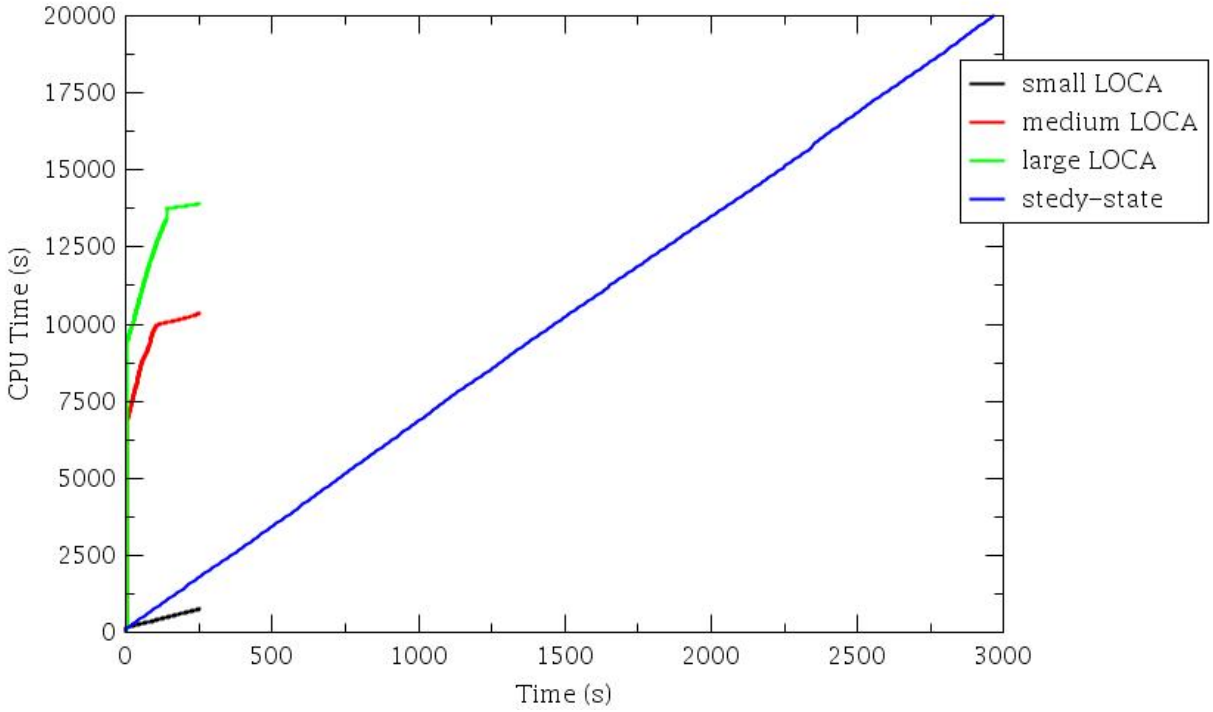

Figure 60. Run statistics for different scenarios performed on computer no. 1

8. CONCLUSIONS

The aim of this work was to judge whether the code is applicable to the analysis of the RR 'Maria'. It was significant to find the weak points of the design and to check - to what extent they might influence the safe operation of the research reactor. Finally, it was important to gain experience in performing analyses using the RELAP5 code.

Not all the aims were reached – the applicability of RELAP5 to the research reactor is difficult and certain doubts arise with respect to the accuracy of the modelling. Large approximations are necessary when modelling fuel elements. On the other hand other numerical tools were even less satisfactory in applying to the safety analysis of the RR 'Maria'. Several weak points have been found in the design but the results need to be confirmed and further calculations are necessary. Certainly experience in using RELAP has been gained but the work drew attention to various problems in using the code.

The steady state results showed that the RELAP5 code can be used for modelling the research reactor in this mode of operation and the results are good and realistic. The transient analysis seems good but the qualification of the model is difficult. The RR 'Maria' is a unique design, there are only a few similar designs and no integral test facilities or separate effect test facilities for this types of reactors have been performed.

The transient analysis performed covered loss of coolant (small break, medium break, large break, double guillotine break), loss of flow and loss of heat sink scenarios. The results are presented in slightly more detail below.

LOCA

This report covers mainly LOCA transients. In case of a loss of coolant accident, the RR 'Maria' has two safety systems:

1) the pressurizer system that supplies the reactor with water using an additional pump and maintains high pressure by means of a water tank filled with helium under high pressure,
2) safety valves that supply the system with water from the reactor pool.

In case of a very small break the pressurizer with an additional pump maintains the reactor working without the necessity for scram. In case of a small break when the additional pump is not capable to maintain the reactor in operation, the reactor will be tripped due to a low pressure alarm signal or to a low water level signal in the pressurizer. The water supplied by the pressurizer should enable a safe reactor shutdown as well as shutdown cooling following the opening of the safety valves.

In case of medium break LOCA this report indicated that during depressurization when the pressure in the primary circuit is too high to open the safety valves, overheating and even degradation of the fuel can occur. The medium break LOCA scenario results depend on the location of the break and more severe consequences are possible in places on high pressure pipes at core channel inlet similarily as in LOCA scenarios in a real nuclear power plant. The medium and large break LOCA scenarios should be analysed additionally using other codes,

especially a severe accident code capable to include in the data an aluminium type of fuel and cladding and capable to calculate material interaction phenomena.

The RELAP5 analysis pointed out a weakness of the RR Maria in case of a medium break and indicated that the reactor safety systems are not capable of preventing fuel damages in specific cases of loss of coolant and suggests that the behaviour of the research reactor during such an accident especially during depressurization should be analysed in more detail.

LOFA

In case when all pumps are tripped in the primary and secondary cooling circuits and the accumulator battery cannot supply the pumps with power, water in the fuel channels starts boiling rapidly. After a short period of time natural circulation will appear and sufficient cooling of the fuel will be provided. The process of boiling should in an efficient way help to remove heat from the fuel until stable natural circulation conditions dominate. The temperature increase is too low to create damage to any reactor materials or to cause any release of radionuclides to the cooling circuit. Natural circulation occurrence depends strongly on local losses at the inlet and outlet of fuel pipes gaps. This behaviour and sensitivity of losses should be analysed in more detail using other codes – preferably a CFD code.

LOHS

The LOHS accident was also analysed however the analysis proved that in case of this accident the reactor is completely safe. Decay heat from the fuel is safely removed to the reactor pool and no threat to the fuel integrity was calculated.

Summary of all analysed scenarios for the research reactor MARIA

This report covers 35 transient scenarios for different accidents and thermo-hydraulic parameters. A summary of the scenarios analysed is presented in Table 37.

Table 37 Summary of scenarios analyzed

Accident	Case	Threat to the 1.8 MW fuel element		
		Boling	Radionuclide releases	Possible fuel degradation
Small Break LOCA	all	×	×	×
Medium Break LOCA	“1”,“2”	✓	✓	✓
	“3”,“4”	×	×	×
Large Break LOCA	“1”,“2”	✓	✓	✓
	“3”	×	×	×
	“4”	✓	✓(*)	×
DEGB LOCA in	all	✓	✓	×

bypass				
LOHS	all	×	×	×
LOFA	all	✓	×	×

(*) release of radionuclides that are present in the primary cooling circuit, in other cases also releases of fission products from fuel.

This table of the safety analysis for the research reactor MARIA can be supplemented by scenarios analysed in the previous report NUREG/IA-0422 and presented in Table 38.

Table 38 Summary of scenarios analysed in NUREG/IA-0422

Accident	Case	Threat		
		Boling	Radionuclide releases	Possible fuel degradation
SRIA	reactor start-up	×	×	×
	nominal power			
FRIA	reactor start-up	×	×	×
	nominal power	✓	×	×
LOFA*	-	×	×	×

* LOFA with working accumulator battery.

APPENDIX A – TECHNICAL INFORMATION ON THE RESEARCH REACTOR MARIA

The research reactor 'Maria' was designed by the Institute for Nuclear Studies in Poland and is operated by the National Centre for Nuclear Research that was created on the basis of two older Institutes. The reactor started to work in 1974 and is under operation till now except for the period of 1986 to 1991 when it was undergoing modernization.

It is a pool type reactor with closed fuel channels and closed fuel channel primary cooling circuit, primary pool cooling circuit and secondary cooling circuit. The fuel channel cooling circuit includes also a pressurizer.

At present the reactor is used for the production of isotopes and for performing experiments. The total thermal power is 30 MW. More data that might be of interest is presented below.

Thermo-hydraulic parameters	During a typical cycle of work: Thermal power of a fuel channel: 15-19 MW(th) for 19-23 fuel channels, Inlet temperature to fuel channels: 303-323 K, Temperature increase in the core: 20-30 deg, Hot leg pressure (in outlet collector): about 0.9-1 MPa, Cold leg pressure (in inlet collector): about 1.7-1.8 MPa, Minimum flow in fuel channels 30 m^3/h for channels with maximum thermal power 1.8 MW, Minimum flow is 15 m^3/h for channels with 0.9 MW (in peripheral core position).
Pressurizer	Filled with water and helium gas under high pressure At pressure about 1.7 MPa maintains sufficient water inventory in the circuit.
Safety signals causing reactor scram	1) Decrease of mass flow in the fuel channel in the channel cooling circuit. Each fuel channel is equipped with temperature and mass flow measurements (it is important for calculating the thermal power of the element), a small value of the mass flow in the channel will generate a "low mass flow" signal i.e. a warning signal when the flow drops to 90% of nominal mass flow and an alarm when the flow drops to 80% of nominal mass flow. 2) Kinetics control system. In case of sudden power jump signal is generated through detectors and other systems. It's warning signal when is 110% of nominal reactor power, and alarm signal in case of 120% of nominal power. Additional safety signal for fast reactivity jump it is alarm signal from increase of period of the reactor.
Reactivity coefficients	Fuel reactivity coefficient (negative) -0.23¢/deg to -0.25¢/deg Coolant reactivity coefficient in the fuel channel (negative)

	-1.93¢/deg to -2.09¢/deg Coolant reactivity coefficient of the pool plus moderator reactivity coefficient (positive) +1.9¢/deg Void reactivity coefficient (negative) -9.37 ¢/% of void to -9.71¢/% of void Values of coefficients depend on the beginning or end of the fuel cycle and number of molybdenum channels in the core (none, one or two molybdenum channels).
Control system	The reactor power is controlled through changes of position of the control rods and automatic or manual changes of position of the UAR. The UAR is an automatic regulation system, that through the change of position of one control rod in the reactor core controls the power level and maintains, if it's necessary, the criticality of the reactor.
Shutdown system	The shutdown system is provided through safety rods (insertion reactivity from -7.5$ to -11$ to the core) and control rods (the weights depend on the position of the rods in the core, it can be pessimistically assumed that the injection is -2.5$). Safety rods and control rods work in accordance to the fail-safe rule. In case of loss of the power supply the safety rods will be automatically released from electromagnets into the reactor core. It's also possible to remove two fuel elements from the core. This is done by moving two fuel type elements (REP). This action is slower than the movement of safety rods. Sometimes it's impossible to remove the REP because of temperature stress until several hours after reactor shutdown. The reactivity of two REPs is about 4.2+/-0.5$. The shutdown system does not depend on the boron injection system.
Emergency core cooling system	In case of low water level in the pressurizer, an additional pump (1u6) that is connected to the pressurizer is automatically switched on and pumps water from the tank system (water volume 20-30m^3) into the pressurizer. The solution is good only in case of a small leakage from the channel cooling circuit. The gas discharge system from the pressurizer. In case of very low water level in the pressurizer a discharge of helium into the tank system through a system of valves will take place. This will result in a sudden depressurization of the channel cooling circuit. The safety vales 1z100A/B. In case of depressurization the valves automatically open and connect the channel cooling circuit with pool of the reactor (due to the pressure difference between two circuits).
Fuelling	Fuelling is performed when necessary depending on the reactivity supply, however always before a new work cycle.

	Refuelling, minimum 48 hours after a previous cycle, includes also a possibility of adding fuel elements removed after earlier cycles.
Cooling system	Fuel cooling channels are cooled by two from four pumps. After shut-down is done by two from the four mentioned pumps but with rotation speed changed from 3000r/s to 1500r/s. Hot water from the core passes through the heat exchangers system (four from six) transferring heat to the secondary circuit. The pool is individually cooled by three from four pumps and in shutdown mode - by one from two shutdown pumps. There is one secondary cooling circuit for the fuel cooling circuit and the pool cooling circuit. It pumps water to the outer cooling tower with ventilators. During normal operation two from three pumps and after shutdown one from three shutdown pumps are in operation. During loss of external power after a rapid shutdown, in order to remove decay heat, about 4 hours of cooling with post-shutdown pumps is necessary. The post-shutdown pumps are powered by accumulator batteries or diesel generators.
Moderator	Beryllium blocks are used as a moderator. They are placed between fuel channels.
Reflector	Graphite blocks are used as a reflector. They placed around beryllium blocks and fuel channels.
Operation	The reactor works in cycles lasting from five to ten days with nominal power usually between 16 and 23 MW(th). In some cases the reactor is used for training of students and then it operates for several hours with the power level about 10 kW(th).
Applications	Production of radioactive materials for medicine – mainly molybdenum production in special molybdenum channels. Training of students. Research activities.
Safety analysis	Present version of the Safety Analysis Report – update from 2009. Next update – end of 2014

APPENDIX B - TRANSIENT CALCULATIONS INPUT

For the Loss of Heat Sink Accident
RESEARCH REACTOR 'MARIA' MODEL
<model exported through SNAP to ASCII>
DATE: 28.10.2013

```
=MARIA
*m: SNAP:Symbolic Nuclear Analysis Package,  Version 2.2.2, January
02, 2013
*m: PLUGIN:RELAP Version 4.3.0
*m: CODE:RELAP5 Version 3.3
*m: DATE:10/28/13
******************************
*      Model Options      *
******************************
*         type       state
100         new      transnt
*        iunits       ounits
102          si          si
*   Noncondensable Gas Species and Mass Fractions
110        helium         air
115          0.5         0.5
*      cell elev fluid sysname info propname
120 420010000  3.0   h2o  *NONE*
*    tend minstep maxstep copt pfreq majed  rsrtf
201    5.0  1.0e-9    0.1    3     1  1000 100000
202    7.0  1.0e-9    0.1    3     1  1000 100000
203  100.0 1.0e-10    0.1    3     1  1000 100000
204 1500.0  1.0e-7    0.1    3    10  1000 100000
20500000        9999
******************************
*     Control Blocks       *
******************************
*
*          name type scale      ival iflag limit
20500010 "unnamed"  sum   1.0 22.472084    0    0
*             a0       scale    name       param
20500011        0.0        -1.0   tempf    405010000
20500012                   1.0   tempf    460010000
*
*          name type scale      ival iflag limit
20500020 "unnamed"  sum   1.0 1.9234381    0    0
*             a0       scale    name       param
20500021        0.0        -1.0   tempf    550010000
20500022                   1.0   tempf    510010000
*
*          name type scale      ival iflag limit
20500030 "1HPk-DT"  sum   1.0 51.836372    0    0
*             a0       scale    name       param
20500031        0.0        -1.0   tempf     10010000
20500032                   1.0   tempf     70130000
*
*          name type scale      ival iflag limit
20500040 "1HPep-DT"  sum   1.0 52.027672    0    0
*             a0       scale    name       param
20500041        0.0        -1.0   tempf     15010000
20500042                   1.0   tempf     65010000
*
*          name type scale      ival iflag limit
20500050 "18MPk-DT"  sum   1.0 23.125975    0    0
*             a0       scale    name       param
20500051        0.0        -1.0   tempf    110010000
20500052                   1.0   tempf    170130000
*
*          name type scale      ival iflag limit
20500060 "18MPep-D"  sum   1.0 23.327713    0    0
*             a0       scale    name       param
20500061        0.0        -1.0   tempf    115010000
20500062                   1.0   tempf    165010000
*
*          name type scale      ival iflag limit
20500070 "1LPk-DT"  sum   1.0 17.152353    0    0
*             a0       scale    name       param
20500071        0.0        -1.0   tempf    210010000
20500072                   1.0   tempf    270130000
*
*          name type scale      ival iflag limit
20500080 "1LPep-DT"  sum   1.0 17.542328    0    0
*             a0       scale    name       param
20500081        0.0        -1.0   tempf    215010000
20500082                   1.0   tempf    265010000
*
*          name type scale      ival iflag limit
20500090 "3LPk-DT"  sum   1.0 10.841631    0    0
*             a0       scale    name       param
20500091        0.0        -1.0   tempf    310010000
20500092                   1.0   tempf    370130000
*
*          name type scale      ival iflag limit
20500100 "3LPep-DT"  sum   1.0 11.289805    0    0
*             a0       scale    name       param
20500101        0.0        -1.0   tempf    315010000
20500102                   1.0   tempf    365010000
*
*          name type  scale      ival iflag limit
20500110 "1HPep-MF" mult 3600.0 29.880085    0    0
*            input       param       input       param
20500111       mflowj     10040000     cntrlvar         15
*
*          name type  scale      ival iflag limit
20500120 "1LPep-MF" mult 3600.0 14.681645    0    0
*            input       param       input       param
20500121       mflowj    210040000     cntrlvar         17
*
*          name type    scale      ival iflag limit
20500130 "18MPep-M" mult 189.4737 30.087345    0    0
*            input       param       input       param
20500131       mflowj    110040000     cntrlvar         16
*
*        name type  scale      ival iflag limit
20500140 "LPep" mult 1200.0 14.498145    0    0
*            input       param       input       param
20500141       mflowj    310040000     cntrlvar         18
*
*          name   type scale       ival iflag limit
20500150 "unnamed" powerr   1.0 1.017899e-3    0    0
*            input       param       power
20500151        rhof     10030000        -1.0
*
*          name   type scale       ival iflag limit
20500160 "unnamed" powerr   1.0 1.01748e-3    0    0
*            input       param       power
20500161        rhof    110030000        -1.0
*
*          name   type scale       ival iflag limit
20500170 "unnamed" powerr   1.0 1.016835e-3    0    0
*            input       param       power
20500171        rhof    210030000        -1.0
*
*          name   type scale       ival iflag limit
20500180 "unnamed" powerr   1.0 1.017274e-3    0    0
*            input       param       power
20500181        rhof    310030000        -1.0
*
*        name type scale      ival iflag limit
20500190 "23ep"  sum   1.0 629.62836    0    0
*             a0       scale    name       param
20500191        0.0         1.0 cntrlvar         11
```

```
20500192                  1.0 cntrlvar          12
20500193                 18.0 cntrlvar          13
20500194                  3.0 cntrlvar          14
*
*          name type scale      ival iflag limit
20500200 "unnamed"  sum   1.0 3.503284e5    0    0
*             a0       scale    name       param
20500201        0.0        -1.0       p     70130000
20500202                   1.0       p     10010000
*
*          name type scale      ival iflag limit
20500210 "unnamed"  sum   1.0 1.148728e6    0    0
*             a0       scale    name       param
20500211        0.0        -1.0       p    445010000
20500212                   1.0       p    420010000
*
*          name type scale      ival iflag limit
20500220 "unnamed" mult   1.0 3.897728e6    0    0
*            input       param       input       param
20500221       hvmix     70130000       mflowj     70120000
*
*          name type scale      ival iflag limit
20500230 "unnamed" mult   1.0 2.12378e6    0    0
*            input       param       input       param
20500231       hvmix     10010000       mflowj     10010000
*
*          name type scale      ival iflag limit
20500240 "1HP Powe"  sum   1.0 1.773948e6    0    0
*             a0       scale    name       param
20500241        0.0         1.0 cntrlvar          22
20500242                   -1.0 cntrlvar          23
*
*          name type scale      ival iflag limit
20500250 "unnamed" mult   1.0 6.368489e7    0    0
*            input       param       input       param
20500251       hvmix    460010000       mflowj    696000000
*
*          name type scale      ival iflag limit
20500260 "unnamed" mult   1.0 4.689532e7    0    0
*            input       param       input       param
20500261       hvmix    405010000       mflowj    696000000
*
*          name type scale      ival iflag limit
20500270 "23 Power"  sum   1.0 1.678958e7    0    0
*             a0       scale    name       param
20500271        0.0         1.0 cntrlvar          25
20500272                   -1.0 cntrlvar          26
*
*          name type scale      ival iflag limit
20500280 "unnamed" mult   1.0 8.669787e7    0    0
*            input       param       input       param
20500281       hvmix    510010000       mflowj    585000000
*
*          name type scale      ival iflag limit
20500290 "unnamed" mult   1.0 8.330522e7    0    0
*            input       param       input       param
20500291       hvmix    550010000       mflowj    590000000
*
*          name type scale      ival iflag limit
20500300 "Pool Pow"  sum   1.0 3.392654e6    0    0
*             a0       scale    name       param
20500301        0.0         1.0 cntrlvar          28
20500302                   -1.0 cntrlvar          29
*
*         name type scale      ival iflag limit
20500310 "PreLvl"  sum   1.0 6.6499963    0    0
*             a0       scale    name       param
20500311        4.0         0.4    voidf     767010000
+                   0.5    voidf     767020000
20500312                   0.53    voidf     767030000
20500313                    0.3    voidf     767040000
20500314                   0.15    voidf     767050000
20500315                   0.22    voidf     767060000
20500316                    0.4    voidf     767070000
20500317                    0.6    voidf     767080000
20500318                    0.4    voidf     767090000
*
*          name type scale      ival iflag limit
20500320 "Hex_ploo"  sum   1.0 8.686379e4    0    0
*             a0       scale    name       param
20500321        0.0         1.0       p     600160000
20500322                   -1.0       p     606010000
*
*          name type scale      ival iflag limit
20500330 "PoolLvl"  sum   1.0 6.9008803    0    0
*             a0       scale    name       param
20500331        0.0         3.8    voidf     555010000
20500332                    0.8    voidf     555020000
20500333                    0.8    voidf     555030000
20500334                    0.8    voidf     555040000
20500335                    0.9    voidf     555050000
20500336                    0.8    voidf     555060000
*
*          name   type scale      ival iflag limit
20500340 "unnamed" powerr   1.0 1.017795e-3    0    0
*            input       param       power
20500341       rhof    946030000        -1.0
*
*          name type  scale      ival iflag limit
20500350 "bypass" mult 3600.0 94.635483    0    0
*            input       param       input       param
20500351      mflowj    946010000     cntrlvar          34
*
*          name   type scale      ival iflag limit
20500360 "unnamed" powerr   1.0 1.017559e-3    0    0
*            input       param       power
20500361       rhof    755010000        -1.0
*
*          name type  scale      ival iflag limit
20500370 "pressuri" mult 3600.0 20.825958    0    0
*            input       param       input       param
20500371     cntrlvar          36      mflowfj    755010000
*
*          name type scale      ival iflag limit
20500380 "unnamed"  sum   1.0 6.4156466    0    0
*             a0       scale    name       param
20500381        0.0         1.0  volmas     10010000
20500382                    1.0  volmas     10020000
20500383                    1.0  volmas     10030000
20500384                    1.0  volmas     10040000
20500385                    1.0  volmas     10050000
20500386                    1.0  volmas     10060000
20500387                    1.0  volmas     10070000
20500388                    1.0  volmas     10080000
*
*          name type scale      ival iflag limit
20500390 "unnamed"  sum   1.0 0.56086189    0    0
*             a0       scale    name       param
20500391        0.0         1.0  volmas     20010000
+                   1.0  volmas     20020000
20500392                    1.0  volmas     20030000
+                   1.0  volmas     20040000
```

```
20500393                1.0  volmas     20050000
+                   1.0  volmas     20060000
20500394                1.0  volmas     20070000
+                   1.0  volmas     20080000
20500395                1.0  volmas     20090000
20500396                1.0  volmas     20100000
20500397                1.0  volmas     20110000
20500398                1.0  volmas     20120000
*
*          name type scale      ival iflag limit
20500400 "unnamed"  sum   1.0 0.48259184    0    0
*             a0       scale    name       param
20500401        0.0         1.0  volmas     25010000
+                   1.0  volmas     25020000
20500402                1.0  volmas     25030000
+                   1.0  volmas     25040000
20500403                1.0  volmas     25050000
+                   1.0  volmas     25060000
20500404                1.0  volmas     25070000
+                   1.0  volmas     25080000
20500405                1.0  volmas     25090000
20500406                1.0  volmas     25100000
20500407                1.0  volmas     25110000
20500408                1.0  volmas     25120000
*
*          name type scale      ival iflag limit
20500410 "unnamed"  sum   1.0 0.40640357    0    0
*             a0       scale    name       param
20500411        0.0         1.0  volmas     30010000
+                   1.0  volmas     30020000
20500412                1.0  volmas     30030000
+                   1.0  volmas     30040000
20500413                1.0  volmas     30050000
+                   1.0  volmas     30060000
20500414                1.0  volmas     30070000
+                   1.0  volmas     30080000
20500415                1.0  volmas     30090000
20500416                1.0  volmas     30100000
20500417                1.0  volmas     30110000
20500418                1.0  volmas     30120000
*
*          name type scale      ival iflag limit
20500420 "unnamed"  sum   1.0 0.32298005    0    0
*             a0       scale    name       param
20500421        0.0         1.0  volmas     50010000
+                   1.0  volmas     50020000
20500422                1.0  volmas     50030000
+                   1.0  volmas     50040000
20500423                1.0  volmas     50050000
+                   1.0  volmas     50060000
20500424                1.0  volmas     50070000
+                   1.0  volmas     50080000
20500425                1.0  volmas     50090000
20500426                1.0  volmas     50100000
20500427                1.0  volmas     50110000
20500428                1.0  volmas     50120000
*
*          name type scale     ival iflag limit
20500430 "unnamed"  sum   1.0 0.250806    0    0
*             a0       scale    name       param
20500431        0.0         1.0  volmas     55010000
+                   1.0  volmas     55020000
20500432                1.0  volmas     55030000
+                   1.0  volmas     55040000
20500433                1.0  volmas     55050000
+                   1.0  volmas     55060000
20500434                1.0  volmas     55070000
+                   1.0  volmas     55080000
20500435                1.0  volmas     55090000
20500436                1.0  volmas     55100000
20500437                1.0  volmas     55110000
20500438                1.0  volmas     55120000
*
*          name type scale      ival iflag limit
20500440 "unnamed"  sum   1.0 0.80317885    0    0
*             a0       scale    name       param
20500441        0.0         1.0  volmas     15010000
20500442                1.0  volmas     35010000
20500443                1.0  volmas     40010000
20500444                1.0  volmas     45010000
20500445                1.0  volmas     65010000
*
*          name type scale      ival iflag limit
20500450 "unnamed"  sum   1.0 4.8495455    0    0
*             a0       scale    name       param
20500451        0.0         1.0  volmas     70010000
20500452                1.0  volmas     70020000
20500453                1.0  volmas     70030000
20500454                1.0  volmas     70040000
20500455                1.0  volmas     70050000
20500456                1.0  volmas     70060000
20500457                1.0  volmas     70070000
20500458                1.0  volmas     70080000
*
*          name type scale      ival iflag limit
20500460 "unnamed"  sum   1.0 0.17015272    0    0
*             a0       scale    name       param
20500461        0.0         1.0  volmas     60010000
+                   1.0  volmas     60020000
20500462                1.0  volmas     60030000
+                   1.0  volmas     60040000
20500463                1.0  volmas     60050000
+                   1.0  volmas     60060000
20500464                1.0  volmas     60070000
20500465                1.0  volmas     60080000
20500466                1.0  volmas     60090000
20500467                1.0  volmas     60100000
20500468                1.0  volmas     60110000
*
*          name type scale     ival iflag limit
20500470 "unnamed"  sum   1.0 19.34774    0    0
*             a0       scale    name       param
20500471        0.0         1.0 cntrlvar          38
+                   1.0 cntrlvar          39
20500472                1.0 cntrlvar          41
20500473                1.0 cntrlvar          42
20500474                1.0 cntrlvar          43
20500475                1.0 cntrlvar          45
20500476                1.0 cntrlvar          44
20500477                1.0 cntrlvar          46
20500478                1.0 cntrlvar          48
*
*          name type scale      ival iflag limit
20500480 "unnamed"  sum   1.0 5.5681658    0    0
*             a0       scale    name       param
20500481        0.0         1.0  volmas     95010000
+                   1.0  volmas     95020000
20500482                1.0  volmas     95030000
+                   1.0  volmas     95030000
20500483                1.0  volmas     95040000
20500484                1.0  volmas     95040000
20500485                1.0  volmas     95040000
```

```
20500486                  1.0  volmas    95040000
20500487                  1.0  volmas    95040000
20500488                  1.0  volmas    95040000
*
*          name type scale       ival iflag limit
20500490 "unnamed"  sum   1.0 -1.162655e6    0    0
*             a0       scale    name       param
20500491        0.0        -1.0       p    923010000
20500492                   1.0       p    929010000
*
*          name type scale      ival iflag limit
20500500 "1HP Pow" mult   1.0 1.796101e6    0    0
*            input       param       input       param
20500501     cntrlvar         11     cntrlvar         51
*
*          name type  scale      ival iflag limit
20500510 "unnamed"  sum 1160.0 6.011032e4    0    0
*             a0       scale    name       param
20500511        0.0         1.0 cntrlvar         52
20500512                 -1.0    tempf    436010000
*
*          name  type scale     ival iflag limit
20500520 "unnamed" delay   1.0 385.7753    0    0
*            input       param       delay       hold
20500521       tempf     90090000        2.0          1
*
*           name type scale       ival iflag limit
20500530 "press_po"  sum   1.0 -1.594277e4    0    0
*             a0       scale    name       param
20500531        0.0         1.0       p    530010000
20500532                 -1.0       p    510010000
*
*         name type scale      ival iflag limit
20500540 "T_ONB"  sum   1.0 476.04184    0    0
*             a0       scale    name       param
20500541        0.0         1.0  sattemp     25040000
20500542                   1.0 cntrlvar         57
*
*          name   type scale     ival iflag limit
20500550 "unnamed" powerr   1.0 163.68207    0    0
*            input       param       power
20500551       htrnr      2500401        0.35
*
*          name   type  scale       ival iflag limit
20500560 "unnamed" powerr 1.0e-5 3.733397e-7    0    0
*            input       param       power
20500561          p     25080000       -0.23
*
*          name type scale       ival iflag limit
20500570 "unnamed" mult 0.182 1.112184e-5    0    0
*            input       param       input       param
20500571     cntrlvar         55     cntrlvar         56
*
*          name type scale      ival iflag limit
20500580 "unnamed"  sum   1.0 105.56395    0    0
*             a0       scale    name       param
20500581        0.0         1.0 cntrlvar         54
20500582                 -1.0    tempf     25080000
*
*        name type scale     ival iflag limit
20500590 "ONBR" mult   1.0 2.067296    0    0
*            input       param       input       param
20500591     cntrlvar         58     cntrlvar         61
*
*          name type scale      ival iflag limit
20500600 "unnamed"  sum   1.0 51.063778    0    0
*             a0       scale    name       param
20500601        0.0         1.0  httemp      2500417
20500602                 -1.0    tempf     25080000
*
*          name   type scale       ival iflag limit
20500610 "unnamed" powerr   1.0 0.019583354    0    0
*            input       param       power
20500611     cntrlvar         60        -1.0
*
*          name   type scale    ival iflag limit
20500620 "unnamed" powerx 1.799 -1.0e38    0    0
*            input       param       input       param
20500621     cntrlvar         68     cntrlvar         65
*
*        name type  scale    ival iflag limit
20500630 "qONB" mult 1082.0 -1.0e38    0    0
*            input       param       input       param
20500631     cntrlvar         64     cntrlvar         62
*
*          name   type  scale      ival iflag limit
20500640 "unnamed" powerr 1.0e-5 150.22029    0    0
*            input       param       power
20500641          p     25080000       1.156
*
*          name   type scale      ival iflag limit
20500650 "unnamed" powerr   2.3 2.1550388    0    0
*            input       param       power
20500651     cntrlvar         69      -0.0234
*
*        name type scale    ival iflag limit
20500660 "ONBR" mult   1.0 -1.0e38    0    0
*            input       param       input       param
20500661     cntrlvar         67     cntrlvar         63
*
*          name   type  scale       ival iflag limit
20500670 "unnamed" powerr 1.0e-6 4.723703e-13    0    0
*            input       param       power
20500671       htrnr      2500401       -1.0
*
*          name type scale      ival iflag limit
20500680 "unnamed"  sum   1.0 -54.500156    0    0
*             a0       scale    name       param
20500681        0.0        -1.0  sattemp     25040000
20500682                   1.0   httemp      2500417
*
*          name type  scale      ival iflag limit
20500690 "unnamed"  sum 1.0e-5 16.152611    0    0
*             a0       scale    name       param
20500691        0.0         1.0       p     25080000
*
*          name type  scale ival iflag limit
20500700 "unnamed" mult 3600.0  0.0    0    0
*            input       param       input       param
20500701       mflowj    991000000     cntrlvar         71
*
*          name   type scale       ival iflag limit
20500710 "unnamed" powerr   1.0 1.017296e-3    0    0
*            input       param       power
20500711         rho     642010000       -1.0
*
20600000     expanded
*******************************
*     Variable Trips       *
*******************************
*
*n: always true
```

```
*       var param  r  var param acon l timeo
20600010 time    0 ge null    0  0.0 n   0.0
*
*n: always false
*       var param  r  var param acon l timeo
20600020 time    0 lt null    0  0.0 n  -1.0
*
*n: artificial off
*       var param  r  var param acon l timeo
20600030 time    0 lt null    0  5.0 n   0.0
*
*n: Loos of power
*       var param  r  var param acon l timeo
20600040 time    0 ge null    0  5.0 n  -1.0
*
*n: Loos of pump 1u2.3
*       var param  r  var param  acon l timeo
20600050 time    0 ge null    0 1.0e6 n  -1.0
*
*n: Loos of pump 1u2.4
*       var param  r  var param  acon l timeo
20600060 time    0 ge null    0 1.0e6 n  -1.0
*
*n: 0H1 Alarm
*          var param  r  var param acon l timeo
20600070 cntrlvar   33 le null    0  3.0 n  -1.0
*
*n: 1T3 Alarm
*        var    param  r  var param   acon l timeo
20600080 tempf 455010000 ge null    0 358.15 n  -1.0
*
*n: 1G1 Alarm
*         var    param  r  var param  acon l timeo
20600090 mflowj 696000000 le null    0 137.5 n  -1.0
*
*n: 2G1 Alarm
*         var    param  r  var param  acon l timeo
20600100 mflowj 560010000 le null    0 305.0 n  -1.0
*
*n: 1P1 Alarm
*       var    param  r  var param  acon l timeo
20600110   p 410030000 le null    0 1.4e6 n  -1.0
*
*n: 1H1 Alarm
*          var param  r  var param acon l timeo
20600120 cntrlvar   31 le null    0 6.44 n  -1.0
*
*n: G1.01 Alarm
*          var param  r  var param acon l timeo
20600130 cntrlvar   11 le null    0 24.0 l  -1.0
*
*n: G1.02 Alarm
*          var param  r  var param acon l timeo
20600140 cntrlvar   13 le null    0 24.0 l  -1.0
*
*n: G1.03 Alarm
*          var param  r  var param acon l timeo
20600150 cntrlvar   12 le null    0  8.0 l  -1.0
*
*n: G1.04 Alarm
*          var param  r  var param acon l timeo
20600160 cntrlvar   14 le null    0  8.0 l  -1.0
*
*n: SCRAM controler
*       var param  r  var param acon l timeo
20600180 time    0 ge null    0  3.0 l  -1.0
*
*n: SCRAM delay
*       var param  r    var param acon l timeo
20600190 time    0 ge timeof  1003 0.35 l  -1.0
*
*n: 1H1 signal
*          var param  r  var param acon l timeo
20600200 cntrlvar   31 le null    0  5.1 l  -1.0
*
*n: LOCA_1 small
*       var param  r  var param acon l timeo
20600210 time    0 lt null    0  0.0 l  -1.0
*
*n: Valve 1z8 closure
*       var param  r    var param acon l
20600220 time    0 ge timeof    20 30.0 n
*
*n: SCRAM button
*       var param  r  var param acon l timeo
20600230 time    0 lt null    0  0.0 n  -1.0
*
*n: Loss of feedwater in seconary
*d: Loss of water in secondary circuit.
*       var param  r  var param acon l timeo
20600240 time    0 ge null    0  5.0 l  -1.0
*
*n: LOCA_2 small
*       var param  r  var param acon l timeo
20600250 time    0 lt null    0  0.0 l  -1.0
*
*n: Valve simulaotor
*          var param  r  var param acon l timeo
20600260 cntrlvar   49 lt null    0  0.0 n  -1.0
*
*n: Loss of additiona pump 1
*       var param  r  var param acon l timeo
20600270 time    0 ge null    0  5.0 n  -1.0
*
*n: LOCA3 - open
*       var param  r  var param acon l timeo
20600280 time    0 lt null    0  0.0 n  -1.0
*
*n: LOCA3 - close
*       var param  r  var param acon l timeo
20600290 time    0 ge null    0  0.0 n   0.0
*
*n: Loss of additiona pump 2
*       var param  r  var param acon l timeo
20600300 time    0 ge null    0  5.0 n  -1.0
*
*n: Pool shutdown cooling
*       var param  r  var param acon l timeo
20600310 time    0 lt null    0  0.0 n  -1.0
*
*n: secondary shutdown cooling
*       var param  r  var param acon l timeo
20600320 time    0 lt null    0  0.0 n  -1.0
*
*       var param  r  var param acon l timeo
20600330 time    0 lt null    0  0.0 l  -1.0
*
*n: LOCA4 - open
*       var param  r  var param acon l timeo
20600340 time    0 lt null    0  0.0 n  -1.0
*
*n: LOCA4 - close
```

```
*       var param  r  var param acon l timeo
20600360 time    0 ge null    0  0.0 n   0.0
*
*n: LOCA5 - open
*       var param  r  var param acon l timeo
20600370 time    0 lt null    0  0.0 n  -1.0
*
*n: LOCA5 - close
*       var param  r  var param acon l timeo
20600380 time    0 ge null    0  0.0 n   0.0
*
*n: LOCA6 - open
*       var param  r  var param acon l
20600390 time    0 le null    0  0.0 n
*
******************************
*     Logical Trips       *
******************************
*
*n: Pump 1u2.4 Trip
*           trip1       oper       trip2         l
20610010         4         or        1017          n
*
*n: Pump 1u2.3 Trip
*           trip1       oper       trip2         l
20610020        1018         or          4          n
*
*n: SCRAM
*           trip1       oper       trip2         l       timeo
20610030         18         and        1016          l       -1.0
*
*           trip1       oper       trip2         l       timeo
20610040          8         or          7          n       -1.0
*
*           trip1       oper       trip2         l       timeo
20610050         20         or         10          n       -1.0
*
*           trip1       oper       trip2         l
20610060          9         or         12          n
*
*           trip1       oper       trip2         l
20610070         13         or         11          n
*
*           trip1       oper       trip2         l
20610080         15         or         14          n
*
*           trip1       oper       trip2         l
20610090          4         or         16          n
*
*           trip1       oper       trip2         l       timeo
20610100        1005         or        1004          n       -1.0
*
*           trip1       oper       trip2         l       timeo
20610110        1007         or        1006          n       -1.0
*
*           trip1       oper       trip2         l
20610120        1009         or        1008          n
*
*           trip1       oper       trip2         l
20610130         4         or        1012          n
*
*           trip1       oper       trip2         l       timeo
20610140        1015         or        1013          n       -1.0
*
*           trip1       oper       trip2         l       timeo
20610150        1011         or        1010          n       -1.0
*
*           trip1       oper       trip2         l
20610160         23         or        1014          n
*
*           trip1       oper       trip2         l
20610170         12         or         11          n
*
*           trip1       oper       trip2         l
20610180         12         or         11          n
*
*n: Loss of feedwater in seconary
*           trip1       oper       trip2         l
20610190          4         or         24          n
*
*n: Loos of additional pump 2
*           trip1       oper       trip2         l
20610200         20         or         30          n
*
******************************
*     General Tables      *
******************************
*
*n: ENVI
*          type        trip
20200100    temp          0
*             Time   Temperature
20200101         0.0        300.0
*
*n: PK + PAR
*          type        trip      factor1      factor2
20200200   reac-t         19         1.0         -2.0
*             Time    Reactivity
20200201         0.0         0.0
20200202        0.01       5.0e-3
20200203        0.02        0.01
20200204        0.03       0.022
20200205        0.04       0.035
20200206        0.05        0.05
20200207        0.06        0.07
20200208        0.07        0.09
20200209        0.08        0.11
20200210        0.09       0.145
20200211         0.1       0.165
20200212        0.11         0.2
20200213        0.12        0.23
20200214        0.13       0.275
20200215        0.14        0.31
20200216        0.15        0.35
20200217        0.16         0.4
20200218        0.17        0.45
20200219        0.18        0.49
20200220        0.19       0.525
20200221         0.2       0.565
20200222        0.21         0.6
20200223        0.22        0.64
20200224        0.23       0.675
20200225        0.24        0.72
20200226        0.25        0.75
20200227        0.26        0.79
20200228        0.27       0.825
20200229        0.28        0.85
20200230        0.29        0.88
20200231         0.3         0.9
20200232        0.35       0.975
20200233        0.36       0.983
20200234        0.37        0.99
```

```
20200235        0.38        0.999
20200236        0.39         1.0
*
*n: PB
*          type        trip      factor1      factor2
20200300   reac-t          19          1.0         -3.5
*              Time    Reactivity
20200301         0.0         0.0
20200302        0.01         0.0
20200303        0.02         0.0
20200304        0.03         0.0
20200305        0.04         0.0
20200306        0.05         0.0
20200307        0.06       1.0e-3
20200308        0.07       2.0e-3
20200309        0.08       3.0e-3
20200310        0.09       4.0e-3
20200311         0.1       5.0e-3
20200312        0.11       6.0e-3
20200313        0.12       7.0e-3
20200314        0.13       8.0e-3
20200315        0.14       9.0e-3
20200316        0.15        0.01
20200317        0.16       0.013
20200318        0.17       0.016
20200319        0.18       0.019
20200320        0.19       0.022
20200321         0.2       0.025
20200322        0.21        0.03
20200323        0.22        0.04
20200324        0.23        0.05
20200325        0.24        0.06
20200326        0.25        0.07
20200327        0.26       0.085
20200328        0.27         0.1
20200329        0.28       0.118
20200330        0.29       0.135
20200331         0.3       0.157
20200332        0.35         0.3
20200333        0.36        0.32
20200334        0.37       0.345
20200335        0.38        0.38
20200336        0.39        0.41
20200337         0.4        0.45
20200338        0.41        0.49
20200339        0.42       0.515
20200340        0.43        0.55
20200341        0.44        0.59
20200342        0.45        0.62
20200343        0.46        0.66
20200344        0.47         0.7
20200345        0.48       0.735
20200346        0.49        0.77
20200347         0.5         0.8
20200348        0.51       0.825
20200349        0.52        0.86
20200350        0.53        0.89
20200351        0.54       0.905
20200352        0.55       0.925
20200353        0.56       0.935
20200354        0.57        0.95
20200355        0.58       0.963
20200356        0.59       0.975
20200357         0.6       0.985
20200358        0.63         1.0
*
*n: Reactivity_Slow
*          type        trip
20200400   reac-t          0
*              Time    Reactivity
20200401        -1.0         0.0
20200402         0.0         0.0
20200403         1.0        0.04
20200404         2.0        0.08
20200405         3.0        0.12
20200406         4.0        0.16
20200407         5.0         0.2
20200408         6.0        0.24
20200409         7.0        0.28
20200410         8.0        0.32
20200411         9.0        0.36
20200412        10.0         0.4
20200413        11.0        0.44
20200414        12.0        0.48
20200415        13.0        0.52
20200416        14.0        0.56
20200417        15.0         0.6
20200418        16.0        0.64
20200419        17.0        0.68
20200420        18.0        0.72
20200421        19.0        0.76
20200422        20.0         0.8
20200423        21.0        0.84
20200424        22.0        0.88
20200425        23.0        0.92
20200426        24.0        0.96
20200427        25.0         1.0
20200428        26.0        1.04
20200429        27.0        1.08
20200430        28.0        1.12
20200431        29.0        1.16
20200432        30.0         1.2
20200433        31.0        1.24
20200434        32.0        1.28
20200435        33.0        1.32
20200436        34.0        1.36
20200437        35.0         1.4
20200438        36.0        1.44
20200439        37.0        1.48
20200440        38.0        1.52
20200441        39.0        1.56
20200442        40.0         1.6
20200443        41.0        1.64
20200444        42.0        1.68
20200445        43.0        1.72
20200446        44.0        1.76
20200447        45.0         1.8
20200448        46.0        1.84
20200449        47.0        1.88
20200450        48.0        1.92
20200451        49.0        1.96
20200452        50.0         2.0
*
*n: Reactivity_Fast
*          type        trip
20200500   reac-t          0
*              Time    Reactivity
20200501        -1.0         0.0
20200502         0.0         0.0
20200503        0.01        0.04
20200504        0.02        0.08
20200505        0.03        0.12
```

```
20200506        0.04        0.16
20200507        0.05         0.2
20200508        0.06        0.24
20200509        0.07        0.28
20200510        0.08        0.32
20200511        0.09        0.36
20200512         0.1         0.4
20200513        0.11        0.44
20200514        0.12        0.48
20200515        0.13        0.52
20200516        0.14        0.56
20200517        0.15         0.6
20200518        0.16        0.64
20200519        0.17        0.68
20200520        0.18        0.72
20200521        0.19        0.76
20200522         0.2         0.8
20200523        0.21        0.84
20200524        0.22        0.88
20200525        0.23        0.92
20200526        0.24        0.96
20200527        0.25         1.0
20200528        0.26        1.04
20200529        0.27        1.08
20200530        0.28        1.12
20200531        0.29        1.16
20200532         0.3         1.2
20200533        0.31        1.24
20200534        0.32        1.28
20200535        0.33        1.32
20200536        0.34        1.36
20200537        0.35         1.4
20200538        0.36        1.44
20200539        0.37        1.48
20200540       0.375         1.5
*
*n: Power_for_SS
*          type        trip
20200600    power           0
*             Time        Power
20200601        -1.0       1.8e6
20200602         0.0       1.8e6
20200603         1.0       1.8e6
20200604        1.0e6      1.8e6
*
*n: Power blocks
*          type        trip
20200700    power          19
*             Time        Power
20200701        -1.0       3.8e6
20200702       100.0       3.8e6
20200703      3600.0       3.3e5
*
*n: Valve 202
*          type        trip
20200800 normarea           0
*           Position    Area Frac.
20200801         0.0         0.0
20200802         1.0        0.11
*
*n: Valve 302
*          type        trip
20200900 normarea           0
*           Position    Area Frac.
20200901         0.0         0.0
20200902         1.0       0.114
*
*n: Valve 1z7
*          type        trip
20201000 normarea           0
*           Position    Area Frac.
20201001         0.0         0.0
20201002         1.0       0.052
*
*n: dlawienie pomp
*          type        trip
20201100 normarea           0
*           Position    Area Frac.
20201101         0.0         0.5
20201102         1.0         1.0
*
*n: Valve 102
*          type        trip
20201200 normarea           0
*           Position    Area Frac.
20201201         0.0         0.0
20201202         1.0       0.278
*
*n: Valve 002
*          type        trip
20201300 normarea           0
*           Position    Area Frac.
20201301         0.0         0.0
20201302         1.0        0.31
*
**************************
*     Materials      *
**************************
*
*n: Fuel
*             type       tflag       vflag
20100100     tbl/fctn           1           1
*            thcond
20100101        59.0
*             temp     capacity
20100151       273.0   2.547614e6
20100152       293.0   2.571122e6
20100153       313.0    2.59463e6
20100154       333.0   2.618138e6
20100155       353.0   2.641646e6
20100156       373.0   2.665154e6
20100157       393.0   2.688662e6
20100158       413.0    2.71217e6
20100159       433.0   2.735678e6
20100160       453.0   2.759186e6
20100161       473.0   2.782694e6
20100162       493.0   2.806202e6
20100163       513.0    2.82971e6
20100164       533.0   2.853218e6
20100165       553.0   2.876726e6
20100166       573.0   2.900234e6
20100167       593.0   2.923742e6
20100168       613.0    2.94725e6
20100169       633.0   2.970758e6
20100170       653.0   2.994266e6
20100171       673.0   3.017774e6
20100172      2000.0    4.57753e6
20100173      5000.0    4.57753e6
*
*n: AGN cladding
*             type       tflag       vflag
20100200     tbl/fctn           1           1
```

```
*           thcond
20100201       130.0
*       heat Capacity
20100251     2.3496e6
*
*n: Aluminium
*           type       tflag       vflag
20100300     tbl/fctn          1          1
*           temp       thcond
20100301       273.0       237.0
20100302       300.0       237.0
20100303       350.0       240.0
20100304       400.0       240.0
20100305       500.0       236.0
20100306       600.0       231.0
20100307       800.0       218.0
20100308      1200.0       218.0
*           temp     capacity
20100351       273.0     2.4219e6
20100352       298.0     2.4219e6
20100353       350.0    2.51262e6
20100354       400.0    2.57985e6
20100355       500.0    2.68596e6
20100356       600.0     2.7918e6
20100357      1000.0     2.7918e6
*
*n: SAW
*           type       tflag       vflag
20100400     tbl/fctn          1          1
*           temp       thcond
20100401       273.0       170.0
20100402       900.0       170.0
*           temp     capacity
20100451       273.0     2.4192e6
20100452       900.0     2.4192e6
*
*n: Graphite
*           type       tflag       vflag
20100500     tbl/fctn          1          1
*           temp       thcond
20100501       273.0        62.4
20100502       473.0        62.7
*           temp     capacity
20100551       273.0     1.184e6
20100552       400.0      1.6e6
20100553       600.0     1.92e6
*
*n: Beryllium
*           type       tflag       vflag
20100600     tbl/fctn          1          1
*           thcond
20100601       201.0
*       heat Capacity
20100651     3.3726e6
*
*n: 1H18N9T
*           type       tflag       vflag
20100700     tbl/fctn          1          1
*           temp       thcond
20100701       273.0        16.1
20100702       373.0        16.1
20100703       673.0        22.2
*       heat Capacity
20100751     4.0135e6
*
************************************
*     Hydraulic Components      *
************************************
*
*           name        type
0010000    "unnamed"       valve
*           from         to        area
0010101    415010002     95010001     1.256e-3
*        fwd. loss    rev. loss      efvcahs
0010102         1.0         1.0         100
*        discharge      thermal
0010103         1.0        0.14
*            hd       flood     intercept       slope
0010110       0.04         0.0         1.0         1.0
*           flow          vl          vv       unused
0010201          0    6.6044221    6.6044221         0.0
*           type
0010300      mtrvlv
*          topen       tclose       vrate        ipos
0010301          1          2         1.0         1.0
*
*           name        type
0020000    "unnamed"       valve
*           from         to        area
0020101     90110002    445010002     1.256e-3
*        fwd. loss    rev. loss      efvcahs
0020102         1.0         1.0         100
*        discharge      thermal
0020103         1.0        0.14
*            hd       flood     intercept       slope
0020110       0.04         0.0         1.0         1.0
*           flow          vl          vv       unused
0020201          0    22.055265    22.055265         0.0
*           type
0020300      mtrvlv
*          topen       tclose       vrate        ipos
0020301          1          2         1.0         1.0
*          vtble
0020302         13
*
*           name        type
0030000    "unnamed"     snglvol
*           area       length          vol
0030101         5.0         5.0         0.0
*         az-angle    inc-angle          dz
0030102         0.0         0.0         0.0
*          x-rough        x-hd       flags
0030103         0.0         0.0           0
*     ebt press   water-ie   steam-ie void    ncqual
0030200 006 1.0e5 6.235152e4 3.864801e5  1.0 0.9894129
*             he         air
0030301         0.0         1.0
*
*           name        type
0040000    "unnamed"       valve
*           from         to        area
0040101    600010001     11010002      0.07065
*        fwd. loss    rev. loss      efvcahs
0040102         0.0         0.0           0
*        discharge      thermal
0040103         1.0        0.14
*           flow          vl          vv       unused
0040201          0         0.0         0.0         0.0
*           type
0040300      trpvlv
*           trip
0040301         34
```

```
*
*           name        type
0050000     "1u2.3"         pump
*           area       length          vol
0050101     0.03142         0.42          0.0
*         az-angle     inc-angle           dz
0050102         0.0         90.0         0.42
*           flags
0050103           0
*            ebt        press      water-ie      steam-ie         void
0050200         000    1.204072e6    2.585984e5    2.587918e6          0.0
*             to         area         kfor         krev      jefvcahs
0050108    636020002          0.0          0.0          0.0           0
*           flow           vl           vv       unused
0050201          0     3.0140681    3.0140681          0.0
*             to         area         kfor         krev      jefvcahs
0050109    654010001          0.0          0.0          0.0           0
*           flow           vl           vv       unused
0050202          0     3.0133905    3.0133905          0.0
*      phase twophase tdiff mtorq tdvel ptrip rev
0050301    0       0    -2    -1    -1  1002   0
*           pvel        pratio        rflow        rhead
0050302      311.96    0.99999997      0.11194        129.1
*          rtorq       imoment         rdens         rmtor
0050303      564.366        2.024        988.0          0.0
*            tf2          tf0          tf1          tf3
0050304        5.64         5.64          0.0          0.0
*           type       regime
0051100          1           1
*            ind          dep
0051101          0.0      1.13913
0051102      0.25271       1.1517
0051103      0.45717      1.14784
0051104      0.62725      1.12905
0051105      0.77301       1.0803
0051106      0.89663      1.04012
0051107          1.0          1.0
*           type       regime
0051200          1           2
*            ind          dep
0051201          0.0        -0.33
0051202      0.27366     -0.14313
0051203      0.45081      0.02763
0051204      0.54082       0.1401
0051205      0.64783      0.29887
0051206      0.80723      0.58571
0051207      0.82126      0.60983
0051208      0.91569      0.80558
0051209          1.0          1.0
*           type       regime
0051300          1           3
*            ind          dep
0051301         -1.0         3.21
0051302         -0.6          1.5
0051303         -0.4          1.0
0051304         -0.2          0.5
0051305          0.0          0.0
*           type       regime
0051400          1           4
*            ind          dep
0051401         -1.0         3.21
0051402         -0.6          2.1
0051403         -0.4         1.72
0051404         -0.2         1.45
0051405          0.0          1.3
*           type       regime
0051500          1           5
*            ind          dep
0051501          0.0          0.0
0051502          0.2         0.11
0051503          0.4         0.13
0051504          0.6         0.26
0051505          0.8         0.49
0051506          1.0         0.83
*           type       regime
0051600          1           6
*            ind          dep
0051601          0.0          1.3
0051602          0.2         1.18
0051603          0.4         1.07
0051604          0.6         0.97
0051605          0.8         0.89
0051606          1.0         0.83
*           type       regime
0051700          1           7
*            ind          dep
0051701          0.0        1.139
0051702         -0.2         0.75
0051703         -0.4          0.3
0051704         -0.6         -0.4
0051705         -0.8         -1.1
0051706         -1.0         -2.0
*           type       regime
0051800          1           8
*            ind          dep
0051801         -1.0         -2.0
0051802        -0.75        -1.94
0051803         -0.5         -1.5
0051804          0.0        -0.33
*           type       regime
0051900          2           1
*            ind          dep
0051901          0.0         0.22
0051902      0.25271      0.49609
0051903      0.45717       0.6428
0051904      0.62725      0.76579
0051905      0.77301      0.85806
0051906      0.89663      0.93808
0051907          1.0          1.0
*           type       regime
0052000          2           2
*            ind          dep
0052001          0.0         -0.3
0052002      0.45081      0.49421
0052003      0.54082      0.69593
0052004      0.64783      0.74099
0052005      0.80723        0.752
0052006      0.82126      0.75649
0052007      0.91569      0.88171
0052008          1.0          1.0
*           type       regime
0052100          2           3
*            ind          dep
0052101         -1.0         3.21
0052102         -0.6          1.5
0052103         -0.4          1.0
0052104         -0.2          0.5
0052105          0.0          0.0
*           type       regime
0052200          2           4
*            ind          dep
0052201         -1.0         3.21
```

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0052202        -0.6         2.1
0052203        -0.4        1.72
0052204        -0.2        1.45
0052205         0.0         1.3
*            type       regime
0052300           2           5
*             ind         dep
0052301         0.0         0.0
0052302         0.2        0.11
0052303         0.4        0.13
0052304         0.6        0.26
0052305         0.8        0.49
0052306         1.0        0.83
*            type       regime
0052400           2           6
*             ind         dep
0052401         0.0         1.3
0052402         0.2        1.18
0052403         0.4        1.07
0052404         0.6        0.97
0052405         0.8        0.89
0052406         1.0        0.83
*            type       regime
0052500           2           7
*             ind         dep
0052501         0.0        0.22
0052502        -0.2        0.11
0052503        -0.4       -0.11
0052504        -0.6        -0.4
0052505        -0.8        -1.1
0052506        -1.0        -2.0
*            type       regime
0052600           2           8
*             ind         dep
0052601        -1.0        -2.0
0052602       -0.75       -1.94
0052603        -0.5        -1.5
0052604         0.0        -0.3
* Multiplier Torque Table
*           extrap
0053000           0
*           voidf       multi
0053001         0.0         0.0
0053002         0.1         0.0
0053003        0.15        0.05
0053004        0.24         0.8
0053005         0.3        0.96
0053006         0.4        0.98
0053007         0.6        0.97
0053008         0.8         0.9
0053009         0.9         0.8
0053010        0.96         0.5
0053011         1.0         0.0
* Multiplier Torque Table
*           extrap
0053100           0
*           voidf       multi
0053101         0.0         0.0
0053102         0.1         0.0
0053103        0.15         0.0
0053104        0.24         0.0
0053105         0.8         0.0
0053106        0.96         0.0
0053107         1.0         0.0
*
*             name        type
0060000     "1u2.4"        pump
*            area      length         vol
0060101     0.03142        0.42         0.0
*         az-angle    inc-angle          dz
0060102         0.0        90.0        0.42
*           flags
0060103           0
*             ebt       press     water-ie     steam-ie         void
0060200         000   1.204019e6   2.585998e5   2.587917e6          0.0
*              to        area        kfor        krev     jefvcahs
0060108    640020002         0.0         0.0         0.0           0
*            flow          vl          vv      unused
0060201           0    3.0044103    3.0044103         0.0
*              to        area        kfor        krev     jefvcahs
0060109    642010001         0.0         0.0         0.0           0
*            flow          vl          vv      unused
0060202           0    3.0037348    3.0037348         0.0
*      phase twophase tdiff mtorq tdvel ptrip rev
0060301    0       5   -2   -1    -1  1001   0
*            pvel       pratio       rflow       rhead
0060302      311.96   0.99999997     0.11194       129.1
*           rtorq      imoment       rdens       rmtor
0060303     564.366       2.024       988.0         0.0
*             tf2         tf0         tf1         tf3
0060304        5.64        5.64         0.0         0.0
*            type       regime
0061100           1           1
*             ind         dep
0061101         0.0     1.13913
0061102     0.25271      1.1517
0061103     0.45717     1.14784
0061104     0.62725     1.12905
0061105     0.77301      1.0803
0061106     0.89663     1.04012
0061107         1.0         1.0
*            type       regime
0061200           1           2
*             ind         dep
0061201         0.0       -0.33
0061202     0.27366    -0.14313
0061203     0.45081     0.02763
0061204     0.54082      0.1401
0061205     0.64783     0.29887
0061206     0.80723     0.58571
0061207     0.82126     0.60983
0061208     0.91569     0.80558
0061209         1.0         1.0
*            type       regime
0061300           1           3
*             ind         dep
0061301        -1.0        3.21
0061302        -0.6         1.5
0061303        -0.4         1.0
0061304        -0.2         0.5
0061305         0.0         0.0
*            type       regime
0061400           1           4
*             ind         dep
0061401        -1.0        3.21
0061402        -0.6         2.1
0061403        -0.4        1.72
0061404        -0.2        1.45
0061405         0.0         1.3
*            type       regime
0061500           1           5
*             ind         dep
```

```
0061501        0.0         0.0
0061502        0.2         0.11
0061503        0.4         0.13
0061504        0.6         0.26
0061505        0.8         0.49
0061506        1.0         0.83
*           type       regime
0061600          1           6
*            ind         dep
0061601        0.0         1.3
0061602        0.2        1.18
0061603        0.4        1.07
0061604        0.6        0.97
0061605        0.8        0.89
0061606        1.0        0.83
*           type       regime
0061700          1           7
*            ind         dep
0061701        0.0       1.139
0061702       -0.2        0.75
0061703       -0.4         0.3
0061704       -0.6        -0.4
0061705       -0.8        -1.1
0061706       -1.0        -2.0
*           type       regime
0061800          1           8
*            ind         dep
0061801       -1.0        -2.0
0061802      -0.75       -1.94
0061803       -0.5        -1.5
0061804        0.0       -0.33
*           type       regime
0061900          2           1
*            ind         dep
0061901        0.0        0.22
0061902    0.25271     0.49609
0061903    0.45717      0.6428
0061904    0.62725     0.76579
0061905    0.77301     0.85806
0061906    0.89663     0.93808
0061907        1.0         1.0
*           type       regime
0062000          2           2
*            ind         dep
0062001        0.0        -0.3
0062002    0.45081     0.49421
0062003    0.54082     0.69593
0062004    0.64783     0.74099
0062005    0.80723       0.752
0062006    0.82126     0.75649
0062007    0.91569     0.88171
0062008        1.0         1.0
*           type       regime
0062100          2           3
*            ind         dep
0062101       -1.0        3.21
0062102       -0.6         1.5
0062103       -0.4         1.0
0062104       -0.2         0.5
0062105        0.0         0.0
*           type       regime
0062200          2           4
*            ind         dep
0062201       -1.0        3.21
0062202       -0.6         2.1
0062203       -0.4        1.72
0062204       -0.2        1.45
0062205        0.0         1.3
*           type       regime
0062300          2           5
*            ind         dep
0062301        0.0         0.0
0062302        0.2        0.11
0062303        0.4        0.13
0062304        0.6        0.26
0062305        0.8        0.49
0062306        1.0        0.83
*           type       regime
0062400          2           6
*            ind         dep
0062401       -0.2         1.3
0062402       -0.4        1.18
0062403       -0.6        1.07
0062404       -0.8        0.97
0062405       -1.0        0.89
*           type       regime
0062500          2           7
*            ind         dep
0062501        0.0        0.22
0062502       -0.2        0.11
0062503       -0.4       -0.11
0062504       -0.6        -0.4
0062505       -0.8        -1.1
0062506       -1.0        -2.0
*           type       regime
0062600          2           8
*            ind         dep
0062601       -1.0        -2.0
0062602      -0.75       -1.94
0062603       -0.5        -1.5
0062604        0.0        -0.3
*
*           name        type
0070000   "unnamed"       valve
*           from          to        area
0070101   601130002     9010002     0.07065
*        fwd. loss    rev. loss     efvcahs
0070102        0.0         0.0           0
*        discharge     thermal
0070103        1.0        0.14
*           flow          vl          vv       unused
0070201          0         0.0         0.0         0.0
*           type
0070300      trpvlv
*           trip
0070301         34
*
*           name        type
0080000   "unnamed"       valve
*           from          to        area
0080101   601130002    600010001    0.07065
*        fwd. loss    rev. loss     efvcahs
0080102        0.8         0.8           0
*        discharge     thermal
0080103        1.0        0.14
*           flow          vl          vv       unused
0080201          0   2.6299736   2.6299736         0.0
*           type
0080300      trpvlv
*           trip
0080301         36
*
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*            name        type
0090000    "unnamed"      tmdpvol
*            area       length          vol
0090101        50.0         50.0          0.0
*         az-angle     inc-angle          dz
0090102         0.0         90.0         50.0
*          x-rough        x-hd        flags
0090103         0.0          0.0           0
*            cword
0090200         1004
*      srch press  temp squal quala1 quala2
0090201  0.0 1.0e5 293.0   1.0    0.0    1.0
*
*            name        type
0100000    "unnamed"         pipe
*           ncells
0100001           8
*           x-area        volid
0100101     2.294e-3           8
*          x-length       volid
0100301          0.1           1
0100302         0.16           2
0100303         0.32           3
0100304         0.55           4
0100305         0.56           6
0100306          0.4           7
0100307          0.2           8
*           volume        volid
0100401          0.0           8
*         azim-angle       volid
0100501          0.0           8
*         vert-angle       volid
0100601        -90.0           8
*           x-wall         xhd        volid
0100801       1.0e-5       0.027           8
*           x-flags        volid
0101001            0           8
*      ebt     press   water-ie   steam-ie void none id
0101201 000 1.685923e6  2.58741e5 2.595942e6  0.0  0.0  1
0101202 000 1.686618e6 2.600519e5  2.59595e6  0.0  0.0  2
0101203 000   1.6879e6 2.626595e5 2.595966e6  0.0  0.0  3
0101204 000 1.690224e6 2.671072e5 2.595994e6  0.0  0.0  4
0101205 000 1.693187e6 2.716455e5  2.59603e6  0.0  0.0  5
0101206 000 1.696176e6 2.761956e5 2.596066e6  0.0  0.0  6
0101207 000 1.698737e6 2.794748e5 2.596097e6  0.0  0.0  7
0101208 000 1.700336e6 2.811307e5 2.596116e6  0.0  0.0  8
*          jefvcahs      jun num
0101101     00000000           7
*             vl          vv       unused        junid
0101301     3.616329    3.616329         0.0            1
0101302    3.6169343   3.6169343         0.0            2
0101303    3.6181455   3.6181455         0.0            3
0101304    3.6202314   3.6202314         0.0            4
0101305    3.6223853   3.6223853         0.0            5
0101306    3.6245718   3.6245718         0.0            6
0101307    3.6261632   3.6261632         0.0            7
*             hd         corr          gas        slope       junid
0101401       0.027          0.0          1.0          1.0           7
*
*            name        type
0110000    "unnamed"      tmdpvol
*            area       length          vol
0110101        50.0         50.0          0.0
*         az-angle     inc-angle          dz
0110102         0.0         90.0         50.0
*          x-rough        x-hd        flags
0110103         0.0          0.0           0
*            cword
0110200         1004
*      srch press  temp squal quala1 quala2
0110201  0.0 1.0e5 293.0   1.0    0.0    1.0
*
*            name        type
0150000    "unnamed"       branch
*           njuns
0150001            4
*            area       length          vol
0150101     2.294e-3          0.1          0.0
*         az-angle     inc-angle          dz
0150102         0.0        -90.0         -0.1
*          x-rough        x-hd        flags
0150103       1.0e-5       0.027           0
*             ebt        press      water-ie      steam-ie          void
0150200          000   1.700489e6   2.819633e5    2.596118e6           0.0
*            from           to         area
0151101     15010001     10080002      2.294e-3
*         fwd. loss     rev. loss      efvcahs
0151102          0.1          0.1           0
*          hyd diam     ccfl wght     ccfl gas    ccfl slope
0151110         0.027          0.0          1.0          1.0
*             vl           vv        unused
0151201   -3.6269717   -3.6269717          0.0
*            from           to         area
0152101     15010002     20010001      5.24e-4
*         fwd. loss     rev. loss      efvcahs
0152102          0.6          0.6           0
*          hyd diam     ccfl wght     ccfl gas    ccfl slope
0152110     4.827e-3          0.0          1.0          1.0
*             vl           vv        unused
0152201    6.1351318    6.1351318          0.0
*            from           to         area
0153101     15010002     25010001      4.54e-4
*         fwd. loss     rev. loss      efvcahs
0153102          0.6          0.6           0
*          hyd diam     ccfl wght     ccfl gas    ccfl slope
0153110     4.802e-3          0.0          1.0          1.0
*             vl           vv        unused
0153201    6.1118174    6.1118174          0.0
*            from           to         area
0154101     15010002     30010001      3.83e-4
*         fwd. loss     rev. loss      efvcahs
0154102          0.6          0.6           0
*          hyd diam     ccfl wght     ccfl gas    ccfl slope
0154110     4.767e-3          0.0          1.0          1.0
*             vl           vv        unused
0154201    6.0878248    6.0878248          0.0
*
*            name        type
0200000    "unnamed"         pipe
*           ncells
0200001           12
*           x-area        volid
0200101     5.24e-4           12
*          x-length       volid
0200301         0.05           1
0200302          0.1          11
0200303         0.05          12
*           volume        volid
0200401          0.0          12
*         azim-angle       volid
0200501          0.0          12
*         vert-angle       volid
```

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0200601       -90.0          12
*           x-wall         xhd       volid
0200801      1.0e-5     4.827e-3          12
*          x-flags       volid
0201001           0          12
*      ebt     press   water-ie   steam-ie void none id
0201201 000 1.675572e6 2.819076e5 2.595814e6  0.0  0.0  1
0201202 000 1.668867e6 2.838359e5 2.595731e6  0.0  0.0  2
0201203 000 1.659922e6 2.877834e5 2.595618e6  0.0  0.0  3
0201204 000 1.650974e6 2.954631e5 2.595505e6  0.0  0.0  4
0201205 000  1.64202e6 3.062711e5  2.59539e6  0.0  0.0  5
0201206 000 1.633061e6  3.19363e5 2.595274e6  0.0  0.0  6
0201207 000   1.6241e6 3.337241e5 2.595156e6  0.0  0.0  7
0201208 000 1.615137e6 3.482477e5 2.595037e6  0.0  0.0  8
0201209 000 1.606175e6 3.618256e5 2.594917e6  0.0  0.0  9
0201210 000 1.597216e6 3.734196e5 2.594796e6  0.0  0.0 10
0201211 000 1.588264e6 3.821547e5 2.594673e6  0.0  0.0 11
0201212 000  1.58155e6 3.830037e5  2.59458e6  0.0  0.0 12
*            area         jun
0200201      5.24e-4          11
*         jefvcahs      jun num
0201101     00000000           11
*             vl           vv       unused        junid
0201301    6.1351495    6.1351495          0.0           1
0201302    6.1367755    6.1367755          0.0           2
0201303    6.1401162    6.1401162          0.0           3
0201304    6.1466904    6.1466904          0.0           4
0201305    6.1561456    6.1561456          0.0           5
0201306    6.1679239    6.1679239          0.0           6
0201307    6.1812534    6.1812534          0.0           7
0201308    6.1951666    6.1951666          0.0           8
0201309    6.2085667    6.2085667          0.0           9
0201310    6.2203093    6.2203093          0.0          10
0201311     6.229342     6.229342          0.0          11
*             hd         corr          gas        slope        junid
0201401     4.827e-3          0.0          1.0          1.0           11
*
*            name         type
0250000    "unnamed"         pipe
*           ncells
0250001           12
*          x-area        volid
0250101      4.54e-4           12
*         x-length        volid
0250301         0.05            1
0250302          0.1           11
0250303         0.05           12
*          volume        volid
0250401          0.0           12
*        azim-angle        volid
0250501          0.0           12
*        vert-angle        volid
0250601       -90.0          12
*           x-wall         xhd       volid
0250801      1.0e-5     4.802e-3          12
*          x-flags       volid
0251001           0          12
*      ebt     press   water-ie   steam-ie void none id
0251201 000  1.67581e6 2.820046e5 2.595817e6  0.0  0.0  1
0251202 000  1.66911e6 2.860249e5 2.595734e6  0.0  0.0  2
0251203 000 1.660168e6 2.938654e5 2.595622e6  0.0  0.0  3
0251204 000  1.65122e6 3.087462e5 2.595508e6  0.0  0.0  4
0251205 000 1.642256e6 3.294138e5 2.595393e6  0.0  0.0  5
0251206 000 1.633275e6 3.541478e5 2.595276e6  0.0  0.0  6
0251207 000 1.624277e6 3.808818e5 2.595158e6  0.0  0.0  7
0251208 000 1.615261e6 4.073714e5 2.595039e6  0.0  0.0  8
0251209 000 1.606231e6 4.313846e5 2.594918e6  0.0  0.0  9
0251210 000 1.597195e6 4.508941e5 2.594795e6  0.0  0.0 10
0251211 000 1.588165e6 4.642522e5 2.594672e6  0.0  0.0 11
0251212 000 1.581398e6 4.631832e5 2.594578e6  0.0  0.0 12
*            area         jun
0250201      4.54e-4          11
*         jefvcahs      jun num
0251101     00000000           11
*             vl           vv       unused        junid
0251301    6.1119146    6.1119146          0.0           1
0251302     6.115283     6.115283          0.0           2
0251303    6.1219401    6.1219401          0.0           3
0251304    6.1349139    6.1349139          0.0           4
0251305    6.1536932    6.1536932          0.0           5
0251306    6.1773214    6.1773214          0.0           6
0251307     6.204257     6.204257          0.0           7
0251308    6.2323661    6.2323661          0.0           8
0251309    6.2590642    6.2590642          0.0           9
0251310    6.2816095    6.2816095          0.0          10
0251311    6.2974944    6.2974944          0.0          11
*             hd         corr          gas        slope        junid
0251401     4.802e-3          0.0          1.0          1.0           11
*
*            name         type
0300000    "unnamed"         pipe
*           ncells
0300001           12
*          x-area        volid
0300101      3.83e-4           12
*         x-length        volid
0300301         0.05            1
0300302          0.1           11
0300303         0.05           12
*          volume        volid
0300401          0.0           12
*        azim-angle        volid
0300501          0.0           12
*        vert-angle        volid
0300601       -90.0          12
*           x-wall         xhd       volid
0300801      1.0e-5     4.767e-3          12
*          x-flags       volid
0301001           0          12
*      ebt     press   water-ie   steam-ie void none id
0301201 000  1.67605e6 2.853684e5  2.59582e6  0.0  0.0  1
0301202 000 1.669329e6 2.939091e5 2.595736e6  0.0  0.0  2
0301203 000 1.660362e6 3.054214e5 2.595624e6  0.0  0.0  3
0301204 000 1.651392e6 3.225335e5  2.59551e6  0.0  0.0  4
0301205 000 1.642409e6 3.441017e5 2.595395e6  0.0  0.0  5
0301206 000  1.63341e6 3.685994e5 2.595278e6  0.0  0.0  6
0301207 000 1.624393e6 3.942411e5  2.59516e6  0.0  0.0  7
0301208 000  1.61536e6 4.191174e5  2.59504e6  0.0  0.0  8
0301209 000 1.606314e6 4.413522e5 2.594919e6  0.0  0.0  9
0301210 000 1.597263e6 4.592617e5 2.594796e6  0.0  0.0 10
0301211 000 1.588218e6 4.714953e5 2.594672e6  0.0  0.0 11
0301212 000 1.581439e6 4.708892e5 2.594578e6  0.0  0.0 12
*            area         jun
0300201      3.83e-4          11
*         jefvcahs      jun num
0301101     00000000           11
*             vl           vv       unused        junid
0301301    6.0907121    6.0907121          0.0           1
0301302    6.0979223    6.0979223          0.0           2
0301303    6.1078854    6.1078854          0.0           3
0301304    6.1231956    6.1231956          0.0           4
0301305    6.1433482    6.1433482          0.0           5
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0301306    6.1673837    6.1673837         0.0          6
0301307    6.1938343    6.1938343         0.0          7
0301308    6.2207527    6.2207527         0.0          8
0301309    6.2458596    6.2458596         0.0          9
0301310    6.2668042    6.2668042         0.0         10
0301311    6.2814879    6.2814879         0.0         11
*             hd         corr         gas        slope       junid
0301401     4.767e-3         0.0         1.0         1.0          11
*
*             name         type
0350000    "unnamed"       branch
*            njuns
0350001           4
*            area       length          vol
0350101     2.294e-3         0.05          0.0
*         az-angle     inc-angle           dz
0350102          0.0        -90.0        -0.05
*          x-rough         x-hd        flags
0350103       1.0e-5        0.027            0
*             ebt        press     water-ie     steam-ie         void
0350200          000    1.58032e6   4.342781e5   2.594563e6          0.0
*             from          to         area
0351101     35010002     40010001     2.294e-3
*         fwd. loss     rev. loss      efvcahs
0351102          1.5          1.5            0
*             vl           vv       unused
0351201    3.7167678    3.7167678          0.0
*             from          to         area
0352101     35010001     20120002      5.24e-4
*         fwd. loss     rev. loss      efvcahs
0352102          0.6          0.6            0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
0352110     4.827e-3          0.0          1.0          1.0
*             vl           vv       unused
0352201   -6.2302437   -6.2302437          0.0
*             from          to         area
0353101     35010001     25120002      4.54e-4
*         fwd. loss     rev. loss      efvcahs
0353102          0.6          0.6            0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
0353110     4.802e-3          0.0          1.0          1.0
*             vl           vv       unused
0353201   -6.2962308   -6.2962308          0.0
*             from          to         area
0354101     35010001     30120002      3.83e-4
*         fwd. loss     rev. loss      efvcahs
0354102          0.6          0.6            0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
0354110     4.767e-3          0.0          1.0          1.0
*             vl           vv       unused
0354201   -6.2807736   -6.2807736          0.0
*
*             name         type
0400000    "unnamed"       branch
*            njuns
0400001           0
*            area       length          vol
0400101     4.418e-3         0.05          0.0
*         az-angle     inc-angle           dz
0400102          0.0        -90.0        -0.05
*          x-rough         x-hd        flags
0400103       1.0e-5        0.075            0
*             ebt        press     water-ie     steam-ie         void
0400200          000    1.577341e6   4.342317e5   2.594521e6          0.0
*
*             name         type
0450000    "unnamed"       branch
*            njuns
0450001           5
*            area       length          vol
0450101     1.81e-3         0.05          0.0
*         az-angle     inc-angle           dz
0450102          0.0         90.0         0.05
*          x-rough         x-hd        flags
0450103       1.0e-5          0.0            0
*             ebt        press     water-ie     steam-ie         void
0450200          000    1.550212e6   4.342318e5   2.594136e6          0.0
*             from          to         area
0451101     45010001     40010001     1.81e-3
*         fwd. loss     rev. loss      efvcahs
0451102          1.5          1.5            0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
0451110        0.048          0.0          1.0          1.0
*             vl           vv       unused
0451201   -4.7106099   -4.7106099          0.0
*             from          to         area
0452101     45010002     50010001     3.12e-4
*         fwd. loss     rev. loss      efvcahs
0452102          0.6          0.6            0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
0452110     4.717e-3          0.0          1.0          1.0
*             vl           vv       unused
0452201    7.0454173    7.0454173          0.0
*             from          to         area
0453101     45010002     55010001      2.42e-4
*         fwd. loss     rev. loss      efvcahs
0453102          0.6          0.6            0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
0453110      4.64e-3          0.0          1.0          1.0
*             vl           vv       unused
0453201    6.9851398    6.9851398          0.0
*             from          to         area
0454101     45010002     60010001      1.71e-4
*         fwd. loss     rev. loss      efvcahs
0454102          0.8          0.8            0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
0454110     4.506e-3          0.0          1.0          1.0
*             vl           vv       unused
0454201    6.7942328    6.7942328          0.0
*             from          to         area
0455101     45010002     61010001      3.46e-4
*         fwd. loss     rev. loss      efvcahs
0455102          2.0          2.0            0
*             vl           vv       unused
0455201     10.046004    10.046004          0.0
*
*             name         type
0500000    "unnamed"        pipe
*           ncells
0500001          12
*           x-area        volid
0500101     3.12e-4          12
*         x-length        volid
0500301         0.05           1
0500302          0.1          11
0500303         0.05          12
*           volume        volid
0500401          0.0          12
*        azim-angle        volid
0500501          0.0          12
*        vert-angle        volid
0500601         90.0          12
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*           x-wall          xhd        volid
0500801       1.0e-5      4.717e-3           12
*           x-flags         volid
0501001             0           12
*      ebt     press   water-ie   steam-ie void none id
0501201 000 1.519167e6 4.347657e5  2.59368e6  0.0  0.0  1
0501202 000 1.508943e6 4.472055e5 2.593526e6  0.0  0.0  2
0501203 000 1.495233e6 4.637351e5 2.593316e6  0.0  0.0  3
0501204 000 1.481478e6 4.828757e5 2.593102e6  0.0  0.0  4
0501205 000 1.467684e6 5.029332e5 2.592884e6  0.0  0.0  5
0501206 000 1.453856e6 5.221133e5 2.592662e6  0.0  0.0  6
0501207 000 1.440008e6 5.386669e5 2.592435e6  0.0  0.0  7
0501208 000 1.426156e6 5.510378e5 2.592204e6  0.0  0.0  8
0501209 000 1.412318e6 5.579859e5  2.59197e6  0.0  0.0  9
0501210 000 1.398516e6 5.587004e5 2.591733e6  0.0  0.0 10
0501211 000 1.384763e6 5.561076e5 2.591492e6  0.0  0.0 11
0501212 000 1.374478e6 5.524282e5  2.59131e6  0.0  0.0 12
*             area          jun
0500201      3.12e-4           11
*          jefvcahs      jun num
0501101     00000000           11
*             vl           vv       unused        junid
0501301    7.0461988    7.0461988          0.0            1
0501302    7.0623837    7.0623837          0.0            2
0501303    7.0844302    7.0844302          0.0            3
0501304    7.1107264    7.1107264          0.0            4
0501305    7.1391754    7.1391754          0.0            5
0501306    7.1672463    7.1672463          0.0            6
0501307    7.1921654    7.1921654          0.0            7
0501308    7.2112188    7.2112188          0.0            8
0501309    7.2220993    7.2220993          0.0            9
0501310    7.2232666    7.2232666          0.0           10
0501311    7.2192531    7.2192531          0.0           11
*             hd         corr          gas        slope        junid
0501401     4.717e-3          0.0          1.0          1.0           11
*
*             name         type
0550000    "unnamed"         pipe
*            ncells
0550001           12
*           x-area        volid
0550101      2.42e-4           12
*         x-length        volid
0550301         0.05            1
0550302          0.1           11
0550303         0.05           12
*           volume        volid
0550401          0.0           12
*        azim-angle        volid
0550501          0.0           12
*        vert-angle        volid
0550601         90.0           12
*           x-wall          xhd        volid
0550801       1.0e-5      4.64e-3           12
*           x-flags         volid
0551001             0           12
*      ebt     press   water-ie   steam-ie void none id
0551201 000 1.519806e6 4.342467e5 2.593689e6  0.0  0.0  1
0551202 000 1.509548e6 4.443166e5 2.593535e6  0.0  0.0  2
0551203 000 1.495806e6 4.583477e5 2.593325e6  0.0  0.0  3
0551204 000 1.482024e6 4.751927e5  2.59311e6  0.0  0.0  4
0551205 000 1.468206e6 4.934629e5 2.592892e6  0.0  0.0  5
0551206 000 1.454356e6 5.116422e5  2.59267e6  0.0  0.0  6
0551207 000 1.440481e6 5.282135e5 2.592443e6  0.0  0.0  7
0551208 000 1.426595e6  5.41787e5 2.592212e6  0.0  0.0  8
0551209 000 1.412712e6 5.512177e5 2.591977e6  0.0  0.0  9
0551210 000 1.398848e6 5.556717e5 2.591739e6  0.0  0.0 10
0551211 000 1.385014e6 5.573956e5 2.591497e6  0.0  0.0 11
0551212 000 1.374652e6 5.567441e5 2.591313e6  0.0  0.0 12
*             area          jun
0550201      2.42e-4           11
*          jefvcahs      jun num
0551101     00000000           11
*             vl           vv       unused        junid
0551301    6.9852519    6.9852519          0.0            1
0551302    6.9982085    6.9982085          0.0            2
0551303    7.0166392    7.0166392          0.0            3
0551304    7.0393414    7.0393414          0.0            4
0551305    7.0646834    7.0646834          0.0            5
0551306     7.090651     7.090651          0.0            6
0551307     7.114984     7.114984          0.0            7
0551308    7.1353955    7.1353955          0.0            8
0551309    7.1498442    7.1498442          0.0            9
0551310     7.156765     7.156765          0.0           10
0551311    7.1594849    7.1594849          0.0           11
*             hd         corr          gas        slope        junid
0551401     4.64e-3          0.0          1.0          1.0           11
*
*             name         type
0600000    "unnamed"         pipe
*            ncells
0600001           12
*           x-area        volid
0600101      1.71e-4           12
*         x-length        volid
0600301         0.05            1
0600302          0.1           11
0600303         0.05           12
*           volume        volid
0600401          0.0           12
*        azim-angle        volid
0600501          0.0           12
*        vert-angle        volid
0600601         90.0           12
*           x-wall          xhd        volid
0600801       1.0e-5      4.506e-3           12
*           x-flags         volid
0601001             0           12
*      ebt     press   water-ie   steam-ie void none id
0601201 000 1.517456e6  4.34238e5 2.593654e6  0.0  0.0  1
0601202 000  1.50736e6 4.409034e5 2.593502e6  0.0  0.0  2
0601203 000 1.493859e6 4.501033e5 2.593295e6  0.0  0.0  3
0601204 000 1.480336e6 4.610588e5 2.593084e6  0.0  0.0  4
0601205 000 1.466793e6 4.728409e5  2.59287e6  0.0  0.0  5
0601206 000 1.453233e6 4.844645e5 2.592651e6  0.0  0.0  6
0601207 000 1.439663e6 4.949632e5 2.592429e6  0.0  0.0  7
0601208 000 1.426089e6 5.034621e5 2.592203e6  0.0  0.0  8
0601209 000 1.412519e6 5.092633e5 2.591974e6  0.0  0.0  9
0601210 000 1.398961e6 5.118636e5  2.59174e6  0.0  0.0 10
0601211 000 1.385421e6 5.127655e5 2.591504e6  0.0  0.0 11
0601212 000 1.375273e6 5.125198e5 2.591324e6  0.0  0.0 12
*             area          jun
0600201      1.71e-4           11
*          jefvcahs      jun num
0601101     00000000           11
*             vl           vv       unused        junid
0601301    6.7943382    6.7943382          0.0            1
0601302    6.8026652    6.8026652          0.0            2
0601303    6.8143163    6.8143163          0.0            3
0601304     6.828424     6.828424          0.0            4
0601305    6.8438854    6.8438854          0.0            5
0601306    6.8594379    6.8594379          0.0            6
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0601307    6.8737445    6.8737445         0.0          7
0601308    6.8855128    6.8855128         0.0          8
0601309     6.893651     6.893651         0.0          9
0601310     6.897347     6.897347         0.0         10
0601311    6.8986602    6.8986602         0.0         11
*             hd         corr          gas        slope        junid
0601401     4.506e-3         0.0          1.0          1.0           11
*
*            name         type
0610000    "unnamed"         pipe
*           ncells
0610001          12
*          x-area        volid
0610101      3.46e-4           12
*        x-length        volid
0610301         0.05            1
0610302          0.1           11
0610303         0.05           12
*          volume        volid
0610401          0.0           12
*       azim-angle        volid
0610501          0.0           12
*       vert-angle        volid
0610601         90.0           12
*          x-wall         xhd        volid
0610801       1.0e-5          0.0           12
*          x-flags        volid
0611001            0          12
*     ebt     press   water-ie   steam-ie void none id
0611201 000 1.414461e6  4.34234e5 2.592007e6  0.0  0.0  1
0611202 000 1.410786e6 4.343033e5 2.591944e6  0.0  0.0  2
0611203 000 1.405889e6 4.344619e5  2.59186e6  0.0  0.0  3
0611204 000 1.400991e6  4.34727e5 2.591776e6  0.0  0.0  4
0611205 000 1.396091e6 4.351065e5 2.591691e6  0.0  0.0  5
0611206 000 1.391189e6 4.355985e5 2.591605e6  0.0  0.0  6
0611207 000 1.386285e6 4.361913e5 2.591519e6  0.0  0.0  7
0611208 000 1.381379e6 4.368644e5 2.591432e6  0.0  0.0  8
0611209 000 1.376472e6 4.375899e5 2.591345e6  0.0  0.0  9
0611210 000 1.371564e6 4.383348e5 2.591257e6  0.0  0.0 10
0611211 000 1.366655e6 4.390816e5 2.591169e6  0.0  0.0 11
0611212 000 1.362971e6  4.39452e5 2.591102e6  0.0  0.0 12
*            area         jun
0610201      3.46e-4           11
*         jefvcahs      jun num
0611101     00000000           11
*             vl          vv       unused       junid
0611301    10.046607    10.046607         0.0           1
0611302     10.04675     10.04675         0.0           2
0611303    10.047062    10.047062         0.0           3
0611304    10.047569    10.047569         0.0           4
0611305    10.048285    10.048285         0.0           5
0611306     10.04921     10.04921         0.0           6
0611307    10.050319    10.050319         0.0           7
0611308    10.051578    10.051578         0.0           8
0611309    10.052934    10.052934         0.0           9
0611310    10.054327    10.054327         0.0          10
0611311    10.055727    10.055727         0.0          11
*
*            name         type
0650000    "unnamed"       branch
*           njuns
0650001          5
*            area       length          vol
0650101      1.81e-3          0.1          0.0
*         az-angle    inc-angle           dz
0650102          0.0         90.0          0.1
*          x-rough         x-hd        flags
0650103       1.0e-5          0.0            0
*             ebt        press     water-ie     steam-ie         void
0650200          000  1.369598e6  5.009112e5  2.591222e6          0.0
*            from          to         area
0651101      65010002      70010001       1.81e-3
*        fwd. loss     rev. loss      efvcahs
0651102          0.1          0.1            0
*             vl          vv       unused
0651201    4.7716241    4.7716241         0.0
*            from          to         area
0652101      65010001      50120002      3.12e-4
*        fwd. loss     rev. loss      efvcahs
0652102          0.6          0.6            0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
0652110     4.717e-3          0.0          1.0          1.0
*             vl          vv       unused
0652201    -7.213553    -7.213553         0.0
*            from          to         area
0653101      65010001      55120002      2.42e-4
*        fwd. loss     rev. loss      efvcahs
0653102          0.6          0.6            0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
0653110     4.64e-3          0.0          1.0          1.0
*             vl          vv       unused
0653201    -7.1585093   -7.1585093         0.0
*            from          to         area
0654101      65010001      60120002      1.71e-4
*        fwd. loss     rev. loss      efvcahs
0654102          0.6          0.6            0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
0654110     4.506e-3          0.0          1.0          1.0
*             vl          vv       unused
0654201    -6.8983459   -6.8983459         0.0
*            from          to         area
0655101      65010001      61120002      3.46e-4
*        fwd. loss     rev. loss      efvcahs
0655102          0.6          0.6            0
*             vl          vv       unused
0655201    -10.056427   -10.056427         0.0
*
*            name         type
0700000    "unnamed"         pipe
*           ncells
0700001          14
*          x-area        volid
0700101      1.81e-3           14
*        x-length        volid
0700301          0.2            1
0700302          0.4            2
0700303         0.56            4
0700304         0.55            5
0700305         0.32            6
0700306         0.16            7
0700307         0.08            8
0700308         0.04           11
0700309         0.03           12
0700310         0.04           13
0700311         0.06           14
*          volume        volid
0700401          0.0           14
*       azim-angle        volid
0700501          0.0           14
*       vert-angle        volid
0700601         90.0           14
*          x-wall         xhd        volid
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0700801       1.0e-5        0.048          14
*           x-flags         volid
0701001           0           14
*      ebt     press   water-ie   steam-ie void none id
0701201 000 1.366668e6 4.991644e5 2.591169e6  0.0  0.0  1
0701202 000 1.362902e6  4.95708e5 2.591101e6  0.0  0.0  2
0701203 000 1.356873e6 4.909231e5 2.590992e6  0.0  0.0  3
0701204 000 1.349837e6 4.861678e5 2.590862e6  0.0  0.0  4
0701205 000 1.342859e6 4.815242e5 2.590733e6  0.0  0.0  5
0701206 000 1.337389e6 4.788132e5 2.590631e6  0.0  0.0  6
0701207 000 1.334371e6 4.774534e5 2.590575e6  0.0  0.0  7
0701208 000 1.332862e6 4.766029e5 2.590546e6  0.0  0.0  8
0701209 000 1.332108e6 4.766031e5 2.590532e6  0.0  0.0  9
0701210 000 1.331603e6 4.766032e5 2.590523e6  0.0  0.0 10
0701211 000 1.331098e6 4.766033e5 2.590513e6  0.0  0.0 11
0701212 000 1.330656e6 4.766034e5 2.590505e6  0.0  0.0 12
0701213 000 1.335595e6 4.766035e5 2.590598e6  0.0  0.0 13
0701214 000 1.340464e6 1.375679e5 2.590689e6  0.0  0.0 14
*             area          jun
0700201      1.81e-3          13
*          jefvcahs      jun num
0701101     00000000           13
*              vl           vv       unused        junid
0701301    4.7699566    4.7699566          0.0           1
0701302    4.7666664    4.7666664          0.0           2
0701303    4.7621436    4.7621436          0.0           3
0701304    4.7576857    4.7576857          0.0           4
0701305    4.7533655    4.7533655          0.0           5
0701306    4.7508616    4.7508616          0.0           6
0701307    4.7496109    4.7496109          0.0           7
0701308    4.7488289    4.7488289          0.0           8
0701309    4.7488303    4.7488303          0.0           9
0701310    4.7488317    4.7488317          0.0          10
0701311    4.7488327    4.7488327          0.0          11
0701312    4.7488337    4.7488337          0.0          12
0701313   1.05473e-7   1.05473e-7          0.0          13
*              hd         corr          gas        slope        junid
0701401        0.048          0.0          1.0          1.0           13
*
*             name         type
0900000    "unnamed"         pipe
*           ncells
0900001           11
*           x-area        volid
0900101    1.256e-3           11
*         x-length        volid
0900301         0.08           1
0900302         0.16           2
0900303         0.32           3
0900304          0.6           4
0900305         0.92           6
0900306          0.8           7
0900307          0.4           8
0900308          0.2           9
0900309          0.3          10
0900310         0.15          11
*           volume        volid
0900401          0.0          11
*        azim-angle        volid
0900501          0.0          11
*        vert-angle        volid
0900601          0.0           8
0900602         90.0           9
0900603          0.0          10
0900604        -90.0          11
*           x-wall         xhd        volid
0900801       1.0e-5         0.04          11
*           x-flags         volid
0901001           0           11
*      ebt     press   water-ie   steam-ie void none id
0901201 000 1.290748e6 4.765189e5 2.589733e6  0.0  0.0  1
0901202 000 1.289739e6 4.763499e5 2.589713e6  0.0  0.0  2
0901203 000  1.28772e6 4.760125e5 2.589673e6  0.0  0.0  3
0901204 000 1.283852e6 4.753816e5 2.589596e6  0.0  0.0  4
0901205 000 1.277463e6 4.744185e5 2.589468e6  0.0  0.0  5
0901206 000  1.26973e6 4.734597e5 2.589311e6  0.0  0.0  6
0901207 000 1.262503e6 4.726292e5 2.589163e6  0.0  0.0  7
0901208 000 1.257462e6 4.722148e5 2.589059e6  0.0  0.0  8
0901209 000 1.240673e6 4.720077e5 2.588709e6  0.0  0.0  9
0901210 000 1.224304e6 4.716976e5  2.58836e6  0.0  0.0 10
0901211 000 1.209776e6 4.715427e5 2.588044e6  0.0  0.0 11
*          fwd. loss     rev.loss        junid
0900901          0.0          0.0            7
0900902          0.6          0.6           10
*          jefvcahs      jun num
0901101     00000000           10
*              vl           vv       unused        junid
0901301    6.843473    6.843473          0.0           1
0901302   6.8432512   6.8432512          0.0           2
0901303   6.8428087   6.8428087          0.0           3
0901304   6.8419824   6.8419824          0.0           4
0901305   6.8407249   6.8407249          0.0           5
0901306   6.8394794   6.8394794          0.0           6
0901307   6.8384042   6.8384042          0.0           7
0901308   6.8378725   6.8378725          0.0           8
0901309   6.8376508   6.8376508          0.0           9
0901310   6.8372922   6.8372922          0.0          10
*              hd         corr          gas        slope        junid
0901401        0.04          0.0          1.0          1.0           10
*
*             name         type
0910000    "unnamed"      sngljun
*             from           to         area
0910101     70130005     90010001     1.256e-3
*          fwd. loss     rev. loss      efvcahs
0910102          1.0          1.0            0
*          discharge      thermal
0910103          1.0         0.14
*              hd         flood     intercept        slope
0910110         0.04          0.0          1.0          1.0
*             flow           vl           vv       unused
0910201            0    6.8434472    6.8434472          0.0
*
*             name         type
0920000    "unnamed"      sngljun
*             from           to         area
0920101     96060002     10010001     1.256e-3
*          fwd. loss     rev. loss      efvcahs
0920102          1.0          1.0            0
*          discharge      thermal
0920103          1.0         0.14
*              hd         flood     intercept        slope
0920110         0.04          0.0          1.0          1.0
*             flow           vl           vv       unused
0920201            0    6.6042728    6.6042728          0.0
*
*             name         type
0930000    "unnamed"         pipe
*           ncells
0930001           1
*           x-area        volid
0930101    1.256e-3           1
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*          x-length        volid
0930301         0.1           1
*          volume        volid
0930401         0.0           1
*        azim-angle        volid
0930501         0.0           1
*        vert-angle        volid
0930601        -90.0          1
*          x-wall         xhd        volid
0930801         0.0          0.0           1
*          x-flags        volid
0931001           0           1
*      ebt     press   water-ie   steam-ie void none id
0931201 000 1.40745e5 2.024406e5 2.517044e6  0.0  0.0  1
*
*            name         type
0940000    "unnamed"         pipe
*           ncells
0940001           1
*          x-area        volid
0940101     1.256e-3           1
*          x-length        volid
0940301         0.1           1
*          volume        volid
0940401         0.0           1
*        azim-angle        volid
0940501         0.0           1
*        vert-angle        volid
0940601        -90.0          1
*          x-wall         xhd        volid
0940801         0.0          0.0           1
*          x-flags        volid
0941001           0           1
*      ebt     press   water-ie   steam-ie void none id
0941201 000 1.40745e5 2.024406e5 2.517044e6  0.0  0.0  1
*
*            name         type
0950000    "unnamed"         pipe
*           ncells
0950001           4
*          x-area        volid
0950101     1.256e-3           4
*          x-length        volid
0950301         0.15          1
0950302         0.3           2
0950303         0.35          3
0950304         0.56          4
*          volume        volid
0950401         0.0           4
*        azim-angle        volid
0950501         0.0           4
*        vert-angle        volid
0950601         90.0          1
0950602         0.0           2
0950603        -90.0          3
0950604         0.0           4
*          x-wall         xhd        volid
0950801        1.0e-5         0.04          4
*          x-flags        volid
0951001           0           4
*      ebt     press   water-ie   steam-ie void none id
0951201 000 1.744048e6 2.584021e5 2.596628e6  0.0  0.0  1
0951202 000 1.732842e6 2.583587e5 2.596499e6  0.0  0.0  2
0951203 000 1.723206e6 2.583082e5 2.596388e6  0.0  0.0  3
0951204 000 1.712476e6 2.582274e5 2.596261e6  0.0  0.0  4
*          fwd. loss      rev.loss         junid
0950901         0.4           0.4           3
*          jefvcahs      jun num
0951101     00000000           3
*             vl          vv        unused        junid
0951301     6.604538     6.604538          0.0           1
0951302     6.6045327    6.6045327         0.0           2
0951303     6.6045165    6.6045165         0.0           3
*             hd         corr          gas         slope        junid
0951401         0.04          0.0          1.0          1.0           3
*
*            name         type
0960000    "unnamed"         pipe
*           ncells
0960001           6
*          x-area        volid
0960101     1.256e-3           6
*          x-length        volid
0960301         0.65          2
0960302         0.3           4
0960303         0.16          5
0960304         0.08          6
*          volume        volid
0960401         0.0           6
*        azim-angle        volid
0960501         0.0           6
*        vert-angle        volid
0960601         0.0           6
*          x-wall         xhd        volid
0960801        1.0e-5         0.04          6
*          x-flags        volid
0961001           0           6
*      ebt     press   water-ie   steam-ie void none id
0961201 000 1.707386e6 2.581338e5 2.596201e6  0.0  0.0  1
0961202 000 1.701917e6 2.580404e5 2.596135e6  0.0  0.0  2
0961203 000  1.69792e6 2.579974e5 2.596087e6  0.0  0.0  3
0961204 000 1.695396e6 2.579544e5 2.596057e6  0.0  0.0  4
0961205 000 1.693461e6 2.579314e5 2.596033e6  0.0  0.0  5
0961206 000 1.692451e6   2.5792e5 2.596021e6  0.0  0.0  6
*            area          jun
0960201     1.256e-3           5
*          jefvcahs      jun num
0961101     00000000           5
*             vl          vv        unused        junid
0961301     6.604413     6.604413          0.0           1
0961302     6.6043491    6.6043491         0.0           2
0961303     6.6043239    6.6043239         0.0           3
0961304     6.6042943    6.6042943         0.0           4
0961305      6.60428      6.60428          0.0           5
*             hd         corr          gas         slope        junid
0961401         0.04          0.0          1.0          1.0           5
*
*            name         type
0970000    "unnamed"         valve
*            from          to          area
0970101     95040002     96010001     1.256e-3
*          fwd. loss     rev. loss      efvcahs
0970102         0.0           0.0           0
*          discharge      thermal
0970103         1.0          0.14
*             hd         flood     intercept        slope
0970110         0.04          0.0          1.0          1.0
*            flow          vl          vv        unused
0970201           0     6.6044784    6.6044784          0.0
*            type
0970300       trpvlv
*            trip
```

```
0970301         38
*
*           name        type
0980000   "unnamed"       valve
*           from         to        area
0980101    95040002    94010002    1.256e-3
*        fwd. loss    rev. loss     efvcahs
0980102        0.0         0.0         100
*        discharge     thermal
0980103        1.0        0.14
*            hd       flood    intercept       slope
0980110       0.04         0.0         1.0         1.0
*           flow          vl          vv       unused
0980201          0        0.0         0.0         0.0
*           type
0980300      trpvlv
*           trip
0980301         37
*
*           name        type
0990000   "unnamed"       valve
*           from         to        area
0990101    96010001    93010002    1.256e-3
*        fwd. loss    rev. loss     efvcahs
0990102        0.0         0.0         100
*        discharge     thermal
0990103        1.0        0.14
*            hd       flood    intercept       slope
0990110       0.04         0.0         1.0         1.0
*           flow          vl          vv       unused
0990201          0        0.0         0.0         0.0
*           type
0990300      trpvlv
*           trip
0990301         37
*
*           name        type
1010000   "unnamed"       valve
*           from         to        area
1010101   425010002   195010001    0.023864
*        fwd. loss    rev. loss     efvcahs
1010102        1.0         1.0         100
*        discharge     thermal
1010103        1.0        0.14
*            hd       flood    intercept       slope
1010110       0.04         0.0         1.0         1.0
*           flow          vl          vv       unused
1010201          0    6.6529312    6.6529312         0.0
*           type
1010300      mtrvlv
*          topen       tclose       vrate        ipos
1010301          1          2         1.0         1.0
*
*           name        type
1020000   "unnamed"       valve
*           from         to        area
1020101   190110002   450010002    0.023864
*        fwd. loss    rev. loss     efvcahs
1020102        1.0         1.0         100
*        discharge     thermal
1020103        1.0        0.14
*            hd       flood    intercept       slope
1020110       0.04         0.0         1.0         1.0
*           flow          vl          vv       unused
1020201          0     24.26293     24.26293         0.0
*           type
1020300       mtrvlv
*           topen       tclose       vrate        ipos
1020301          1          2         1.0         1.0
*           vtble
1020302         12
*
*           name        type
1100000   "unnamed"        pipe
*           ncells
1100001          8
*          x-area       volid
1100101    0.043586          8
*        x-length       volid
1100301         0.1          1
1100302        0.16          2
1100303        0.32          3
1100304        0.55          4
1100305        0.56          6
1100306         0.4          7
1100307         0.2          8
*          volume       volid
1100401         0.0          8
*       azim-angle       volid
1100501         0.0          8
*       vert-angle       volid
1100601       -90.0          8
*          x-wall        xhd       volid
1100801      1.0e-5       0.027          8
*          x-flags       volid
1101001          0          8
*     ebt     press   water-ie   steam-ie void none id
1101201 000 1.670901e6 2.581354e5 2.595756e6  0.0  0.0  1
1101202 000 1.671588e6 2.585597e5 2.595764e6  0.0  0.0  2
1101203 000 1.672857e6 2.594036e5  2.59578e6  0.0  0.0  3
1101204 000 1.675156e6 2.608417e5 2.595809e6  0.0  0.0  4
1101205 000 1.678089e6 2.623062e5 2.595845e6  0.0  0.0  5
1101206 000 1.681049e6 2.637718e5 2.595882e6  0.0  0.0  6
1101207 000 1.683585e6 2.648253e5 2.595913e6  0.0  0.0  7
1101208 000  1.68517e6  2.65356e5 2.595932e6  0.0  0.0  8
*            area         jun
1100201    0.041292          7
*         jefvcahs      jun num
1101101    00000000          7
*            vl          vv       unused       junid
1101301   3.8450227   3.8450227         0.0          1
1101302   3.8452301   3.8452301         0.0          2
1101303    3.845643    3.845643         0.0          3
1101304   3.8463488   3.8463488         0.0          4
1101305   3.8470697   3.8470697         0.0          5
1101306   3.8477941   3.8477941         0.0          6
1101307   3.8483157   3.8483157         0.0          7
*            hd        corr         gas       slope       junid
1101401       0.027         0.0         1.0         1.0          7
*
*           name        type
1150000   "unnamed"      branch
*           njuns
1150001          4
*           area      length         vol
1150101    0.043586         0.1         0.0
*        az-angle     inc-angle          dz
1150102         0.0       -90.0        -0.1
*         x-rough        x-hd       flags
1150103      1.0e-5       0.027          0
*            ebt       press     water-ie     steam-ie         void
1150200         000    1.685308e6    2.656677e5    2.595934e6          0.0
```

```
*           from         to        area
1151101    115010001    110080002     0.043586
*        fwd. loss    rev. loss      efvcahs
1151102         0.1          0.1           0
*         hyd diam    ccfl wght     ccfl gas    ccfl slope
1151110        0.027          0.0         1.0          1.0
*             vl           vv       unused
1151201   -3.6460221   -3.6460221         0.0
*           from         to        area
1152101    115010002    120010001     9.956e-3
*        fwd. loss    rev. loss      efvcahs
1152102         0.6          0.6           0
*         hyd diam    ccfl wght     ccfl gas    ccfl slope
1152110     4.827e-3          0.0         1.0          1.0
*             vl           vv       unused
1152201     6.161747     6.161747         0.0
*           from         to        area
1153101    115010002    125010001     8.626e-3
*        fwd. loss    rev. loss      efvcahs
1153102         0.6          0.6           0
*         hyd diam    ccfl wght     ccfl gas    ccfl slope
1153110     4.802e-3          0.0         1.0          1.0
*             vl           vv       unused
1153201    6.1466818    6.1466818         0.0
*           from         to        area
1154101    115010002    130010001     7.277e-3
*        fwd. loss    rev. loss      efvcahs
1154102         0.6          0.6           0
*         hyd diam    ccfl wght     ccfl gas    ccfl slope
1154110     4.767e-3          0.0         1.0          1.0
*             vl           vv       unused
1154201    6.1226225    6.1226225         0.0
*
*           name         type
1200000    "unnamed"         pipe
*          ncells
1200001          12
*          x-area        volid
1200101     9.956e-3          12
*         x-length        volid
1200301         0.05           1
1200302          0.1          11
1200303         0.05          12
*          volume        volid
1200401          0.0          12
*        azim-angle        volid
1200501          0.0          12
*        vert-angle        volid
1200601        -90.0          12
*          x-wall         xhd        volid
1200801       1.0e-5      4.827e-3          12
*          x-flags        volid
1201001           0          12
*      ebt     press   water-ie   steam-ie void none id
1201201 000 1.660115e6 2.656268e5 2.595621e6  0.0  0.0  1
1201202 000 1.653302e6 2.689986e5 2.595534e6  0.0  0.0  2
1201203 000  1.64421e6 2.737845e5 2.595418e6  0.0  0.0  3
1201204 000  1.63512e6 2.796035e5  2.5953e6  0.0  0.0  4
1201205 000 1.626033e6 2.859988e5 2.595182e6  0.0  0.0  5
1201206 000 1.616949e6 2.924659e5 2.595061e6  0.0  0.0  6
1201207 000 1.607871e6 2.985015e5  2.59494e6  0.0  0.0  7
1201208 000 1.598799e6 3.036333e5 2.594817e6  0.0  0.0  8
1201209 000 1.589733e6 3.074654e5 2.594693e6  0.0  0.0  9
1201210 000 1.580675e6 3.096997e5 2.594568e6  0.0  0.0 10
1201211 000 1.571624e6 3.110655e5 2.594441e6  0.0  0.0 11
1201212 000 1.564838e6 3.109855e5 2.594346e6  0.0  0.0 12
*           area         jun
1200201     9.956e-3          11
*         jefvcahs      jun num
1201101     00000000          11
*             vl           vv       unused        junid
1201301     6.1617794    6.1617794         0.0           1
1201302     6.1645131    6.1645131         0.0           2
1201303     6.1684351    6.1684351         0.0           3
1201304     6.1732664    6.1732664         0.0           4
1201305     6.1786585    6.1786585         0.0           5
1201306     6.1842017    6.1842017         0.0           6
1201307     6.1894574    6.1894574         0.0           7
1201308     6.1939917    6.1939917         0.0           8
1201309     6.1974196    6.1974196         0.0           9
1201310     6.1994429    6.1994429         0.0          10
1201311     6.2006941    6.2006941         0.0          11
*             hd         corr          gas        slope        junid
1201401     4.827e-3          0.0          1.0          1.0          11
*
*           name         type
1250000    "unnamed"         pipe
*          ncells
1250001          12
*          x-area        volid
1250101     8.626e-3          12
*         x-length        volid
1250301         0.05           1
1250302          0.1          11
1250303         0.05          12
*          volume        volid
1250401          0.0          12
*        azim-angle        volid
1250501          0.0          12
*        vert-angle        volid
1250601        -90.0          12
*          x-wall         xhd        volid
1250801       1.0e-5      4.802e-3          12
*          x-flags        volid
1251001           0          12
*      ebt     press   water-ie   steam-ie void none id
1251201 000 1.660268e6 2.656728e5 2.595623e6  0.0  0.0  1
1251202 000 1.653441e6 2.722726e5 2.595536e6  0.0  0.0  2
1251203 000 1.644326e6 2.814403e5  2.59542e6  0.0  0.0  3
1251204 000 1.635211e6 2.924088e5 2.595302e6  0.0  0.0  4
1251205 000 1.626099e6 3.042634e5 2.595182e6  0.0  0.0  5
1251206 000 1.616992e6 3.160152e5 2.595062e6  0.0  0.0  6
1251207 000  1.60789e6 3.266828e5  2.59494e6  0.0  0.0  7
1251208 000 1.598797e6  3.35374e5 2.594817e6  0.0  0.0  8
1251209 000 1.589714e6 3.413609e5 2.594693e6  0.0  0.0  9
1251210 000 1.580643e6 3.441405e5 2.594567e6  0.0  0.0 10
1251211 000 1.571586e6 3.452184e5 2.594441e6  0.0  0.0 11
1251212 000 1.564798e6 3.452235e5 2.594345e6  0.0  0.0 12
*           area         jun
1250201     8.626e-3          11
*         jefvcahs      jun num
1251101     00000000          11
*             vl           vv       unused        junid
1251301     6.1467505    6.1467505         0.0           1
1251302     6.1520953    6.1520953         0.0           2
1251303      6.159678     6.159678         0.0           3
1251304     6.1689849    6.1689849         0.0           4
1251305     6.1793323    6.1793323         0.0           5
1251306     6.1898847    6.1898847         0.0           6
1251307      6.199717     6.199717         0.0           7
1251308     6.2079077    6.2079077         0.0           8
1251309     6.2136483    6.2136483         0.0           9
```

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1251310     6.216352     6.216352          0.0          10
1251311     6.2174191    6.2174191         0.0          11
*             hd         corr          gas        slope        junid
1251401     4.802e-3         0.0          1.0          1.0          11
*
*             name         type
1300000     "unnamed"         pipe
*           ncells
1300001          12
*           x-area        volid
1300101     7.277e-3          12
*         x-length        volid
1300301         0.05           1
1300302          0.1          11
1300303         0.05          12
*           volume        volid
1300401          0.0          12
*        azim-angle        volid
1300501          0.0          12
*        vert-angle        volid
1300601        -90.0          12
*           x-wall         xhd        volid
1300801       1.0e-5      4.767e-3          12
*           x-flags        volid
1301001          0          12
*      ebt     press   water-ie   steam-ie void none id
1301201 000 1.660507e6 2.656728e5 2.595626e6  0.0  0.0  1
1301202 000 1.653667e6 2.725642e5 2.595539e6  0.0  0.0  2
1301203 000 1.644534e6  2.81672e5 2.595422e6  0.0  0.0  3
1301204 000 1.635402e6 2.923634e5 2.595304e6  0.0  0.0  4
1301205 000 1.626274e6 3.038697e5 2.595184e6  0.0  0.0  5
1301206 000 1.617152e6 3.153478e5 2.595064e6  0.0  0.0  6
1301207 000 1.608034e6 3.259501e5 2.594942e6  0.0  0.0  7
1301208 000 1.598924e6 3.348927e5 2.594819e6  0.0  0.0  8
1301209 000 1.589823e6 3.415206e5 2.594694e6  0.0  0.0  9
1301210 000 1.580733e6 3.453613e5 2.594568e6  0.0  0.0 10
1301211 000 1.571655e6 3.476692e5 2.594442e6  0.0  0.0 11
1301212 000 1.564849e6 3.476744e5 2.594346e6  0.0  0.0 12
*             area          jun
1300201     7.277e-3          11
*          jefvcahs      jun num
1301101     00000000          11
*             vl           vv        unused       junid
1301301     6.1226902    6.1226902         0.0           1
1301302     6.1282511    6.1282511         0.0           2
1301303     6.1357598    6.1357598         0.0           3
1301304     6.1447988    6.1447988         0.0           4
1301305     6.1547985    6.1547985         0.0           5
1301306     6.1650524    6.1650524         0.0           6
1301307     6.1747713    6.1747713         0.0           7
1301308     6.1831536    6.1831536         0.0           8
1301309     6.1894798    6.1894798         0.0           9
1301310     6.1931968    6.1931968         0.0          10
1301311     6.1954546    6.1954546         0.0          11
*             hd         corr          gas        slope        junid
1301401     4.767e-3         0.0          1.0          1.0          11
*
*             name         type
1350000     "unnamed"       branch
*           njuns
1350001          4
*             area       length          vol
1350101     0.043586         0.05          0.0
*         az-angle     inc-angle           dz
1350102          0.0        -90.0        -0.05
*           x-rough         x-hd        flags
1350103       1.0e-5        0.027            0
*             ebt        press     water-ie     steam-ie         void
1350200          000   1.563648e6   3.326539e5   2.594328e6          0.0
*           from          to         area
1351101     135010002     140010001     0.043586
*        fwd. loss     rev. loss      efvcahs
1351102          1.5           1.5           0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
1351110        0.027           0.0           1.0           1.0
*             vl           vv        unused
1351201     3.6810174    3.6810174         0.0
*           from          to         area
1352101     135010001     120120002     9.956e-3
*        fwd. loss     rev. loss      efvcahs
1352102          0.6           0.6           0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
1352110     4.827e-3          0.0           1.0           1.0
*             vl           vv        unused
1352201    -6.2006397   -6.2006397         0.0
*           from          to         area
1353101     135010001     125120002     8.626e-3
*        fwd. loss     rev. loss      efvcahs
1353102          0.6           0.6           0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
1353110     4.802e-3          0.0           1.0           1.0
*             vl           vv        unused
1353201    -6.217442    -6.217442         0.0
*           from          to         area
1354101     135010001     130120002     7.277e-3
*        fwd. loss     rev. loss      efvcahs
1354102          0.6           0.6           0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
1354110     4.767e-3          0.0           1.0           1.0
*             vl           vv        unused
1354201    -6.1954775   -6.1954775         0.0
*
*             name         type
1400000     "unnamed"       branch
*           njuns
1400001          0
*             area       length          vol
1400101     0.083942         0.05          0.0
*         az-angle     inc-angle           dz
1400102          0.0        -90.0        -0.05
*           x-rough         x-hd        flags
1400103       1.0e-5        0.075            0
*             ebt        press     water-ie     steam-ie         void
1400200          000   1.56068e6   3.326337e5   2.594286e6          0.0
*
*             name         type
1450000     "unnamed"       branch
*           njuns
1450001          5
*             area       length          vol
1450101      0.03439         0.05          0.0
*         az-angle     inc-angle           dz
1450102          0.0         90.0         0.05
*           x-rough         x-hd        flags
1450103       1.0e-5        0.048            0
*             ebt        press     water-ie     steam-ie         void
1450200          000   1.533603e6   3.326338e5   2.593894e6          0.0
*           from          to         area
1451101     145010001     140010001      0.03439
*        fwd. loss     rev. loss      efvcahs
1451102          1.5           1.5           0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
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1451110       0.048         0.0         1.0         1.0
*             vl          vv       unused
1451201   -4.6653256   -4.6653256         0.0
*            from          to         area
1452101    145010002    150010001     5.928e-3
*         fwd. loss    rev. loss      efvcahs
1452102         0.6          0.6           0
*         hyd diam    ccfl wght     ccfl gas    ccfl slope
1452110    4.717e-3          0.0         1.0         1.0
*             vl          vv       unused
1452201    6.9758368    6.9758368         0.0
*            from          to         area
1453101    145010002    155010001     4.598e-3
*         fwd. loss    rev. loss      efvcahs
1453102         0.6          0.6           0
*         hyd diam    ccfl wght     ccfl gas    ccfl slope
1453110     4.64e-3          0.0         1.0         1.0
*             vl          vv       unused
1453201    6.9144158    6.9144158         0.0
*            from          to         area
1454101    145010002    160010001     3.249e-3
*         fwd. loss    rev. loss      efvcahs
1454102         0.8          0.8           0
*         hyd diam    ccfl wght     ccfl gas    ccfl slope
1454110    4.506e-3          0.0         1.0         1.0
*             vl          vv       unused
1454201    6.7148123    6.7148123         0.0
*            from          to         area
1455101    145010002    161010001     6.574e-3
*         fwd. loss    rev. loss      efvcahs
1455102         2.0          2.0           0
*         hyd diam    ccfl wght     ccfl gas    ccfl slope
1455110       0.021          0.0         1.0         1.0
*             vl          vv       unused
1455201    9.9605589    9.9605589         0.0
*
*            name         type
1500000    "unnamed"         pipe
*           ncells
1500001          12
*          x-area        volid
1500101     5.928e-3          12
*         x-length        volid
1500301         0.05           1
1500302          0.1          11
1500303         0.05          12
*          volume        volid
1500401          0.0          12
*        azim-angle        volid
1500501          0.0          12
*        vert-angle        volid
1500601         90.0          12
*          x-wall         xhd        volid
1500801       1.0e-5     4.717e-3          12
*          x-flags        volid
1501001          0          12
*      ebt     press   water-ie   steam-ie void none id
1501201 000 1.502594e6 3.326404e5 2.593429e6  0.0  0.0  1
1501202 000 1.492253e6 3.367637e5  2.59327e6  0.0  0.0  2
1501203 000 1.478448e6 3.430892e5 2.593054e6  0.0  0.0  3
1501204 000 1.464634e6 3.509908e5 2.592835e6  0.0  0.0  4
1501205 000 1.450813e6 3.597226e5 2.592612e6  0.0  0.0  5
1501206 000  1.43699e6 3.684795e5 2.592385e6  0.0  0.0  6
1501207 000 1.423167e6  3.76461e5 2.592154e6  0.0  0.0  7
1501208 000 1.409348e6 3.829355e5  2.59192e6  0.0  0.0  8
1501209 000 1.395536e6 3.872978e5 2.591681e6  0.0  0.0  9
1501210 000 1.381737e6 3.891178e5 2.591439e6  0.0  0.0 10
1501211 000 1.367953e6 3.895906e5 2.591192e6  0.0  0.0 11
1501212 000 1.357619e6 3.895972e5 2.591005e6  0.0  0.0 12
*            area         jun
1500201     5.928e-3          11
*         jefvcahs      jun num
1501101     00000000          11
*             vl          vv       unused       junid
1501301     6.9759355    6.9759355         0.0           1
1501302     6.9803576    6.9803576         0.0           2
1501303     6.9872122    6.9872122         0.0           3
1501304     6.9958949    6.9958949         0.0           4
1501305     7.0056539    7.0056539         0.0           5
1501306     7.0156169    7.0156169         0.0           6
1501307     7.0248547    7.0248547         0.0           7
1501308     7.0324636    7.0324636         0.0           8
1501309     7.0376577    7.0376577         0.0           9
1501310     7.0398622    7.0398622         0.0          10
1501311     7.0404673    7.0404673         0.0          11
*             hd         corr         gas        slope       junid
1501401     4.717e-3          0.0         1.0         1.0          11
*
*            name         type
1550000    "unnamed"         pipe
*           ncells
1550001          12
*          x-area        volid
1550101     4.598e-3          12
*         x-length        volid
1550301         0.05           1
1550302          0.1          11
1550303         0.05          12
*          volume        volid
1550401          0.0          12
*        azim-angle        volid
1550501          0.0          12
*        vert-angle        volid
1550601         90.0          12
*          x-wall         xhd        volid
1550801       1.0e-5     4.64e-3          12
*          x-flags        volid
1551001          0          12
*      ebt     press   water-ie   steam-ie void none id
1551201 000 1.503251e6 3.326404e5 2.593439e6  0.0  0.0  1
1551202 000 1.492874e6 3.371047e5  2.59328e6  0.0  0.0  2
1551203 000  1.47902e6 3.433214e5 2.593063e6  0.0  0.0  3
1551204 000 1.465159e6  3.50782e5 2.592844e6  0.0  0.0  4
1551205 000 1.451294e6 3.588749e5  2.59262e6  0.0  0.0  5
1551206 000 1.437427e6 3.669338e5 2.592392e6  0.0  0.0  6
1551207 000 1.423562e6 3.742927e5 2.592161e6  0.0  0.0  7
1551208 000   1.4097e6 3.803406e5 2.591926e6  0.0  0.0  8
1551209 000 1.395844e6  3.84571e5 2.591686e6  0.0  0.0  9
1551210 000   1.382e6 3.866244e5 2.591443e6  0.0  0.0 10
1551211 000 1.368166e6 3.874995e5 2.591196e6  0.0  0.0 11
1551212 000 1.357795e6 3.875062e5 2.591008e6  0.0  0.0 12
*            area         jun
1550201     4.598e-3          11
*         jefvcahs      jun num
1551101     00000000          11
*             vl          vv       unused       junid
1551301     6.9145117    6.9145117         0.0           1
1551302     6.9192567    6.9192567         0.0           2
1551303     6.9259391    6.9259391         0.0           3
1551304     6.9340677    6.9340677         0.0           4
1551305     6.9430261    6.9430261         0.0           5
1551306      6.952096     6.952096         0.0           6
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1551307    6.9605103    6.9605103         0.0          7
1551308    6.9675255    6.9675255         0.0          8
1551309    6.9724941    6.9724941         0.0          9
1551310    6.9749422    6.9749422         0.0         10
1551311    6.9760122    6.9760122         0.0         11
*             hd         corr         gas        slope       junid
1551401     4.64e-3         0.0         1.0          1.0          11
*
*            name        type
1600000    "unnamed"        pipe
*           ncells
1600001          12
*          x-area       volid
1600101     3.249e-3          12
*         x-length       volid
1600301         0.05           1
1600302          0.1          11
1600303         0.05          12
*          volume       volid
1600401          0.0          12
*        azim-angle       volid
1600501          0.0          12
*        vert-angle       volid
1600601         90.0          12
*          x-wall         xhd       volid
1600801       1.0e-5      4.506e-3          12
*          x-flags       volid
1601001          0          12
*     ebt     press   water-ie   steam-ie void none id
1601201 000 1.501044e6 3.326399e5 2.593405e6  0.0  0.0  1
1601202 000 1.490854e6 3.356302e5 2.593248e6  0.0  0.0  2
1601203 000 1.477256e6 3.397641e5 2.593036e6  0.0  0.0  3
1601204 000 1.463655e6 3.446895e5  2.59282e6  0.0  0.0  4
1601205 000 1.450052e6 3.499923e5   2.5926e6  0.0  0.0  5
1601206 000  1.43645e6 3.552297e5 2.592376e6  0.0  0.0  6
1601207 000  1.42285e6 3.599665e5 2.592149e6  0.0  0.0  7
1601208 000 1.409253e6 3.638097e5 2.591918e6  0.0  0.0  8
1601209 000 1.395661e6 3.664391e5 2.591683e6  0.0  0.0  9
1601210 000 1.382076e6 3.676326e5 2.591445e6  0.0  0.0 10
1601211 000 1.368498e6 3.680625e5 2.591202e6  0.0  0.0 11
1601212 000 1.358317e6 3.676241e5 2.591018e6  0.0  0.0 12
*            area         jun
1600201     3.249e-3          11
*         jefvcahs      jun num
1601101     00000000          11
*             vl          vv       unused       junid
1601301    6.7149115    6.7149115         0.0          1
1601302    6.7180018    6.7180018         0.0          2
1601303    6.7223067    6.7223067         0.0          3
1601304     6.727478     6.727478         0.0          4
1601305    6.7331028    6.7331028         0.0          5
1601306    6.7387209    6.7387209         0.0          6
1601307    6.7438579    6.7438579         0.0          7
1601308    6.7480702    6.7480702         0.0          8
1601309    6.7509828    6.7509828         0.0          9
1601310    6.7523317    6.7523317         0.0         10
1601311    6.7528439    6.7528439         0.0         11
*             hd         corr         gas        slope       junid
1601401     4.506e-3         0.0         1.0          1.0          11
*
*            name        type
1610000    "unnamed"        pipe
*           ncells
1610001          12
*          x-area       volid
1610101     6.574e-3          12
*         x-length       volid
1610301         0.05           1
1610302          0.1          11
1610303         0.05          12
*          volume       volid
1610401          0.0          12
*        azim-angle       volid
1610501          0.0          12
*        vert-angle       volid
1610601         90.0          12
*          x-wall         xhd       volid
1610801       1.0e-5       0.021          12
*          x-flags       volid
1611001          0          12
*     ebt     press   water-ie   steam-ie void none id
1611201 000 1.397822e6 3.326359e5 2.591721e6  0.0  0.0  1
1611202 000 1.394104e6 3.326665e5 2.591656e6  0.0  0.0  2
1611203 000  1.38915e6 3.327333e5  2.59157e6  0.0  0.0  3
1611204 000 1.384197e6 3.328433e5 2.591482e6  0.0  0.0  4
1611205 000 1.379242e6 3.329995e5 2.591394e6  0.0  0.0  5
1611206 000 1.374288e6 3.332012e5 2.591306e6  0.0  0.0  6
1611207 000 1.369332e6 3.334438e5 2.591217e6  0.0  0.0  7
1611208 000 1.364376e6 3.337189e5 2.591128e6  0.0  0.0  8
1611209 000  1.35942e6 3.340155e5 2.591038e6  0.0  0.0  9
1611210 000 1.354463e6 3.343202e5 2.590948e6  0.0  0.0 10
1611211 000 1.349506e6 3.346262e5 2.590856e6  0.0  0.0 11
1611212 000 1.345788e6 3.347764e5 2.590788e6  0.0  0.0 12
*            area         jun
1610201     6.574e-3          11
*         jefvcahs      jun num
1611101     00000000          11
*             vl          vv       unused       junid
1611301    9.9611359    9.9611359         0.0          1
1611302    9.9611979    9.9611979         0.0          2
1611303    9.9613199    9.9613199         0.0          3
1611304    9.9615078    9.9615078         0.0          4
1611305    9.9617653    9.9617653         0.0          5
1611306    9.9620924    9.9620924         0.0          6
1611307    9.9624815    9.9624815         0.0          7
1611308    9.9629192    9.9629192         0.0          8
1611309    9.9633904    9.9633904         0.0          9
1611310    9.9638748    9.9638748         0.0         10
1611311    9.9643612    9.9643612         0.0         11
*             hd         corr         gas        slope       junid
1611401       0.021         0.0         1.0          1.0          11
*
*            name        type
1650000    "unnamed"      branch
*           njuns
1650001          5
*            area      length         vol
1650101     0.03439         0.1         0.0
*         az-angle     inc-angle          dz
1650102          0.0        90.0         0.1
*          x-rough        x-hd       flags
1650103       1.0e-5       0.048           0
*             ebt        press      water-ie     steam-ie         void
1650200         000   1.352588e6   3.634758e5    2.590913e6          0.0
*            from          to        area
1651101    165010002    170010001     0.03439
*         fwd. loss     rev. loss      efvcahs
1651102          0.1          0.1           0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
1651110       0.048          0.0         1.0          1.0
*             vl          vv       unused
1651201    4.6883473    4.6883473         0.0
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*            from          to         area
1652101    165010001    150120002     5.928e-3
*         fwd. loss     rev. loss      efvcahs
1652102         0.6           0.6           0
*          hyd diam     ccfl wght     ccfl gas    ccfl slope
1652110     4.717e-3          0.0           1.0           1.0
*             vl           vv        unused
1652201   -7.0405064    -7.0405064         0.0
*            from          to         area
1653101    165010001    155120002     4.598e-3
*         fwd. loss     rev. loss      efvcahs
1653102         0.6           0.6           0
*          hyd diam     ccfl wght     ccfl gas    ccfl slope
1653110     4.64e-3          0.0           1.0           1.0
*             vl           vv        unused
1653201   -6.9760513    -6.9760513         0.0
*            from          to         area
1654101    165010001    160120002     3.249e-3
*         fwd. loss     rev. loss      efvcahs
1654102         0.6           0.6           0
*          hyd diam     ccfl wght     ccfl gas    ccfl slope
1654110     4.506e-3          0.0           1.0           1.0
*             vl           vv        unused
1654201   -6.7523913    -6.7523913         0.0
*            from          to         area
1655101    165010001    161120002     6.574e-3
*         fwd. loss     rev. loss      efvcahs
1655102         0.6           0.6           0
*          hyd diam     ccfl wght     ccfl gas    ccfl slope
1655110       0.021           0.0           1.0           1.0
*             vl           vv        unused
1655201   -9.9646053    -9.9646053         0.0
*
*            name         type
1700000    "unnamed"         pipe
*           ncells
1700001          14
*          x-area        volid
1700101     0.03439          14
*          x-length        volid
1700301          0.2           1
1700302          0.4           2
1700303         0.56           4
1700304         0.55           5
1700305         0.32           6
1700306         0.16           7
1700307         0.08           8
1700308         0.04          11
1700309         0.03          12
1700310         0.04          13
1700311         0.06          14
*           volume        volid
1700401          0.0          14
*         azim-angle        volid
1700501          0.0          14
*         vert-angle        volid
1700601         90.0          14
*           x-wall         xhd        volid
1700801      1.0e-5          0.0          14
*           x-flags        volid
1701001           0          14
*      ebt     press   water-ie   steam-ie void none id
1701201 000 1.349883e6 3.628761e5 2.590863e6  0.0  0.0  1
1701202 000 1.346863e6 3.616861e5 2.590808e6  0.0  0.0  2
1701203 000  1.34203e6 3.600334e5 2.590718e6  0.0  0.0  3
1701204 000  1.33639e6 3.583871e5 2.590613e6  0.0  0.0  4
1701205 000   1.3308e6 3.567759e5 2.590508e6  0.0  0.0  5
1701206 000 1.326418e6 3.558351e5 2.590425e6  0.0  0.0  6
1701207 000    1.324e6 3.553633e5 2.590379e6  0.0  0.0  7
1701208 000 1.322791e6 3.550682e5 2.590356e6  0.0  0.0  8
1701209 000 1.322186e6 3.550682e5 2.590344e6  0.0  0.0  9
1701210 000 1.321783e6 3.550682e5 2.590336e6  0.0  0.0 10
1701211 000 1.321379e6 3.550682e5 2.590329e6  0.0  0.0 11
1701212 000 1.321026e6 3.550682e5 2.590322e6  0.0  0.0 12
1701213 000 1.326042e6 3.550717e5 2.590418e6  0.0  0.0 13
1701214 000 1.330822e6 2.140815e5 2.590508e6  0.0  0.0 14
*            area         jun
1700201      0.03258          13
*          jefvcahs      jun num
1701101     00000000          13
*             vl           vv       unused       junid
1701301      4.948338     4.948338         0.0           1
1701302     4.9473963    4.9473963         0.0           2
1701303     4.9460936    4.9460936         0.0           3
1701304     4.9448023    4.9448023         0.0           4
1701305     4.9435425    4.9435425         0.0           5
1701306     4.9428115    4.9428115         0.0           6
1701307     4.9424458    4.9424458         0.0           7
1701308     4.9422164    4.9422164         0.0           8
1701309     4.9422178    4.9422178         0.0           9
1701310     4.9422188    4.9422188         0.0          10
1701311     4.9422197    4.9422197         0.0          11
1701312     4.9422202    4.9422202         0.0          12
1701313  -2.786248e-8 -2.786248e-8         0.0          13
*             hd         corr          gas        slope        junid
1701401        0.048          0.0          1.0          1.0          13
*
*            name         type
1900000    "unnamed"         pipe
*           ncells
1900001          11
*          x-area        volid
1900101     0.023864          11
*          x-length        volid
1900301          0.08           1
1900302          0.16           2
1900303          0.32           3
1900304           0.6           4
1900305          0.92           6
1900306           0.8           7
1900307           0.4           8
1900308           0.2           9
1900309           0.3          10
1900310          0.15          11
*           volume        volid
1900401           0.0          11
*         azim-angle        volid
1900501           0.0          11
*         vert-angle        volid
1900601           0.0           8
1900602          90.0           9
1900603           0.0          10
1900604         -90.0          11
*           x-wall         xhd        volid
1900801      1.0e-5         0.04          11
*           x-flags        volid
1901001           0          11
*      ebt     press   water-ie   steam-ie void none id
1901201 000 1.278194e6 3.550313e5 2.589482e6  0.0  0.0  1
1901202 000 1.277175e6 3.549507e5 2.589462e6  0.0  0.0  2
1901203 000 1.275138e6 3.547897e5  2.58942e6  0.0  0.0  3
1901204 000 1.271232e6  3.54509e5 2.589342e6  0.0  0.0  4
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1901205 000  1.26478e6 3.540489e5  2.58921e6  0.0  0.0  5
1901206 000  1.25697e6 3.535906e5 2.589049e6  0.0  0.0  6
1901207 000 1.249668e6 3.531933e5 2.588898e6  0.0  0.0  7
1901208 000 1.244575e6 3.529951e5 2.588791e6  0.0  0.0  8
1901209 000 1.227824e6  3.52896e5 2.588435e6  0.0  0.0  9
1901210 000 1.211496e6 3.527476e5 2.588081e6  0.0  0.0 10
1901211 000 1.197046e6 3.526734e5 2.587762e6  0.0  0.0 11
*            area         jun
1900201     0.023864          10
*         fwd. loss     rev.loss       junid
1900901         0.0          0.0           7
1900902         0.6          0.6          10
*          jefvcahs      jun num
1901101     00000000          10
*             vl           vv       unused       junid
1901301    6.7473826    6.7473826          0.0           1
1901302    6.7472992    6.7472992          0.0           2
1901303    6.7471328    6.7471328          0.0           3
1901304    6.7468433    6.7468433          0.0           4
1901305    6.7463694    6.7463694          0.0           5
1901306    6.7459021    6.7459021          0.0           6
1901307    6.7454987    6.7454987          0.0           7
1901308    6.7453012    6.7453012          0.0           8
1901309    6.7452435    6.7452435          0.0           9
1901310    6.7451324    6.7451324          0.0          10
*             hd         corr          gas        slope        junid
1901401         0.04          0.0          1.0          1.0           10
*
*            name         type
1910000    "unnamed"      sngljun
*            from           to         area
1910101    170130005    190010001     0.023864
*         fwd. loss     rev. loss      efvcahs
1910102          1.0          1.0            0
*         discharge      thermal
1910103          1.0         0.14
*             hd         flood     intercept        slope
1910110         0.04          0.0          1.0          1.0
*            flow           vl           vv       unused
1910201            0    6.7472882    6.7472882          0.0
*
*            name         type
1920000    "unnamed"      sngljun
*            from           to         area
1920101    195100002    110010001     0.023864
*         fwd. loss     rev. loss      efvcahs
1920102          1.0          1.0            0
*         discharge      thermal
1920103          1.0         0.14
*             hd         flood     intercept        slope
1920110         0.04          0.0          1.0          1.0
*            flow           vl           vv       unused
1920201            0    6.6528182    6.6528182          0.0
*
*            name         type
1950000    "unnamed"         pipe
*           ncells
1950001          10
*           x-area        volid
1950101     0.023864          10
*         x-length        volid
1950301         0.15           1
1950302          0.3           2
1950303         0.35           3
1950304         0.56           4
1950305         0.65           6
1950306          0.3           8
1950307         0.16           9
1950308         0.08          10
*           volume        volid
1950401          0.0          10
*         azim-angle        volid
1950501          0.0          10
*         vert-angle        volid
1950601         90.0           1
1950602          0.0           2
1950603        -90.0           3
1950604          0.0          10
*           x-wall         xhd        volid
1950801       1.0e-5        0.04          10
*           x-flags        volid
1951001            0          10
*      ebt     press   water-ie   steam-ie void none id
1951201 000 1.743014e6 2.583622e5 2.596616e6  0.0  0.0  1
1951202 000 1.727296e6 2.583192e5 2.596435e6  0.0  0.0  2
1951203 000 1.713134e6 2.582691e5 2.596269e6  0.0  0.0  3
1951204 000 1.697862e6  2.58189e5 2.596086e6  0.0  0.0  4
1951205 000 1.692694e6 2.580963e5 2.596024e6  0.0  0.0  5
1951206 000 1.687142e6 2.580038e5 2.595956e6  0.0  0.0  6
1951207 000 1.683084e6 2.579536e5 2.595907e6  0.0  0.0  7
1951208 000 1.680522e6 2.579035e5 2.595875e6  0.0  0.0  8
1951209 000 1.678557e6 2.578808e5 2.595851e6  0.0  0.0  9
1951210 000 1.677532e6 2.578695e5 2.595838e6  0.0  0.0 10
*            area         jun
1950201     0.023864          9
*         fwd. loss     rev.loss       junid
1950901         0.6          0.6           3
1950902         0.0          0.0           9
*          jefvcahs      jun num
1951101     00000000          9
*             vl           vv       unused       junid
1951301    6.6530514    6.6530514          0.0           1
1951302     6.653059     6.653059          0.0           2
1951303    6.6530561    6.6530561          0.0           3
1951304    6.6530313    6.6530313          0.0           4
1951305    6.6529675    6.6529675          0.0           5
1951306    6.6529045    6.6529045          0.0           6
1951307    6.6528735    6.6528735          0.0           7
1951308    6.6528387    6.6528387          0.0           8
1951309    6.6528249    6.6528249          0.0           9
*             hd         corr          gas        slope        junid
1951401         0.04          0.0          1.0          1.0           9
*
*            name         type
2010000    "unnamed"        valve
*            from           to         area
2010101    436010001    295010001     1.256e-3
*         fwd. loss     rev. loss      efvcahs
2010102          1.0          1.0          100
*         discharge      thermal
2010103          1.0         0.14
*             hd         flood     intercept        slope
2010110         0.04          0.0          1.0          1.0
*            flow           vl           vv       unused
2010201            0    3.2467511    3.2467511          0.0
*            type
2010300       mtrvlv
*           topen        tclose        vrate         ipos
2010301           1           2      5.0e-3          1.0
*
*            name         type
2020000    "unnamed"        valve
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*           from          to        area
2020101    290110002    460010001     1.256e-3
*        fwd. loss    rev. loss      efvcahs
2020102         1.0          1.0          100
*        discharge      thermal
2020103         1.0         0.14
*             hd        flood     intercept       slope
2020110        0.04          0.0          1.0          1.0
*           flow          vl          vv       unused
2020201          0    29.792727    29.792727         0.0
*           type
2020300      mtrvlv
*          topen       tclose       vrate        ipos
2020301          1          2      5.0e-3         1.0
*          vtble
2020302          8
*
*           name        type
2100000    "unnamed"        pipe
*          ncells
2100001          8
*          x-area       volid
2100101     2.294e-3          8
*         x-length       volid
2100301         0.1          1
2100302        0.16          2
2100303        0.32          3
2100304        0.55          4
2100305        0.56          6
2100306         0.4          7
2100307         0.2          8
*          volume       volid
2100401         0.0          8
*        azim-angle       volid
2100501         0.0          8
*        vert-angle       volid
2100601       -90.0          8
*          x-wall         xhd       volid
2100801      1.0e-5       0.027          8
*          x-flags       volid
2101001          0          8
*      ebt     press   water-ie   steam-ie void none id
2101201 000  1.76658e6 2.535231e5 2.596881e6  0.0  0.0  1
2101202 000 1.767686e6 2.539321e5 2.596893e6  0.0  0.0  2
2101203 000 1.769728e6 2.547428e5 2.596916e6  0.0  0.0  3
2101204 000  1.77343e6 2.561181e5 2.596957e6  0.0  0.0  4
2101205 000 1.778151e6 2.575192e5 2.597008e6  0.0  0.0  5
2101206 000 1.782915e6  2.58922e5  2.59706e6  0.0  0.0  6
2101207 000 1.786998e6 2.599338e5 2.597104e6  0.0  0.0  7
2101208 000 1.789549e6 2.604457e5 2.597132e6  0.0  0.0  8
*          jefvcahs      jun num
2101101     00000000           7
*             vl          vv       unused        junid
2101301    1.7775121    1.7775121         0.0           1
2101302    1.7776028    1.7776028         0.0           2
2101303    1.7777833    1.7777833         0.0           3
2101304     1.77809      1.77809         0.0           4
2101305    1.778403     1.778403         0.0           5
2101306    1.7787178    1.7787178         0.0           6
2101307    1.7789451    1.7789451         0.0           7
*             hd        corr         gas       slope       junid
2101401       0.027         0.0         1.0         1.0           7
*
*           name        type
2150000    "unnamed"      branch
*           njuns
2150001           4
*           area       length         vol
2150101     2.294e-3         0.1         0.0
*         az-angle     inc-angle           dz
2150102          0.0       -90.0        -0.1
*          x-rough        x-hd       flags
2150103        1.0e-5       0.027           0
*            ebt       press     water-ie     steam-ie         void
2150200          000   1.790668e6   2.607046e5   2.597144e6          0.0
*           from          to        area
2151101    215010001    210080002     2.294e-3
*        fwd. loss    rev. loss      efvcahs
2151102         0.1          0.1            0
*        hyd diam     ccfl wght     ccfl gas    ccfl slope
2151110        0.027          0.0          1.0          1.0
*            vl          vv       unused
2151201   -1.7790599   -1.7790599         0.0
*           from          to        area
2152101    215010002    220010001     5.24e-4
*        fwd. loss    rev. loss      efvcahs
2152102         0.6          0.6            0
*        hyd diam     ccfl wght     ccfl gas    ccfl slope
2152110     4.827e-3          0.0          1.0          1.0
*            vl          vv       unused
2152201    3.0051746    3.0051746         0.0
*           from          to        area
2153101    215010002    225010001     4.54e-4
*        fwd. loss    rev. loss      efvcahs
2153102         0.6          0.6            0
*        hyd diam     ccfl wght     ccfl gas    ccfl slope
2153110     4.802e-3          0.0          1.0          1.0
*            vl          vv       unused
2153201    3.0001597    3.0001597         0.0
*           from          to        area
2154101    215010002    230010001     3.83e-4
*        fwd. loss    rev. loss      efvcahs
2154102         0.6          0.6            0
*        hyd diam     ccfl wght     ccfl gas    ccfl slope
2154110     4.767e-3          0.0          1.0          1.0
*            vl          vv       unused
2154201    2.9882851    2.9882851         0.0
*
*           name        type
2200000    "unnamed"        pipe
*          ncells
2200001          12
*          x-area       volid
2200101      5.24e-4          12
*         x-length       volid
2200301         0.05           1
2200302          0.1          11
2200303         0.05          12
*          volume       volid
2200401          0.0          12
*        azim-angle       volid
2200501          0.0          12
*        vert-angle       volid
2200601        -90.0          12
*          x-wall         xhd       volid
2200801       1.0e-5     4.827e-3          12
*          x-flags       volid
2201001          0          12
*      ebt     press   water-ie   steam-ie void none id
2201201 000 1.785172e6 2.606227e5 2.597085e6  0.0  0.0  1
2201202 000 1.783963e6 2.630943e5 2.597072e6  0.0  0.0  2
2201203 000  1.78235e6 2.666552e5 2.597054e6  0.0  0.0  3
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2201204 000  1.78074e6 2.710105e5 2.597036e6  0.0  0.0  4
2201205 000 1.779131e6 2.758228e5 2.597019e6  0.0  0.0  5
2201206 000 1.777525e6 2.807013e5 2.597002e6  0.0  0.0  6
2201207 000 1.775921e6 2.852604e5 2.596984e6  0.0  0.0  7
2201208 000  1.77432e6 2.891416e5 2.596966e6  0.0  0.0  8
2201209 000 1.772721e6 2.920382e5 2.596949e6  0.0  0.0  9
2201210 000 1.771124e6 2.937175e5 2.596931e6  0.0  0.0 10
2201211 000 1.769529e6   2.9473e5 2.596914e6  0.0  0.0 11
2201212 000 1.768333e6 2.945952e5   2.5969e6  0.0  0.0 12
*            area         jun
2200201      5.24e-4          11
*          jefvcahs      jun num
2201101     00000000          11
*             vl          vv       unused        junid
2201301    3.0051498    3.0051498         0.0           1
2201302    3.0061085    3.0061085         0.0           2
2201303    3.0075009    3.0075009         0.0           3
2201304     3.009222     3.009222         0.0           4
2201305    3.0111475    3.0111475         0.0           5
2201306    3.0131245    3.0131245         0.0           6
2201307    3.0149953    3.0149953         0.0           7
2201308    3.0166054    3.0166054         0.0           8
2201309     3.017818     3.017818         0.0           9
2201310    3.0185258    3.0185258         0.0          10
2201311    3.0189548    3.0189548         0.0          11
*             hd         corr          gas        slope        junid
2201401     4.827e-3         0.0          1.0          1.0           11
*
*            name         type
2250000    "unnamed"         pipe
*           ncells
2250001           12
*          x-area        volid
2250101      4.54e-4           12
*          x-length        volid
2250301         0.05            1
2250302          0.1           11
2250303         0.05           12
*           volume        volid
2250401          0.0           12
*         azim-angle        volid
2250501          0.0           12
*         vert-angle        volid
2250601        -90.0           12
*           x-wall          xhd        volid
2250801       1.0e-5      4.802e-3           12
*          x-flags        volid
2251001            0          12
*      ebt     press   water-ie   steam-ie void none id
2251201 000 1.785196e6 2.607059e5 2.597085e6  0.0  0.0  1
2251202 000 1.783981e6 2.656987e5 2.597072e6  0.0  0.0  2
2251203 000  1.78236e6 2.726167e5 2.597054e6  0.0  0.0  3
2251204 000 1.780742e6 2.808794e5 2.597036e6  0.0  0.0  4
2251205 000 1.779128e6 2.897922e5 2.597019e6  0.0  0.0  5
2251206 000 1.777518e6 2.986077e5 2.597002e6  0.0  0.0  6
2251207 000 1.775911e6 3.065872e5 2.596984e6  0.0  0.0  7
2251208 000 1.774308e6 3.130612e5 2.596966e6  0.0  0.0  8
2251209 000 1.772709e6 3.174919e5 2.596949e6  0.0  0.0  9
2251210 000 1.771113e6 3.194972e5 2.596931e6  0.0  0.0 10
2251211 000 1.769519e6 3.202251e5 2.596914e6  0.0  0.0 11
2251212 000 1.768325e6 3.202264e5   2.5969e6  0.0  0.0 12
*            area         jun
2250201      4.54e-4          11
*          jefvcahs      jun num
2251101     00000000          11
*             vl          vv       unused        junid
2251301    3.0001671    3.0001671         0.0           1
2251302     3.002106     3.002106         0.0           2
2251303    3.0048366    3.0048366         0.0           3
2251304    3.0081649    3.0081649         0.0           4
2251305    3.0118361    3.0118361         0.0           5
2251306    3.0155494    3.0155494         0.0           6
2251307    3.0189805    3.0189805         0.0           7
2251308    3.0218132    3.0218132         0.0           8
2251309     3.023777     3.023777         0.0           9
2251310    3.0246737    3.0246737         0.0          10
2251311    3.0250015    3.0250015         0.0          11
*             hd         corr          gas        slope        junid
2251401     4.802e-3         0.0          1.0          1.0           11
*
*            name         type
2300000    "unnamed"         pipe
*           ncells
2300001           12
*          x-area        volid
2300101      3.83e-4           12
*          x-length        volid
2300301         0.05            1
2300302          0.1           11
2300303         0.05           12
*           volume        volid
2300401          0.0           12
*         azim-angle        volid
2300501          0.0           12
*         vert-angle        volid
2300601        -90.0           12
*           x-wall          xhd        volid
2300801       1.0e-5      4.767e-3           12
*          x-flags        volid
2301001            0          12
*      ebt     press   water-ie   steam-ie void none id
2301201 000 1.785254e6 2.607059e5 2.597086e6  0.0  0.0  1
2301202 000 1.784035e6  2.66172e5 2.597072e6  0.0  0.0  2
2301203 000  1.78241e6 2.732885e5 2.597055e6  0.0  0.0  3
2301204 000 1.780788e6 2.815893e5 2.597037e6  0.0  0.0  4
2301205 000 1.779169e6 2.904862e5  2.59702e6  0.0  0.0  5
2301206 000 1.777554e6 2.993392e5 2.597002e6  0.0  0.0  6
2301207 000 1.775943e6 3.075042e5 2.596984e6  0.0  0.0  7
2301208 000 1.774336e6 3.143811e5 2.596966e6  0.0  0.0  8
2301209 000 1.772732e6 3.194843e5 2.596949e6  0.0  0.0  9
2301210 000 1.771132e6 3.224457e5 2.596931e6  0.0  0.0 10
2301211 000 1.769534e6 3.242336e5 2.596914e6  0.0  0.0 11
2301212 000 1.768336e6 3.242348e5   2.5969e6  0.0  0.0 12
*            area         jun
2300201      3.83e-4          11
*          jefvcahs      jun num
2301101     00000000          11
*             vl          vv       unused        junid
2301301    2.9882925    2.9882925         0.0           1
2301302    2.9904077    2.9904077         0.0           2
2301303    2.9932098    2.9932098         0.0           3
2301304    2.9965465    2.9965465         0.0           4
2301305    3.0002031    3.0002031         0.0           5
2301306    3.0039239    3.0039239         0.0           6
2301307    3.0074279    3.0074279         0.0           7
2301308    3.0104327    3.0104327         0.0           8
2301309    3.0126941    3.0126941         0.0           9
2301310    3.0140195    3.0140195         0.0          10
2301311    3.0148249    3.0148249         0.0          11
*             hd         corr          gas        slope        junid
2301401     4.767e-3         0.0          1.0          1.0           11
*
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*           name        type
2350000    "unnamed"      branch
*          njuns
2350001         4
*          area      length        vol
2350101    2.294e-3       0.05        0.0
*        az-angle    inc-angle         dz
2350102        0.0       -90.0       -0.05
*         x-rough       x-hd       flags
2350103      1.0e-5      0.027           0
*           ebt       press     water-ie     steam-ie        void
2350200        000   1.768368e6   3.113991e5   2.596901e6         0.0
*          from         to        area
2351101    235010002    240010001     2.294e-3
*        fwd. loss    rev. loss     efvcahs
2351102        1.5          1.5           0
*           vl          vv       unused
2351201    1.7915299    1.7915299         0.0
*          from         to        area
2352101    235010001    220120002     5.24e-4
*        fwd. loss    rev. loss     efvcahs
2352102        0.6          0.6           0
*         hyd diam    ccfl wght     ccfl gas    ccfl slope
2352110     4.827e-3         0.0         1.0         1.0
*           vl          vv       unused
2352201   -3.0188994   -3.0188994         0.0
*          from         to        area
2353101    235010001    225120002     4.54e-4
*        fwd. loss    rev. loss     efvcahs
2353102        0.6          0.6           0
*         hyd diam    ccfl wght     ccfl gas    ccfl slope
2353110     4.802e-3         0.0         1.0         1.0
*           vl          vv       unused
2353201   -3.0250037   -3.0250037         0.0
*          from         to        area
2354101    235010001    230120002     3.83e-4
*        fwd. loss    rev. loss     efvcahs
2354102        0.6          0.6           0
*         hyd diam    ccfl wght     ccfl gas    ccfl slope
2354110     4.767e-3         0.0         1.0         1.0
*           vl          vv       unused
2354201   -3.014827    -3.014827         0.0
*
*           name        type
2400000    "unnamed"      branch
*          njuns
2400001         0
*          area      length        vol
2400101    4.418e-3       0.05        0.0
*        az-angle    inc-angle         dz
2400102        0.0       -90.0       -0.05
*         x-rough       x-hd       flags
2400103      1.0e-5      0.075           0
*           ebt       press     water-ie     steam-ie        void
2400200        000   1.768018e6   3.11367e5   2.596897e6         0.0
*
*           name        type
2450000    "unnamed"      branch
*          njuns
2450001         5
*          area      length        vol
2450101    1.81e-3        0.05        0.0
*        az-angle    inc-angle         dz
2450102        0.0        90.0        0.05
*         x-rough       x-hd       flags
2450103      1.0e-5      0.048           0
*           ebt       press     water-ie     steam-ie        void
2450200        000   1.761208e6   3.11367e5   2.596821e6         0.0
*          from         to        area
2451101    245010001    240010001     1.81e-3
*        fwd. loss    rev. loss     efvcahs
2451102        1.5          1.5           0
*           vl          vv       unused
2451201   -2.2705808   -2.2705808         0.0
*          from         to        area
2452101    245010002    250010001     3.12e-4
*        fwd. loss    rev. loss     efvcahs
2452102        0.6          0.6           0
*         hyd diam    ccfl wght     ccfl gas    ccfl slope
2452110     4.717e-3         0.0         1.0         1.0
*           vl          vv       unused
2452201    3.3694048    3.3694048         0.0
*          from         to        area
2453101    245010002    255010001     2.42e-4
*        fwd. loss    rev. loss     efvcahs
2453102        0.6          0.6           0
*         hyd diam    ccfl wght     ccfl gas    ccfl slope
2453110     4.64e-3          0.0         1.0         1.0
*           vl          vv       unused
2453201    3.3385797    3.3385797         0.0
*          from         to        area
2454101    245010002    260010001     1.71e-4
*        fwd. loss    rev. loss     efvcahs
2454102        0.8          0.8           0
*         hyd diam    ccfl wght     ccfl gas    ccfl slope
2454110     4.506e-3         0.0         1.0         1.0
*           vl          vv       unused
2454201    3.2395585    3.2395585         0.0
*          from         to        area
2455101    245010002    261010001     3.46e-4
*        fwd. loss    rev. loss     efvcahs
2455102        2.0          2.0           0
*         hyd diam    ccfl wght     ccfl gas    ccfl slope
2455110       0.021         0.0         1.0         1.0
*           vl          vv       unused
2455201    4.9034905    4.9034905         0.0
*
*           name        type
2500000    "unnamed"       pipe
*          ncells
2500001         12
*          x-area       volid
2500101    3.12e-4          12
*        x-length       volid
2500301        0.05          1
2500302         0.1         11
2500303        0.05         12
*          volume       volid
2500401         0.0         12
*       azim-angle       volid
2500501         0.0         12
*       vert-angle       volid
2500601        90.0         12
*          x-wall        xhd       volid
2500801      1.0e-5     4.717e-3         12
*          x-flags       volid
2501001           0         12
*     ebt     press   water-ie   steam-ie void none id
2501201 000 1.753564e6 3.113687e5 2.596736e6  0.0  0.0  1
2501202 000 1.750441e6  3.14272e5   2.5967e6  0.0  0.0  2
2501203 000 1.746275e6 3.188975e5 2.596653e6  0.0  0.0  3
2501204 000 1.742112e6 3.247607e5 2.596606e6  0.0  0.0  4
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2501205 000 1.737951e6 3.312821e5 2.596558e6  0.0  0.0  5
2501206 000 1.733793e6   3.3784e5  2.59651e6  0.0  0.0  6
2501207 000  1.72964e6 3.438168e5 2.596462e6  0.0  0.0  7
2501208 000  1.72549e6 3.486448e5 2.596414e6  0.0  0.0  8
2501209 000 1.721343e6 3.518576e5 2.596366e6  0.0  0.0  9
2501210 000   1.7172e6 3.531269e5 2.596317e6  0.0  0.0 10
2501211 000  1.71306e6 3.533754e5 2.596268e6  0.0  0.0 11
2501212 000 1.709956e6  3.53377e5 2.596231e6  0.0  0.0 12
*             area         jun
2500201     3.12e-4          11
*          jefvcahs      jun num
2501101     00000000          11
*             vl          vv       unused        junid
2501301    3.3694165    3.3694165         0.0           1
2501302    3.3708467    3.3708467         0.0           2
2501303    3.3731439    3.3731439         0.0           3
2501304    3.3760896    3.3760896         0.0           4
2501305     3.379411     3.379411          0.0          5
2501306    3.3827994    3.3827994         0.0           6
2501307    3.3859305    3.3859305         0.0           7
2501308     3.38849      3.38849          0.0          8
2501309    3.3902099    3.3902099         0.0           9
2501310    3.3908961    3.3908961         0.0          10
2501311    3.3910353    3.3910353         0.0          11
*             hd         corr          gas        slope        junid
2501401     4.717e-3         0.0          1.0          1.0          11
*
*             name         type
2550000    "unnamed"         pipe
*           ncells
2550001          12
*           x-area        volid
2550101     2.42e-4          12
*          x-length       volid
2550301         0.05           1
2550302          0.1          11
2550303         0.05          12
*           volume        volid
2550401          0.0          12
*         azim-angle        volid
2550501          0.0          12
*         vert-angle        volid
2550601         90.0          12
*           x-wall         xhd        volid
2550801      1.0e-5      4.64e-3          12
*           x-flags        volid
2551001          0          12
*      ebt     press   water-ie   steam-ie void none id
2551201 000 1.753724e6 3.113687e5 2.596738e6  0.0  0.0  1
2551202 000 1.750592e6  3.14725e5 2.596702e6  0.0  0.0  2
2551203 000 1.746416e6 3.193988e5 2.596655e6  0.0  0.0  3
2551204 000 1.742241e6 3.250002e5 2.596607e6  0.0  0.0  4
2551205 000  1.73807e6  3.31059e5  2.59656e6  0.0  0.0  5
2551206 000 1.733901e6 3.370839e5 2.596512e6  0.0  0.0  6
2551207 000 1.729737e6 3.425838e5 2.596464e6  0.0  0.0  7
2551208 000 1.725576e6 3.470895e5 2.596415e6  0.0  0.0  8
2551209 000 1.721418e6 3.502136e5 2.596366e6  0.0  0.0  9
2551210 000 1.717263e6 3.516949e5 2.596318e6  0.0  0.0 10
2551211 000 1.713111e6 3.522758e5 2.596269e6  0.0  0.0 11
2551212 000 1.709998e6 3.522774e5 2.596232e6  0.0  0.0 12
*             area         jun
2550201     2.42e-4          11
*          jefvcahs      jun num
2551101     00000000          11
*             vl          vv       unused        junid
2551301    3.3385909    3.3385909         0.0           1
2551302    3.3402293    3.3402293         0.0           2
2551303    3.3425319    3.3425319         0.0           3
2551304    3.3453228    3.3453228         0.0           4
2551305    3.3483808    3.3483808         0.0           5
2551306    3.3514626    3.3514626         0.0           6
2551307    3.3543117    3.3543117         0.0           7
2551308     3.356672     3.356672          0.0          8
2551309    3.3583236    3.3583236         0.0           9
2551310    3.3591137    3.3591137         0.0          10
2551311    3.3594277    3.3594277         0.0          11
*             hd         corr          gas        slope        junid
2551401     4.64e-3         0.0          1.0          1.0          11
*
*             name         type
2600000    "unnamed"         pipe
*           ncells
2600001          12
*           x-area        volid
2600101     1.71e-4          12
*          x-length       volid
2600301         0.05           1
2600302          0.1          11
2600303         0.05          12
*           volume        volid
2600401          0.0          12
*         azim-angle        volid
2600501          0.0          12
*         vert-angle        volid
2600601         90.0          12
*           x-wall         xhd        volid
2600801      1.0e-5      4.506e-3          12
*           x-flags        volid
2601001          0          12
*      ebt     press   water-ie   steam-ie void none id
2601201 000 1.753222e6 3.113685e5 2.596732e6  0.0  0.0  1
2601202 000 1.750137e6 3.136398e5 2.596697e6  0.0  0.0  2
2601203 000 1.746024e6 3.167824e5  2.59665e6  0.0  0.0  3
2601204 000 1.741911e6 3.205182e5 2.596604e6  0.0  0.0  4
2601205 000 1.737801e6 3.245278e5 2.596556e6  0.0  0.0  5
2601206 000 1.733694e6 3.284821e5 2.596509e6  0.0  0.0  6
2601207 000 1.729589e6 3.320583e5 2.596462e6  0.0  0.0  7
2601208 000 1.725486e6 3.349541e5 2.596414e6  0.0  0.0  8
2601209 000 1.721386e6 3.369181e5 2.596366e6  0.0  0.0  9
2601210 000 1.717288e6 3.377942e5 2.596318e6  0.0  0.0 10
2601211 000 1.713191e6 3.380806e5  2.59627e6  0.0  0.0 11
2601212 000 1.710119e6 3.376816e5 2.596233e6  0.0  0.0 12
*             area         jun
2600201     1.71e-4          11
*          jefvcahs      jun num
2601101     00000000          11
*             vl          vv       unused        junid
2601301    3.2395699    3.2395699         0.0           1
2601302    3.2406459    3.2406459         0.0           2
2601303    3.2421434    3.2421434         0.0           3
2601304     3.243937     3.243937          0.0          4
2601305    3.2458785    3.2458785         0.0           5
2601306    3.2478104    3.2478104         0.0           6
2601307     3.249573     3.249573          0.0          7
2601308    3.2510114    3.2510114         0.0           8
2601309    3.2519939    3.2519939         0.0           9
2601310    3.2524369    3.2524369         0.0          10
2601311    3.2525854    3.2525854         0.0          11
*             hd         corr          gas        slope        junid
2601401     4.506e-3         0.0          1.0          1.0          11
*
*             name         type
```

```
2610000    "unnamed"        pipe
*          ncells
2610001         12
*          x-area       volid
2610101     3.46e-4         12
*         x-length       volid
2610301        0.05          1
2610302         0.1         11
2610303        0.05         12
*          volume       volid
2610401         0.0         12
*        azim-angle       volid
2610501         0.0         12
*        vert-angle       volid
2610601        90.0         12
*          x-wall         xhd       volid
2610801      1.0e-5       0.021          12
*          x-flags       volid
2611001           0          12
*     ebt     press   water-ie   steam-ie void none id
2611201 000 1.727736e6 3.113675e5  2.59644e6  0.0  0.0  1
2611202 000 1.726253e6 3.113923e5 2.596423e6  0.0  0.0  2
2611203 000 1.724277e6 3.114498e5   2.5964e6  0.0  0.0  3
2611204 000   1.7223e6 3.115458e5 2.596377e6  0.0  0.0  4
2611205 000 1.720323e6 3.116833e5 2.596354e6  0.0  0.0  5
2611206 000 1.718346e6 3.118612e5  2.59633e6  0.0  0.0  6
2611207 000 1.716369e6 3.120753e5 2.596307e6  0.0  0.0  7
2611208 000 1.714392e6 3.123182e5 2.596284e6  0.0  0.0  8
2611209 000 1.712415e6 3.125796e5  2.59626e6  0.0  0.0  9
2611210 000 1.710438e6 3.128476e5 2.596237e6  0.0  0.0 10
2611211 000 1.708461e6 3.131159e5 2.596214e6  0.0  0.0 11
2611212 000 1.706978e6 3.132472e5 2.596196e6  0.0  0.0 12
*            area         jun
2610201     3.46e-4         11
*         jefvcahs      jun num
2611101     00000000         11
*             vl          vv       unused       junid
2611301    4.9035602    4.9035602         0.0          1
2611302    4.9035811    4.9035811         0.0          2
2611303     4.903626     4.903626         0.0          3
2611304    4.9036984    4.9036984         0.0          4
2611305    4.9038005    4.9038005         0.0          5
2611306    4.9039316    4.9039316         0.0          6
2611307    4.9040885    4.9040885         0.0          7
2611308    4.9042659    4.9042659         0.0          8
2611309    4.9044566    4.9044566         0.0          9
2611310    4.9046521    4.9046521         0.0         10
2611311    4.9048481    4.9048481         0.0         11
*             hd         corr          gas       slope       junid
2611401       0.021         0.0         1.0         1.0          11
*
*            name        type
2650000    "unnamed"      branch
*           njuns
2650001          5
*           area       length         vol
2650101     1.81e-3         0.1         0.0
*         az-angle    inc-angle          dz
2650102         0.0        90.0         0.1
*          x-rough        x-hd       flags
2650103      1.0e-5         0.0           0
*            ebt       press     water-ie     steam-ie         void
2650200         000   1.708135e6   3.341591e5    2.59621e6          0.0
*            from          to        area
2651101    265010002    270010001     1.81e-3
*         fwd. loss    rev. loss      efvcahs
2651102         0.1         0.1           0
*         hyd diam    ccfl wght     ccfl gas    ccfl slope
2651110        0.048         0.0         1.0         1.0
*             vl          vv       unused
2651201    2.2783549    2.2783549         0.0
*            from          to        area
2652101    265010001    250120002     3.12e-4
*         fwd. loss    rev. loss      efvcahs
2652102         0.6         0.6           0
*         hyd diam    ccfl wght     ccfl gas    ccfl slope
2652110    4.717e-3         0.0         1.0         1.0
*             vl          vv       unused
2652201   -3.3910408   -3.3910408         0.0
*            from          to        area
2653101    265010001    255120002     2.42e-4
*         fwd. loss    rev. loss      efvcahs
2653102         0.6         0.6           0
*         hyd diam    ccfl wght     ccfl gas    ccfl slope
2653110    4.64e-3         0.0         1.0         1.0
*             vl          vv       unused
2653201   -3.3594332   -3.3594332         0.0
*            from          to        area
2654101    265010001    260120002     1.71e-4
*         fwd. loss    rev. loss      efvcahs
2654102         0.6         0.6           0
*         hyd diam    ccfl wght     ccfl gas    ccfl slope
2654110    4.506e-3         0.0         1.0         1.0
*             vl          vv       unused
2654201   -3.2523904   -3.2523904         0.0
*            from          to        area
2655101    265010001    261120002     3.46e-4
*         fwd. loss    rev. loss      efvcahs
2655102         0.6         0.6           0
*         hyd diam    ccfl wght     ccfl gas    ccfl slope
2655110       0.021         0.0         1.0         1.0
*             vl          vv       unused
2655201   -4.9049449   -4.9049449         0.0
*
*            name        type
2700000    "unnamed"        pipe
*           ncells
2700001          14
*           x-area       volid
2700101     1.81e-3          14
*          x-length       volid
2700301         0.2           1
2700302         0.4           2
2700303        0.56           4
2700304        0.55           5
2700305        0.32           6
2700306        0.16           7
2700307        0.08           8
2700308        0.04          11
2700309        0.03          12
2700310        0.04          13
2700311        0.06          14
*           volume       volid
2700401         0.0          14
*         azim-angle       volid
2700501         0.0          14
*         vert-angle       volid
2700601        90.0          14
*           x-wall         xhd       volid
2700801      1.0e-5       0.048          14
*           x-flags       volid
2701001           0          14
```

```
*      ebt     press   water-ie   steam-ie void none id
2701201 000 1.706324e6 3.335235e5 2.596188e6  0.0  0.0  1
2701202 000 1.703205e6 3.322666e5 2.596151e6  0.0  0.0  2
2701203 000 1.698214e6  3.30528e5 2.596091e6  0.0  0.0  3
2701204 000  1.69239e6  3.28801e5  2.59602e6  0.0  0.0  4
2701205 000 1.686616e6 3.271153e5  2.59595e6  0.0  0.0  5
2701206 000 1.682089e6 3.261308e5 2.595894e6  0.0  0.0  6
2701207 000 1.679592e6 3.256369e5 2.595864e6  0.0  0.0  7
2701208 000 1.678343e6 3.253279e5 2.595848e6  0.0  0.0  8
2701209 000 1.677718e6 3.253279e5  2.59584e6  0.0  0.0  9
2701210 000 1.677302e6 3.253279e5 2.595836e6  0.0  0.0 10
2701211 000 1.676886e6 3.253279e5  2.59583e6  0.0  0.0 11
2701212 000 1.676521e6 3.253279e5 2.595826e6  0.0  0.0 12
2701213 000 1.677425e6 3.253279e5 2.595837e6  0.0  0.0 13
2701214 000 1.678204e6 2.101262e5 2.595846e6  0.0  0.0 14
*          jefvcahs      jun num
2701101     00000000          13
*              vl          vv       unused        junid
2701301     2.278136     2.278136         0.0           1
2701302    2.2777038    2.2777038         0.0           2
2701303    2.2771084    2.2771084         0.0           3
2701304    2.2765203    2.2765203         0.0           4
2701305    2.2759483    2.2759483         0.0           5
2701306    2.2756164    2.2756164         0.0           6
2701307    2.2754505    2.2754505         0.0           7
2701308    2.2753463    2.2753463         0.0           8
2701309     2.275347     2.275347         0.0           9
2701310    2.2753475    2.2753475         0.0          10
2701311    2.2753477    2.2753477         0.0          11
2701312    2.2753482    2.2753482         0.0          12
2701313   1.028659e-8   1.028659e-8         0.0          13
*
*             name         type
2900000    "unnamed"         pipe
*           ncells
2900001          11
*           x-area        volid
2900101     1.256e-3          11
*         x-length        volid
2900301         0.08           1
2900302         0.16           2
2900303         0.32           3
2900304          0.6           4
2900305         0.92           6
2900306          0.8           7
2900307          0.4           8
2900308          0.2           9
2900309          0.3          10
2900310         0.15          11
*           volume        volid
2900401          0.0          11
*        azim-angle        volid
2900501          0.0          11
*        vert-angle        volid
2900601          0.0           8
2900602         90.0           9
2900603          0.0          10
2900604        -90.0          11
*           x-wall         xhd        volid
2900801      1.0e-5        0.04          11
*           x-flags        volid
2901001            0          11
*      ebt     press   water-ie   steam-ie void none id
2901201 000 1.666839e6 3.252657e5 2.595705e6  0.0  0.0  1
2901202 000 1.666582e6 3.251412e5 2.595702e6  0.0  0.0  2
2901203 000 1.666068e6 3.248931e5 2.595696e6  0.0  0.0  3
2901204 000 1.665083e6 3.244299e5 2.595683e6  0.0  0.0  4
2901205 000 1.663455e6 3.237246e5 2.595663e6  0.0  0.0  5
2901206 000 1.661485e6 3.230243e5 2.595638e6  0.0  0.0  6
2901207 000 1.659643e6  3.22419e5 2.595615e6  0.0  0.0  7
2901208 000 1.658358e6 3.221173e5 2.595598e6  0.0  0.0  8
2901209 000 1.653611e6 3.219667e5 2.595538e6  0.0  0.0  9
2901210 000  1.64897e6 3.217413e5 2.595479e6  0.0  0.0 10
2901211 000 1.646056e6 3.216287e5 2.595442e6  0.0  0.0 11
*          fwd. loss      rev.loss        junid
2900901          0.0           0.0            7
2900902          0.6           0.6           10
*          jefvcahs      jun num
2901101     00000000          10
*              vl          vv       unused        junid
2901301    3.2789478    3.2789478         0.0           1
2901302    3.2788873    3.2788873         0.0           2
2901303    3.2787662    3.2787662         0.0           3
2901304    3.2785406    3.2785406         0.0           4
2901305    3.2781978    3.2781978         0.0           5
2901306    3.2778585    3.2778585         0.0           6
2901307     3.277566     3.277566         0.0           7
2901308    3.2774208    3.2774208         0.0           8
2901309     3.277354     3.277354         0.0           9
2901310    3.2772505    3.2772505         0.0          10
*             hd         corr          gas        slope        junid
2901401         0.04          0.0          1.0          1.0           10
*
*             name         type
2910000    "unnamed"      sngljun
*             from           to         area
2910101    270130005    290010001     1.256e-3
*         fwd. loss     rev. loss      efvcahs
2910102          1.0          1.0            0
*         discharge      thermal
2910103          1.0         0.14
*             hd         flood     intercept        slope
2910110         0.04          0.0          1.0          1.0
*             flow           vl           vv       unused
2910201            0    3.2789638    3.2789638          0.0
*
*             name         type
2920000    "unnamed"      sngljun
*             from           to         area
2920101    295100002    210010001     1.256e-3
*         fwd. loss     rev. loss      efvcahs
2920102          1.0          1.0            0
*         discharge      thermal
2920103          1.0         0.14
*             hd         flood     intercept        slope
2920110         0.04          0.0          1.0          1.0
*             flow           vl           vv       unused
2920201            0    3.2464004    3.2464004          0.0
*
*             name         type
2950000    "unnamed"         pipe
*           ncells
2950001          10
*           x-area        volid
2950101     1.256e-3          10
*         x-length        volid
2950301         0.15           1
2950302          0.3           2
2950303         0.35           3
2950304         0.56           4
2950305         0.65           6
2950306          0.3           8
```

```
2950307         0.16           9
2950308         0.08          10
*            volume        volid
2950401          0.0          10
*         azim-angle        volid
2950501          0.0          10
*         vert-angle        volid
2950601         90.0           1
2950602          0.0           2
2950603        -90.0           3
2950604          0.0          10
*            x-wall         xhd        volid
2950801       1.0e-5        0.04           10
*           x-flags        volid
2951001            0          10
*      ebt     press   water-ie   steam-ie void none id
2951201 000  1.78187e6 2.541749e5 2.597049e6  0.0  0.0  1
2951202 000 1.777538e6 2.540927e5 2.597002e6  0.0  0.0  2
2951203 000   1.7754e6 2.539971e5 2.596978e6  0.0  0.0  3
2951204 000  1.77298e6 2.538445e5 2.596952e6  0.0  0.0  4
2951205 000 1.771666e6 2.536682e5 2.596937e6  0.0  0.0  5
2951206 000 1.770254e6 2.534926e5 2.596922e6  0.0  0.0  6
2951207 000 1.769223e6 2.534117e5  2.59691e6  0.0  0.0  7
2951208 000 1.768571e6 2.533309e5 2.596903e6  0.0  0.0  8
2951209 000 1.768071e6 2.532879e5 2.596898e6  0.0  0.0  9
2951210 000 1.767811e6 2.532664e5 2.596895e6  0.0  0.0 10
*             area          jun
2950201     1.256e-3           9
*         fwd. loss     rev.loss        junid
2950901           0.6          0.6           3
2950902           0.0          0.0           9
*          jefvcahs      jun num
2951101     00000000           9
*              vl          vv       unused        junid
2951301     3.2467523    3.2467523          0.0           1
2951302     3.2467246    3.2467246          0.0           2
2951303     3.2466884    3.2466884          0.0           3
2951304     3.2466295    3.2466295          0.0           4
2951305     3.2465591    3.2465591          0.0           5
2951306     3.2464893    3.2464893          0.0           6
2951307     3.2464578    3.2464578          0.0           7
2951308     3.2464256    3.2464256          0.0           8
2951309     3.2464087    3.2464087          0.0           9
*              hd         corr          gas        slope        junid
2951401         0.04          0.0          1.0          1.0            9
*
*             name         type
3010000    "unnamed"        valve
*             from           to         area
3010101     415010001    395010001     3.768e-3
*         fwd. loss     rev. loss      efvcahs
3010102           1.0          1.0          100
*         discharge      thermal
3010103           1.0         0.14
*              hd        flood     intercept        slope
3010110         0.04          0.0          1.0          1.0
*             flow           vl           vv       unused
3010201            0    3.2065039    3.2065039          0.0
*             type
3010300       mtrvlv
*            topen        tclose        vrate         ipos
3010301            1             2       5.0e-3          1.0
*
*             name         type
3020000    "unnamed"        valve
*             from           to         area
3020101     390110002    445010001     3.768e-3
*         fwd. loss     rev. loss      efvcahs
3020102           1.0          1.0          100
*         discharge      thermal
3020103           1.0         0.14
*              hd        flood     intercept        slope
3020110         0.04          0.0          1.0          1.0
*             flow           vl           vv       unused
3020201            0    28.286598    28.286598          0.0
*             type
3020300       mtrvlv
*            topen        tclose        vrate         ipos
3020301            1             2          1.0          1.0
*           vtble
3020302            9
*
*             name         type
3100000    "unnamed"         pipe
*           ncells
3100001            8
*           x-area        volid
3100101     6.882e-3           8
*         x-length        volid
3100301          0.1           1
3100302         0.16           2
3100303         0.32           3
3100304         0.55           4
3100305         0.56           6
3100306          0.4           7
3100307          0.2           8
*           volume        volid
3100401          0.0           8
*         azim-angle        volid
3100501          0.0           8
*         vert-angle        volid
3100601        -90.0           8
*            x-wall         xhd        volid
3100801       1.0e-5       0.027           8
*           x-flags        volid
3101001            0           8
*      ebt     press   water-ie   steam-ie void none id
3101201 000 1.769214e6 2.575055e5  2.59691e6  0.0  0.0  1
3101202 000 1.770323e6 2.577217e5 2.596922e6  0.0  0.0  2
3101203 000 1.772372e6 2.581505e5 2.596945e6  0.0  0.0  3
3101204 000 1.776084e6 2.588783e5 2.596986e6  0.0  0.0  4
3101205 000  1.78082e6 2.596229e5 2.597038e6  0.0  0.0  5
3101206 000 1.785598e6 2.603718e5 2.597089e6  0.0  0.0  6
3101207 000 1.789693e6 2.609144e5 2.597134e6  0.0  0.0  7
3101208 000 1.792253e6 2.611897e5 2.597161e6  0.0  0.0  8
*             area          jun
3100201     6.882e-3           7
*          jefvcahs      jun num
3101101     00000000           7
*              vl          vv       unused        junid
3101301     1.7554215    1.7554215          0.0           1
3101302      1.755469     1.755469          0.0           2
3101303     1.7555635    1.7555635          0.0           3
3101304     1.7557238    1.7557238          0.0           4
3101305     1.7558875    1.7558875          0.0           5
3101306     1.7560526    1.7560526          0.0           6
3101307     1.7561718    1.7561718          0.0           7
*              hd         corr          gas        slope        junid
3101401         0.027         0.0          1.0          1.0            7
*
*             name         type
3150000    "unnamed"       branch
```

```
*           njuns
3150001         4
*           area       length         vol
3150101     6.882e-3        0.1         0.0
*         az-angle     inc-angle          dz
3150102         0.0       -90.0        -0.1
*          x-rough        x-hd       flags
3150103       1.0e-5       0.027           0
*            ebt        press     water-ie     steam-ie        void
3150200         000    1.79338e6    2.611953e5    2.597173e6         0.0
*           from          to        area
3151101    315010001    310080002     6.882e-3
*        fwd. loss     rev. loss      efvcahs
3151102         0.1          0.1           0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
3151110        0.027         0.0         1.0         1.0
*            vl           vv       unused
3151201   -1.7562321   -1.7562321         0.0
*           from          to        area
3152101    315010002    320010001     1.572e-3
*        fwd. loss     rev. loss      efvcahs
3152102         0.6          0.6           0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
3152110     4.827e-3         0.0         1.0         1.0
*            vl           vv       unused
3152201    2.9670184    2.9670184         0.0
*           from          to        area
3153101    315010002    325010001     1.362e-3
*        fwd. loss     rev. loss      efvcahs
3153102         0.6          0.6           0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
3153110     4.802e-3         0.0         1.0         1.0
*            vl           vv       unused
3153201    2.9612799    2.9612799         0.0
*           from          to        area
3154101    315010002    330010001     1.149e-3
*        fwd. loss     rev. loss      efvcahs
3154102         0.6          0.6           0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
3154110     4.767e-3         0.0         1.0         1.0
*            vl           vv       unused
3154201    2.9495008    2.9495008         0.0
*
*           name         type
3200000    "unnamed"         pipe
*          ncells
3200001          12
*          x-area        volid
3200101     1.572e-3          12
*         x-length        volid
3200301         0.05           1
3200302          0.1          11
3200303         0.05          12
*          volume        volid
3200401          0.0          12
*        azim-angle        volid
3200501          0.0          12
*        vert-angle        volid
3200601        -90.0          12
*           x-wall         xhd        volid
3200801       1.0e-5     4.827e-3          12
*          x-flags        volid
3201001           0          12
*      ebt     press   water-ie   steam-ie void none id
3201201 000 1.788039e6 2.611115e5 2.597116e6  0.0  0.0  1
3201202 000 1.786876e6  2.62645e5 2.597103e6  0.0  0.0  2
3201203 000 1.785325e6 2.648851e5 2.597086e6  0.0  0.0  3
3201204 000 1.783775e6 2.676452e5  2.59707e6  0.0  0.0  4
3201205 000 1.782227e6 2.707026e5 2.597053e6  0.0  0.0  5
3201206 000  1.78068e6 2.738048e5 2.597036e6  0.0  0.0  6
3201207 000 1.779134e6 2.767052e5 2.597019e6  0.0  0.0  7
3201208 000 1.777591e6 2.791633e5 2.597002e6  0.0  0.0  8
3201209 000 1.776049e6 2.809864e5 2.596985e6  0.0  0.0  9
3201210 000 1.774508e6 2.820222e5 2.596968e6  0.0  0.0 10
3201211 000 1.772968e6 2.826325e5 2.596952e6  0.0  0.0 11
3201212 000 1.771814e6 2.825202e5 2.596939e6  0.0  0.0 12
*           area         jun
3200201     1.572e-3          11
*         jefvcahs      jun num
3201101     00000000          11
*            vl           vv       unused       junid
3201301    2.9669931    2.9669931         0.0           1
3201302    2.9675808    2.9675808         0.0           2
3201303    2.9684434    2.9684434         0.0           3
3201304    2.9695134    2.9695134         0.0           4
3201305    2.9707079    2.9707079         0.0           5
3201306     2.97193      2.97193          0.0           6
3201307    2.9730821    2.9730821         0.0           7
3201308    2.9740655    2.9740655         0.0           8
3201309    2.9747996    2.9747996         0.0           9
3201310    2.9752192    2.9752192         0.0          10
3201311    2.9754677    2.9754677         0.0          11
*            hd         corr          gas         slope        junid
3201401     4.827e-3         0.0         1.0         1.0          11
*
*           name         type
3250000    "unnamed"         pipe
*          ncells
3250001          12
*          x-area        volid
3250101     1.362e-3          12
*         x-length        volid
3250301         0.05           1
3250302          0.1          11
3250303         0.05          12
*          volume        volid
3250401          0.0          12
*        azim-angle        volid
3250501          0.0          12
*        vert-angle        volid
3250601        -90.0          12
*           x-wall         xhd        volid
3250801       1.0e-5     4.802e-3          12
*          x-flags        volid
3251001           0          12
*      ebt     press   water-ie   steam-ie void none id
3251201 000 1.788067e6 2.611966e5 2.597116e6  0.0  0.0  1
3251202 000 1.786899e6 2.644111e5 2.597104e6  0.0  0.0  2
3251203 000 1.785341e6  2.68866e5 2.597086e6  0.0  0.0  3
3251204 000 1.783785e6 2.741849e5  2.59707e6  0.0  0.0  4
3251205 000 1.782231e6   2.7992e5 2.597053e6  0.0  0.0  5
3251206 000  1.78068e6 2.855907e5 2.597036e6  0.0  0.0  6
3251207 000 1.779132e6  2.90722e5 2.597019e6  0.0  0.0  7
3251208 000 1.777587e6 2.948839e5 2.597002e6  0.0  0.0  8
3251209 000 1.776045e6 2.977289e5 2.596985e6  0.0  0.0  9
3251210 000 1.774504e6 2.990165e5 2.596968e6  0.0  0.0 10
3251211 000 1.772965e6 2.994822e5 2.596952e6  0.0  0.0 11
3251212 000 1.771812e6 2.994834e5 2.596939e6  0.0  0.0 12
*           area         jun
3250201     1.362e-3          11
*         jefvcahs      jun num
3251101     00000000          11
```

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*            vl          vv       unused       junid
3251301    2.961287    2.961287        0.0          1
3251302    2.962518    2.962518        0.0          2
3251303   2.9642422   2.9642422        0.0          3
3251304   2.9663281   2.9663281        0.0          4
3251305   2.9686108   2.9686108        0.0          5
3251306   2.9709015   2.9709015        0.0          6
3251307   2.9730034   2.9730034        0.0          7
3251308   2.9747286   2.9747286        0.0          8
3251309   2.9759188   2.9759188        0.0          9
3251310   2.9764612   2.9764612        0.0         10
3251311   2.9766591   2.9766591        0.0         11
*            hd         corr         gas       slope       junid
3251401    4.802e-3        0.0         1.0         1.0          11
*
*           name        type
3300000   "unnamed"       pipe
*          ncells
3300001         12
*          x-area       volid
3300101    1.149e-3          12
*         x-length       volid
3300301        0.05           1
3300302         0.1          11
3300303        0.05          12
*          volume       volid
3300401         0.0          12
*       azim-angle       volid
3300501         0.0          12
*       vert-angle       volid
3300601       -90.0          12
*          x-wall         xhd       volid
3300801      1.0e-5     4.767e-3          12
*          x-flags       volid
3301001           0          12
*      ebt     press   water-ie   steam-ie void none id
3301201 000 1.788124e6 2.611966e5 2.597116e6  0.0  0.0  1
3301202 000 1.786952e6  2.64723e5 2.597104e6  0.0  0.0  2
3301203 000 1.785389e6 2.693177e5 2.597087e6  0.0  0.0  3
3301204 000 1.783829e6 2.746717e5  2.59707e6  0.0  0.0  4
3301205 000 1.782271e6 2.804094e5 2.597053e6  0.0  0.0  5
3301206 000 1.780716e6 2.861159e5 2.597036e6  0.0  0.0  6
3301207 000 1.779164e6 2.913743e5  2.59702e6  0.0  0.0  7
3301208 000 1.777615e6  2.95803e5 2.597002e6  0.0  0.0  8
3301209 000 1.776068e6 2.990828e5 2.596986e6  0.0  0.0  9
3301210 000 1.774523e6 3.009821e5 2.596969e6  0.0  0.0 10
3301211 000  1.77298e6   3.0212e5 2.596952e6  0.0  0.0 11
3301212 000 1.771824e6 3.021213e5 2.596939e6  0.0  0.0 12
*            area         jun
3300201    1.149e-3          11
*          jefvcahs      jun num
3301101    00000000          11
*            vl          vv       unused       junid
3301301   2.9495077   2.9495077        0.0          1
3301302   2.9508533   2.9508533        0.0          2
3301303   2.9526265   2.9526265        0.0          3
3301304   2.9547203   2.9547203        0.0          4
3301305   2.9569976   2.9569976        0.0          5
3301306   2.9592967   2.9592967        0.0          6
3301307   2.9614453   2.9614453        0.0          7
3301308   2.9632773   2.9632773        0.0          8
3301309   2.9646475   2.9646475        0.0          9
3301310   2.9654467   2.9654467        0.0         10
3301311   2.9659283   2.9659283        0.0         11
*            hd         corr         gas       slope       junid
3301401    4.767e-3        0.0         1.0         1.0          11
*
*           name        type
3350000   "unnamed"       branch
*          njuns
3350001          4
*          area       length         vol
3350101    6.882e-3         0.05          0.0
*        az-angle     inc-angle          dz
3350102         0.0        -90.0        -0.05
*         x-rough        x-hd       flags
3350103       1.0e-5       0.027           0
*           ebt       press     water-ie     steam-ie         void
3350200         000   1.771861e6   2.936277e5    2.59694e6          0.0
*          from          to        area
3351101    335010002    340010001    6.882e-3
*        fwd. loss    rev. loss      efvcahs
3351102         1.5          1.5           0
*        hyd diam    ccfl wght     ccfl gas    ccfl slope
3351110       0.027         0.0         1.0          1.0
*            vl          vv       unused
3351201    1.7639031    1.7639031         0.0
*          from          to        area
3352101    335010001    320120002    1.572e-3
*        fwd. loss    rev. loss      efvcahs
3352102         0.6          0.6           0
*        hyd diam    ccfl wght     ccfl gas    ccfl slope
3352110    4.827e-3         0.0         1.0          1.0
*            vl          vv       unused
3352201   -2.9754236   -2.9754236          0.0
*          from          to        area
3353101    335010001    325120002    1.362e-3
*        fwd. loss    rev. loss      efvcahs
3353102         0.6          0.6           0
*        hyd diam    ccfl wght     ccfl gas    ccfl slope
3353110    4.802e-3         0.0         1.0          1.0
*            vl          vv       unused
3353201    -2.976661    -2.976661         0.0
*          from          to        area
3354101    335010001    330120002    1.149e-3
*        fwd. loss    rev. loss      efvcahs
3354102         0.6          0.6           0
*        hyd diam    ccfl wght     ccfl gas    ccfl slope
3354110    4.767e-3         0.0         1.0          1.0
*            vl          vv       unused
3354201   -2.9659302   -2.9659302          0.0
*
*           name        type
3400000   "unnamed"       branch
*          njuns
3400001          0
*          area       length         vol
3400101   0.013254         0.05          0.0
*        az-angle     inc-angle          dz
3400102         0.0        -90.0        -0.05
*         x-rough        x-hd       flags
3400103       1.0e-5        0.075           0
*           ebt       press     water-ie     steam-ie         void
3400200         000   1.771535e6   2.936025e5   2.596936e6          0.0
*
*           name        type
3450000   "unnamed"       branch
*          njuns
3450001          5
*          area       length         vol
3450101    5.43e-3         0.05          0.0
*        az-angle     inc-angle          dz
```

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3450102         0.0         90.0         0.05
*           x-rough         x-hd        flags
3450103       1.0e-5        0.048           0
*              ebt        press      water-ie      steam-ie         void
3450200         000    1.764901e6    2.936025e5    2.596862e6          0.0
*             from          to         area
3451101    345010001     340010001      5.43e-3
*          fwd. loss     rev. loss      efvcahs
3451102          1.5           1.5           0
*          hyd diam     ccfl wght     ccfl gas    ccfl slope
3451110        0.048         0.0           1.0           1.0
*              vl            vv        unused
3451201    -2.235569     -2.235569          0.0
*             from          to         area
3452101    345010002     350010001      9.36e-4
*          fwd. loss     rev. loss      efvcahs
3452102          0.6           0.6           0
*          hyd diam     ccfl wght     ccfl gas    ccfl slope
3452110     4.717e-3         0.0           1.0           1.0
*              vl            vv        unused
3452201    3.3107777     3.3107777          0.0
*             from          to         area
3453101    345010002     355010001      7.26e-4
*          fwd. loss     rev. loss      efvcahs
3453102          0.6           0.6           0
*          hyd diam     ccfl wght     ccfl gas    ccfl slope
3453110      4.64e-3         0.0           1.0           1.0
*              vl            vv        unused
3453201    3.2803485     3.2803485          0.0
*             from          to         area
3454101    345010002     360010001      5.13e-4
*          fwd. loss     rev. loss      efvcahs
3454102          0.8           0.8           0
*          hyd diam     ccfl wght     ccfl gas    ccfl slope
3454110     4.506e-3         0.0           1.0           1.0
*              vl            vv        unused
3454201    3.1833518     3.1833518          0.0
*             from          to         area
3455101    345010002     361010001      1.04e-3
*          fwd. loss     rev. loss      efvcahs
3455102          2.0           2.0           0
*          hyd diam     ccfl wght     ccfl gas    ccfl slope
3455110        0.021         0.0           1.0           1.0
*              vl            vv        unused
3455201    4.8323979     4.8323979          0.0
*
*              name         type
3500000    "unnamed"         pipe
*             ncells
3500001           12
*            x-area        volid
3500101      9.36e-4           12
*           x-length        volid
3500301         0.05            1
3500302          0.1           11
3500303         0.05           12
*            volume        volid
3500401          0.0           12
*         azim-angle        volid
3500501          0.0           12
*         vert-angle        volid
3500601         90.0           12
*            x-wall         xhd        volid
3500801       1.0e-5      4.717e-3           12
*            x-flags        volid
3501001            0           12
*      ebt     press   water-ie   steam-ie void none id
3501201 000  1.75749e6 2.936041e5  2.59678e6  0.0  0.0  1
3501202 000 1.754423e6 2.954823e5 2.596745e6  0.0  0.0  2
3501203 000 1.750334e6  2.98469e5 2.596699e6  0.0  0.0  3
3501204 000 1.746247e6 3.022552e5 2.596653e6  0.0  0.0  4
3501205 000 1.742162e6 3.064683e5 2.596606e6  0.0  0.0  5
3501206 000  1.73808e6 3.107079e5  2.59656e6  0.0  0.0  6
3501207 000    1.734e6  3.14576e5 2.596513e6  0.0  0.0  7
3501208 000 1.729924e6 3.177053e5 2.596466e6  0.0  0.0  8
3501209 000  1.72585e6 3.197959e5 2.596418e6  0.0  0.0  9
3501210 000 1.721778e6 3.206315e5 2.596371e6  0.0  0.0 10
3501211 000 1.717708e6 3.208048e5 2.596323e6  0.0  0.0 11
3501212 000 1.714656e6 3.208063e5 2.596287e6  0.0  0.0 12
*             area         jun
3500201       9.36e-4           11
*           jefvcahs      jun num
3501101     00000000           11
*              vl            vv        unused       junid
3501301    3.3107886     3.3107886          0.0           1
3501302    3.3116624     3.3116624          0.0           2
3501303    3.3130591     3.3130591          0.0           3
3501304    3.3148429     3.3148429          0.0           4
3501305    3.3168464     3.3168464          0.0           5
3501306    3.3188827     3.3188827          0.0           6
3501307    3.3207588     3.3207588          0.0           7
3501308    3.3222899     3.3222899          0.0           8
3501309    3.3233211     3.3233211          0.0           9
3501310    3.3237379     3.3237379          0.0          10
3501311    3.3238289     3.3238289          0.0          11
*              hd          corr          gas         slope       junid
3501401     4.717e-3          0.0           1.0           1.0          11
*
*              name         type
3550000    "unnamed"         pipe
*             ncells
3550001           12
*            x-area        volid
3550101      7.26e-4           12
*           x-length        volid
3550301         0.05            1
3550302          0.1           11
3550303         0.05           12
*            volume        volid
3550401          0.0           12
*         azim-angle        volid
3550501          0.0           12
*         vert-angle        volid
3550601         90.0           12
*            x-wall         xhd        volid
3550801       1.0e-5      4.64e-3           12
*            x-flags        volid
3551001            0           12
*      ebt     press   water-ie   steam-ie void none id
3551201 000 1.757645e6 2.936041e5 2.596782e6  0.0  0.0  1
3551202 000  1.75457e6 2.957726e5 2.596747e6  0.0  0.0  2
3551203 000 1.750471e6 2.987879e5 2.596701e6  0.0  0.0  3
3551204 000 1.746373e6 3.024042e5 2.596654e6  0.0  0.0  4
3551205 000 1.742277e6 3.063208e5 2.596608e6  0.0  0.0  5
3551206 000 1.738184e6 3.102158e5 2.596561e6  0.0  0.0  6
3551207 000 1.734094e6 3.137676e5 2.596514e6  0.0  0.0  7
3551208 000 1.730006e6 3.166764e5 2.596466e6  0.0  0.0  8
3551209 000 1.725922e6 3.186985e5 2.596419e6  0.0  0.0  9
3551210 000 1.721838e6 3.196565e5 2.596372e6  0.0  0.0 10
3551211 000 1.717757e6 3.200393e5 2.596324e6  0.0  0.0 11
3551212 000 1.714697e6 3.200409e5 2.596288e6  0.0  0.0 12
*             area         jun
```

```
3550201     7.26e-4          11
*          jefvcahs      jun num
3551101     00000000          11
*             vl          vv       unused       junid
3551301    3.2803593    3.2803593         0.0          1
3551302    3.2813585    3.2813585         0.0          2
3551303    3.2827566    3.2827566         0.0          3
3551304     3.284446     3.284446         0.0          4
3551305    3.2862916    3.2862916         0.0          5
3551306    3.2881444    3.2881444         0.0          6
3551307     3.289849     3.289849         0.0          7
3551308    3.2912569    3.2912569         0.0          8
3551309    3.2922428    3.2922428         0.0          9
3551310    3.2927144    3.2927144         0.0         10
3551311    3.2929065    3.2929065         0.0         11
*             hd         corr          gas       slope       junid
3551401     4.64e-3          0.0          1.0          1.0          11
*
*             name         type
3600000    "unnamed"         pipe
*           ncells
3600001          12
*           x-area        volid
3600101     5.13e-4          12
*          x-length        volid
3600301         0.05           1
3600302          0.1          11
3600303         0.05          12
*           volume        volid
3600401          0.0          12
*        azim-angle        volid
3600501          0.0          12
*        vert-angle        volid
3600601         90.0          12
*           x-wall         xhd        volid
3600801       1.0e-5      4.506e-3          12
*           x-flags        volid
3601001           0          12
*      ebt     press   water-ie   steam-ie void none id
3601201 000 1.757158e6  2.93604e5 2.596776e6  0.0  0.0  1
3601202 000 1.754128e6 2.950736e5 2.596742e6  0.0  0.0  2
3601203 000 1.750088e6 2.971032e5 2.596696e6  0.0  0.0  3
3601204 000  1.74605e6 2.995213e5 2.596651e6  0.0  0.0  4
3601205 000 1.742013e6 3.021221e5 2.596605e6  0.0  0.0  5
3601206 000 1.737978e6 3.046879e5 2.596558e6  0.0  0.0  6
3601207 000 1.733945e6 3.070049e5 2.596512e6  0.0  0.0  7
3601208 000 1.729914e6 3.088782e5 2.596466e6  0.0  0.0  8
3601209 000 1.725885e6 3.101523e5 2.596419e6  0.0  0.0  9
3601210 000 1.721857e6 3.107156e5 2.596372e6  0.0  0.0 10
3601211 000  1.71783e6 3.109049e5 2.596324e6  0.0  0.0 11
3601212 000  1.71481e6 3.106523e5 2.596289e6  0.0  0.0 12
*             area          jun
3600201     5.13e-4          11
*          jefvcahs      jun num
3601101     00000000          11
*             vl          vv       unused       junid
3601301    3.1833627    3.1833627         0.0          1
3601302    3.1840208    3.1840208         0.0          2
3601303    3.1849329    3.1849329         0.0          3
3601304    3.1860249    3.1860249         0.0          4
3601305    3.1872058    3.1872058         0.0          5
3601306    3.1883783    3.1883783         0.0          6
3601307    3.1894438    3.1894438         0.0          7
3601308    3.1903107    3.1903107         0.0          8
3601309    3.1909041    3.1909041         0.0          9
3601310    3.1911702    3.1911702         0.0         10
3601311    3.1912632    3.1912632         0.0         11
*             hd         corr          gas       slope       junid
3601401     4.506e-3          0.0          1.0          1.0          11
*
*             name         type
3610000    "unnamed"         pipe
*           ncells
3610001          12
*           x-area        volid
3610101     1.04e-3          12
*          x-length        volid
3610301         0.05           1
3610302          0.1          11
3610303         0.05          12
*           volume        volid
3610401          0.0          12
*        azim-angle        volid
3610501          0.0          12
*        vert-angle        volid
3610601         90.0          12
*           x-wall         xhd        volid
3610801       1.0e-5       0.021          12
*           x-flags        volid
3611001           0          12
*      ebt     press   water-ie   steam-ie void none id
3611201 000  1.73229e6  2.93603e5 2.596493e6  0.0  0.0  1
3611202 000 1.730822e6 2.936191e5 2.596476e6  0.0  0.0  2
3611203 000 1.728864e6 2.936557e5 2.596453e6  0.0  0.0  3
3611204 000 1.726906e6 2.937167e5  2.59643e6  0.0  0.0  4
3611205 000 1.724948e6 2.938039e5 2.596408e6  0.0  0.0  5
3611206 000 1.722991e6 2.939166e5 2.596385e6  0.0  0.0  6
3611207 000 1.721033e6 2.940521e5 2.596362e6  0.0  0.0  7
3611208 000 1.719075e6 2.942057e5 2.596339e6  0.0  0.0  8
3611209 000 1.717117e6 2.943709e5 2.596316e6  0.0  0.0  9
3611210 000 1.715159e6 2.945403e5 2.596293e6  0.0  0.0 10
3611211 000 1.713201e6  2.9471e5  2.59627e6  0.0  0.0 11
3611212 000 1.711732e6 2.947931e5 2.596252e6  0.0  0.0 12
*             area          jun
3610201     1.04e-3          11
*          jefvcahs      jun num
3611101     00000000          11
*             vl          vv       unused       junid
3611301    4.8324647    4.8324647         0.0          1
3611302     4.832478     4.832478         0.0          2
3611303    4.8325071    4.8325071         0.0          3
3611304     4.832552     4.832552         0.0          4
3611305    4.8326149    4.8326149         0.0          5
3611306     4.832695     4.832695         0.0          6
3611307    4.8327904    4.8327904         0.0          7
3611308    4.8328981    4.8328981         0.0          8
3611309    4.8330135    4.8330135         0.0          9
3611310    4.8331318    4.8331318         0.0         10
3611311    4.8332505    4.8332505         0.0         11
*             hd         corr          gas       slope       junid
3611401       0.021          0.0          1.0          1.0          11
*
*             name         type
3650000    "unnamed"       branch
*            njuns
3650001           5
*             area       length          vol
3650101     5.43e-3          0.1          0.0
*          az-angle     inc-angle           dz
3650102          0.0         90.0          0.1
*          x-rough        x-hd        flags
3650103       1.0e-5       0.048            0
```

```
*            ebt       press     water-ie     steam-ie        void
3650200        000   1.712847e6   3.084529e5   2.596266e6        0.0
*           from          to        area
3651101    365010002    370010001      5.43e-3
*        fwd. loss     rev. loss      efvcahs
3651102         0.1          0.1           0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
3651110        0.048          0.0          1.0          1.0
*            vl           vv       unused
3651201    2.2403409    2.2403409         0.0
*           from          to        area
3652101    365010001    350120002      9.36e-4
*        fwd. loss     rev. loss      efvcahs
3652102         0.6          0.6           0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
3652110     4.717e-3          0.0          1.0          1.0
*            vl           vv       unused
3652201   -3.3238339   -3.3238339         0.0
*           from          to        area
3653101    365010001    355120002      7.26e-4
*        fwd. loss     rev. loss      efvcahs
3653102         0.6          0.6           0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
3653110      4.64e-3          0.0          1.0          1.0
*            vl           vv       unused
3653201   -3.2929115   -3.2929115         0.0
*           from          to        area
3654101    365010001    360120002      5.13e-4
*        fwd. loss     rev. loss      efvcahs
3654102         0.6          0.6           0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
3654110     4.506e-3          0.0          1.0          1.0
*            vl           vv       unused
3654201   -3.1911504   -3.1911504         0.0
*           from          to        area
3655101    365010001    361120002      1.04e-3
*        fwd. loss     rev. loss      efvcahs
3655102         0.6          0.6           0
*         hyd diam     ccfl wght     ccfl gas    ccfl slope
3655110        0.021          0.0          1.0          1.0
*            vl           vv       unused
3655201   -4.8333097   -4.8333097         0.0
*
*            name        type
3700000    "unnamed"        pipe
*           ncells
3700001          14
*          x-area       volid
3700101      5.43e-3          14
*         x-length       volid
3700301          0.2           1
3700302          0.4           2
3700303         0.56           4
3700304         0.55           5
3700305         0.32           6
3700306         0.16           7
3700307         0.08           8
3700308         0.04          11
3700309         0.03          12
3700310         0.04          13
3700311         0.06          14
*           volume       volid
3700401          0.0          14
*        azim-angle       volid
3700501          0.0          14
*        vert-angle       volid
3700601         90.0          14
*          x-wall        xhd       volid
3700801       1.0e-5       0.048          14
*          x-flags       volid
3701001            0          14
*     ebt     press   water-ie   steam-ie void none id
3701201 000 1.711039e6 3.080503e5 2.596244e6  0.0  0.0  1
3701202 000 1.707914e6 3.072547e5 2.596207e6  0.0  0.0  2
3701203 000 1.702914e6 3.061556e5 2.596147e6  0.0  0.0  3
3701204 000 1.697079e6  3.05066e5 2.596077e6  0.0  0.0  4
3701205 000 1.691296e6 3.040047e5 2.596007e6  0.0  0.0  5
3701206 000 1.686762e6 3.033864e5 2.595952e6  0.0  0.0  6
3701207 000 1.684261e6 3.030766e5 2.595921e6  0.0  0.0  7
3701208 000  1.68301e6 3.028829e5 2.595906e6  0.0  0.0  8
3701209 000 1.682385e6 3.028829e5 2.595898e6  0.0  0.0  9
3701210 000 1.681968e6 3.028829e5 2.595893e6  0.0  0.0 10
3701211 000 1.681551e6 3.028829e5 2.595888e6  0.0  0.0 11
3701212 000 1.681186e6 3.028829e5 2.595884e6  0.0  0.0 12
3701213 000 1.682053e6  3.02883e5 2.595894e6  0.0  0.0 13
3701214 000 1.682795e6  2.09872e5 2.595903e6  0.0  0.0 14
*          jefvcahs      jun num
3701101     00000000          13
*            vl           vv       unused        junid
3701301    2.2402124    2.2402124         0.0           1
3701302    2.2399588    2.2399588         0.0           2
3701303    2.2396095    2.2396095         0.0           3
3701304     2.239265     2.239265         0.0           4
3701305    2.2389305    2.2389305         0.0           5
3701306    2.2387371    2.2387371         0.0           6
3701307    2.2386405    2.2386405         0.0           7
3701308    2.2385798    2.2385798         0.0           8
3701309    2.2385805    2.2385805         0.0           9
3701310    2.2385809    2.2385809         0.0          10
3701311    2.2385812    2.2385812         0.0          11
3701312    2.2385817    2.2385817         0.0          12
3701313   1.467717e-8   1.467717e-8         0.0          13
*            hd         corr         gas        slope        junid
3701401        0.048          0.0          1.0          1.0          13
*
*            name        type
3900000    "unnamed"        pipe
*           ncells
3900001          11
*          x-area       volid
3900101      3.768e-3          11
*         x-length       volid
3900301          0.08           1
3900302          0.16           2
3900303          0.32           3
3900304           0.6           4
3900305          0.92           6
3900306           0.8           7
3900307           0.4           8
3900308           0.2           9
3900309           0.3          10
3900310          0.15          11
*           volume       volid
3900401          0.0          11
*        azim-angle       volid
3900501          0.0          11
*        vert-angle       volid
3900601          0.0           8
3900602         90.0           9
3900603          0.0          10
3900604        -90.0          11
*          x-wall        xhd       volid
```

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3900801      1.0e-5       0.04          11
*          x-flags       volid
3901001          0          11
*     ebt     press   water-ie   steam-ie void none id
3901201 000  1.67172e6 3.028172e5 2.595766e6  0.0  0.0  1
3901202 000 1.671469e6 3.027188e5 2.595763e6  0.0  0.0  2
3901203 000 1.670966e6 3.025224e5 2.595757e6  0.0  0.0  3
3901204 000 1.670001e6 3.021558e5 2.595745e6  0.0  0.0  4
3901205 000 1.668407e6 3.015975e5 2.595725e6  0.0  0.0  5
3901206 000 1.666478e6 3.010429e5 2.595701e6  0.0  0.0  6
3901207 000 1.664675e6 3.005635e5 2.595678e6  0.0  0.0  7
3901208 000 1.663416e6 3.003245e5 2.595662e6  0.0  0.0  8
3901209 000  1.65877e6 3.002052e5 2.595604e6  0.0  0.0  9
3901210 000 1.654228e6 3.000265e5 2.595546e6  0.0  0.0 10
3901211 000 1.651417e6 2.999373e5  2.59551e6  0.0  0.0 11
*         fwd. loss     rev.loss       junid
3900901         0.0          0.0           7
3900902         0.6          0.6          10
*         jefvcahs      jun num
3901101     00000000          10
*             vl          vv       unused       junid
3901301    3.2259641    3.2259641          0.0           1
3901302    3.2259192    3.2259192          0.0           2
3901303    3.2258296    3.2258296          0.0           3
3901304    3.2256625    3.2256625          0.0           4
3901305    3.2254086    3.2254086          0.0           5
3901306    3.2251573    3.2251573          0.0           6
3901307    3.2249403    3.2249403          0.0           7
3901308    3.2248328    3.2248328          0.0           8
3901309    3.2247846    3.2247846          0.0           9
3901310    3.2247093    3.2247093          0.0          10
*             hd         corr          gas        slope       junid
3901401         0.04          0.0          1.0          1.0          10
*
*            name        type
3910000    "unnamed"      sngljun
*            from          to        area
3910101    370130005    390010001     3.768e-3
*         fwd. loss     rev. loss      efvcahs
3910102         1.0          1.0           0
*         discharge      thermal
3910103         1.0         0.14
*             hd        flood     intercept       slope
3910110         0.04          0.0          1.0          1.0
*            flow          vl          vv       unused
3910201          0    3.2259803    3.2259803          0.0
*
*            name        type
3920000    "unnamed"      sngljun
*            from          to        area
3920101    395100002    310010001     3.768e-3
*         fwd. loss     rev. loss      efvcahs
3920102         1.0          1.0           0
*         discharge      thermal
3920103         1.0         0.14
*             hd        flood     intercept       slope
3920110         0.04          0.0          1.0          1.0
*            flow          vl          vv       unused
3920201          0    3.2061028    3.2061028          0.0
*
*            name        type
3950000    "unnamed"        pipe
*           ncells
3950001         10
*          x-area       volid
3950101     3.768e-3          10
*          x-length       volid
3950301         0.15           1
3950302          0.3           2
3950303         0.35           3
3950304         0.56           4
3950305         0.65           6
3950306          0.3           8
3950307         0.16           9
3950308         0.08          10
*           volume       volid
3950401          0.0          10
*         azim-angle       volid
3950501          0.0          10
*         vert-angle       volid
3950601         90.0           1
3950602          0.0           2
3950603        -90.0           3
3950604          0.0          10
*           x-wall        xhd       volid
3950801      1.0e-5         0.04          10
*          x-flags       volid
3951001          0          10
*     ebt     press   water-ie   steam-ie void none id
3951201 000 1.784041e6 2.583782e5 2.597072e6  0.0  0.0  1
3951202 000   1.7798e6  2.58287e5 2.597026e6  0.0  0.0  2
3951203 000 1.777758e6 2.581808e5 2.597004e6  0.0  0.0  3
3951204 000  1.77544e6 2.580115e5 2.596979e6  0.0  0.0  4
3951205 000  1.77416e6 2.578157e5 2.596965e6  0.0  0.0  5
3951206 000 1.772784e6 2.576208e5  2.59695e6  0.0  0.0  6
3951207 000 1.771778e6  2.57531e5 2.596938e6  0.0  0.0  7
3951208 000 1.771143e6 2.574414e5 2.596932e6  0.0  0.0  8
3951209 000 1.770656e6 2.573936e5 2.596926e6  0.0  0.0  9
3951210 000 1.770402e6 2.573698e5 2.596923e6  0.0  0.0 10
*         fwd. loss     rev.loss       junid
3950901         0.6          0.6           3
3950902         0.0          0.0           9
*         jefvcahs      jun num
3951101     00000000           9
*             vl          vv       unused       junid
3951301    3.2064962    3.2064962          0.0           1
3951302    3.2064648    3.2064648          0.0           2
3951303    3.2064242    3.2064242          0.0           3
3951304    3.2063582    3.2063582          0.0           4
3951305      3.20628      3.20628          0.0           5
3951306    3.2062023    3.2062023          0.0           6
3951307     3.206167     3.206167          0.0           7
3951308    3.2061312    3.2061312          0.0           8
3951309    3.2061124    3.2061124          0.0           9
*             hd         corr          gas        slope       junid
3951401         0.04          0.0          1.0          1.0           9
*
*            name        type
4050000    "unnamed"      branch
*           njuns
4050001          1
*            area      length         vol
4050101     0.07065         0.5         0.0
*         az-angle    inc-angle          dz
4050102         0.0          0.0         0.0
*          x-rough        x-hd       flags
4050103      1.0e-5         0.0           0
*             ebt       press     water-ie     steam-ie        void
4050200         000   1.792394e6   2.585507e5   2.597162e6         0.0
*            from          to        area
4052101    405010002    410010001     0.07065
*         fwd. loss     rev. loss      efvcahs
```

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4052102         0.0         0.0          0
*             vl          vv       unused
4052201    2.5934396    2.5934396         0.0
*
*            name        type
4100000    "unnamed"        pipe
*           ncells
4100001           3
*           x-area       volid
4100101      0.07065           3
*         x-length       volid
4100301          1.0           1
4100302          1.2           2
4100303          1.0           3
*           volume       volid
4100401          0.0           3
*        azim-angle       volid
4100501          0.0           3
*        vert-angle       volid
4100601          0.0           3
*           x-wall         xhd       volid
4100801       1.0e-5         0.0           3
*           x-flags       volid
4101001           0           3
*      ebt     press   water-ie   steam-ie void none id
4101201 000 1.792298e6 2.585177e5 2.597162e6  0.0  0.0  1
4101202 000 1.792157e6 2.584782e5  2.59716e6  0.0  0.0  2
4101203 000 1.792016e6 2.584452e5 2.597158e6  0.0  0.0  3
*          jefvcahs      jun num
4101101     00000000           2
*             vl          vv       unused       junid
4101301    2.5934289    2.5934289         0.0           1
4101302     2.593416     2.593416         0.0           2
*
*            name        type
4150000    "unnamed"      branch
*           njuns
4150001           2
*            area      length         vol
4150101      0.07065        0.65         0.0
*          az-angle    inc-angle          dz
4150102         0.0         0.0         0.0
*          x-rough        x-hd       flags
4150103       1.0e-5         0.0           0
*            ebt       press     water-ie     steam-ie        void
4150200         000   1.792332e6   2.584239e5   2.597162e6         0.0
*            from          to        area
4151101    415010001    410030002      0.07065
*         fwd. loss    rev. loss      efvcahs
4151102         0.0         0.0           0
*             vl          vv       unused
4151201   -2.5934055   -2.5934055         0.0
*            from          to        area
4152101    415010002    420010001      0.07065
*         fwd. loss    rev. loss      efvcahs
4152102         0.0         0.0           0
*             vl          vv       unused
4152201    2.3049726    2.3049726         0.0
*
*            name        type
4200000    "unnamed"        pipe
*           ncells
4200001           1
*           x-area       volid
4200101      0.07065           1
*         x-length       volid
4200301          0.59           1
*           volume       volid
4200401          0.0           1
*        azim-angle       volid
4200501          0.0           1
*        vert-angle       volid
4200601          0.0           1
*           x-wall         xhd       volid
4200801       1.0e-5         0.0           1
*           x-flags       volid
4201001           0           1
*      ebt     press   water-ie   steam-ie void none id
4201201 000 1.792538e6 2.584022e5 2.597164e6  0.0  0.0  1
*
*            name        type
4250000    "unnamed"      branch
*           njuns
4250001           2
*            area      length         vol
4250101      0.07065         0.5         0.0
*          az-angle    inc-angle          dz
4250102         0.0         0.0         0.0
*          x-rough        x-hd       flags
4250103       1.0e-5         0.0           0
*            ebt       press     water-ie     steam-ie        void
4250200         000   1.792482e6   2.583838e5   2.597164e6         0.0
*            from          to        area
4251101    425010001    420010002      0.07065
*         fwd. loss    rev. loss      efvcahs
4251102         0.0         0.0           0
*             vl          vv       unused
4251201   -2.3049662   -2.3049662         0.0
*            from          to        area
4252101    425010002    435010001      0.07065
*         fwd. loss    rev. loss      efvcahs
4252102         0.0         0.0           0
*             vl          vv       unused
4252201   0.057748705   0.057748705         0.0
*
*            name        type
4350000    "unnamed"        pipe
*           ncells
4350001           6
*           x-area       volid
4350101      0.07065           6
*         x-length       volid
4350301          1.0           1
4350302          1.2           2
4350303         1.24           3
4350304          1.2           4
4350305          1.0           5
4350306          0.8           6
*           volume       volid
4350401          0.0           6
*        azim-angle       volid
4350501          0.0           6
*        vert-angle       volid
4350601          0.0           6
*           x-wall         xhd       volid
4350801       1.0e-5         0.0           6
*           x-flags       volid
4351001           0           6
*      ebt     press   water-ie   steam-ie void none id
4351201 000 1.795091e6 2.577422e5 2.597192e6  0.0  0.0  1
4351202 000 1.795091e6 2.569855e5 2.597192e6  0.0  0.0  2
4351203 000 1.795091e6  2.56216e5 2.597192e6  0.0  0.0  3
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4351204 000 1.795091e6 2.554807e5 2.597192e6  0.0  0.0  4
4351205 000 1.795091e6 2.548739e5 2.597192e6  0.0  0.0  5
4351206 000 1.795091e6 2.543924e5 2.597192e6  0.0  0.0  6
*          jefvcahs      jun num
4351101     00000000           5
*             vl          vv       unused       junid
4351301   0.057744149   0.057744149         0.0          1
4351302   0.057738848   0.057738848         0.0          2
4351303   0.057733454   0.057733454         0.0          3
4351304   0.057728313   0.057728313         0.0          4
4351305   0.057724088   0.057724088         0.0          5
*
*            name        type
4360000    "unnamed"       branch
*           njuns
4360001           2
*            area       length          vol
4360101      0.07065         0.4         0.0
*         az-angle     inc-angle          dz
4360102          0.0         0.0         0.0
*          x-rough        x-hd       flags
4360103          0.0         0.0           0
*             ebt        press      water-ie      steam-ie        void
4360200         000    1.795093e6    2.54216e5    2.597192e6         0.0
*            from          to         area
4361101    436010001    435060002      0.07065
*         fwd. loss     rev. loss      efvcahs
4361102          0.0         0.0           0
*             vl          vv       unused
4361201  -0.057720747  -0.057720747         0.0
*            from          to         area
4362101    436010002    437010001      0.07065
*         fwd. loss     rev. loss      efvcahs
4362102          0.0         0.0           0
*             vl          vv       unused
4362201  -4.690685e-7  -4.690685e-7         0.0
*
*            name        type
4370000    "unnamed"         pipe
*           ncells
4370001           1
*           x-area       volid
4370101      0.07065           1
*         x-length       volid
4370301          0.7           1
*           volume       volid
4370401          0.0           1
*        azim-angle       volid
4370501          0.0           1
*        vert-angle       volid
4370601          0.0           1
*           x-wall        xhd       volid
4370801          0.0         0.0           1
*           x-flags       volid
4371001           0           1
*      ebt     press   water-ie   steam-ie void none id
4371201 000 1.795093e6 1.786175e5 2.597192e6  0.0  0.0  1
*
*            name        type
4400000    "unnamed"         pipe
*           ncells
4400001           6
*           x-area       volid
4400101      0.07065           6
*         x-length       volid
4400301         1.12           1
4400302          1.0           4
4400303          0.8           5
4400304          0.4           6
*           volume       volid
4400401          0.0           6
*        azim-angle       volid
4400501          0.0           6
*        vert-angle       volid
4400601          0.0           6
*           x-wall        xhd       volid
4400801       1.0e-5         0.0           6
*           x-flags       volid
4401001           0           6
*      ebt     press   water-ie   steam-ie void none id
4401201 000 6.438231e5 1.787592e5 2.569105e6  0.0  0.0  2
4401202 000 6.438232e5 1.787592e5 2.569105e6  0.0  0.0  4
4401203 000 6.438234e5 1.787584e5 2.569105e6  0.0  0.0  5
4401204 000 6.438234e5 1.793915e5 2.569105e6  0.0  0.0  6
*          jefvcahs      jun num
4401101     00000000           5
*             vl          vv       unused       junid
4401301   2.767925e-7   2.767925e-7         0.0          1
4401302   5.268843e-7   5.268843e-7         0.0          2
4401303    7.82453e-7    7.82453e-7         0.0          3
4401304   1.046482e-6   1.046482e-6         0.0          4
4401305   1.266331e-6   1.266331e-6         0.0          5
*
*            name        type
4410000    "unnamed"       branch
*           njuns
4410001           0
*            area       length          vol
4410101      0.07065        0.35         0.0
*         az-angle     inc-angle          dz
4410102          0.0         0.0         0.0
*          x-rough        x-hd       flags
4410103          0.0         0.0           0
*             ebt        press      water-ie      steam-ie        void
4410200         000    6.437814e5    3.693832e5    2.569102e6         0.0
*
*            name        type
4450000    "unnamed"       branch
*           njuns
4450001           2
*            area       length          vol
4450101      0.07065        0.23         0.0
*         az-angle     inc-angle          dz
4450102          0.0         0.0         0.0
*          x-rough        x-hd       flags
4450103       1.0e-5         0.0           0
*             ebt        press      water-ie      steam-ie        void
4450200         000    6.438094e5    3.696496e5    2.569104e6         0.0
*            from          to         area
4451101    445010002    441010001      0.07065
*         fwd. loss     rev. loss      efvcahs
4451102          0.0         0.0           0
*             vl          vv       unused
4451201   0.29328865   0.29328865         0.0
*            from          to         area
4452101    445010001    440060002         0.0
*         fwd. loss     rev. loss      efvcahs
4452102          0.0         0.0           0
*             vl          vv       unused
4452201  -1.369306e-6  -1.369306e-6         0.0
*
*            name        type
```

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4500000    "unnamed"       branch
*           njuns
4500001          2
*           area       length         vol
4500101      0.07065         0.5         0.0
*         az-angle     inc-angle          dz
4500102         0.0         0.0         0.0
*          x-rough        x-hd       flags
4500103       1.0e-5         0.0           0
*            ebt        press      water-ie     steam-ie         void
4500200         000    6.437776e5    3.545372e5    2.569102e6          0.0
*            from          to         area
4501101    450010001    441010002      0.07065
*        fwd. loss     rev. loss      efvcahs
4501102         0.0         0.0           0
*             vl          vv       unused
4501201   -0.29327586   -0.29327586          0.0
*            from          to         area
4502101    450010002    455010001      0.07065
*        fwd. loss     rev. loss      efvcahs
4502102         0.0         0.0           0
*             vl          vv       unused
4502201      2.57213      2.57213          0.0
*
*            name        type
4550000    "unnamed"         pipe
*           ncells
4550001          8
*           x-area       volid
4550101      0.07065          8
*         x-length       volid
4550301         1.0          3
4550302        1.15          4
4550303         1.0          8
*           volume       volid
4550401         0.0          8
*         azim-angle       volid
4550501         0.0          8
*         vert-angle       volid
4550601         0.0          8
*           x-wall        xhd       volid
4550801       1.0e-5         0.0          8
*           x-flags       volid
4551001          0          8
*      ebt     press   water-ie   steam-ie void none id
4551201 000 6.405219e5  3.54434e5 2.568937e6  0.0  0.0  1
4551202 000 6.404011e5 3.543309e5 2.568931e6  0.0  0.0  2
4551203 000 6.402803e5 3.542278e5 2.568925e6  0.0  0.0  3
4551204 000 6.401506e5 3.541094e5 2.568918e6  0.0  0.0  4
4551205 000 6.400208e5 3.540065e5 2.568912e6  0.0  0.0  5
4551206 000 6.399001e5 3.539037e5 2.568905e6  0.0  0.0  6
4551207 000 6.397794e5  3.53801e5 2.568899e6  0.0  0.0  7
4551208 000 6.396588e5 3.536983e5 2.568893e6  0.0  0.0  8
*          jefvcahs      jun num
4551101     00000000           7
*             vl          vv       unused        junid
4551301    2.5720913    2.5720913          0.0           1
4551302    2.5720491    2.5720491          0.0           2
4551303    2.5720072    2.5720072          0.0           3
4551304     2.571959     2.571959          0.0           4
4551305    2.5719171    2.5719171          0.0           5
4551306    2.5718753    2.5718753          0.0           6
4551307    2.5718336    2.5718336          0.0           7
*
*            name        type
4600000    "unnamed"       branch
*           njuns
4600001          1
*           area       length         vol
4600101      0.07065         0.55         0.0
*         az-angle     inc-angle          dz
4600102         0.0         0.0         0.0
*          x-rough        x-hd       flags
4600103       1.0e-5         0.0           0
*            ebt        press      water-ie     steam-ie         void
4600200         000    6.394172e5    3.529342e5    2.568881e6          0.0
*            from          to         area
4601101    460010001    455080002      0.07065
*        fwd. loss     rev. loss      efvcahs
4601102         0.0         0.0           0
*             vl          vv       unused
4601201   -2.5717919   -2.5717919          0.0
*
*            name        type
5050000    "unnamed"         pipe
*           ncells
5050001          2
*           x-area       volid
5050101       15.904          2
*         x-length       volid
5050301         0.5          2
*           volume       volid
5050401         0.0          2
*         azim-angle       volid
5050501         0.0          2
*         vert-angle       volid
5050601        90.0          2
*           x-wall        xhd       volid
5050801         0.0         0.0          2
*           x-flags       volid
5051001          0          2
*      ebt     press   water-ie   steam-ie void none id
5051201 000 1.931135e5 1.126714e5 2.527884e6  0.0  0.0  1
5051202 000 1.882279e5 1.182008e5 2.527001e6  0.0  0.0  2
*          jefvcahs      jun num
5051101     00000000           1
*             vl          vv       unused        junid
5051301  -4.190619e-7  -4.190619e-7          0.0           1
*
*            name        type
5100000    "unnamed"       branch
*           njuns
5100001          2
*           area       length         vol
5100101       15.904         0.5         0.0
*         az-angle     inc-angle          dz
5100102         0.0        90.0         0.5
*          x-rough        x-hd       flags
5100103         0.0         0.0           0
*            ebt        press      water-ie     steam-ie         void
5100200         000    1.83362e5    2.062403e5    2.526098e6          0.0
*            from          to         area
5103101    510010002    520010001       11.032
*        fwd. loss     rev. loss      efvcahs
5103102         0.0         0.0           0
*         hyd diam     ccfl wght      ccfl gas     ccfl slope
5103110        1.965         0.0           1.0           1.0
*             vl          vv       unused
5103201  -0.038519282  -0.038519282          0.0
*            from          to         area
5105101    510010001    505020002          0.0
*        fwd. loss     rev. loss      efvcahs
```

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5105102         0.0         0.0           0
*             vl          vv       unused
5105201   8.38625e-7   8.38625e-7         0.0
*
*            name        type
5200000    "unnamed"        pipe
*           ncells
5200001           6
*           x-area       volid
5200101       11.032           6
*         x-length       volid
5200301         0.25           1
5200302          0.2           5
5200303         0.25           6
*           volume       volid
5200401          0.0           6
*        azim-angle       volid
5200501          0.0           6
*        vert-angle       volid
5200601         90.0           6
*           x-wall         xhd       volid
5200801       1.0e-5       1.965           6
*           x-flags       volid
5201001           0           6
*      ebt     press   water-ie   steam-ie void none id
5201201 000 1.797269e5 2.065742e5 2.525409e6  0.0  0.0  1
5201202 000 1.775552e5 2.049277e5 2.524991e6  0.0  0.0  2
5201203 000 1.756255e5 2.035606e5 2.524615e6  0.0  0.0  3
5201204 000 1.736955e5 2.021839e5 2.524235e6  0.0  0.0  4
5201205 000 1.717652e5 2.008019e5 2.523851e6  0.0  0.0  5
5201206 000 1.695922e5 1.994155e5 2.523414e6  0.0  0.0  6
*         fwd. loss      rev.loss        junid
5200901         10.0         10.0            5
*          jefvcahs      jun num
5201101     00000000            5
*             vl          vv       unused        junid
5201301   -0.03851248   -0.03851248          0.0           1
5201302   -0.03850691   -0.03850691          0.0           2
5201303  -0.038501348  -0.038501348          0.0           3
5201304  -0.038495805  -0.038495805          0.0           4
5201305  -0.038490281  -0.038490281          0.0           5
*             hd         corr          gas        slope        junid
5201401       1.965          0.0          1.0          1.0            5
*
*            name        type
5300000    "unnamed"       branch
*           njuns
5300001           2
*            area       length          vol
5300101       15.79          0.2          0.0
*          az-angle     inc-angle           dz
5300102          0.0         90.0          0.2
*          x-rough         x-hd        flags
5300103          0.0        3.183            0
*            ebt        press      water-ie      steam-ie         void
5300200          000    1.674192e5    1.97709e5    2.522972e6          0.0
*           from          to         area
5304101    530010001    520060002       11.032
*         fwd. loss     rev. loss      efvcahs
5304102         10.0         10.0            0
*          hyd diam     ccfl wght      ccfl gas     ccfl slope
5304110        1.965          0.0          1.0          1.0
*             vl          vv       unused
5304201   0.038483519   0.038483519          0.0
*            from          to         area
5305101    530010002    535010001         25.1
*         fwd. loss     rev. loss      efvcahs
5305102          0.0          0.0            0
*             vl          vv       unused
5305201  -0.016914418  -0.016914418          0.0
*
*            name        type
5350000    "unnamed"        pipe
*           ncells
5350001           4
*           x-area       volid
5350101        15.79           4
*         x-length       volid
5350301          0.4           1
5350302         0.56           3
5350303         0.58           4
*           volume       volid
5350401          0.0           4
*        azim-angle       volid
5350501          0.0           4
*        vert-angle       volid
5350601         90.0           4
*           x-wall         xhd       volid
5350801       1.0e-5       3.183           4
*           x-flags       volid
5351001           0           4
*      ebt     press   water-ie   steam-ie void none id
5351201 000 1.645088e5 1.977034e5  2.52237e6  0.0  0.0  1
5351202 000 1.598531e5 1.976925e5 2.521387e6  0.0  0.0  2
5351203 000 1.544214e5 1.976792e5 2.520204e6  0.0  0.0  3
5351204 000 1.488927e5  1.97675e5  2.51896e6  0.0  0.0  4
*         fwd. loss      rev.loss        junid
5350901          2.0          2.0            3
*          jefvcahs      jun num
5351101     00000000            3
*             vl          vv       unused        junid
5351301  -0.026887594  -0.026887594          0.0           1
5351302  -0.026887879  -0.026887879          0.0           2
5351303  -0.026888179  -0.026888179          0.0           3
*             hd         corr          gas        slope        junid
5351401       3.183          0.0          1.0          1.0            3
*
*            name        type
5400000    "unnamed"       branch
*           njuns
5400001           2
*            area       length          vol
5400101       33.73          0.3          0.0
*          az-angle     inc-angle           dz
5400102          0.0         90.0          0.3
*          x-rough         x-hd        flags
5400103          0.0          0.0            0
*            ebt        press      water-ie      steam-ie         void
5400200          000    1.446254e5    1.977061e5    2.517969e6          0.0
*           from          to         area
5401101    540010001    535040002          0.0
*         fwd. loss     rev. loss      efvcahs
5401102          2.0          2.0            0
*             vl          vv       unused
5401201   0.026888499   0.026888499          0.0
*            from          to         area
5402101    540010002    545010001          0.0
*         fwd. loss     rev. loss      efvcahs
5402102          2.0          2.0            0
*             vl          vv       unused
5402201   -0.01258751   -0.01258751          0.0
*
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*           name        type
5450000    "unnamed"      branch
*          njuns
5450001         2
*          area      length        vol
5450101       33.73        0.3        0.0
*        az-angle    inc-angle         dz
5450102        0.0        90.0        0.3
*         x-rough       x-hd       flags
5450103      1.0e-5        0.0          0
*           ebt       press     water-ie     steam-ie        void
5450200        000   1.417153e5    1.97866e5    2.517278e6         0.0
*          from         to       area
5451101    545010002     93010001     1.256e-3
*       fwd. loss    rev. loss     efvcahs
5451102        0.0        0.0          0
*           vl          vv       unused
5451201  8.762918e-8  8.762918e-8         0.0
*          from         to       area
5452101    545010002     94010001     1.256e-3
*       fwd. loss    rev. loss     efvcahs
5452102        0.0        0.0          0
*           vl          vv       unused
5452201  8.762918e-8  8.762918e-8         0.0
*
*           name        type
5500000    "unnamed"      branch
*          njuns
5500001         4
*          area      length        vol
5500101       26.7        0.3        0.0
*        az-angle    inc-angle         dz
5500102        0.0        90.0        0.3
*         x-rough       x-hd       flags
5500103      1.0e-5        0.0          0
*           ebt       press     water-ie     steam-ie        void
5500200        000   1.388054e5   1.982054e5    2.516572e6         0.0
*          from         to       area
5501101    550010001    545010002        0.0
*       fwd. loss    rev. loss     efvcahs
5501102        2.0        2.0          0
*           vl          vv       unused
5501201  0.015902065  0.015902065        0.0
*          from         to       area
5502101    550010002    555010001        0.0
*       fwd. loss    rev. loss     efvcahs
5502102        0.0        0.0          0
*           vl          vv       unused
5502201 -2.068068e-8 -2.068068e-8        0.0
*          from         to       area
5503101    550010002    598010002        0.0
*       fwd. loss    rev. loss     efvcahs
5503102        0.0        0.0          0
*           vl          vv       unused
5503201  1.798778e-7  1.798778e-7        0.0
*          from         to       area
5504101    550010002    597010002        0.0
*       fwd. loss    rev. loss     efvcahs
5504102        0.0        0.0          0
*           vl          vv       unused
5504201  1.798121e-7  1.798121e-7        0.0
*
*           name        type
5550000    "unnamed"       pipe
*          ncells
5550001         6
*          x-area       volid
5550101       33.84          6
*        x-length       volid
5550301        0.6           1
5550302        0.8           4
5550303        0.9           5
5550304        0.8           6
*          volume       volid
5550401        0.0           6
*       azim-angle       volid
5550501        0.0           6
*       vert-angle       volid
5550601       90.0           6
*          x-wall        xhd       volid
5550801        0.0        0.0           6
*          x-flags       volid
5551001          0           6
*     ebt     press   water-ie   steam-ie     void     ncqual id
5551201 006 1.344262e5 1.471957e5 2.515485e6      0.0       0.0  1
5551202 006  1.27598e5 1.309953e5  2.51372e6      0.0       0.0  2
5551203 006 1.197877e5  1.22567e5 2.511591e6      0.0       0.0  3
5551204 006  1.11974e5 1.182648e5 2.509326e6      0.0       0.0  4
5551205 006 1.046425e5 1.167579e5 4.204667e5 0.2212439
0.97737396  5
5551206 006 1.013293e5 1.123783e5 4.183832e5      1.0 0.97801888
6
*             he         air         vol
5553201        0.0        1.0           6
*         jefvcahs      jun num
5551101     00000000           5
*            vl          vv       unused       junid
5551301  -5.617792e-7  -5.617792e-7         0.0           1
5551302  -1.307628e-6  -1.307628e-6         0.0           2
5551303   -2.07454e-6   -2.07454e-6         0.0           3
5551304  -3.678226e-6    0.61983407         0.0           4
5551305   -0.56592929  -2.801868e-3         0.0           5
*
*           name        type
5600000    "unnamed"        pipe
*          ncells
5600001          6
*          x-area       volid
5600101       0.7065          6
*        x-length       volid
5600301        0.8           5
5600302        1.0           6
*          volume       volid
5600401        0.0           6
*       azim-angle       volid
5600501        0.0           6
*       vert-angle       volid
5600601       90.0           6
*          x-wall        xhd       volid
5600801        0.0        0.0           6
*          x-flags       volid
5601001          0           6
*     ebt     press   water-ie   steam-ie void none id
5601201 000 1.700435e5 2.046134e5 2.523505e6  0.0  0.0  1
5601202 000 1.622852e5 2.029996e5 2.521904e6  0.0  0.0  2
5601203 000 1.545256e5 2.013985e5 2.520228e6  0.0  0.0  3
5601204 000 1.467649e5 1.998101e5 2.518469e6  0.0  0.0  4
5601205 000 1.390029e5 1.982343e5 2.516621e6  0.0  0.0  5
5601206 000 1.302692e5 1.966637e5 2.514421e6  0.0  0.0  6
*          jefvcahs      jun num
5601101     00000000           5
*             vl          vv       unused       junid
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5601301   0.60134852   0.60134852        0.0          1
5601302   0.60124737   0.60124737        0.0          2
5601303   0.60114771   0.60114771        0.0          3
5601304   0.60104948   0.60104948        0.0          4
5601305   0.60095274   0.60095274        0.0          5
*
*           name        type
5650000   "unnamed"       pipe
*          ncells
5650001          6
*          x-area       volid
5650101      0.7065          6
*        x-length       volid
5650301         1.0          1
5650302         0.8          6
*          volume       volid
5650401         0.0          6
*       azim-angle       volid
5650501         0.0          6
*       vert-angle       volid
5650601       -90.0          6
*          x-wall         xhd       volid
5650801         0.0       0.016          6
*          x-flags       volid
5651001          0          6
*     ebt     press   water-ie   steam-ie void none id
5651201 000 6.015371e4 7.146356e4 2.489034e6  0.0  0.0  1
5651202 000 6.799239e4 7.227698e4 2.492947e6  0.0  0.0  2
5651203 000 7.496134e4 7.309723e4 2.496096e6  0.0  0.0  3
5651204 000 8.193107e4  7.39244e4  2.49899e6  0.0  0.0  4
5651205 000 8.890161e4 7.475856e4 2.501667e6  0.0  0.0  5
5651206 000 9.587295e4 7.559979e4 2.504158e6  0.0  0.0  6
*         jefvcahs      jun num
5651101     00000000           5
*            vl          vv       unused       junid
5651301    1.1337548    1.4960167         0.0          1
5651302    1.1337894    1.4960624         0.0          2
5651303    1.1338252    1.4961096         0.0          3
5651304    1.1338619     1.496158         0.0          4
5651305    1.1338993    1.4962075         0.0          5
*            hd        corr         gas       slope       junid
5651401       0.016         0.0         1.0         1.0           5
*
*           name        type
5700000   "unnamed"      tmdpjun
*           from          to        area      jefvcahs
5700101    575010002    565010001       0.1256           0
*         control        trip
5700200          1        1019
*           srch         mfl         mfv       unused
5700201        -1.0       800.0         0.0         0.0
5700202         0.0       800.0         0.0         0.0
5700203         5.0       400.0         0.0         0.0
5700204        10.0       200.0         0.0         0.0
5700205        15.0       100.0         0.0         0.0
5700206        20.0        50.0         0.0         0.0
5700207        25.0        10.0         0.0         0.0
5700208        50.0         0.0         0.0         0.0
*
*           name        type
5710000   "unnamed"      tmdpjun
*           from          to        area      jefvcahs
5710101    576010002    565010001       0.1256           0
*         control        trip
5710200          1          32
*           srch         mfl         mfv       unused
5710201        -1.0         0.0         0.0         0.0
5710202         0.0         0.0         0.0         0.0
5710203         3.0         5.0         0.0         0.0
5710204         5.0        10.0         0.0         0.0
5710205         8.0        25.0         0.0         0.0
5710206        10.0        48.0         0.0         0.0
*
*           name        type
5750000   "unnamed"      tmdpvol
*           area       length          vol
5750101        20.0        20.0         0.0
*        az-angle     inc-angle           dz
5750102         0.0        90.0        20.0
*         x-rough        x-hd       flags
5750103         0.0         0.0           0
*          cword
5750200           3
*           srch       press        temp
5750201         0.0       1.4e6       290.0
5750202        0.99       1.4e6       290.0
5750203         1.0       1.4e6       290.0
*
*           name        type
5760000   "unnamed"      tmdpvol
*           area       length          vol
5760101        50.0        50.0         0.0
*        az-angle     inc-angle           dz
5760102         0.0        90.0        50.0
*         x-rough        x-hd       flags
5760103         0.0         0.0           0
*          cword
5760200           3
*           srch       press        temp
5760201         0.0       1.4e6       290.0
5760202        0.99       1.4e6       290.0
5760203         1.0       1.4e6       290.0
*
*           name        type
5790000   "unnamed"      sngljun
*           from          to        area
5790101    565060002    580010002         0.0
*        fwd. loss    rev. loss      efvcahs
5790102         0.0         0.0           0
*       discharge      thermal
5790103         1.0        0.14
*           flow          vl          vv       unused
5790201           0    1.1339377    1.1339377         0.0
*
*           name        type
5800000   "unnamed"      tmdpvol
*           area       length          vol
5800101        20.0        20.0         0.0
*        az-angle     inc-angle           dz
5800102         0.0        90.0        20.0
*         x-rough        x-hd       flags
5800103         0.0         0.0           0
*          cword
5800200           3
*           srch       press        temp
5800201         0.0       1.0e5       300.0
*
*           name        type
5850000   "unnamed"       valve
*           from          to        area
5850101    510010001    560010001       0.1256
*        fwd. loss    rev. loss      efvcahs
```

```
5850102         0.0         0.0         100
*         discharge      thermal
5850103         1.0         0.14
*             flow          vl          vv       unused
5850201          0    3.3831553    3.3831553         0.0
*             type
5850300       mtrvlv
*            topen       tclose       vrate        ipos
5850301          1           2         1.0         1.0
*
*             name        type
5900000    "unnamed"      tmdpjun
*             from          to        area      jefvcahs
5900101    560060002    550010002      0.1256           0
*          control        trip
5900200          1           4
*             srch         mfl         mfv       unused
5900201        -1.0       420.0         0.0         0.0
5900202         0.0       400.0         0.0         0.0
5900203        12.5       200.0         0.0         0.0
5900204        25.0       100.0         0.0         0.0
5900205        50.0        50.0         0.0         0.0
5900206        75.0         0.0         0.0         0.0
5900207       100.0         0.0         0.0         0.0
5900208       500.0         0.0         0.0         0.0
*
*             name        type
5910000    "unnamed"       valve
*             from          to        area
5910101    597010001    436010002    1.256e-3
*         fwd. loss    rev. loss      efvcahs
5910102         0.0         0.0         100
*         discharge      thermal
5910103         1.0         0.14
*             flow          vl          vv       unused
5910201          0         0.0         0.0         0.0
*             type
5910300       chkvlv
*             type         pos         add        leak
5910301          0           0     1.8745e4         0.0
*
*             name        type
5920000    "unnamed"       valve
*             from          to        area
5920101    598010001    405010002    1.256e-3
*         fwd. loss    rev. loss      efvcahs
5920102         0.0         0.0         100
*         discharge      thermal
5920103         1.0         0.14
*             flow          vl          vv       unused
5920201          0         0.0         0.0         0.0
*             type
5920300       chkvlv
*             type         pos         add        leak
5920301          0           0     1.8745e4         0.0
*
*             name        type
5950000    "unnamed"      sngljun
*             from          to        area
5950101    596010002    555060002         0.0
*         fwd. loss    rev. loss      efvcahs
5950102         0.0         0.0           0
*         discharge      thermal
5950103         1.0         0.14
*             flow          vl          vv       unused
5950201          0  2.590754e-3  2.590754e-3         0.0
*
*             name        type
5960000    "unnamed"      tmdpvol
*             area      length         vol
5960101         50.0        50.0         0.0
*         az-angle    inc-angle          dz
5960102         0.0         90.0        50.0
*            x-rough        x-hd       flags
5960103         0.0         0.0           0
*            cword
5960200         1004
*      srch    press  temp squal quala1 quala2
5960201  0.0 1.01325e5 300.0   1.0    0.0    1.0
*
*             name        type
5970000    "unnamed"        pipe
*            ncells
5970001           1
*            x-area       volid
5970101     1.256e-3           1
*          x-length       volid
5970301          0.2           1
*            volume       volid
5970401          0.0           1
*         azim-angle       volid
5970501          0.0           1
*         vert-angle       volid
5970601         90.0           1
*            x-wall         xhd       volid
5970801          0.0         0.0           1
*           x-flags       volid
5971001           0           1
*      ebt     press   water-ie   steam-ie void none id
5971201 000 1.383248e5 1.514738e5 2.516455e6  0.0  0.0  1
*
*             name        type
5980000    "unnamed"        pipe
*            ncells
5980001           1
*            x-area       volid
5980101     1.256e-3           1
*          x-length       volid
5980301          0.2           1
*            volume       volid
5980401          0.0           1
*         azim-angle       volid
5980501          0.0           1
*         vert-angle       volid
5980601         90.0           1
*            x-wall         xhd       volid
5980801          0.0         0.0           1
*           x-flags       volid
5981001           0           1
*      ebt     press   water-ie   steam-ie void none id
5981201 000 1.383249e5 1.507925e5 2.516455e6  0.0  0.0  1
*
*             name        type
6000000    "unnamed"        pipe
*            ncells
6000001          17
*            x-area       volid
6000101       0.07065          15
6000102        0.0314          17
*          x-length       volid
6000301          1.2           3
6000302          2.0          10
```

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6000303         1.5          11
6000304         1.0          12
6000305         2.0          13
6000306         1.0          14
6000307         0.7          15
6000308         0.8          17
*           volume        volid
6000401         0.0          17
*        azim-angle       volid
6000501         0.0          17
*        vert-angle       volid
6000601         0.0          17
*           x-wall         xhd        volid
6000801       1.0e-5         0.0          17
*           x-flags        volid
6001001           0          17
*      ebt     press   water-ie   steam-ie void none id
6001201 000 6.669274e5 3.528269e5  2.57025e6  0.0  0.0  1
6001202 000 6.667765e5 3.528263e5 2.570243e6  0.0  0.0  2
6001203 000 6.666256e5 3.528257e5 2.570236e6  0.0  0.0  3
6001204 000 6.637324e5 3.528247e5 2.570095e6  0.0  0.0  4
6001205 000 6.634809e5 3.528237e5 2.570082e6  0.0  0.0  5
6001206 000 6.632294e5 3.528226e5  2.57007e6  0.0  0.0  6
6001207 000 6.629779e5 3.528215e5 2.570058e6  0.0  0.0  7
6001208 000 6.627262e5 3.528205e5 2.570046e6  0.0  0.0  8
6001209 000 6.624747e5 3.528195e5 2.570033e6  0.0  0.0  9
6001210 000  6.62223e5 3.528185e5 2.570021e6  0.0  0.0 10
6001211 000 6.620028e5 3.528178e5  2.57001e6  0.0  0.0 11
6001212 000 6.591534e5 3.528174e5  2.56987e6  0.0  0.0 12
6001213 000 6.589647e5 3.528166e5 2.569861e6  0.0  0.0 13
6001214 000 6.587759e5 3.528163e5 2.569852e6  0.0  0.0 14
6001215 000 6.586689e5  3.52816e5 2.569846e6  0.0  0.0 15
6001216 000 6.576655e5 3.528159e5 2.569797e6  0.0  0.0 16
6001217 000 6.574627e5 3.528158e5 2.569787e6  0.0  0.0 17
*         fwd. loss     rev.loss       junid
6000901         0.0          0.0          2
6000902         0.8          0.8          3
6000903         0.0          0.0         10
6000904         0.8          0.8         11
6000905         0.0          0.0         16
*          jefvcahs      jun num
6001101     00000000           16
*              vl           vv       unused       junid
6001301     2.629977     2.629977          0.0          1
6001302    2.6299772    2.6299772          0.0          2
6001303    2.6299777    2.6299777          0.0          3
6001304     2.629981     2.629981          0.0          4
6001305    2.6299818    2.6299818          0.0          5
6001306    2.6299822    2.6299822          0.0          6
6001307    2.6299827    2.6299827          0.0          7
6001308    2.6299832    2.6299832          0.0          8
6001309    2.6299837    2.6299837          0.0          9
6001310    2.6299841    2.6299841          0.0         10
6001311    2.6299846    2.6299846          0.0         11
6001312     2.629988     2.629988          0.0         12
6001313    2.6299882    2.6299882          0.0         13
6001314    2.6299884    2.6299884          0.0         14
6001315     2.955092     2.955092          0.0         15
6001316    2.9550934    2.9550934          0.0         16
*
*             name         type
6010000    "unnamed"         pipe
*           ncells
6010001          13
*          x-area        volid
6010101     0.07065          13
*         x-length       volid
6010301         0.5           2
6010302         1.0           7
6010303         2.0          10
6010304         3.0          11
6010305         2.0          12
6010306         1.5          13
*           volume        volid
6010401         0.0          13
*        azim-angle       volid
6010501         0.0          13
*        vert-angle       volid
6010601         0.0           2
6010602       -90.0           6
6010603         0.0          13
*           x-wall         xhd        volid
6010801       1.0e-5         0.0          13
*           x-flags        volid
6011001           0          13
*      ebt     press   water-ie   steam-ie void none id
6011201 000 6.393516e5 3.528842e5 2.568877e6  0.0  0.0  1
6011202 000 6.392887e5 3.528343e5 2.568874e6  0.0  0.0  2
6011203 000  6.41255e5  3.52834e5 2.568974e6  0.0  0.0  3
6011204 000 6.506348e5 3.528336e5 2.569447e6  0.0  0.0  4
6011205 000 6.600148e5 3.528333e5 2.569912e6  0.0  0.0  5
6011206 000 6.693947e5  3.52833e5  2.57037e6  0.0  0.0  6
6011207 000 6.713297e5 3.528326e5 2.570463e6  0.0  0.0  7
6011208 000 6.711409e5 3.528319e5 2.570454e6  0.0  0.0  8
6011209 000 6.708894e5 3.528311e5 2.570442e6  0.0  0.0  9
6011210 000 6.706378e5 3.528303e5  2.57043e6  0.0  0.0 10
6011211 000 6.703234e5 3.528291e5 2.570415e6  0.0  0.0 11
6011212 000 6.700091e5 3.528282e5   2.5704e6  0.0  0.0 12
6011213 000 6.697891e5 3.528275e5 2.570389e6  0.0  0.0 13
*         fwd. loss     rev.loss       junid
6010901         0.0          0.0          1
6010902         0.8          0.8          2
6010903         0.0          0.0          5
6010904         0.8          0.8          6
6010905         0.0          0.0         12
*          jefvcahs      jun num
6011101     00000000           1
6011102     00000003           2
6011103     00000000           5
6011104     00000003           6
6011105     00000000          12
*              vl           vv       unused       junid
6011301    2.6300271    2.6300271          0.0          1
6011302    2.6300066    2.6300066          0.0          2
6011303    2.6300042    2.6300042          0.0          3
6011304    2.6299937    2.6299937          0.0          4
6011305    2.6299832    2.6299832          0.0          5
6011306    2.6299727    2.6299727          0.0          6
6011307    2.6299706    2.6299706          0.0          7
6011308    2.6299708    2.6299708          0.0          8
6011309    2.6299713    2.6299713          0.0          9
6011310    2.6299717    2.6299717          0.0         10
6011311    2.6299725    2.6299725          0.0         11
6011312    2.6299732    2.6299732          0.0         12
*
*             name         type
6020000    "unnamed"         pipe
*           ncells
6020001          3
*          x-area        volid
6020101      0.0314          3
*         x-length       volid
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6020301         1.1           3
*           volume        volid
6020401         0.0           3
*        azim-angle        volid
6020501         0.0           3
*        vert-angle        volid
6020601         0.0           3
*           x-wall         xhd        volid
6020801       1.0e-5          0.0           3
*           x-flags        volid
6021001           0           3
*      ebt     press   water-ie   steam-ie void none id
6021201 000 6.576058e5 3.528158e5 2.569794e6  0.0  0.0  1
6021202 000 6.573257e5 3.528157e5  2.56978e6  0.0  0.0  2
6021203 000 6.570455e5 3.528157e5 2.569766e6  0.0  0.0  3
*          jefvcahs      jun num
6021101     00000000           2
*             vl          vv       unused        junid
6021301     2.962384     2.962384          0.0           1
6021302     2.9623845    2.9623845         0.0           2
*
*             name         type
6040000    "unnamed"         pipe
*           ncells
6040001           3
*           x-area        volid
6040101       0.0314          3
*         x-length        volid
6040301         1.1           3
*           volume        volid
6040401         0.0           3
*        azim-angle        volid
6040501         0.0           3
*        vert-angle        volid
6040601         0.0           3
*           x-wall         xhd        volid
6040801       1.0e-5          0.0           3
*           x-flags        volid
6041001           0           3
*      ebt     press   water-ie   steam-ie void none id
6041201 000  5.71323e5 2.581169e5 2.565172e6  0.0  0.0  1
6041202 000 5.710398e5 2.581169e5 2.565156e6  0.0  0.0  2
6041203 000 5.707564e5  2.58117e5  2.56514e6  0.0  0.0  3
*          jefvcahs      jun num
6041101     00000000           2
*             vl          vv       unused        junid
6041301     2.9153903    2.9153903         0.0           1
6041302     2.9153907    2.9153907         0.0           2
*
*             name         type
6060000    "unnamed"         pipe
*           ncells
6060001           3
*           x-area        volid
6060101       0.0314          2
6060102      0.07065          3
*         x-length        volid
6060301         1.6           1
6060302         1.1           3
*           volume        volid
6060401         0.0           3
*        azim-angle        volid
6060501         0.0           3
*        vert-angle        volid
6060601         0.0           3
*           x-wall         xhd        volid
6060801       1.0e-5          0.0           3
*           x-flags        volid
6061001           0           3
*      ebt     press   water-ie   steam-ie void none id
6061201 000 5.708017e5 2.582278e5 2.565142e6  0.0  0.0  1
6061202 000 5.577802e5  2.58173e5 2.564374e6  0.0  0.0  2
6061203 000 5.706118e5 2.581729e5 2.565131e6  0.0  0.0  3
*          jefvcahs      jun num
6061101     00000000           2
*             vl          vv       unused        junid
6061301     2.9226253    2.9226253         0.0           1
6061302     5.8380489    5.8380489         0.0           2
*
*             name         type
6070000    "PRE_OUT"         branch
*            njuns
6070001           2
*             area       length          vol
6070101       0.07069         1.0         0.0
*         az-angle     inc-angle          dz
6070102         0.0         0.0         0.0
*           x-rough        x-hd        flags
6070103         0.0         0.0           0
*             ebt        press      water-ie     steam-ie         void
6070200         000    5.704847e5    2.581756e5    2.565124e6          0.0
*             from          to         area
6071101     607010002     608010001      0.07069
*         fwd. loss     rev. loss      efvcahs
6071102         0.0         0.0           0
*             vl          vv       unused
6071201     2.675036     2.675036          0.0
*             from          to         area
6072101     607010001     606030002      0.07069
*         fwd. loss     rev. loss      efvcahs
6072102         0.0         0.0           0
*             vl          vv       unused
6072201    -2.5932062   -2.5932062         0.0
*
*             name         type
6080000    "unnamed"         pipe
*           ncells
6080001           9
*           x-area        volid
6080101       0.07069           9
*         x-length        volid
6080301         0.75          2
6080302          0.7          9
*           volume        volid
6080401         0.0           9
*        azim-angle        volid
6080501         0.0           9
*        vert-angle        volid
6080601         0.0           9
*           x-wall         xhd        volid
6080801       1.0e-5          0.0           9
*           x-flags        volid
6081001           0           9
*      ebt     press   water-ie   steam-ie void none id
6081201 000 5.701598e5 2.581756e5 2.565105e6  0.0  0.0  1
6081202 000 5.700581e5 2.581755e5 2.565099e6  0.0  0.0  2
6081203 000  5.67137e5 2.581755e5 2.564928e6  0.0  0.0  3
6081204 000 5.670421e5 2.581755e5 2.564922e6  0.0  0.0  4
6081205 000 5.669472e5 2.581754e5 2.564917e6  0.0  0.0  5
6081206 000 5.658011e5 2.581935e5  2.56485e6  0.0  0.0  6
6081207 000 5.656797e5 2.581935e5 2.564842e6  0.0  0.0  7
6081208 000 5.655582e5 2.581935e5 2.564835e6  0.0  0.0  8
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6081209 000 5.654368e5 2.581935e5 2.564828e6  0.0  0.0  9
*         fwd. loss     rev.loss       junid
6080901          0.0          0.0          1
6080902          0.8          0.8          2
6080903          0.0          0.0          8
*          jefvcahs      jun num
6081101     00000000           8
*             vl           vv       unused       junid
6081301    2.6750364    2.6750364          0.0          2
6081302    2.6750398    2.6750398          0.0          3
6081303      2.67504      2.67504          0.0          4
6081304    2.6750402    2.6750402          0.0          5
6081305    3.0469205    3.0469205          0.0          6
6081306    3.0469208    3.0469208          0.0          7
6081307     3.046921     3.046921          0.0          8
*
*             name         type
6100000    "unnamed"       branch
*            njuns
6100001           3
*             area       length          vol
6100101      0.07069          0.5          0.0
*          az-angle     inc-angle           dz
6100102          0.0          0.0          0.0
*           x-rough         x-hd        flags
6100103       1.0e-5          0.0            0
*              ebt        press      water-ie      steam-ie         void
6100200          000    5.663776e5    2.581935e5    2.564884e6          0.0
*             from           to         area
6101101    610010002    612010001      0.07069
*         fwd. loss     rev. loss      efvcahs
6101102          0.0          0.0            0
*             vl           vv       unused
6101201    2.6750474    2.6750474          0.0
*             from           to         area
6102101    610010001    608090002      0.07069
*         fwd. loss     rev. loss      efvcahs
6102102          0.0          0.0            0
*             vl           vv       unused
6102201   -3.0469213   -3.0469213          0.0
*             from           to         area
6103101    610010001    946010001       0.0132
*         fwd. loss     rev. loss      efvcahs
6103102          0.8          0.8            0
*          hyd diam     ccfl wght     ccfl gas    ccfl slope
6103110         0.13          0.0          1.0          1.0
*             vl           vv       unused
6103201    1.9914906    1.9914906          0.0
*
*             name         type
6120000    "unnamed"         pipe
*            ncells
6120001           8
*            x-area        volid
6120101      0.07069            5
6120102      0.03142            8
*          x-length        volid
6120301          0.5            4
6120302        0.466            5
6120303         0.41            7
6120304          0.3            8
*           volume        volid
6120401          0.0            8
*         azim-angle        volid
6120501          0.0            8
*         vert-angle        volid
6120601          0.0            8
*             x-wall         xhd        volid
6120801       1.0e-5          0.0            8
*            x-flags        volid
6121001            0            8
*      ebt     press   water-ie   steam-ie void none id
6121201 000 5.663052e5 2.581935e5 2.564879e6  0.0  0.0  1
6121202 000 5.662374e5 2.581935e5 2.564875e6  0.0  0.0  2
6121203 000 5.661697e5 2.581935e5 2.564871e6  0.0  0.0  3
6121204 000 5.661019e5 2.581935e5 2.564867e6  0.0  0.0  4
6121205 000 5.660364e5 2.581935e5 2.564864e6  0.0  0.0  5
6121206 000   5.6386e5 2.581938e5 2.564735e6  0.0  0.0  6
6121207 000   5.6386e5 1.184866e5 2.564735e6  0.0  0.0  7
6121208 000   5.6386e5 1.126855e5 2.564735e6  0.0  0.0  8
*         fwd. loss     rev.loss       junid
6120901          0.0          0.0          4
6120902          0.3          0.3          5
6120903          0.0          0.0          7
*          jefvcahs      jun num
6121101     00000000           7
*             vl           vv       unused       junid
6121301    2.6750474    2.6750474          0.0          1
6121302    2.6750476    2.6750476          0.0          3
6121303    2.6750479    2.6750479          0.0          4
6121304    6.0184321    6.0184321          0.0          5
6121305   2.823649e-8  2.823649e-8          0.0          6
6121306   1.190306e-8  1.190306e-8          0.0          7
*
*             name         type
6140000    "unnamed"       branch
*            njuns
6140001           2
*             area       length          vol
6140101      0.07069          0.5          0.0
*          az-angle     inc-angle           dz
6140102          0.0          0.0          0.0
*           x-rough         x-hd        flags
6140103       1.0e-5          0.0            0
*              ebt        press      water-ie      steam-ie         void
6140200          000    5.599976e5    2.581938e5    2.564506e6          0.0
*             from           to         area
6141101    614010001    612060001      0.07069
*         fwd. loss     rev. loss      efvcahs
6141102          0.0          0.0            0
*             vl           vv       unused
6141201   -2.6750505   -2.6750505          0.0
*             from           to         area
6142101    614010002    616010001      0.07069
*         fwd. loss     rev. loss      efvcahs
6142102          0.0          0.0            0
*             vl           vv       unused
6142201    2.6750548    2.6750548          0.0
*
*             name         type
6160000    "unnamed"         pipe
*            ncells
6160001           6
*            x-area        volid
6160101      0.07069            3
6160102      0.03142            6
*          x-length        volid
6160301          0.6            3
6160302         0.41            5
6160303          0.3            6
*           volume        volid
6160401          0.0            6
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*        azim-angle        volid
6160501          0.0           6
*        vert-angle        volid
6160601          0.0           6
*          x-wall         xhd        volid
6160801       1.0e-5         0.0           6
*          x-flags        volid
6161001           0          6
*      ebt     press   water-ie   steam-ie void none id
6161201 000 5.599231e5 2.581937e5 2.564502e6  0.0  0.0  1
6161202 000 5.598418e5 2.581937e5 2.564497e6  0.0  0.0  2
6161203 000 5.597604e5 2.581937e5 2.564492e6  0.0  0.0  3
6161204 000 5.575739e5  2.58194e5 2.564362e6  0.0  0.0  4
6161205 000 5.575739e5 1.213917e5 2.564362e6  0.0  0.0  5
6161206 000 5.575739e5 1.129781e5 2.564362e6  0.0  0.0  6
*        fwd. loss      rev.loss        junid
6160901          0.0          0.0           2
6160902          0.3          0.3           3
6160903          0.0          0.0           5
*          jefvcahs      jun num
6161101     00000000           5
*             vl           vv       unused        junid
6161301     2.6750548    2.6750548          0.0           1
6161302      2.675055     2.675055          0.0           2
6161303     6.0184479    6.0184479          0.0           3
6161304  8.078625e-11 8.078625e-11          0.0           4
6161305  8.511632e-11 8.511632e-11          0.0           5
*
*            name         type
6180000    "unnamed"       branch
*           njuns
6180001           2
*           area       length          vol
6180101      0.07069          0.5          0.0
*         az-angle     inc-angle           dz
6180102          0.0          0.0          0.0
*          x-rough        x-hd        flags
6180103       1.0e-5          0.0           0
*             ebt        press      water-ie      steam-ie         void
6180200          000    5.537105e5     2.58194e5     2.56413e6          0.0
*            from          to         area
6181101     618010001     616040001      0.07069
*        fwd. loss     rev. loss      efvcahs
6181102          0.0          0.0           0
*             vl           vv       unused
6181201    -2.6750576   -2.6750576          0.0
*            from          to         area
6182101     618010002     620010001      0.07069
*        fwd. loss     rev. loss      efvcahs
6182102          0.0          0.0           0
*             vl           vv       unused
6182201     2.6750619    2.6750619          0.0
*
*            name         type
6200000    "unnamed"         pipe
*           ncells
6200001           6
*          x-area       volid
6200101      0.07069           3
6200102      0.03142           6
*          x-length       volid
6200301          0.6           3
6200302         0.41           5
6200303          0.3           6
*          volume       volid
6200401          0.0           6
*        azim-angle        volid
6200501          0.0           6
*        vert-angle        volid
6200601          0.0           6
*          x-wall         xhd        volid
6200801       1.0e-5         0.0           6
*          x-flags        volid
6201001           0          6
*      ebt     press   water-ie   steam-ie void none id
6201201 000  5.53636e5  2.58194e5 2.564126e6  0.0  0.0  1
6201202 000 5.535546e5  2.58194e5 2.564121e6  0.0  0.0  2
6201203 000 5.534733e5  2.58194e5 2.564116e6  0.0  0.0  3
6201204 000 5.522226e5 2.581942e5  2.56404e6  0.0  0.0  4
6201205 000 5.520348e5 2.581943e5 2.564029e6  0.0  0.0  5
6201206 000 5.519374e5 2.581944e5 2.564023e6  0.0  0.0  6
*          jefvcahs      jun num
6201101     00000000           5
*             vl           vv       unused        junid
6201301     2.6750622    2.6750622          0.0           1
6201302     2.6750624    2.6750624          0.0           2
6201303      6.018465     6.018465          0.0           3
6201304     3.0140636    3.0140636          0.0           4
6201305     3.0140638    3.0140638          0.0           5
*
*            name         type
6220000    "unnamed"       branch
*           njuns
6220001           2
*           area       length          vol
6220101      0.07069          0.5          0.0
*         az-angle     inc-angle           dz
6220102          0.0          0.0          0.0
*          x-rough        x-hd        flags
6220103       1.0e-5          0.0           0
*             ebt        press      water-ie      steam-ie         void
6220200          000    5.556691e5    2.581941e5    2.564248e6          0.0
*            from          to         area
6221101     622010001     620040001      0.07069
*        fwd. loss     rev. loss      efvcahs
6221102          0.0          0.0           0
*             vl           vv       unused
6221201    -1.3353854   -1.3353854          0.0
*            from          to         area
6222101     622010002     624010001      0.07069
*        fwd. loss     rev. loss      efvcahs
6222102          0.0          0.0           0
*             vl           vv       unused
6222201     1.3353835    1.3353835          0.0
*
*            name         type
6240000    "unnamed"         pipe
*           ncells
6240001           6
*          x-area       volid
6240101      0.03142           6
*          x-length       volid
6240301          0.55           1
6240302           0.6           2
6240303           0.7           3
6240304         0.335           5
6240305           0.3           6
*          volume       volid
6240401          0.0           6
*        azim-angle        volid
6240501          0.0           6
*        vert-angle        volid
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6240601         0.0          6
*           x-wall         xhd       volid
6240801      1.0e-5         0.0          6
*          x-flags       volid
6241001           0          6
*      ebt     press   water-ie   steam-ie void none id
6241201 000 5.520268e5 2.581942e5 2.564029e6  0.0  0.0  1
6241202 000 5.518701e5 2.581943e5 2.564019e6  0.0  0.0  2
6241203 000 5.516929e5 2.581944e5 2.564008e6  0.0  0.0  3
6241204 000 5.515519e5 2.581945e5    2.564e6  0.0  0.0  4
6241205 000 5.514606e5 2.581945e5 2.563994e6  0.0  0.0  5
6241206 000  5.51374e5 2.581946e5 2.563989e6  0.0  0.0  6
*         jefvcahs      jun num
6241101     00000000           5
*             vl          vv       unused       junid
6241301     3.004405    3.004405         0.0           1
6241302    3.0044055   3.0044055         0.0           2
6241303    3.0044057   3.0044057         0.0           3
6241304     3.004406    3.004406         0.0           4
6241305    3.0044062   3.0044062         0.0           5
*
*             name         type
6260000      "1z22"        valve
*             from           to         area
6260101    612080002    628010001       0.0227
*         fwd. loss     rev. loss      efvcahs
6260102         0.0          0.0          100
*         discharge      thermal
6260103         1.0         0.14
*              hd        flood     intercept        slope
6260110        0.17          0.0          1.0          1.0
*             flow          vl           vv       unused
6260201           0         0.0          0.0          0.0
*             type
6260300       mtrvlv
*           topen       tclose        vrate         ipos
6260301           2           1          1.0          0.0
*
*             name         type
6280000    "unnamed"         pipe
*           ncells
6280001           2
*           x-area        volid
6280101     0.03142            2
*          x-length        volid
6280301        0.255            2
*           volume        volid
6280401          0.0            2
*         azim-angle        volid
6280501          0.0            2
*         vert-angle        volid
6280601          0.0            2
*           x-wall         xhd       volid
6280801      1.0e-5         0.0          2
*          x-flags       volid
6281001           0          2
*      ebt press  water-ie   steam-ie void none id
6281201 000 1.0e6 1.12479e5 2.582747e6  0.0  0.0  2
*          jefvcahs      jun num
6281101     00000000           1
*              vl          vv       unused       junid
6281301         0.0          0.0          0.0           1
*
*             name         type
6300000      "1z23"        valve
*             from           to         area
6300101    616060002    632010001       0.0227
*         fwd. loss     rev. loss      efvcahs
6300102         0.0          0.0          100
*         discharge      thermal
6300103         1.0         0.14
*              hd        flood     intercept        slope
6300110        0.17          0.0          1.0          1.0
*             flow          vl           vv       unused
6300201           0         0.0          0.0          0.0
*             type
6300300       mtrvlv
*           topen       tclose        vrate         ipos
6300301           2           1          1.0          0.0
*
*             name         type
6320000    "unnamed"         pipe
*           ncells
6320001           2
*           x-area        volid
6320101     0.03142            2
*          x-length        volid
6320301        0.255            2
*           volume        volid
6320401          0.0            2
*         azim-angle        volid
6320501          0.0            2
*         vert-angle        volid
6320601          0.0            2
*           x-wall         xhd       volid
6320801      1.0e-5         0.0          2
*          x-flags       volid
6321001           0          2
*      ebt press  water-ie   steam-ie void none id
6321201 000 1.0e6 1.12479e5 2.582747e6  0.0  0.0  2
*          jefvcahs      jun num
6321101     00000000           1
*              vl          vv       unused       junid
6321301         0.0          0.0          0.0           1
*
*             name         type
6340000      "1z24"        valve
*             from           to         area
6340101    620060002    636010001       0.0227
*         fwd. loss     rev. loss      efvcahs
6340102         0.0          0.0          100
*         discharge      thermal
6340103         1.0         0.14
*              hd        flood     intercept        slope
6340110        0.17          0.0          1.0          1.0
*             flow          vl           vv       unused
6340201           0    4.1718898    4.1718898          0.0
*             type
6340300       mtrvlv
*           topen       tclose        vrate         ipos
6340301           1           2          1.0    0.99999998
*
*             name         type
6360000    "unnamed"         pipe
*           ncells
6360001           2
*           x-area        volid
6360101     0.03142            2
*          x-length        volid
6360301        0.255            2
*           volume        volid
6360401          0.0            2
```

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*       azim-angle       volid
6360501         0.0           2
*       vert-angle       volid
6360601         0.0           2
*          x-wall         xhd       volid
6360801      1.0e-5         0.0           2
*          x-flags       volid
6361001           0          2
*     ebt     press   water-ie   steam-ie void none id
6361201 000 5.489018e5 2.581944e5 2.563839e6  0.0  0.0  1
6361202 000 5.488318e5 2.581944e5 2.563835e6  0.0  0.0  2
*          jefvcahs      jun num
6361101     00000000           1
*            vl          vv       unused       junid
6361301    3.0140681    3.0140681         0.0           1
*
*            name        type
6380000     "1z24A"       valve
*            from          to        area
6380101    624060002    640010001       0.0227
*        fwd. loss    rev. loss      efvcahs
6380102         0.0         0.0          100
*        discharge      thermal
6380103         1.0        0.14
*             hd       flood    intercept       slope
6380110        0.17         0.0         1.0         1.0
*            flow          vl          vv       unused
6380201           0    4.1585217    4.1585217         0.0
*            type
6380300      mtrvlv
*           topen       tclose       vrate        ipos
6380301           1           2         1.0   0.99999998
*
*            name        type
6400000    "unnamed"        pipe
*           ncells
6400001           2
*           x-area       volid
6400101     0.03142           2
*          x-length       volid
6400301        0.36           2
*          volume       volid
6400401         0.0           2
*       azim-angle       volid
6400501         0.0           2
*       vert-angle       volid
6400601         0.0           2
*          x-wall         xhd       volid
6400801      1.0e-5         0.0           2
*          x-flags       volid
6401001           0          2
*     ebt     press   water-ie   steam-ie void none id
6401201 000 5.483434e5 2.581946e5 2.563805e6  0.0  0.0  1
6401202 000 5.482453e5 2.581947e5 2.563799e6  0.0  0.0  2
*          jefvcahs      jun num
6401101     00000000           1
*            vl          vv       unused       junid
6401301    3.0044103    3.0044103         0.0           1
*
*            name        type
6420000    "unnamed"        pipe
*           ncells
6420001           1
*           x-area       volid
6420101     0.03142           1
*          x-length       volid
6420301         0.5           1
*          volume       volid
6420401         0.0           1
*       azim-angle       volid
6420501         0.0           1
*       vert-angle       volid
6420601        90.0           1
*          x-wall         xhd       volid
6420801      1.0e-5         0.0           1
*          x-flags       volid
6421001           0          1
*     ebt     press   water-ie   steam-ie void none id
6421201 000 1.857366e6 2.586004e5 2.597832e6  0.0  0.0  1
*
*            name        type
6440000     "1z27A"       valve
*            from          to        area
6440101    642010002    646010001       0.0227
*        fwd. loss    rev. loss      efvcahs
6440102         0.0         0.0          100
*        discharge      thermal
6440103         1.0        0.14
*            flow          vl          vv       unused
6440201           0    4.1564493    4.1564493         0.0
*            type
6440300      chkvlv
*            type         pos         add        leak
6440301           0           1       1.0e5         0.0
*
*            name        type
6460000    "unnamed"        pipe
*           ncells
6460001           1
*           x-area       volid
6460101     0.03142           1
*          x-length       volid
6460301         0.5           1
*          volume       volid
6460401         0.0           1
*       azim-angle       volid
6460501         0.0           1
*       vert-angle       volid
6460601        90.0           1
*          x-wall         xhd       volid
6460801      1.0e-5         0.0           1
*          x-flags       volid
6461001           0          1
*     ebt     press   water-ie   steam-ie void none id
6461201 000 1.849472e6 2.586005e5 2.597754e6  0.0  0.0  1
*
*            name        type
6480000       "1z4"       valve
*            from          to        area
6480101    646010002    650010001       0.0227
*        fwd. loss    rev. loss      efvcahs
6480102         0.0         0.0          100
*        discharge      thermal
6480103         1.0        0.14
*             hd       flood    intercept       slope
6480110        0.17         0.0         1.0         1.0
*            flow          vl          vv       unused
6480201           0    4.1564631    4.1564631         0.0
*            type
6480300      mtrvlv
*           topen       tclose       vrate        ipos
6480301           1           2         1.0   0.99999998
```

```
*
*           name        type
6500000   "unnamed"       pipe
*          ncells
6500001          5
*          x-area       volid
6500101     0.03142          5
*         x-length       volid
6500301         0.5          1
6500302        0.58          2
6500303        0.65          3
6500304         0.6          5
*          volume       volid
6500401         0.0          5
*        azim-angle       volid
6500501         0.0          5
*        vert-angle       volid
6500601        90.0          2
6500602         0.0          5
*          x-wall        xhd       volid
6500801      1.0e-5          0.0          5
*          x-flags       volid
6501001          0          5
*     ebt     press   water-ie   steam-ie void none id
6501201 000 1.841577e6 2.586006e5 2.597674e6  0.0  0.0  1
6501202 000 1.836224e6 2.586007e5  2.59762e6  0.0  0.0  2
6501203 000 1.831038e6 2.586008e5 2.597568e6  0.0  0.0  3
6501204 000 1.830868e6 2.586009e5 2.597566e6  0.0  0.0  4
6501205 000 1.830704e6  2.58601e5 2.597564e6  0.0  0.0  5
*        fwd. loss     rev.loss       junid
6500901         0.0          0.0          1
6500902         0.5          0.5          2
6500903         0.0          0.0          4
*         jefvcahs      jun num
6501101     00000000          1
6501102     00000003          2
6501103     00000000          4
*             vl          vv       unused       junid
6501301     3.002929     3.002929         0.0          1
6501302    3.0029359    3.0029359         0.0          2
6501303    3.0029426    3.0029426         0.0          3
6501304    3.0029428    3.0029428         0.0          4
*
*           name        type
6520000   "unnamed"      branch
*          njuns
6520001          2
*           area      length         vol
6520101      0.07069         0.5         0.0
*         az-angle    inc-angle          dz
6520102         0.0         0.0         0.0
*          x-rough       x-hd       flags
6520103      1.0e-5          0.0          0
*            ebt       press     water-ie     steam-ie         void
6520200         000    1.83417e6   2.586009e5     2.5976e6          0.0
*           from          to        area
6521101    652010002    662030001     0.07069
*        fwd. loss    rev. loss      efvcahs
6521102         0.0          0.0          0
*             vl          vv       unused
6521201     1.334734     1.334734         0.0
*           from          to        area
6522101    652010001    650050002     0.07069
*        fwd. loss    rev. loss      efvcahs
6522102         0.0          0.0          0
*             vl          vv       unused
6522201    -1.3347359    -1.3347359          0.0
*
*           name        type
6540000   "unnamed"       pipe
*          ncells
6540001          1
*          x-area       volid
6540101     0.03142          1
*         x-length       volid
6540301         0.5          1
*          volume       volid
6540401         0.0          1
*        azim-angle       volid
6540501         0.0          1
*        vert-angle       volid
6540601        90.0          1
*          x-wall        xhd       volid
6540801      1.0e-5          0.0          1
*          x-flags       volid
6541001          0          1
*     ebt     press   water-ie   steam-ie void none id
6541201 000 1.85687e6 2.58599e5 2.597828e6  0.0  0.0  1
*
*           name        type
6560000      "1z27"       valve
*           from          to        area
6560101    654010002    658010001     0.0227
*        fwd. loss    rev. loss      efvcahs
6560102         0.0          0.0         100
*        discharge      thermal
6560103         1.0         0.14
*             hd       flood     intercept        slope
6560110        0.17          0.0          1.0          1.0
*           flow          vl          vv       unused
6560201          0    4.1698117    4.1698117          0.0
*           type
6560300      chkvlv
*           type         pos         add        leak
6560301          0          1       1.0e5         0.0
*
*           name        type
6580000   "unnamed"       pipe
*          ncells
6580001          1
*          x-area       volid
6580101     0.03142          1
*         x-length       volid
6580301         0.5          1
*          volume       volid
6580401         0.0          1
*        azim-angle       volid
6580501         0.0          1
*        vert-angle       volid
6580601        90.0          1
*          x-wall        xhd       volid
6580801      1.0e-5          0.0          1
*          x-flags       volid
6581001          0          1
*     ebt     press   water-ie   steam-ie void none id
6581201 000 1.848957e6 2.585991e5 2.597749e6  0.0  0.0  1
*
*           name        type
6600000      "1z3"       valve
*           from          to        area
6600101    658010002    662010001     0.0227
*        fwd. loss    rev. loss      efvcahs
```

```
6600102         0.0         0.0         100
*         discharge      thermal
6600103         1.0         0.14
*              hd        flood     intercept        slope
6600110         0.17         0.0         1.0         1.0
*             flow          vl          vv        unused
6600201          0    4.1698256    4.1698256         0.0
*             type
6600300       mtrvlv
*            topen       tclose       vrate        ipos
6600301          1          2         1.0    0.99999998
*
*             name        type
6620000    "unnamed"         pipe
*           ncells
6620001          5
*           x-area       volid
6620101      0.03142          2
6620102      0.07069          5
*          x-length       volid
6620301         0.5          1
6620302         0.58         2
6620303         0.6          5
*           volume       volid
6620401         0.0          5
*         azim-angle       volid
6620501         0.0          5
*         vert-angle       volid
6620601         90.0         2
6620602         0.0          5
*           x-wall         xhd       volid
6620801       1.0e-5         0.0          5
*           x-flags       volid
6621001          0          5
*      ebt     press   water-ie   steam-ie void none id
6621201 000 1.841042e6 2.585991e5 2.597669e6  0.0  0.0  1
6621202 000 1.835688e6 2.585992e5 2.597615e6  0.0  0.0  2
6621203 000 1.831502e6   2.586e5 2.597572e6  0.0  0.0  3
6621204 000 1.831421e6   2.586e5 2.597572e6  0.0  0.0  4
6621205 000 1.831339e6   2.586e5  2.59757e6  0.0  0.0  5
*         fwd. loss      rev.loss        junid
6620901         0.0         0.0          1
6620902         0.5         0.5          2
6620903         0.0         0.0          4
*          jefvcahs      jun num
6621101     00000000          4
*             vl          vv       unused       junid
6621301     3.012583     3.012583         0.0          1
6621302    3.0125899    3.0125899         0.0          2
6621303    2.6737614    2.6737614         0.0          3
6621304    2.6737616    2.6737616         0.0          4
*
*             name        type
6640000    "unnamed"       branch
*            njuns
6640001          2
*             area       length         vol
6640101      0.07069         0.5         0.0
*          az-angle     inc-angle          dz
6640102         0.0         0.0         0.0
*           x-rough        x-hd       flags
6640103       1.0e-5         0.0          0
*             ebt        press      water-ie     steam-ie         void
6640200          000    1.831264e6    2.586001e5     2.59757e6          0.0
*             from          to        area
6641101     664010002     674030001      0.07069
*         fwd. loss      rev. loss      efvcahs
6641102         0.0         0.0          0
*             vl          vv       unused
6641201     2.6737621     2.6737621         0.0
*             from          to        area
6642101     664010001     662050002      0.07069
*         fwd. loss      rev. loss      efvcahs
6642102         0.0         0.0          0
*             vl          vv       unused
6642201    -2.6737618    -2.6737618         0.0
*
*             name        type
6660000    "unnamed"         pipe
*           ncells
6660001          1
*           x-area       volid
6660101      0.03142          1
*          x-length       volid
6660301         0.5          1
*           volume       volid
6660401         0.0          1
*         azim-angle       volid
6660501         0.0          1
*         vert-angle       volid
6660601         90.0         1
*           x-wall         xhd       volid
6660801         0.0         0.0          1
*           x-flags       volid
6661001          0          1
*      ebt     press   water-ie  steam-ie void none id
6661201 000 2.23313e5 1.124788e5 2.53291e6  0.0  0.0  1
*
*             name        type
6680000       "1z26"        valve
*             from          to        area
6680101     666010002     670010001       0.0227
*         fwd. loss      rev. loss      efvcahs
6680102         0.0         0.0         100
*         discharge      thermal
6680103         1.0         0.14
*              hd        flood     intercept        slope
6680110         0.17         0.0         1.0         1.0
*             flow          vl          vv        unused
6680201          0         0.0         0.0         0.0
*             type
6680300       chkvlv
*             type         pos         add        leak
6680301          0          0       1.0e5         0.0
*
*             name        type
6700000    "unnamed"         pipe
*           ncells
6700001          1
*           x-area       volid
6700101      0.03142          1
*          x-length       volid
6700301         0.5          1
*           volume       volid
6700401         0.0          1
*         azim-angle       volid
6700501         0.0          1
*         vert-angle       volid
6700601         90.0         1
*           x-wall         xhd       volid
6700801         0.0         0.0          1
*           x-flags       volid
```

```
6701001          0          1
*      ebt     press   water-ie   steam-ie void none id
6701201 000 1.844215e6 1.125101e5 2.597701e6  0.0  0.0  1
*
*             name         type
6720000       "1z2"        valve
*             from         to         area
6720101    670010002    674010001       0.0227
*         fwd. loss    rev. loss      efvcahs
6720102         0.0          0.0          100
*         discharge      thermal
6720103         1.0         0.14
*              hd        flood     intercept        slope
6720110        0.17          0.0          1.0          1.0
*             flow          vl           vv       unused
6720201          0 -1.166217e-6 -1.166217e-6          0.0
*             type
6720300       mtrvlv
*           topen       tclose        vrate         ipos
6720301          1            2          1.0   0.99999998
*
*             name         type
6740000    "unnamed"         pipe
*           ncells
6740001          5
*          x-area        volid
6740101      0.03142            2
6740102      0.07069            5
*         x-length        volid
6740301          0.5            1
6740302         0.58            2
6740303          0.6            5
*          volume        volid
6740401          0.0            5
*        azim-angle        volid
6740501          0.0            5
*        vert-angle        volid
6740601         90.0            2
6740602          0.0            5
*          x-wall         xhd        volid
6740801       1.0e-5          0.0            5
*          x-flags        volid
6741001          0            5
*      ebt     press   water-ie   steam-ie void none id
6741201 000 1.839325e6 1.133586e5 2.597652e6  0.0  0.0  1
6741202 000 1.834047e6 1.252833e5 2.597598e6  0.0  0.0  2
6741203 000 1.831213e6   2.586e5 2.597569e6  0.0  0.0  3
6741204 000 1.831109e6   2.586e5 2.597568e6  0.0  0.0  4
6741205 000 1.831028e6 2.586001e5 2.597567e6  0.0  0.0  5
*         fwd. loss      rev.loss        junid
6740901          0.0          0.0            1
6740902          0.5          0.5            2
6740903          0.0          0.0            4
*          jefvcahs      jun num
6741101      00000000            1
6741102      00000003            2
6741103      00000000            4
*              vl           vv       unused        junid
6741301 -1.699463e-6 -1.699463e-6          0.0            1
6741302  -2.73293e-6  -2.73293e-6          0.0            2
6741303    2.6737599    2.6737599          0.0            3
6741304    2.6737602    2.6737602          0.0            4
*
*             name         type
6760000    "unnamed"       branch
*            njuns
6760001          2
*             area       length          vol
6760101       0.07069          0.5          0.0
*         az-angle     inc-angle           dz
6760102          0.0          0.0          0.0
*          x-rough        x-hd        flags
6760103        1.0e-5          0.0            0
*              ebt       press      water-ie      steam-ie          void
6760200          000   1.830954e6   2.586001e5   2.597566e6           0.0
*             from         to         area
6761101    676010002    686030001      0.07069
*         fwd. loss    rev. loss      efvcahs
6761102          0.0          0.0            0
*              vl           vv       unused
6761201    2.6737604    2.6737604          0.0
*             from         to         area
6762101    676010001    674050002      0.07069
*         fwd. loss    rev. loss      efvcahs
6762102          0.0          0.0            0
*              vl           vv       unused
6762201   -2.6737604   -2.6737604          0.0
*
*             name         type
6780000    "unnamed"         pipe
*           ncells
6780001          1
*          x-area        volid
6780101      0.03142            1
*         x-length        volid
6780301          0.5            1
*          volume        volid
6780401          0.0            1
*        azim-angle        volid
6780501          0.0            1
*        vert-angle        volid
6780601         90.0            1
*          x-wall         xhd        volid
6780801          0.0          0.0            1
*          x-flags        volid
6781001          0            1
*      ebt     press   water-ie   steam-ie void none id
6781201 000 2.192378e5 1.124788e5 2.532272e6  0.0  0.0  1
*
*             name         type
6800000       "1z25"       valve
*             from         to         area
6800101    678010002    682010001       0.0227
*         fwd. loss    rev. loss      efvcahs
6800102          0.0          0.0          100
*         discharge      thermal
6800103          1.0         0.14
*              hd        flood     intercept        slope
6800110        0.17          0.0          1.0          1.0
*             flow          vl           vv       unused
6800201          0          0.0          0.0          0.0
*             type
6800300       chkvlv
*             type          pos          add         leak
6800301          0            0       1.0e5          0.0
*
*             name         type
6820000    "unnamed"         pipe
*           ncells
6820001          1
*          x-area        volid
6820101      0.03142            1
```

```
*         x-length       volid
6820301        0.5           1
*          volume       volid
6820401        0.0           1
*       azim-angle       volid
6820501        0.0           1
*       vert-angle       volid
6820601       90.0           1
*          x-wall        xhd       volid
6820801        0.0         0.0           1
*          x-flags       volid
6821001          0           1
*     ebt     press   water-ie   steam-ie void none id
6821201 000 1.847399e6 1.124828e5 2.597733e6  0.0  0.0  1
*
*           name        type
6840000       "1z1"       valve
*           from          to        area
6840101    682010002    686010001       0.0227
*        fwd. loss    rev. loss      efvcahs
6840102        0.0         0.0         100
*        discharge      thermal
6840103        1.0        0.14
*             hd       flood    intercept       slope
6840110       0.17         0.0         1.0         1.0
*           flow          vl          vv       unused
6840201          0   7.807513e-9   7.807513e-9         0.0
*           type
6840300      mtrvlv
*          topen       tclose       vrate        ipos
6840301          1           2         1.0   0.99999998
*
*           name        type
6860000    "unnamed"        pipe
*          ncells
6860001          9
*          x-area       volid
6860101     0.03142           2
6860102     0.07069           9
*         x-length       volid
6860301         0.5           1
6860302        0.58           2
6860303         0.6           4
6860304         0.8           5
6860305       0.948           6
6860306         0.7           8
6860307        0.75           9
*          volume       volid
6860401         0.0           9
*       azim-angle       volid
6860501         0.0           9
*       vert-angle       volid
6860601        90.0           2
6860602         0.0           9
*          x-wall        xhd       volid
6860801       1.0e-5         0.0           9
*          x-flags       volid
6861001          0           9
*     ebt     press   water-ie   steam-ie void none id
6861201 000 1.842509e6 1.126628e5 2.597684e6  0.0  0.0  1
6861202 000 1.837229e6 1.175972e5  2.59763e6  0.0  0.0  2
6861203 000  1.83088e6 2.586001e5 2.597566e6  0.0  0.0  3
6861204 000 1.830798e6 2.586001e5 2.597565e6  0.0  0.0  4
6861205 000 1.830704e6 2.586001e5 2.597564e6  0.0  0.0  5
6861206 000 1.830585e6 2.586001e5 2.597563e6  0.0  0.0  6
6861207 000 1.830473e6 2.586001e5 2.597562e6  0.0  0.0  7
6861208 000 1.830378e6 2.586001e5 2.597561e6  0.0  0.0  8
6861209 000  1.83028e6 2.586002e5  2.59756e6  0.0  0.0  9
*        fwd. loss     rev.loss       junid
6860901         0.0         0.0           1
6860902         0.5         0.5           2
6860903         0.0         0.0           8
*         jefvcahs      jun num
6861101     00000000           8
*             vl          vv       unused       junid
6861301   1.187619e-8   1.187619e-8         0.0           1
6861302   2.058837e-8   2.058837e-8         0.0           2
6861303    2.6737618     2.6737618         0.0           3
6861304    2.6737621     2.6737621         0.0           5
6861305    2.6737623     2.6737623         0.0           6
6861306    2.6737626     2.6737626         0.0           8
*
*           name        type
6880000    "unnamed"       branch
*          njuns
6880001          3
*           area      length         vol
6880101     0.07069         0.5         0.0
*         az-angle     inc-angle          dz
6880102         0.0         0.0         0.0
*          x-rough        x-hd       flags
6880103       1.0e-5         0.0           0
*           ebt       press      water-ie     steam-ie        void
6880200        000     1.8302e6    2.586002e5    2.597559e6         0.0
*           from          to        area
6881101    688010002    690010001     0.07069
*        fwd. loss    rev. loss      efvcahs
6881102         0.0         0.0           0
*             vl          vv       unused
6881201    2.6737628    2.6737628         0.0
*           from          to        area
6882101    688010001    686090002     0.07069
*        fwd. loss    rev. loss      efvcahs
6882102         0.0         0.0           0
*             vl          vv       unused
6882201   -2.6737628   -2.6737628         0.0
*           from          to        area
6883101    688010002    914010001     0.01327
*        fwd. loss    rev. loss      efvcahs
6883102         0.8         0.8           0
*             vl          vv       unused
6883201  -3.625827e-8  -3.625827e-8         0.0
*
*           name        type
6900000    "unnamed"        pipe
*          ncells
6900001          9
*          x-area       volid
6900101     0.07069           9
*         x-length       volid
6900301         0.7           4
6900302         0.5           5
6900303        0.58           6
6900304         0.5           8
6900305        0.42           9
*          volume       volid
6900401         0.0           9
*       azim-angle       volid
6900501         0.0           9
*       vert-angle       volid
6900601         0.0           4
6900602       -90.0           9
```

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*           x-wall         xhd       volid
6900801      1.0e-5         0.0          9
*          x-flags       volid
6901001          0          9
*      ebt     press   water-ie   steam-ie void none id
6901201 000 1.830114e6 2.586002e5 2.597558e6  0.0  0.0  1
6901202 000  1.83002e6 2.586002e5 2.597557e6  0.0  0.0  2
6901203 000 1.829925e6 2.586002e5 2.597556e6  0.0  0.0  3
6901204 000 1.830041e6 2.586002e5 2.597557e6  0.0  0.0  4
6901205 000 1.829722e6 2.586002e5 2.597554e6  0.0  0.0  5
6901206 000 1.834858e6 2.586002e5 2.597606e6  0.0  0.0  6
6901207 000 1.839995e6 2.586002e5 2.597658e6  0.0  0.0  7
6901208 000 1.844751e6 2.586002e5 2.597706e6  0.0  0.0  8
6901209 000 1.849126e6 2.586002e5  2.59775e6  0.0  0.0  9
*        fwd. loss     rev.loss       junid
6900901          0.0          0.0          3
6900902          0.8          0.8          4
6900903          0.0          0.0          8
*         jefvcahs      jun num
6901101     00000000           8
*             vl           vv       unused        junid
6901301     2.673763     2.673763          0.0           2
6901302    2.6737633    2.6737633          0.0           3
6901303    2.5919473    2.5919473          0.0           4
6901304    2.5919478    2.5919478          0.0           5
6901305    2.5919423    2.5919423          0.0           6
6901306    2.5919366    2.5919366          0.0           7
6901307    2.5919316    2.5919316          0.0           8
*
*            name         type
6920000    "unnamed"      sngljun
*            from           to         area
6920101    690090002    695010001          0.0
*        fwd. loss     rev. loss      efvcahs
6920102          0.5          0.5           0
*        discharge      thermal
6920103          1.0         0.14
*            flow           vl           vv       unused
6920201           0     2.5933943     2.5933943          0.0
*
*            name         type
6940000    "unnamed"         pipe
*           ncells
6940001          21
*           x-area       volid
6940101      0.07065          21
*         x-length       volid
6940301          1.2           1
6940302          2.0           2
6940303          4.0           3
6940304          2.0           5
6940305          1.0           8
6940306          1.2           9
6940307          1.0          11
6940308          2.0          15
6940309          1.0          21
*           volume       volid
6940401          0.0          21
*        azim-angle       volid
6940501          0.0          21
*        vert-angle       volid
6940601          0.0          16
6940602         90.0          20
6940603          0.0          21
*           x-wall         xhd       volid
6940801      1.0e-5          0.0          21
*           x-flags       volid
6941001           0          21
*      ebt     press   water-ie   steam-ie void none id
6941201 000 1.848195e6 2.586003e5 2.597741e6  0.0  0.0  1
6941202 000 1.845336e6 2.586003e5 2.597712e6  0.0  0.0  2
6941203 000 1.844952e6 2.586003e5 2.597708e6  0.0  0.0  3
6941204 000 1.844569e6 2.586003e5 2.597705e6  0.0  0.0  4
6941205 000 1.844313e6 2.586003e5 2.597702e6  0.0  0.0  5
6941206 000 1.844122e6 2.586003e5   2.5977e6  0.0  0.0  6
6941207 000 1.841339e6 2.586003e5 2.597672e6  0.0  0.0  7
6941208 000 1.841211e6 2.586003e5 2.597671e6  0.0  0.0  8
6941209 000 1.841071e6 2.586003e5  2.59767e6  0.0  0.0  9
6941210 000 1.838276e6 2.586003e5 2.597641e6  0.0  0.0 10
6941211 000 1.838148e6 2.586003e5  2.59764e6  0.0  0.0 11
6941212 000 1.837956e6 2.586003e5 2.597638e6  0.0  0.0 12
6941213 000 1.837701e6 2.586002e5 2.597635e6  0.0  0.0 13
6941214 000 1.837445e6 2.586002e5 2.597633e6  0.0  0.0 14
6941215 000  1.83719e6 2.586002e5  2.59763e6  0.0  0.0 15
6941216 000 1.836998e6 2.586002e5 2.597628e6  0.0  0.0 16
6941217 000 1.829395e6 2.586002e5 2.597551e6  0.0  0.0 17
6941218 000 1.819628e6 2.586002e5  2.59745e6  0.0  0.0 18
6941219 000  1.80986e6 2.586002e5 2.597348e6  0.0  0.0 19
6941220 000 1.800092e6 2.586001e5 2.597245e6  0.0  0.0 20
6941221 000  1.79249e6 2.585671e5 2.597164e6  0.0  0.0 21
*        fwd. loss     rev.loss       junid
6940901          0.8          0.8          1
6940902          0.0          0.0          5
6940903          0.8          0.8          6
6940904          0.0          0.0          8
6940905          0.8          0.8          9
6940906          0.0          0.0         15
6940907          0.8          0.8         16
6940908          0.0          0.0         19
6940909          0.8          0.8         20
*         jefvcahs      jun num
6941101     00000000          15
6941102     00000003          16
6941103     00000000          19
6941104     00000003          20
*             vl           vv       unused        junid
6941301    2.5933957    2.5933957          0.0           1
6941302    2.5933988    2.5933988          0.0           2
6941303     2.593399     2.593399          0.0           3
6941304    2.5933995    2.5933995          0.0           4
6941305    2.5933998    2.5933998          0.0           6
6941306    2.5934029    2.5934029          0.0           8
6941307    2.5934031    2.5934031          0.0           9
6941308     2.593406     2.593406          0.0          10
6941309    2.5934062    2.5934062          0.0          12
6941310    2.5934064    2.5934064          0.0          13
6941311    2.5934067    2.5934067          0.0          14
6941312    2.5934069    2.5934069          0.0          15
6941313    2.5934072    2.5934072          0.0          16
6941314    2.5934153    2.5934153          0.0          17
6941315     2.593426     2.593426          0.0          18
6941316    2.5934367    2.5934367          0.0          19
6941317    2.5934474    2.5934474          0.0          20
*
*            name         type
6950000    "unnamed"         pipe
*           ncells
6950001          6
*           x-area       volid
6950101      0.07065          6
*         x-length       volid
6950301          1.0           2
```

```
6950302         2.0          5
6950303         1.3          6
*           volume       volid
6950401         0.0          6
*        azim-angle       volid
6950501         0.0          6
*        vert-angle       volid
6950601         0.0          6
*           x-wall         xhd       volid
6950801       1.0e-5         0.0          6
*           x-flags       volid
6951001           0          6
*      ebt     press   water-ie   steam-ie void none id
6951201 000 1.849397e6 2.586003e5 2.597753e6  0.0  0.0  1
6951202 000 1.849269e6 2.586003e5 2.597752e6  0.0  0.0  2
6951203 000 1.849077e6 2.586003e5  2.59775e6  0.0  0.0  3
6951204 000 1.848822e6 2.586003e5 2.597747e6  0.0  0.0  4
6951205 000 1.848566e6 2.586003e5 2.597745e6  0.0  0.0  5
6951206 000 1.848355e6 2.586003e5 2.597743e6  0.0  0.0  6
*          jefvcahs      jun num
6951101     00000000           5
*             vl          vv       unused        junid
6951301     2.593394     2.593394         0.0           2
6951302    2.5933945    2.5933945         0.0           3
6951303    2.5933948    2.5933948         0.0           4
6951304    2.5933952    2.5933952         0.0           5
*
*            name         type
6960000    "unnamed"      sngljun
*            from           to         area
6960101    694210002    405010001      0.07069
*         fwd. loss     rev. loss      efvcahs
6960102         0.0          0.0           0
*         discharge      thermal
6960103         1.0         0.14
*            flow          vl          vv       unused
6960201           0     2.5919774    2.5919774         0.0
*
*            name         type
6980000    "unnamed"      sngljun
*            from           to         area
6980101    460010002    601010001      0.07069
*         fwd. loss     rev. loss      efvcahs
6980102         0.0          0.0           0
*         discharge      thermal
6980103         1.0         0.14
*            flow          vl          vv       unused
6980201           0     2.6285596    2.6285596         0.0
*
*            name         type
7510000    "unnamed"        pipe
*           ncells
7510001           6
*           x-area        volid
7510101     5.027e-3           6
*         x-length        volid
7510301         0.54           1
7510302        0.625           5
7510303          0.5           6
*           volume        volid
7510401         0.0           6
*        azim-angle       volid
7510501         0.0           6
*        vert-angle       volid
7510601         0.0           6
*           x-wall         xhd       volid
7510801         0.0         0.0           6
*           x-flags       volid
7511001           0           6
*      ebt     press   water-ie   steam-ie void none id
7511201 000  1.83231e6 2.586001e5  2.59758e6  0.0  0.0  1
7511202 000 1.832236e6    2.586e5  2.59758e6  0.0  0.0  2
7511203 000 1.832156e6    2.586e5 2.597579e6  0.0  0.0  3
7511204 000 1.832076e6 2.585999e5 2.597578e6  0.0  0.0  4
7511205 000 1.831866e6 2.585998e5 2.597576e6  0.0  0.0  5
7511206 000 1.831794e6 2.585997e5 2.597575e6  0.0  0.0  6
*         fwd. loss      rev.loss        junid
7510901         0.0          0.0           3
7510902         0.2          0.2           4
7510903         0.0          0.0           5
*          jefvcahs      jun num
7511101     00000000           5
*             vl          vv       unused        junid
7511301     1.150498     1.150498         0.0           1
7511302    1.1504982    1.1504982         0.0           3
7511303    1.1504983    1.1504983         0.0           4
7511304    1.1504984    1.1504984         0.0           5
*
*            name         type
7530000       "1z7"        valve
*            from           to         area
7530101     751060002    755010001    5.027e-3
*         fwd. loss     rev. loss      efvcahs
7530102         3.0          3.0          100
*         discharge      thermal
7530103         1.0         0.14
*            flow          vl          vv       unused
7530201           0     22.124969    22.124969         0.0
*            type
7530300       mtrvlv
*           topen        tclose        vrate         ipos
7530301           1           2          1.0          1.0
*           vtble
7530302          10
*
*            name         type
7550000    "unnamed"        pipe
*           ncells
7550001          23
*           x-area        volid
7550101     5.027e-3          23
*         x-length        volid
7550301         0.48           1
7550302         0.56           2
7550303     0.518288           3
7550304     0.210856           5
7550305        0.475           7
7550306         0.25           8
7550307          0.5          10
7550308         0.25          11
7550309          0.5          12
7550310        0.525          14
7550311          0.5          15
7550312         0.25          16
7550313       0.3215          17
7550314        0.406          18
7550315       0.2615          19
7550316         0.25          21
7550317        0.356          22
7550318        0.589          23
*           volume        volid
7550401         0.0          23
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*        azim-angle        volid
7550501          0.0           23
*        vert-angle        volid
7550601          0.0            1
7550602         90.0           23
*           x-wall         xhd        volid
7550801       1.0e-5         0.0           23
*           x-flags        volid
7551001            0          23
*      ebt     press   water-ie   steam-ie void none id
7551201 000 1.243431e6 2.585993e5 2.588767e6  0.0  0.0  1
7551202 000 1.240334e6 2.585992e5 2.588702e6  0.0  0.0  2
7551203 000 1.235065e6 2.585991e5  2.58859e6  0.0  0.0  3
7551204 000 1.231502e6 2.585991e5 2.588514e6  0.0  0.0  4
7551205 000 1.229442e6 2.585991e5  2.58847e6  0.0  0.0  5
7551206 000 1.226091e6  2.58599e5 2.588398e6  0.0  0.0  6
7551207 000 1.221449e6 2.585989e5 2.588298e6  0.0  0.0  7
7551208 000 1.217906e6 2.585989e5 2.588221e6  0.0  0.0  8
7551209 000 1.214242e6 2.585988e5 2.588142e6  0.0  0.0  9
7551210 000 1.209356e6 2.585987e5 2.588034e6  0.0  0.0 10
7551211 000 1.205691e6 2.585987e5 2.587954e6  0.0  0.0 11
7551212 000 1.202026e6 2.585986e5 2.587873e6  0.0  0.0 12
7551213 000 1.197018e6 2.585985e5 2.587761e6  0.0  0.0 13
7551214 000 1.191888e6 2.585984e5 2.587646e6  0.0  0.0 14
7551215 000 1.186879e6 2.585984e5 2.587534e6  0.0  0.0 15
7551216 000 1.183215e6 2.585983e5  2.58745e6  0.0  0.0 16
7551217 000 1.180422e6 2.585983e5 2.587387e6  0.0  0.0 17
7551218 000 1.176868e6 2.585982e5 2.587306e6  0.0  0.0 18
7551219 000 1.173606e6 2.585982e5 2.587231e6  0.0  0.0 19
7551220 000 1.171107e6 2.585981e5 2.587174e6  0.0  0.0 20
7551221 000 1.168664e6 2.585981e5 2.587117e6  0.0  0.0 21
7551222 000 1.165703e6  2.58598e5 2.587048e6  0.0  0.0 22
7551223 000 1.161086e6 2.585979e5 2.586941e6  0.0  0.0 23
*        fwd. loss     rev.loss       junid
7550901          0.5           0.5            1
7550902          0.0           0.0           22
*        jefvcahs      jun num
7551101     00000000           22
*             vl          vv       unused        junid
7551301    1.1507834    1.1507834         0.0            1
7551302     1.150785     1.150785         0.0            2
7551303    1.1507876    1.1507876         0.0            3
7551304    1.1507893    1.1507893         0.0            4
7551305    1.1507903    1.1507903         0.0            5
7551306    1.1507919    1.1507919         0.0            6
7551307    1.1507941    1.1507941         0.0            7
7551308    1.1507959    1.1507959         0.0            8
7551309    1.1507977    1.1507977         0.0            9
7551310    1.1508001    1.1508001         0.0           10
7551311    1.1508019    1.1508019         0.0           11
7551312    1.1508037    1.1508037         0.0           12
7551313    1.1508062    1.1508062         0.0           13
7551314    1.1508087    1.1508087         0.0           14
7551315    1.1508111    1.1508111         0.0           15
7551316    1.1508129    1.1508129         0.0           16
7551317    1.1508143    1.1508143         0.0           17
7551318     1.150816     1.150816         0.0           18
7551319    1.1508176    1.1508176         0.0           19
7551320    1.1508188    1.1508188         0.0           20
7551321     1.15082      1.15082         0.0           21
7551322    1.1508214    1.1508214         0.0           22
*
*            name         type
7560000    "unnamed"         pipe
*           ncells
7560001            7
*           x-area        volid
7560101     5.027e-3            7
*         x-length        volid
7560301        0.231            1
7560302        0.535            2
7560303        0.815            3
7560304          1.0            5
7560305          0.5            7
*           volume        volid
7560401          0.0            7
*        azim-angle        volid
7560501          0.0            7
*        vert-angle        volid
7560601         90.0            2
7560602          0.0            7
*           x-wall         xhd        volid
7560801       1.0e-5         0.0            7
*           x-flags        volid
7561001            0            7
*      ebt     press   water-ie   steam-ie void none id
7561201 000 1.148519e6 2.585979e5 2.586645e6  0.0  0.0  1
7561202 000 1.144776e6 2.585978e5 2.586556e6  0.0  0.0  2
7561203 000 1.141779e6 2.585976e5 2.586484e6  0.0  0.0  3
7561204 000 1.141328e6 2.585975e5 2.586473e6  0.0  0.0  4
7561205 000 1.141194e6 2.585973e5  2.58647e6  0.0  0.0  5
7561206 000 1.141092e6 2.585972e5 2.586468e6  0.0  0.0  6
7561207 000 1.141025e6 2.585971e5 2.586466e6  0.0  0.0  7
*        fwd. loss     rev.loss       junid
7560901          0.0           0.0            1
7560902          0.5           0.5            3
7560903          0.0           0.0            6
*           jefvcahs      jun num
7561101     00000000           6
*             vl          vv       unused        junid
7561301    1.1508298    1.1508298         0.0            1
7561302    1.1508317    1.1508317         0.0            2
7561303    1.1508331    1.1508331         0.0            3
7561304    1.1508334    1.1508334         0.0            4
7561305    1.1508335    1.1508335         0.0            6
*
*            name         type
7570000    "unnamed"         valve
*           from           to         area
7570101    755230002    756010001   1.963495e-3
*        fwd. loss     rev. loss      efvcahs
7570102          2.0           2.0            0
*        discharge      thermal
7570103          1.0          0.14
*            flow          vl          vv       unused
7570201            0     2.9463742     2.9463742          0.0
*            type
7570300       chkvlv
*            type         pos         add        leak
7570301            0           1       500.0         0.0
*
*            name         type
7580000    "unnamed"       sngljun
*           from           to         area
7580101    756070002    759010001      7.54e-3
*        fwd. loss     rev. loss      efvcahs
7580102          6.0           6.0            3
*        discharge      thermal
7580103          1.0          0.14
*            flow          vl          vv       unused
7580201            0    0.76727325    0.76727325          0.0
*
```

```
*           name        type
7590000   "unnamed"       pipe
*          ncells
7590001          5
*          x-area       volid
7590101     7.54e-3          2
7590102     2.281e-3         3
7590103     0.011781         5
*         x-length       volid
7590301       0.535          1
7590302       0.231          2
7590303       0.589          3
7590304       0.356          4
7590305       0.232          5
*          volume       volid
7590401         0.0          5
*        azim-angle       volid
7590501         0.0          5
*        vert-angle       volid
7590601        -90.0         4
7590602         0.0          5
*          x-wall         xhd       volid
7590801       1.0e-5        0.04          2
7590802       1.0e-5       0.022          3
7590803       1.0e-5        0.05          5
*          x-flags       volid
7591001          0          5
*     ebt     press   water-ie   steam-ie void none id
7591201 000 1.141771e6  2.58597e5 2.586484e6  0.0  0.0  1
7591202 000 1.145405e6 2.585969e5 2.586571e6  0.0  0.0  2
7591203 000 4.690148e5 2.585983e5  2.55854e6  0.0  0.0  3
7591204 000 4.754059e5 2.585981e5 2.558999e6  0.0  0.0  4
7591205 000 4.767431e5 2.585979e5 2.559094e6  0.0  0.0  5
*           area         jun
7590201     7.54e-3          1
7590202     3.82e-4          2
7590203    0.011781          3
7590204         0.0          4
*        fwd. loss     rev.loss       junid
7590901         0.0         0.0          1
7590902         6.0         6.0          2
7590903         3.0         3.0          4
*         jefvcahs      jun num
7591101     00000000          3
7591102     00000003          4
*            vl          vv       unused       junid
7591301   0.76727307   0.76727307         0.0          1
7591302    15.144581    15.144581         0.0          2
7591303   0.49120465   0.64284426         0.0          3
7591304   0.49120334   0.64807206         0.0          4
*            hd        corr         gas       slope       junid
7591401       0.04         0.0         1.0         1.0          1
7591402       9.0e-3       0.0         1.0         1.0          2
7591403       0.05         0.0         1.0         1.0          4
*
*           name        type
7610000   "unnamed"     sngljun
*           from          to        area
7610101   759050002    763010001     0.03927
*        fwd. loss    rev. loss     efvcahs
7610102         6.0         6.0          3
*        discharge      thermal
7610103         1.0        0.14
*           flow         vl          vv       unused
7610201          0   0.14736092   0.14736092         0.0
*
*           name        type
7630000   "unnamed"       pipe
*          ncells
7630001         14
*          x-area       volid
7630101     0.458723         3
7630102     0.916834         4
7630103      0.07195        14
*         x-length       volid
7630301         0.25          2
7630302       0.2615          3
7630303        0.406          4
7630304       0.4215          5
7630305          0.4          6
7630306          0.5          7
7630307         0.53          8
7630308          0.3          9
7630309         0.15         10
7630310         0.22         11
7630311        0.176         12
7630312         0.22         13
7630313         0.15         14
*          volume       volid
7630401         0.0         14
*        azim-angle       volid
7630501         0.0         14
*        vert-angle       volid
7630601        -90.0         11
7630602         0.0          12
7630603         90.0         14
*          x-wall         xhd       volid
7630801       1.0e-5        0.312          3
7630802       1.0e-5         0.0           4
7630803       1.0e-5        0.251          11
7630804       1.0e-5         0.0          14
*          x-flags       volid
7631001          0          14
*     ebt     press   water-ie   steam-ie void none id
7631201 000 4.778732e5 2.585879e5 2.559175e6  0.0  0.0  1
7631202 000 4.802813e5 2.585802e5 2.559345e6  0.0  0.0  2
7631203 000 4.827449e5 2.585744e5 2.559518e6  0.0  0.0  3
7631204 000 4.859596e5 2.585545e5 2.559743e6  0.0  0.0  4
7631205 000 4.899359e5 2.585529e5 2.560019e6  0.0  0.0  5
7631206 000 4.938914e5 2.585513e5 2.560291e6  0.0  0.0  6
7631207 000  4.98225e5 2.585493e5 2.560586e6  0.0  0.0  7
7631208 000 5.031848e5 2.585472e5  2.56092e6  0.0  0.0  8
7631209 000 5.071812e5 2.585459e5 2.561187e6  0.0  0.0  9
7631210 000  5.09348e5 2.585453e5 2.561331e6  0.0  0.0 10
7631211 000 5.111294e5 2.585444e5 2.561448e6  0.0  0.0 11
7631212 000  5.12182e5 2.585437e5 2.561518e6  0.0  0.0 12
7631213 000 5.111151e5 2.585427e5 2.561447e6  0.0  0.0 13
7631214 000 5.093326e5 2.585421e5  2.56133e6  0.0  0.0 14
*           area         jun
7630201     0.458723         3
7630202     0.074506         4
7630203          0.0        13
*        fwd. loss     rev.loss       junid
7630901          3.0         3.0          2
7630902          6.0         6.0          3
7630903          2.0         2.0          4
7630904          0.5         0.5          8
7630905         0.25        0.25         10
7630906          2.0         2.0         12
7630907          0.0         0.0         13
*         jefvcahs      jun num
7631101     00000000         13
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*             vl          vv       unused       junid
7631301  0.012615153  0.012615153         0.0          1
7631302  0.012615141  0.012615141         0.0          2
7631303  0.012615128  0.012615128         0.0          3
7631304  0.077669479  0.077669479         0.0          4
7631305  0.080428533  0.080428533         0.0          5
7631306  0.080428399  0.080428399         0.0          6
7631307   0.08042825   0.08042825         0.0          7
7631308  0.080428086  0.080428086         0.0          8
7631309  0.080427952  0.080427952         0.0          9
7631310  0.080427878  0.080427878         0.0         10
7631311  0.080427818  0.080427818         0.0         11
7631312  0.080427788  0.080427788         0.0         12
7631313  0.080427825  0.080427825         0.0         13
*             hd        corr         gas       slope       junid
7631401       0.312         0.0         1.0         1.0           3
7631402       0.251         0.0         1.0         1.0          10
7631403         0.0         0.0         1.0         1.0          13
*
*            name        type
7650000    "unnamed"      sngljun
*            from          to        area
7650101    763140005    767050005       0.048
*         fwd. loss    rev. loss      efvcahs
7650102         2.0          2.0           0
*         discharge      thermal
7650103         1.0         0.14
*             hd        flood     intercept       slope
7650110     0.10435          0.0         1.0         1.0
*            flow          vl          vv       unused
7650201          0    0.12055805   0.12055805         0.0
*
*            name        type
7670000    "unnamed"        pipe
*           ncells
7670001          10
*           x-area       volid
7670101       1.258           1
7670102       1.928           6
7670103        2.01           8
7670104        1.34           9
7670105    7.854e-3          10
*          x-length       volid
7670301         0.4           1
7670302         0.5           2
7670303        0.53           3
7670304         0.3           4
7670305        0.15           5
7670306        0.22           6
7670307         0.4           7
7670308         0.6           8
7670309         0.4           9
7670310         0.2          10
*           volume       volid
7670401         0.0          10
*         azim-angle       volid
7670501         0.0          10
*         vert-angle       volid
7670601        -90.0          10
*            x-wall         xhd       volid
7670801       1.0e-5          0.0          10
*           x-flags       volid
7671001           0          10
*      ebt     press   water-ie   steam-ie void    ncqual id
7671201 006 5.000004e5 1.071929e5 9.985798e5  1.0 0.9711076  1
*      ebt     press   water-ie   steam-ie      void     ncqual id
7671202 006 5.002477e5 1.350607e5 1.026018e6 0.90000707
0.95791429  2
*      ebt     press   water-ie   steam-ie void ncqual id
7671203 006 5.030796e5 1.345863e5 2.560913e6  0.0    0.0  3
*      ebt     press   water-ie   steam-ie void none id
7671204 000 5.071293e5 1.374163e5 2.561184e6  0.0  0.0  4
*      ebt     press   water-ie   steam-ie void none id
7671205 000 5.093165e5 2.475103e5 2.561328e6  0.0  0.0  5
*      ebt     press   water-ie   steam-ie void none id
7671206 000 5.111012e5 2.489735e5 2.561446e6  0.0  0.0  6
*      ebt     press   water-ie   steam-ie void none id
7671207 000 5.140898e5 2.561958e5 2.561643e6  0.0  0.0  7
*      ebt     press   water-ie   steam-ie void none id
7671208 000 5.189078e5 2.581076e5 2.561956e6  0.0  0.0  8
*      ebt     press   water-ie   steam-ie void none id
7671209 000 5.237252e5 2.582503e5 2.562267e6  0.0  0.0  9
*      ebt     press   water-ie   steam-ie void none id
7671210 000 5.260197e5 2.582508e5 2.562414e6  0.0  0.0 10
*             he          air          vol
7673201         1.0          0.0           10
*         fwd. loss     rev.loss       junid
7670901         0.0          0.0           8
7670902         1.2          1.2           9
*          jefvcahs      jun num
7671101     00000000            9
*             vl          vv       unused       junid
7671301    42.467194  -2.077881e-5          0.0          1
7671302   -5.82183e-8   -0.61309701          0.0          2
7671303  -5.340051e-8  -5.340051e-8          0.0          3
7671304  -5.095859e-8  -5.095859e-8          0.0          4
7671305   3.001328e-3   3.001328e-3          0.0          5
7671306   3.001326e-3   3.001326e-3          0.0          6
7671307   2.878856e-3   2.878856e-3          0.0          7
7671308   4.318279e-3   4.318279e-3          0.0          8
7671309    0.73707455    0.73707455          0.0          9
*
*            name        type
7690000    "unnamed"      sngljun
*            from          to        area
7690101    771020002    767010001      7.85e-3
*         fwd. loss    rev. loss      efvcahs
7690102         0.0          0.0           0
*         discharge      thermal
7690103         1.0         0.14
*            flow          vl          vv       unused
7690201          0  -4.308443e-5  -4.308443e-5          0.0
*
*            name        type
7710000    "unnamed"        pipe
*           ncells
7710001           2
*           x-area       volid
7710101      7.85e-3           2
*          x-length       volid
7710301         0.5           2
*           volume       volid
7710401         0.0           2
*         azim-angle       volid
7710501         0.0           2
*         vert-angle       volid
7710601        -90.0           2
*            x-wall         xhd       volid
7710801         0.0          0.0           2
*           x-flags       volid
7711001           0           2
*      ebt     press   water-ie   steam-ie void     ncqual id
```

```
7711201 006 4.999927e5 1.572541e4 9.143786e5  1.0 0.99284476  1
7711202 006 4.999968e5 5.790316e4 9.492365e5  1.0 0.98594582  2
*             he         air         vol
7713201        1.0         0.0           2
*         jefvcahs      jun num
7711101     00000000           1
*             vl          vv       unused       junid
7711301  -2.110661e-5  -2.110661e-5         0.0           1
*
*            name        type
7730000    "unnamed"       valve
*            from          to        area
7730101      3010001     771010001      7.85e-3
*        fwd. loss     rev. loss      efvcahs
7730102         0.0         0.0         100
*        discharge      thermal
7730103         1.0        0.14
*            flow          vl          vv       unused
7730201           0         0.0         0.0         0.0
*            type
7730300       mtrvlv
*           topen       tclose       vrate        ipos
7730301          20           2         0.1         0.0
*
*            name        type
7770000    "unnamed"      sngljun
*            from          to        area
7770101     767100002     779010001     7.854e-3
*        fwd. loss     rev. loss      efvcahs
7770102         0.0         0.0           0
*        discharge      thermal
7770103         1.0        0.14
*            flow          vl          vv       unused
7770201           0    0.73652101    0.73652101         0.0
*
*            name        type
7790000    "unnamed"        pipe
*           ncells
7790001           6
*           x-area       volid
7790101     7.854e-3           6
*         x-length       volid
7790301        0.475           2
7790302       0.8425           4
7790303         0.56           6
*           volume       volid
7790401         0.0           6
*        azim-angle       volid
7790501         0.0           6
*        vert-angle       volid
7790601        -90.0           2
7790602        -15.0           4
7790603        -90.0           6
*           x-wall         xhd       volid
7790801       1.0e-5         0.0           6
*           x-flags       volid
7791001           0           6
*      ebt     press   water-ie   steam-ie void none id
7791201 000 5.292566e5 2.582521e5  2.56262e6  0.0  0.0  1
7791202 000 5.338116e5 2.582532e5 2.562907e6  0.0  0.0  2
7791203 000 5.369854e5 2.582553e5 2.563105e6  0.0  0.0  3
7791204 000 5.390481e5 2.582572e5 2.563234e6  0.0  0.0  4
7791205 000 5.426294e5 2.582585e5 2.563455e6  0.0  0.0  5
7791206 000 5.479996e5 2.582597e5 2.563784e6  0.0  0.0  6
*         fwd. loss     rev.loss        junid
7790901         0.0         0.0           1
7790902         0.5         0.5           2
7790903         0.0         0.0           3
7790904         0.5         0.5           4
7790905         0.0         0.0           5
*         jefvcahs      jun num
7791101     00000000           5
*             vl          vv       unused       junid
7791301   0.73651999   0.73651999         0.0           1
7791302   0.73651862   0.73651862         0.0           2
7791303   0.73651761   0.73651761         0.0           3
7791304   0.73651701   0.73651701         0.0           4
7791305   0.73651588   0.73651588         0.0           5
*
*            name        type
7810000       "1z8"       valve
*            from          to        area
7810101     779060002     783010001     7.854e-3
*        fwd. loss     rev. loss      efvcahs
7810102         0.5         0.5         100
*        discharge      thermal
7810103         1.0        0.14
*            flow          vl          vv       unused
7810201           0    0.73651421    0.73651421         0.0
*            type
7810300       mtrvlv
*           topen       tclose       vrate        ipos
7810301           2          22         0.1         1.0
*
*            name        type
7830000    "unnamed"        pipe
*           ncells
7830001           5
*           x-area       volid
7830101     7.854e-3           5
*         x-length       volid
7830301       0.40389           1
7830302          0.54           2
7830303           1.0           3
7830304           1.1           4
7830305          0.45           5
*           volume       volid
7830401         0.0           5
*        azim-angle       volid
7830501         0.0           5
*        vert-angle       volid
7830601        -90.0           2
7830602        -30.0           4
7830603        -90.0           5
*           x-wall         xhd       volid
7830801         0.0         0.0           5
*           x-flags       volid
7831001           0           5
*      ebt     press   water-ie   steam-ie void none id
7831201 000 5.524865e5 2.582605e5 2.564056e6  0.0  0.0  1
7831202 000 5.570131e5 2.582616e5 2.564328e6  0.0  0.0  2
7831203 000 5.618547e5 2.582636e5 2.564617e6  0.0  0.0  3
7831204 000 5.668672e5 2.582655e5 2.564912e6  0.0  0.0  4
7831205 000 5.715159e5 2.582663e5 2.565184e6  0.0  0.0  5
*         fwd. loss     rev.loss        junid
7830901         0.0         0.0           1
7830902         0.5         0.5           2
7830903         0.0         0.0           3
7830904         0.5         0.5           4
*         jefvcahs      jun num
7831101     00000000           4
*             vl          vv       unused       junid
```

```
7831301   0.73651284   0.73651284        0.0          1
7831302   0.73651147   0.73651147        0.0          2
7831303   0.73650998   0.73650998        0.0          3
7831304   0.73650843   0.73650843        0.0          4
*
*           name        type
7850000   "unnamed"     sngljun
*           from         to        area
7850101   783050002    607010002    7.854e-3
*        fwd. loss    rev. loss     efvcahs
7850102        0.5          0.5         100
*        discharge     thermal
7850103        1.0         0.14
*           flow          vl          vv       unused
7850201           0     0.736507     0.736507         0.0
*
*           name        type
7870000   "unnamed"     sngljun
*           from         to        area
7870101   690040001    751010001    5.027e-3
*        fwd. loss    rev. loss     efvcahs
7870102        0.5          0.5         100
*        discharge     thermal
7870103        1.0         0.14
*           flow          vl          vv       unused
7870201           0     1.1504992    1.1504992         0.0
*
*           name        type
7900000   "unnamed"       valve
*           from         to        area
7900101   791120002    767080003    1.225e-3
*        fwd. loss    rev. loss     efvcahs
7900102        0.0          0.0         100
*        discharge     thermal
7900103        1.0         0.14
*           flow          vl          vv       unused
7900201           0   2.868196e-8   2.868196e-8         0.0
*           type
7900300       mtrvlv
*          topen       tclose       vrate        ipos
7900301           1            2         1.0         1.0
*
*           name        type
7910000   "unnamed"       pipe
*          ncells
7910001          12
*          x-area       volid
7910101    1.225e-3          12
*        x-length       volid
7910301        0.42           1
7910302        0.37           2
7910303         0.7           3
7910304         0.8           4
7910305        0.58           5
7910306         0.6           6
7910307        0.82           8
7910308         0.6          10
7910309     0.84625          12
*          volume       volid
7910401         0.0          12
*       azim-angle       volid
7910501         0.0          12
*       vert-angle       volid
7910601        90.0           2
7910602         0.0           4
7910603       -60.0           6
7910604         0.0           8
7910605        90.0          10
7910606         0.0          12
*           x-wall         xhd       volid
7910801         0.0         0.0          12
*          x-flags       volid
7911001           0          12
*     ebt     press   water-ie   steam-ie void none id
7911201 000 5.263179e5 1.124788e5 2.562433e6  0.0  0.0  1
7911202 000 5.224569e5 1.124788e5 2.562186e6  0.0  0.0  2
7911203 000 5.206486e5 1.124788e5 2.562069e6  0.0  0.0  4
7911204 000 5.231035e5 1.124788e5 2.562227e6  0.0  0.0  5
7911205 000 5.280979e5 1.124788e5 2.562546e6  0.0  0.0  6
7911206 000 5.306375e5 1.124788e5 2.562707e6  0.0  0.0  8
7911207 000 5.277051e5 1.124788e5 2.562521e6  0.0  0.0  9
7911208 000 5.218402e5 1.124788e5 2.562146e6  0.0  0.0 10
7911209 000 5.189078e5 1.124819e5 2.561956e6  0.0  0.0 11
7911210 000 5.189078e5 1.131039e5 2.561956e6  0.0  0.0 12
*        fwd. loss     rev.loss       junid
7910901         0.0          0.0           1
7910902         0.2          0.2           4
7910903         0.0          0.0           5
7910904         0.2          0.2           8
7910905         0.0          0.0           9
7910906         0.2          0.2          11
*          jefvcahs      jun num
7911101     00000000           11
*             vl           vv       unused       junid
7911301 7.769075e-10 7.769075e-10          0.0           1
7911302  1.469415e-9  1.469415e-9          0.0           2
7911303  2.818728e-9  2.818728e-9          0.0           3
7911304  4.481141e-9  4.481141e-9          0.0           4
7911305  5.813992e-9  5.813992e-9          0.0           5
7911306  7.339237e-9  7.339237e-9          0.0           6
7911307  9.727838e-9  9.727838e-9          0.0           7
7911308  1.258205e-8  1.258205e-8          0.0           8
7911309  1.505215e-8  1.505215e-8          0.0           9
7911310  1.790819e-8  1.790819e-8          0.0          10
7911311  2.271694e-8  2.271694e-8          0.0          11
*
*           name        type
7920000   "unnamed"     tmdpjun
*           from         to        area      jefvcahs
7920101    793010002    791010001    1.225e-3           0
*          control        trip       alpha         num
7920200           1           2     cntrlvar          31
*           srch         mfl         mfv       unused
7920201        -1.0         0.0         0.0          0.0
7920202         0.0        1.92         0.0          0.0
7920203         5.1        1.92         0.0          0.0
7920204        6.44        1.37         0.0          0.0
7920205        6.61         0.0         0.0          0.0
7920206         7.0         0.0         0.0          0.0
*
*           name        type
7930000      "11u6"     tmdpvol
*           area       length         vol
7930101        20.0        20.0          0.0
*        az-angle     inc-angle          dz
7930102         0.0        90.0        20.0
*          x-rough        x-hd       flags
7930103         0.0         0.0           0
*           cword
7930200           3
*           srch        press         temp
7930201         0.0       1.0e6        300.0
```

```
*
*           name        type
8000000   "unnamed"       pipe
*          ncells
8000001         16
*          x-area       volid
8000101      0.0314          1
8000102       0.217         15
8000103      0.0314         16
*         x-length       volid
8000301         0.5          1
8000302      0.4717          7
8000303       0.831          9
8000304      0.4717         15
8000305         0.5         16
*          volume       volid
8000401         0.0         16
*        azim-angle       volid
8000501         0.0         16
*        vert-angle       volid
8000601         0.0          1
8000602       -90.0          7
8000603       -45.0          8
8000604        45.0          9
8000605        90.0         15
8000606         0.0         16
*          x-elev       volid
8000701         0.0          1
8000702        -0.4          7
8000703       -0.25          8
8000704        0.25          9
8000705         0.4         15
8000706         0.0         16
*          x-wall         xhd       volid
8000801      1.0e-5         0.2          1
8000802      1.0e-5      0.0157         15
8000803      1.0e-5         0.2         16
*          x-flags       volid
8001001           0         16
*     ebt     press   water-ie   steam-ie void none id
8001201 000 6.572979e5 3.528157e5 2.569778e6  0.0  0.0  1
8001202 000 6.463603e5 3.488416e5 2.569233e6  0.0  0.0  2
8001203 000 6.487416e5 3.448912e5 2.569352e6  0.0  0.0  3
8001204 000 6.512443e5 3.409646e5 2.569478e6  0.0  0.0  4
8001205 000 6.536316e5 3.370616e5 2.569597e6  0.0  0.0  5
8001206 000 6.561401e5 3.331822e5 2.569721e6  0.0  0.0  6
8001207 000 6.585332e5 3.293262e5  2.56984e6  0.0  0.0  7
8001208 000 6.603032e5  3.25494e5 2.569927e6  0.0  0.0  8
8001209 000 6.598471e5 3.216851e5 2.569904e6  0.0  0.0  9
8001210 000 6.554114e5  3.17899e5 2.569685e6  0.0  0.0 10
8001211 000 6.501684e5 3.141361e5 2.569424e6  0.0  0.0 11
8001212 000 6.450415e5 3.103963e5 2.569166e6  0.0  0.0 12
8001213 000 6.397954e5 3.066796e5   2.5689e6  0.0  0.0 13
8001214 000 6.346654e5  3.02986e5 2.568637e6  0.0  0.0 14
8001215 000 6.294164e5 2.993154e5 2.568366e6  0.0  0.0 15
8001216 000 6.147599e5 2.993155e5 2.567593e6  0.0  0.0 16
*            area         jun
8000201         0.0          1
8000202       0.106          2
8000203       0.111          3
8000204       0.106          4
8000205       0.111          5
8000206       0.106          6
8000207       0.111          7
8000208         0.0          8
8000209       0.111          9
8000210       0.106         10
8000211       0.111         11
8000212       0.106         12
8000213       0.111         13
8000214       0.106         14
8000215         0.0         15
*         fwd. loss     rev.loss       junid
8000901         3.0          3.0          1
8000902         3.6          3.6         14
8000903         3.0          3.0         15
*          jefvcahs      jun num
8001101    00000003           1
8001102    00000000          14
8001103    00000003          15
*             vl           vv       unused       junid
8001301   2.9550941    2.9550941          0.0          1
8001302  0.87483275    1.0141853          0.0          2
8001303   0.8349089   0.98946732          0.0          3
8001304  0.87375766    1.0100859          0.0          4
8001305  0.83389688   0.99627399          0.0          5
8001306  0.87271309    1.0408165          0.0          6
8001307   0.8329137   0.99715984          0.0          7
8001308  0.42580673   0.42580673          0.0          8
8001309  0.83196008   0.83196008          0.0          9
8001310  0.87071705   0.89772725          0.0         10
8001311  0.83103818    0.8626169          0.0         11
8001312  0.86976624   0.89967096          0.0         12
8001313  0.83014375   0.84990203          0.0         13
8001314  0.86884362   0.91308677          0.0         14
8001315   2.9315171    2.9315171          0.0         15
*             hd         corr          gas        slope       junid
8001401         0.0          0.0          1.0          1.0          1
8001402      0.0147          0.0          1.0          1.0          2
8001403      0.0152          0.0          1.0          1.0          3
8001404      0.0147          0.0          1.0          1.0          4
8001405      0.0152          0.0          1.0          1.0          5
8001406      0.0147          0.0          1.0          1.0          6
8001407      0.0152          0.0          1.0          1.0          7
8001408         0.0          0.0          1.0          1.0          8
8001409      0.0152          0.0          1.0          1.0          9
8001410      0.0147          0.0          1.0          1.0         10
8001411      0.0152          0.0          1.0          1.0         11
8001412      0.0147          0.0          1.0          1.0         12
8001413      0.0152          0.0          1.0          1.0         13
8001414      0.0147          0.0          1.0          1.0         14
8001415         0.0          0.0          1.0          1.0         15
*
*           name        type
8020000   "unnamed"     sngljun
*           from          to        area
8020101   600170002   800010001      0.0314
*        fwd. loss    rev. loss      efvcahs
8020102         0.0          0.0           0
*        discharge      thermal
8020103         1.0         0.14
*           flow          vl          vv       unused
8020201          0   2.9550939   2.9550939          0.0
*
*           name        type
8030000   "unnamed"     sngljun
*           from          to        area
8030101   604030002   606020001      0.0314
*        fwd. loss    rev. loss      efvcahs
8030102         0.0          0.0           0
*        discharge      thermal
8030103         1.0         0.14
```

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*           flow         vl         vv       unused
8030201          0    2.9153912    2.9153912         0.0
*
*           name        type
8040000   "unnamed"     sngljun
*           from         to        area
8040101   800160002    805010001      0.0314
*        fwd. loss    rev. loss      efvcahs
8040102         0.1         0.1          0
*        discharge      thermal
8040103         1.0        0.14
*            hd       flood    intercept       slope
8040110         0.2         0.0         1.0         1.0
*           flow         vl         vv       unused
8040201          0    2.9315352    2.9315352         0.0
*
*           name        type
8050000   "unnamed"       pipe
*          ncells
8050001         16
*          x-area       volid
8050101       0.0314          1
8050102        0.217         15
8050103       0.0314         16
*         x-length       volid
8050301          0.5          1
8050302       0.4717          7
8050303        0.831          9
8050304       0.4717         15
8050305          0.5         16
*          volume       volid
8050401          0.0         16
*        azim-angle       volid
8050501          0.0         16
*        vert-angle       volid
8050601          0.0          1
8050602        -90.0          7
8050603        -45.0          8
8050604         45.0          9
8050605         90.0         15
8050606          0.0         16
*          x-elev       volid
8050701          0.0          1
8050702         -0.4          7
8050703        -0.25          8
8050704         0.25          9
8050705          0.4         15
8050706          0.0         16
*          x-wall        xhd       volid
8050801       1.0e-5         0.2          1
8050802       1.0e-5      0.0157         15
8050803       1.0e-5         0.2         16
*          x-flags       volid
8051001          0         16
*      ebt     press   water-ie   steam-ie void none id
8051201 000 6.142109e5 2.993156e5 2.567564e6  0.0  0.0  1
8051202 000  6.03388e5 2.962736e5 2.566979e6  0.0  0.0  2
8051203 000 6.058071e5  2.93247e5  2.56711e6  0.0  0.0  3
8051204 000 6.083458e5 2.902356e5 2.567248e6  0.0  0.0  4
8051205 000 6.107689e5 2.872395e5 2.567379e6  0.0  0.0  5
8051206 000 6.133114e5 2.842587e5 2.567516e6  0.0  0.0  6
8051207 000 6.157387e5 2.812932e5 2.567645e6  0.0  0.0  7
8051208 000 6.175353e5 2.783421e5 2.567741e6  0.0  0.0  8
8051209 000  6.17078e5 2.754062e5 2.567717e6  0.0  0.0  9
8051210 000 6.126276e5 2.724865e5 2.567479e6  0.0  0.0 10
8051211 000 6.073669e5 2.695821e5 2.567195e6  0.0  0.0 11
8051212 000 6.022222e5 2.666929e5 2.566915e6  0.0  0.0 12
8051213 000 5.969593e5  2.63819e5 2.566626e6  0.0  0.0 13
8051214 000 5.918123e5 2.609604e5  2.56634e6  0.0  0.0 14
8051215 000 5.865473e5 2.581169e5 2.566044e6  0.0  0.0 15
8051216 000 5.719481e5 2.581169e5 2.565209e6  0.0  0.0 16
*          area         jun
8050201        0.0          1
8050202      0.106          2
8050203      0.111          3
8050204      0.106          4
8050205      0.111          5
8050206      0.106          6
8050207      0.111          7
8050208        0.0          8
8050209      0.111          9
8050210      0.106         10
8050211      0.111         11
8050212      0.106         12
8050213      0.111         13
8050214      0.106         14
8050215        0.0         15
*        fwd. loss     rev.loss       junid
8050901        3.0         3.0          1
8050902        3.6         3.6         14
8050903        3.0         3.0         15
*         jefvcahs      jun num
8051101    00000003          1
8051102    00000000         14
8051103    00000003         15
*            vl          vv       unused       junid
8051301   2.9315362   2.9315362         0.0          1
8051302  0.86803025   1.0612791         0.0          2
8051303  0.82857805   1.0316921         0.0          3
8051304  0.86729813   1.0778818         0.0          4
8051305  0.82788771  0.98058647         0.0          5
8051306  0.86658442   1.0730544         0.0          6
8051307  0.82721478  0.97691071         0.0          7
8051308   0.4229688   0.4229688         0.0          8
8051309   0.8265602   0.8265602         0.0          9
8051310  0.86521471  0.93837774         0.0         10
8051311  0.82592636  0.89596635         0.0         11
8051312  0.86455995  0.92905247         0.0         12
8051313  0.82530934   0.8672989         0.0         13
8051314  0.86392236   0.9484995         0.0         14
8051315   2.9153714   2.9153714         0.0         15
*            hd         corr         gas        slope       junid
8051401         0.0         0.0         1.0         1.0          1
8051402      0.0147         0.0         1.0         1.0          2
8051403      0.0152         0.0         1.0         1.0          3
8051404      0.0147         0.0         1.0         1.0          4
8051405      0.0152         0.0         1.0         1.0          5
8051406      0.0147         0.0         1.0         1.0          6
8051407      0.0152         0.0         1.0         1.0          7
8051408         0.0         0.0         1.0         1.0          8
8051409      0.0152         0.0         1.0         1.0          9
8051410      0.0147         0.0         1.0         1.0         10
8051411      0.0152         0.0         1.0         1.0         11
8051412      0.0147         0.0         1.0         1.0         12
8051413      0.0152         0.0         1.0         1.0         13
8051414      0.0147         0.0         1.0         1.0         14
8051415         0.0         0.0         1.0         1.0         15
*
*           name        type
8060000   "unnamed"     sngljun
*           from         to        area
8060101    805160002    604010001      0.0314
```

```
*        fwd. loss     rev. loss      efvcahs
8060102         0.1          0.1           0
*        discharge      thermal
8060103         1.0         0.14
*             hd        flood     intercept        slope
8060110         0.2          0.0          1.0          1.0
*            flow          vl          vv       unused
8060201          0     2.9153893     2.9153893          0.0
*
*            name         type
8100000    "unnamed"         pipe
*           ncells
8100001         16
*          x-area        volid
8100101      0.0314            1
8100102       0.217           15
8100103      0.0314           16
*         x-length        volid
8100301         0.5            1
8100302      0.4717            7
8100303       0.831            9
8100304      0.4717           15
8100305         0.5           16
*          volume        volid
8100401         0.0           16
*        azim-angle        volid
8100501         0.0           16
*        vert-angle        volid
8100601         0.0            1
8100602       -90.0            7
8100603       -45.0            8
8100604        45.0            9
8100605        90.0           15
8100606         0.0           16
*          x-elev        volid
8100701         0.0            1
8100702        -0.4            7
8100703       -0.25            8
8100704        0.25            9
8100705         0.4           15
8100706         0.0           16
*          x-wall         xhd        volid
8100801      1.0e-5         0.2            1
8100802      1.0e-5      0.0157           15
8100803      1.0e-5         0.2           16
*          x-flags        volid
8101001          0           16
*     ebt     press   water-ie   steam-ie void none id
8101201 000 6.568418e5 3.528156e5 2.569756e6  0.0  0.0  1
8101202 000 6.458409e5 3.488482e5 2.569206e6  0.0  0.0  2
8101203 000 6.482152e5 3.449043e5 2.569326e6  0.0  0.0  3
8101204 000 6.507114e5 3.409839e5 2.569451e6  0.0  0.0  4
8101205 000 6.530918e5 3.370868e5  2.56957e6  0.0  0.0  5
8101206 000 6.555939e5 3.332131e5 2.569694e6  0.0  0.0  6
8101207 000 6.579801e5 3.293627e5 2.569812e6  0.0  0.0  7
8101208 000 6.597435e5 3.255357e5 2.569899e6  0.0  0.0  8
8101209 000 6.592852e5 3.217317e5 2.569876e6  0.0  0.0  9
8101210 000 6.548432e5 3.179504e5 2.569657e6  0.0  0.0 10
8101211 000 6.495931e5 3.141921e5 2.569395e6  0.0  0.0 11
8101212 000 6.444599e5 3.104567e5 2.569137e6  0.0  0.0 12
8101213 000 6.392069e5 3.067442e5  2.56887e6  0.0  0.0 13
8101214 000 6.340706e5 3.030545e5 2.568606e6  0.0  0.0 14
8101215 000 6.288147e5 2.993878e5 2.568334e6  0.0  0.0 15
8101216 000 6.140953e5 2.993878e5 2.567558e6  0.0  0.0 16
*            area         jun
8100201         0.0           1
8100202       0.106           2
8100203       0.111           3
8100204       0.106           4
8100205       0.111           5
8100206       0.106           6
8100207       0.111           7
8100208         0.0           8
8100209       0.111           9
8100210       0.106          10
8100211       0.111          11
8100212       0.106          12
8100213       0.111          13
8100214       0.106          14
8100215         0.0          15
*        fwd. loss     rev.loss        junid
8100901         3.0          3.0            1
8100902         3.6          3.6           14
8100903         3.0          3.0           15
*         jefvcahs      jun num
8101101    00000003            1
8101102    00000000           14
8101103    00000003           15
*            vl          vv       unused        junid
8101301   2.9623852   2.9623852          0.0            1
8101302  0.87699217   1.0413486          0.0            2
8101303  0.83697063   1.0095184          0.0            3
8101304  0.87591612   0.9652518          0.0            4
8101305  0.83595759  0.99912083          0.0            5
8101306  0.87487048   1.0088456          0.0            6
8101307  0.83497334   1.0000308          0.0            7
8101308     0.42686     0.42686          0.0            8
8101309  0.83401859  0.83401859          0.0            9
8101310  0.87287199   0.8843475          0.0           10
8101311  0.83309543  0.85952073          0.0           11
8101312  0.87191987  0.88993639          0.0           12
8101313  0.83219969  0.85203892          0.0           13
8101314  0.87099594  0.91541809          0.0           14
8101315   2.9387805   2.9387805          0.0           15
*             hd         corr         gas        slope        junid
8101401         0.0          0.0          1.0          1.0            1
8101402      0.0147          0.0          1.0          1.0            2
8101403      0.0152          0.0          1.0          1.0            3
8101404      0.0147          0.0          1.0          1.0            4
8101405      0.0152          0.0          1.0          1.0            5
8101406      0.0147          0.0          1.0          1.0            6
8101407      0.0152          0.0          1.0          1.0            7
8101408         0.0          0.0          1.0          1.0            8
8101409      0.0152          0.0          1.0          1.0            9
8101410      0.0147          0.0          1.0          1.0           10
8101411      0.0152          0.0          1.0          1.0           11
8101412      0.0147          0.0          1.0          1.0           12
8101413      0.0152          0.0          1.0          1.0           13
8101414      0.0147          0.0          1.0          1.0           14
8101415         0.0          0.0          1.0          1.0           15
*
*            name         type
8120000    "unnamed"      sngljun
*            from           to         area
8120101   602030002    810010001       0.0314
*        fwd. loss     rev. loss      efvcahs
8120102         0.0          0.0            0
*        discharge      thermal
8120103         1.0         0.14
*            flow          vl          vv       unused
8120201          0     2.9623849     2.9623849          0.0
*
```

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*           name        type
8140000   "unnamed"     sngljun
*           from         to        area
8140101   810160002   815010001     0.0314
*        fwd. loss    rev. loss     efvcahs
8140102       0.1         0.1          0
*        discharge     thermal
8140103       1.0        0.14
*            hd       flood    intercept       slope
8140110       0.2         0.0         1.0         1.0
*           flow         vl          vv       unused
8140201          0    2.9387987    2.9387987         0.0
*
*           name        type
8150000   "unnamed"       pipe
*          ncells
8150001         16
*          x-area       volid
8150101      0.0314          1
8150102       0.217         15
8150103      0.0314         16
*         x-length       volid
8150301         0.5          1
8150302      0.4717          7
8150303       0.831          9
8150304      0.4717         15
8150305         0.5         16
*          volume       volid
8150401         0.0         16
*        azim-angle       volid
8150501         0.0         16
*        vert-angle       volid
8150601         0.0          1
8150602       -90.0          7
8150603       -45.0          8
8150604        45.0          9
8150605        90.0         15
8150606         0.0         16
*           x-elev       volid
8150701         0.0          1
8150702        -0.4          7
8150703       -0.25          8
8150704        0.25          9
8150705         0.4         15
8150706         0.0         16
*           x-wall         xhd       volid
8150801      1.0e-5         0.2          1
8150802      1.0e-5      0.0157         15
8150803      1.0e-5         0.2         16
*          x-flags       volid
8151001          0         16
*      ebt     press   water-ie   steam-ie void none id
8151201 000 6.135437e5 2.993879e5 2.567528e6  0.0  0.0  1
8151202 000 6.026578e5 2.963496e5 2.566939e6  0.0  0.0  2
8151203 000   6.0507e5 2.933264e5  2.56707e6  0.0  0.0  3
8151204 000 6.076022e5 2.903184e5 2.567208e6  0.0  0.0  4
8151205 000 6.100184e5 2.873255e5 2.567338e6  0.0  0.0  5
8151206 000 6.125546e5 2.843478e5 2.567475e6  0.0  0.0  6
8151207 000 6.149748e5 2.813851e5 2.567604e6  0.0  0.0  7
8151208 000 6.167649e5 2.784368e5   2.5677e6  0.0  0.0  8
8151209 000 6.163055e5 2.755037e5 2.567676e6  0.0  0.0  9
8151210 000 6.118487e5 2.725865e5 2.567437e6  0.0  0.0 10
8151211 000 6.065811e5 2.696845e5 2.567153e6  0.0  0.0 11
8151212 000 6.014301e5 2.667976e5 2.566872e6  0.0  0.0 12
8151213 000 5.961604e5 2.639259e5 2.566582e6  0.0  0.0 13
8151214 000 5.910071e5 2.610693e5 2.566295e6  0.0  0.0 14
8151215 000 5.857352e5 2.582277e5 2.565998e6  0.0  0.0 15
8151216 000 5.710734e5 2.582277e5 2.565158e6  0.0  0.0 16
*           area         jun
8150201         0.0          1
8150202       0.106          2
8150203       0.111          3
8150204       0.106          4
8150205       0.111          5
8150206       0.106          6
8150207       0.111          7
8150208         0.0          8
8150209       0.111          9
8150210       0.106         10
8150211       0.111         11
8150212       0.106         12
8150213       0.111         13
8150214       0.106         14
8150215         0.0         15
*        fwd. loss     rev.loss       junid
8150901         3.0          3.0          1
8150902         3.6          3.6         14
8150903         3.0          3.0         15
*          jefvcahs      jun num
8151101     00000003           1
8151102     00000000          14
8151103     00000003          15
*             vl           vv       unused       junid
8151301    2.9387996    2.9387996          0.0          1
8151302   0.87018138    1.0644426          0.0          2
8151303   0.83063173   0.93272465          0.0          3
8151304   0.86944818   0.97530019          0.0          4
8151305   0.82994032   0.93006152          0.0          5
8151306   0.86873329    1.0694015          0.0          6
8151307   0.82926631    0.9797805          0.0          7
8151308   0.42401791   0.42401791          0.0          8
8151309    0.8286106    0.8286106          0.0          9
8151310   0.86736119   0.90413833          0.0         10
8151311   0.82797557   0.88755268          0.0         11
8151312   0.86670512    0.9079597          0.0         12
8151313   0.82735735   0.89368105          0.0         13
8151314   0.86606634   0.95107508          0.0         14
8151315    2.9226067    2.9226067          0.0         15
*             hd         corr          gas        slope       junid
8151401          0.0          0.0          1.0          1.0          1
8151402       0.0147          0.0          1.0          1.0          2
8151403       0.0152          0.0          1.0          1.0          3
8151404       0.0147          0.0          1.0          1.0          4
8151405       0.0152          0.0          1.0          1.0          5
8151406       0.0147          0.0          1.0          1.0          6
8151407       0.0152          0.0          1.0          1.0          7
8151408          0.0          0.0          1.0          1.0          8
8151409       0.0152          0.0          1.0          1.0          9
8151410       0.0147          0.0          1.0          1.0         10
8151411       0.0152          0.0          1.0          1.0         11
8151412       0.0147          0.0          1.0          1.0         12
8151413       0.0152          0.0          1.0          1.0         13
8151414       0.0147          0.0          1.0          1.0         14
8151415          0.0          0.0          1.0          1.0         15
*
*           name        type
8160000   "unnamed"     sngljun
*           from         to        area
8160101   815160002   606010001     0.0314
*        fwd. loss    rev. loss     efvcahs
8160102         0.0          0.0          0
*        discharge     thermal
```

```
8160103        1.0        0.14
*          flow         vl          vv       unused
8160201           0    2.9226248    2.9226248         0.0
*
*           name        type
8200000    "unnamed"     tmdpvol
*           area       length         vol
8200101        50.0        50.0         0.0
*         az-angle    inc-angle          dz
8200102         0.0        90.0        50.0
*          x-rough        x-hd       flags
8200103         0.0         0.0           0
*           cword
8200200           3
*           srch       press        temp
8200201         0.0       9.0e5      295.15
*
*           name        type
8220000    "unnamed"     tmdpjun
*           from         to        area      jefvcahs
8220101    820010002    824010001      0.0314           0
*          control        trip
8220200           1        1019
*           srch         mfl         mfv       unused
8220201       -1.0       380.0         0.0         0.0
8220202        0.0       380.0         0.0         0.0
8220203        1.0       200.4         0.0         0.0
8220204        5.0       100.2         0.0         0.0
8220205       10.0        50.1         0.0         0.0
8220206       20.0         0.0         0.0         0.0
*
*           name        type
8230000      "823"     tmdpvol
*           area       length         vol
8230101        50.0        50.0         0.0
*         az-angle    inc-angle          dz
8230102         0.0        90.0        50.0
*          x-rough        x-hd       flags
8230103         0.0         0.0           0
*           cword
8230200           3
*           srch       press        temp
8230201         0.0       9.0e5      295.15
*
*           name        type
8240000    "unnamed"     branch
*          njuns
8240001           4
*           area       length         vol
8240101      0.0314          0.4         0.0
*         az-angle    inc-angle          dz
8240102         0.0         0.0         0.0
*          x-rough        x-hd       flags
8240103         0.0         0.0           0
*            ebt        press     water-ie     steam-ie        void
8240200         000   9.552642e5   9.221891e4   2.581409e6         0.0
*           from         to        area
8241101    824010002    828010001      0.0314
*        fwd. loss    rev. loss      efvcahs
8241102         0.0         0.0           0
*            vl          vv       unused
8241201    3.0275283    3.0275283         0.0
*           from         to        area
8242101    824010002    830010001      0.0314
*        fwd. loss    rev. loss      efvcahs
8242102         0.0         0.0           0
*            vl          vv       unused
8242201    3.0345707    3.0345707         0.0
*           from         to        area
8243101    824010002    826010001      0.0314
*        fwd. loss    rev. loss      efvcahs
8243102         0.0         0.0           0
*            vl          vv       unused
8243201    3.0345347    3.0345347         0.0
*           from         to        area
8244101    824010002    832010001      0.0314
*        fwd. loss    rev. loss      efvcahs
8244102         0.0         0.0           0
*            vl          vv       unused
8244201    3.0275667    3.0275667         0.0
*
*           name        type
8250000    "unnamed"     tmdpjun
*           from         to        area      jefvcahs
8250101    823010002    824010001      0.0314           0
*          control        trip
8250200           1          32
*           srch         mfl         mfv       unused
8250201       -1.0         0.0         0.0         0.0
8250202        0.0         0.0         0.0         0.0
8250203       10.0        50.0         0.0         0.0
8250204       20.0       100.2         0.0         0.0
*
*           name        type
8260000    "unnamed"        pipe
*          ncells
8260001          18
*          x-area       volid
8260101      0.0314           1
8260102       0.055          17
8260103      0.0314          18
*         x-length       volid
8260301         0.5           1
8260302         0.3           2
8260303         0.4           8
8260304      0.4435          10
8260305         0.4          16
8260306         0.3          17
8260307         0.5          18
*          volume       volid
8260401         0.0          18
*        azim-angle       volid
8260501         0.0          18
*        vert-angle       volid
8260601         0.0           1
8260602       -90.0           8
8260603       -45.0           9
8260604        45.0          10
8260605        90.0          17
8260606         0.0          18
*          x-elev       volid
8260701         0.0           1
8260702        -0.3           2
8260703        -0.4           8
8260704       -0.25           9
8260705        0.25          10
8260706         0.4          16
8260707         0.3          17
8260708         0.0          18
*          x-wall        xhd       volid
8260801      1.0e-5         0.2           1
8260802      1.0e-5      0.0128          17
```

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8260803      1.0e-5        0.2          18
*          x-flags       volid
8261001          0          18
*     ebt     press   water-ie   steam-ie void none id
8261201 000 1.023774e6 9.221909e4 2.583424e6  0.0  0.0  1
8261202 000 1.023774e6 9.222004e4 2.583424e6  0.0  0.0  2
8261203 000 1.026108e6 9.569238e4  2.58349e6  0.0  0.0  3
8261204 000 1.028779e6 9.918663e4 2.583564e6  0.0  0.0  4
8261205 000  1.03085e6 1.027028e5 2.583622e6  0.0  0.0  5
8261206 000 1.032925e6  1.06241e5 2.583679e6  0.0  0.0  6
8261207 000 1.035003e6 1.098011e5 2.583737e6  0.0  0.0  7
8261208 000 1.037084e6 1.133833e5 2.583794e6  0.0  0.0  8
8261209 000 1.038368e6 1.169876e5  2.58383e6  0.0  0.0  9
8261210 000 1.036414e6 1.206139e5 2.583776e6  0.0  0.0 10
8261211 000 1.031354e6 1.242622e5 2.583636e6  0.0  0.0 11
8261212 000 1.025632e6 1.279325e5 2.583476e6  0.0  0.0 12
8261213 000 1.019915e6 1.316249e5 2.583316e6  0.0  0.0 13
8261214 000 1.014202e6 1.353394e5 2.583154e6  0.0  0.0 14
8261215 000 1.008494e6  1.39076e5 2.582991e6  0.0  0.0 15
8261216 000 1.002791e6 1.428347e5 2.582828e6  0.0  0.0 16
8261217 000 9.983316e5 1.428356e5 2.582698e6  0.0  0.0 17
8261218 000  9.96346e5 1.428358e5  2.58264e6  0.0  0.0 18
*         fwd. loss     rev.loss       junid
8260901         0.2          0.2           1
8260902         0.0          0.0           3
8260903         0.4          0.4          15
8260904         0.0          0.0          17
*         jefvcahs      jun num
8261101     00000003            1
8261102     00000000           16
8261103     00000003           17
*              vl           vv       unused       junid
8261301     3.034441     3.034441          0.0           1
8261302      1.73239      1.73239          0.0           2
8261303    1.7327236    1.7327236          0.0           3
8261304    1.7330712    1.7330712          0.0           4
8261305    1.7334335    1.7334335          0.0           5
8261306    1.7338102    1.7338102          0.0           6
8261307    1.7342013    1.7342013          0.0           7
8261308    1.7346067    1.7346067          0.0           8
8261309    1.7350274    1.7350274          0.0           9
8261310    1.7354652    1.7354652          0.0          10
8261311    1.7359198    1.7359198          0.0          11
8261312    1.7363895    1.7363895          0.0          12
8261313    1.7368741    1.7368741          0.0          13
8261314    1.7373734    1.7373734          0.0          14
8261315    1.7378874    1.7378874          0.0          15
8261316    1.7384164    1.7384164          0.0          16
8261317    3.0450029    3.0450029          0.0          17
*              hd         corr          gas        slope        junid
8261401         0.2          0.0          1.0          1.0            1
8261402      0.0128          0.0          1.0          1.0           16
8261403         0.2          0.0          1.0          1.0           17
*
*              name         type
8280000    "unnamed"         pipe
*           ncells
8280001          18
*           x-area       volid
8280101       0.0314           1
8280102        0.055          17
8280103       0.0314          18
*         x-length       volid
8280301          0.5           1
8280302          0.3           2
8280303          0.4           8
8280304       0.4435          10
8280305          0.4          16
8280306          0.3          17
8280307          0.5          18
*           volume       volid
8280401          0.0          18
*        azim-angle       volid
8280501          0.0          18
*        vert-angle       volid
8280601          0.0           1
8280602        -90.0           8
8280603        -45.0           9
8280604         45.0          10
8280605         90.0          17
8280606          0.0          18
*           x-elev       volid
8280701          0.0           1
8280702         -0.3           2
8280703         -0.4           8
8280704        -0.25           9
8280705         0.25          10
8280706          0.4          16
8280707          0.3          17
8280708          0.0          18
*           x-wall         xhd       volid
8280801      1.0e-5         0.2           1
8280802      1.0e-5      0.0128          17
8280803      1.0e-5         0.2          18
*          x-flags       volid
8281001          0          18
*     ebt     press   water-ie   steam-ie void none id
8281201 000 1.023795e6 9.221909e4 2.583425e6  0.0  0.0  1
8281202 000 1.023802e6 9.222003e4 2.583425e6  0.0  0.0  2
8281203 000 1.026141e6 9.491586e4  2.58349e6  0.0  0.0  3
8281204 000 1.028815e6 9.762602e4 2.583565e6  0.0  0.0  4
8281205 000 1.030893e6 1.003505e5 2.583623e6  0.0  0.0  5
8281206 000 1.032973e6 1.030894e5  2.58368e6  0.0  0.0  6
8281207 000 1.035056e6 1.058428e5 2.583738e6  0.0  0.0  7
8281208 000 1.037141e6 1.086105e5 2.583796e6  0.0  0.0  8
8281209 000 1.038429e6 1.113929e5 2.583831e6  0.0  0.0  9
8281210 000 1.036476e6 1.141897e5 2.583777e6  0.0  0.0 10
8281211 000 1.031415e6  1.17001e5 2.583638e6  0.0  0.0 11
8281212 000 1.025691e6 1.198268e5 2.583478e6  0.0  0.0 12
8281213 000 1.019971e6 1.226671e5 2.583317e6  0.0  0.0 13
8281214 000 1.014254e6 1.255221e5 2.583156e6  0.0  0.0 14
8281215 000 1.008542e6 1.283916e5 2.582993e6  0.0  0.0 15
8281216 000 1.002832e6 1.312758e5 2.582828e6  0.0  0.0 16
8281217 000 9.983645e5 1.312766e5 2.582699e6  0.0  0.0 17
8281218 000 9.963752e5 1.312768e5 2.582642e6  0.0  0.0 18
*         fwd. loss     rev.loss       junid
8280901         0.2          0.2           1
8280902         0.0          0.0           3
8280903         0.4          0.4          15
8280904         0.0          0.0          17
*         jefvcahs      jun num
8281101     00000003            1
8281102     00000000           16
8281103     00000003           17
*              vl           vv       unused       junid
8281301    3.0274346    3.0274346          0.0           1
8281302    1.7283901    1.7283901          0.0           2
8281303     1.728647     1.728647          0.0           3
8281304    1.7289124    1.7289124          0.0           4
8281305    1.7291869    1.7291869          0.0           5
8281306    1.7294701    1.7294701          0.0           6
8281307    1.7297622    1.7297622          0.0           7
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8281308    1.7300632    1.7300632         0.0          8
8281309    1.7303735    1.7303735         0.0          9
8281310    1.7306952    1.7306952         0.0         10
8281311    1.7310283    1.7310283         0.0         11
8281312    1.7313708    1.7313708         0.0         12
8281313    1.7317224    1.7317224         0.0         13
8281314    1.7320828    1.7320828         0.0         14
8281315    1.7324524    1.7324524         0.0         15
8281316     1.732831     1.732831         0.0         16
8281317    3.0352197    3.0352197         0.0         17
*             hd         corr         gas        slope       junid
8281401        0.2          0.0          1.0          1.0          1
8281402     0.0128          0.0          1.0          1.0         16
8281403        0.2          0.0          1.0          1.0         17
*
*            name         type
8300000    "unnamed"         pipe
*           ncells
8300001          18
*          x-area        volid
8300101       0.0314           1
8300102        0.055          17
8300103       0.0314          18
*         x-length        volid
8300301         0.5           1
8300302         0.3           2
8300303         0.4           8
8300304      0.4435          10
8300305         0.4          16
8300306         0.3          17
8300307         0.5          18
*          volume        volid
8300401         0.0          18
*        azim-angle        volid
8300501         0.0          18
*        vert-angle        volid
8300601         0.0           1
8300602       -90.0           8
8300603       -45.0           9
8300604        45.0          10
8300605        90.0          17
8300606         0.0          18
*           x-elev        volid
8300701         0.0           1
8300702        -0.3           2
8300703        -0.4           8
8300704       -0.25           9
8300705        0.25          10
8300706         0.4          16
8300707         0.3          17
8300708         0.0          18
*           x-wall         xhd        volid
8300801       1.0e-5         0.2           1
8300802       1.0e-5      0.0128          17
8300803       1.0e-5         0.2          18
*           x-flags        volid
8301001           0          18
*      ebt     press   water-ie   steam-ie void none id
8301201 000 1.023773e6 9.221909e4 2.583424e6  0.0  0.0  1
8301202 000 1.023774e6 9.222004e4 2.583424e6  0.0  0.0  2
8301203 000 1.026108e6 9.569723e4  2.58349e6  0.0  0.0  3
8301204 000 1.028779e6 9.919621e4 2.583564e6  0.0  0.0  4
8301205 000  1.03085e6  1.02717e5 2.583622e6  0.0  0.0  5
8301206 000 1.032925e6 1.062596e5 2.583679e6  0.0  0.0  6
8301207 000 1.035002e6 1.098241e5 2.583737e6  0.0  0.0  7
8301208 000 1.037084e6 1.134105e5 2.583794e6  0.0  0.0  8
8301209 000 1.038368e6 1.170189e5  2.58383e6  0.0  0.0  9
8301210 000 1.036414e6 1.206492e5 2.583776e6  0.0  0.0 10
8301211 000 1.031354e6 1.243013e5 2.583636e6  0.0  0.0 11
8301212 000 1.025632e6 1.279753e5 2.583476e6  0.0  0.0 12
8301213 000 1.019915e6 1.316712e5 2.583316e6  0.0  0.0 13
8301214 000 1.014202e6  1.35389e5 2.583154e6  0.0  0.0 14
8301215 000 1.008494e6 1.391288e5 2.582991e6  0.0  0.0 15
8301216 000 1.002791e6 1.428906e5 2.582828e6  0.0  0.0 16
8301217 000 9.983314e5 1.428915e5 2.582698e6  0.0  0.0 17
8301218 000 9.963459e5 1.428917e5  2.58264e6  0.0  0.0 18
*        fwd. loss     rev.loss       junid
8300901        0.2          0.2           1
8300902        0.0          0.0           3
8300903        0.4          0.4          15
8300904        0.0          0.0          17
*         jefvcahs      jun num
8301101     00000003            1
8301102     00000000           16
8301103     00000003           17
*             vl          vv       unused       junid
8301301     3.034477    3.034477         0.0           1
8301302    1.7324106   1.7324106         0.0           2
8301303    1.7327446   1.7327446         0.0           3
8301304    1.7330927   1.7330927         0.0           4
8301305    1.7334555   1.7334555         0.0           5
8301306    1.7338327   1.7338327         0.0           6
8301307    1.7342244   1.7342244         0.0           7
8301308    1.7346305   1.7346305         0.0           8
8301309    1.7350518   1.7350518         0.0           9
8301310     1.73549     1.73549         0.0          10
8301311    1.7359452   1.7359452         0.0          11
8301312    1.7364156   1.7364156         0.0          12
8301313    1.7369007   1.7369007         0.0          13
8301314    1.7374007   1.7374007         0.0          14
8301315    1.7379153   1.7379153         0.0          15
8301316    1.7384449   1.7384449         0.0          16
8301317     3.045053    3.045053         0.0          17
*             hd         corr         gas        slope       junid
8301401        0.2          0.0          1.0          1.0          1
8301402     0.0128          0.0          1.0          1.0         16
8301403        0.2          0.0          1.0          1.0         17
*
*            name         type
8320000    "unnamed"         pipe
*           ncells
8320001          18
*          x-area        volid
8320101       0.0314           1
8320102        0.055          17
8320103       0.0314          18
*         x-length        volid
8320301         0.5           1
8320302         0.3           2
8320303         0.4           8
8320304      0.4435          10
8320305         0.4          16
8320306         0.3          17
8320307         0.5          18
*          volume        volid
8320401         0.0          18
*        azim-angle        volid
8320501         0.0          18
*        vert-angle        volid
8320601         0.0           1
8320602       -90.0           8
8320603       -45.0           9
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8320604        45.0          10
8320605        90.0          17
8320606         0.0          18
*           x-elev        volid
8320701         0.0           1
8320702        -0.3           2
8320703        -0.4           8
8320704       -0.25           9
8320705        0.25          10
8320706         0.4          16
8320707         0.3          17
8320708         0.0          18
*           x-wall         xhd        volid
8320801       1.0e-5         0.2            1
8320802       1.0e-5      0.0128           17
8320803       1.0e-5         0.2           18
*           x-flags        volid
8321001            0          18
*      ebt     press   water-ie   steam-ie void none id
8321201 000 1.023795e6 9.221909e4 2.583425e6  0.0  0.0  1
8321202 000 1.023802e6 9.222003e4 2.583425e6  0.0  0.0  2
8321203 000 1.026141e6 9.492067e4  2.58349e6  0.0  0.0  3
8321204 000 1.028815e6 9.763555e4 2.583565e6  0.0  0.0  4
8321205 000 1.030893e6 1.003647e5 2.583623e6  0.0  0.0  5
8321206 000 1.032973e6 1.031082e5  2.58368e6  0.0  0.0  6
8321207 000 1.035056e6 1.058659e5 2.583738e6  0.0  0.0  7
8321208 000 1.037141e6 1.086381e5 2.583796e6  0.0  0.0  8
8321209 000 1.038429e6 1.114247e5 2.583831e6  0.0  0.0  9
8321210 000 1.036475e6 1.142258e5 2.583777e6  0.0  0.0 10
8321211 000 1.031415e6 1.170411e5 2.583638e6  0.0  0.0 11
8321212 000 1.025691e6 1.198709e5 2.583478e6  0.0  0.0 12
8321213 000 1.019971e6 1.227151e5 2.583317e6  0.0  0.0 13
8321214 000 1.014254e6 1.255738e5 2.583156e6  0.0  0.0 14
8321215 000 1.008541e6  1.28447e5 2.582993e6  0.0  0.0 15
8321216 000 1.002832e6 1.313347e5 2.582828e6  0.0  0.0 16
8321217 000 9.983643e5 1.313356e5 2.582699e6  0.0  0.0 17
8321218 000 9.963751e5 1.313357e5 2.582642e6  0.0  0.0 18
*         fwd. loss      rev.loss        junid
8320901         0.2           0.2            1
8320902         0.0           0.0            3
8320903         0.4           0.4           15
8320904         0.0           0.0           17
*          jefvcahs      jun num
8321101     00000003            1
8321102     00000000           16
8321103     00000003           17
*              vl           vv       unused        junid
8321301     3.027473     3.027473          0.0            1
8321302    1.7284119    1.7284119          0.0            2
8321303    1.7286693    1.7286693          0.0            3
8321304    1.7289351    1.7289351          0.0            4
8321305    1.7292103    1.7292103          0.0            5
8321306     1.729494     1.729494          0.0            6
8321307    1.7297866    1.7297866          0.0            7
8321308    1.7300881    1.7300881          0.0            8
8321309     1.730399     1.730399          0.0            9
8321310    1.7307214    1.7307214          0.0           10
8321311     1.731055     1.731055          0.0           11
8321312    1.7313981    1.7313981          0.0           12
8321313    1.7317501    1.7317501          0.0           13
8321314    1.7321112    1.7321112          0.0           14
8321315    1.7324814    1.7324814          0.0           15
8321316    1.7328606    1.7328606          0.0           16
8321317    3.0352716    3.0352716          0.0           17
*              hd         corr          gas        slope        junid
8321401         0.2          0.0          1.0          1.0            1
8321402      0.0128          0.0          1.0          1.0           16
8321403         0.2          0.0          1.0          1.0           17
*
*           name         type
8340000    "unnamed"       branch
*          njuns
8340001           5
*           area       length          vol
8340101      0.0314          0.4          0.0
*        az-angle     inc-angle           dz
8340102         0.0          0.0          0.0
*         x-rough        x-hd       flags
8340103         0.0          0.0           0
*           ebt        press     water-ie     steam-ie        void
8340200         000   9.271262e5   1.370924e5   2.580524e6          0.0
*           from          to        area
8341101    834010001    826180002      0.0314
*        fwd. loss     rev. loss      efvcahs
8341102         0.0          0.0           0
*            vl           vv       unused
8341201   -3.0450058   -3.0450058          0.0
*           from          to        area
8342101    834010001    828180002      0.0314
*        fwd. loss     rev. loss      efvcahs
8342102         0.0          0.0           0
*            vl           vv       unused
8342201   -3.0352223   -3.0352223          0.0
*           from          to        area
8343101    834010002    836010002      0.0314
*        fwd. loss     rev. loss      efvcahs
8343102         0.0          0.0           0
*            vl           vv       unused
8343201    12.160827    12.160827          0.0
*           from          to        area
8344101    834010001    830180002      0.0314
*        fwd. loss     rev. loss      efvcahs
8344102         0.0          0.0           0
*            vl           vv       unused
8344201   -3.0450556   -3.0450556          0.0
*           from          to        area
8345101    834010001    832180002      0.0314
*        fwd. loss     rev. loss      efvcahs
8345102         0.0          0.0           0
*            vl           vv       unused
8345201   -3.0352743   -3.0352743          0.0
*
*           name         type
8360000    "unnamed"       tmdpvol
*           area       length          vol
8360101         50.0         50.0          0.0
*        az-angle     inc-angle           dz
8360102         0.0         90.0         50.0
*         x-rough        x-hd       flags
8360103         0.0          0.0           0
*          cword
8360200           3
*           srch        press         temp
8360201         0.0         1.0e6        300.0
*
*           name         type
9020000    "unnamed"       tmdpvol
*           area       length          vol
9020101         50.0         50.0          0.0
*        az-angle     inc-angle           dz
9020102         0.0         90.0         50.0
*         x-rough        x-hd       flags
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9020103        0.0         0.0          0
*           cword
9020200          3
*           srch        press         temp
9020201         0.0        1.0e6        315.0
*
*           name        type
9040000    "unnamed"      tmdpjun
*           from          to         area      jefvcahs
9040101    902010002     767090003      3.14e-4          0
*         control        trip        alpha         num
9040200          1           3     cntrlvar          31
*           srch         mfl         mfv       unused
9040201        -1.0         0.0         0.0         0.0
9040202         0.0        50.0         0.0         0.0
9040203         6.0        50.0         0.0         0.0
9040204         6.6        35.0         0.0         0.0
9040205        6.65         0.0         0.0         0.0
9040206         6.7       -35.0         0.0         0.0
9040207         7.0       -40.0         0.0         0.0
9040208         7.8       -50.0         0.0         0.0
*
*           name        type
9050000    "unnamed"      tmdpvol
*           area       length         vol
9050101        50.0        50.0         0.0
*        az-angle    inc-angle          dz
9050102         0.0        90.0        50.0
*         x-rough        x-hd       flags
9050103         0.0         0.0           0
*           cword
9050200        1004
*     srch press  temp squal quala1 quala2
9050201  0.0 5.0e5 300.0   1.0    1.0    0.0
*
*           name        type
9060000    "unnamed"      tmdpjun
*           from          to         area      jefvcahs
9060101    905010002     767010003      9.14e-4          0
*         control        trip        alpha         num
9060200          1           3            p     767010000
*           srch         mfl         mfv       unused
9060201        -1.0         0.0         0.0         0.0
9060202       4.0e5         0.0         3.0         0.0
9060203       5.0e5         0.0         0.0         0.0
9060204       6.0e6         0.0        -3.0         0.0
9060205       7.0e6         0.0        -4.0         0.0
*
*           name        type
9140000    "unnamed"        pipe
*          ncells
9140001          4
*          x-area        volid
9140101     0.01327           4
*         x-length        volid
9140301        0.428           1
9140302          0.4           2
9140303        0.175           3
9140304        0.135           4
*          volume        volid
9140401          0.0           4
*        azim-angle        volid
9140501          0.0           4
*        vert-angle        volid
9140601          0.0           2
9140602        -90.0           4
*          x-wall         xhd        volid
9140801       1.0e-5          0.0           4
*          x-flags        volid
9141001            0           4
*     ebt     press   water-ie   steam-ie void none id
9141201 000 1.833709e6 1.317068e5 2.597595e6  0.0  0.0  1
9141202 000 1.833709e6 1.173401e5 2.597595e6  0.0  0.0  2
9141203 000 1.834565e6 1.152023e5 2.597604e6  0.0  0.0  3
9141204 000 1.836081e6 1.149017e5 2.597619e6  0.0  0.0  4
*        fwd. loss      rev.loss        junid
9140901          0.0         0.0           1
9140902          0.2         0.2           2
9140903          0.0         0.0           3
*         jefvcahs      jun num
9141101     00000000           3
*            vl          vv       unused       junid
9141301  -3.524137e-8  -3.524137e-8          0.0           1
9141302  -3.363033e-8  -3.363033e-8          0.0           2
9141303  -3.273611e-8  -3.273611e-8          0.0           3
*
*           name        type
9150000    "unnamed"       branch
*           njuns
9150001          4
*           area       length         vol
9150101      0.01327        0.248         0.0
*        az-angle    inc-angle          dz
9150102         0.0         0.0         0.0
*         x-rough        x-hd       flags
9150103         0.0         0.0           0
*            ebt        press      water-ie      steam-ie         void
9150200         000    1.836741e6    1.148843e5    2.597626e6          0.0
*           from          to         area
9151101    915010001     916010001      0.35345
*        fwd. loss     rev. loss      efvcahs
9151102         0.0         0.0           0
*            vl          vv       unused
9151201 -3.643099e-10 -3.643099e-10          0.0
*           from          to         area
9152101    915010002     917010001      0.35345
*        fwd. loss     rev. loss      efvcahs
9152102         0.2         0.2           0
*            vl          vv       unused
9152201 -1.968688e-10 -1.968688e-10          0.0
*           from          to         area
9153101    915010001     914040002          0.0
*        fwd. loss     rev. loss      efvcahs
9153102         0.0         0.0           0
*            vl          vv       unused
9153201   3.196995e-8   3.196995e-8          0.0
*           from          to         area
9154101    915010002     918010001          0.0
*        fwd. loss     rev. loss      efvcahs
9154102         0.0         0.0           0
*            vl          vv       unused
9154201  -1.544668e-8  -1.544668e-8          0.0
*
*           name        type
9160000    "unnamed"        pipe
*          ncells
9160001          4
*          x-area        volid
9160101     0.01327           4
*         x-length        volid
9160301        0.475           2
9160302       0.2325           3
```

```
9160303         0.2           4
*           volume        volid
9160401         0.0           4
*        azim-angle        volid
9160501         0.0           4
*        vert-angle        volid
9160601         0.0           2
9160602       -90.0           4
*           x-wall         xhd        volid
9160801       1.0e-5         0.0           4
*           x-flags        volid
9161001           0           4
*      ebt     press   water-ie   steam-ie void none id
9161201 000 1.836741e6 1.152098e5 2.597626e6  0.0  0.0  1
9161202 000 1.836741e6 1.153552e5 2.597626e6  0.0  0.0  2
9161203 000 1.837877e6  1.15563e5 2.597637e6  0.0  0.0  3
9161204 000 1.839992e6 1.157722e5 2.597658e6  0.0  0.0  4
*         fwd. loss      rev.loss        junid
9160901         0.0           0.0           1
9160902         0.2           0.2           2
9160903         0.0           0.0           3
*          jefvcahs      jun num
9161101     00000000            3
*              vl           vv       unused        junid
9161301  -6.498002e-9  -6.498002e-9          0.0           1
9161302   -3.12826e-9   -3.12826e-9          0.0           2
9161303  -1.450257e-9  -1.450257e-9          0.0           3
*
*            name         type
9170000    "unnamed"         pipe
*           ncells
9170001           2
*           x-area        volid
9170101      0.01327           2
*          x-length       volid
9170301       0.2325           1
9170302         0.2            2
*           volume        volid
9170401         0.0           2
*        azim-angle        volid
9170501         0.0           2
*        vert-angle        volid
9170601       -90.0           2
*           x-wall         xhd        volid
9170801         0.0           0.0           2
*           x-flags        volid
9171001           0           2
*      ebt     press   water-ie   steam-ie void none id
9171201 000 1.837877e6 1.153105e5 2.597637e6  0.0  0.0  1
9171202 000 1.839992e6 1.155218e5 2.597658e6  0.0  0.0  2
*          jefvcahs      jun num
9171101     00000000            1
*              vl           vv       unused        junid
9171301  -3.733271e-9  -3.733271e-9          0.0           1
*
*            name         type
9180000    "unnamed"         pipe
*           ncells
9180001           4
*           x-area        volid
9180101      0.01327           4
*          x-length       volid
9180301        0.599           1
9180302          0.6           2
9180303       0.2325           3
9180304          0.2           4
*           volume        volid
9180401         0.0           4
*        azim-angle        volid
9180501         0.0           4
*        vert-angle        volid
9180601         0.0           2
9180602       -90.0           4
*           x-wall         xhd        volid
9180801         0.0           0.0           4
*           x-flags        volid
9181001           0           4
*      ebt     press   water-ie   steam-ie void none id
9181201 000 1.836741e6 1.141589e5 2.597626e6  0.0  0.0  1
9181202 000 1.836741e6 1.141806e5 2.597626e6  0.0  0.0  2
9181203 000 1.837878e6 1.143507e5 2.597637e6  0.0  0.0  3
9181204 000 1.839992e6 1.145549e5 2.597658e6  0.0  0.0  4
*         fwd. loss      rev.loss        junid
9180901         0.0           0.0           1
9180902         0.2           0.2           2
9180903         0.0           0.0           3
*          jefvcahs      jun num
9181101     00000000            3
*              vl           vv       unused        junid
9181301  -1.120946e-8  -1.120946e-8          0.0           1
9181302  -6.527632e-9  -6.527632e-9          0.0           2
9181303  -4.645412e-9  -4.645412e-9          0.0           3
*
*            name         type
9190000      "1z205"         valve
*            from           to         area
9190101    922010001    917020002       9.5e-3
*         fwd. loss     rev. loss      efvcahs
9190102         0.0           0.0          100
*         discharge      thermal
9190103         1.0          0.14
*              hd        flood     intercept        slope
9190110        0.11          0.0          1.0          1.0
*            flow           vl           vv       unused
9190201           0  3.374653e-9  3.374653e-9          0.0
*            type
9190300       mtrvlv
*           topen       tclose        vrate         ipos
9190301           1            2          1.0          1.0
*
*            name         type
9200000      "1z206"         valve
*            from           to         area
9200101    923010001    918040002       9.5e-3
*         fwd. loss     rev. loss      efvcahs
9200102         0.0           0.0          100
*         discharge      thermal
9200103         1.0          0.14
*              hd        flood     intercept        slope
9200110        0.11          0.0          1.0          1.0
*            flow           vl           vv       unused
9200201           0  4.197321e-9  4.197321e-9          0.0
*            type
9200300       mtrvlv
*           topen       tclose        vrate         ipos
9200301           1            2          1.0          1.0
*
*            name         type
9210000    "unnamed"         pipe
*           ncells
9210001           1
*           x-area        volid
```

```
9210101      0.01327          1
*          x-length        volid
9210301      0.3625           1
*          volume        volid
9210401      0.0              1
*        azim-angle        volid
9210501      0.0              1
*        vert-angle        volid
9210601      -90.0            1
*          x-wall         xhd       volid
9210801      0.0         0.0           1
*          x-flags        volid
9211001      0            1
*     ebt    press   water-ie   steam-ie void none id
9211201 000 2.16154e6 1.159907e5 2.600318e6  0.0  0.0  1
*
*            name         type
9220000    "unnamed"         pipe
*          ncells
9220001          1
*          x-area        volid
9220101      0.01327          1
*          x-length        volid
9220301      0.3625           1
*          volume        volid
9220401      0.0              1
*        azim-angle        volid
9220501      0.0              1
*        vert-angle        volid
9220601      -90.0            1
*          x-wall         xhd       volid
9220801      0.0         0.0           1
*          x-flags        volid
9221001      0            1
*     ebt     press   water-ie   steam-ie void none id
9221201 000 1.842742e6 1.153596e5 2.597686e6  0.0  0.0  1
*
*            name         type
9230000    "unnamed"         pipe
*          ncells
9230001          1
*          x-area        volid
9230101      0.01327          1
*          x-length        volid
9230301      0.3625           1
*          volume        volid
9230401      0.0              1
*        azim-angle        volid
9230501      0.0              1
*        vert-angle        volid
9230601      -90.0            1
*          x-wall         xhd       volid
9230801      0.0         0.0           1
*          x-flags        volid
9231001      0            1
*     ebt     press   water-ie   steam-ie void none id
9231201 000 1.842742e6 1.153028e5 2.597686e6  0.0  0.0  1
*
*            name         type
9240000     "1z207"         valve
*            from          to         area
9240101    927010001    921010002       9.5e-3
*         fwd. loss     rev. loss      efvcahs
9240102         0.2          0.2           0
*         discharge      thermal
9240103         1.0         0.14
*             hd        flood     intercept       slope
9240110       0.11          0.0          1.0         1.0
*           flow          vl          vv        unused
9240201          0         0.0         0.0         0.0
*           type
9240300      chkvlv
*           type         pos         add        leak
9240301          0          0       1.0e4         0.0
*
*            name         type
9250000     "1z208"         valve
*            from          to         area
9250101    928010001    922010002       9.5e-3
*         fwd. loss     rev. loss      efvcahs
9250102         0.2          0.2           0
*         discharge      thermal
9250103         1.0         0.14
*             hd        flood     intercept       slope
9250110       0.11          0.0          1.0         1.0
*           flow          vl          vv        unused
9250201          0         0.0         0.0         0.0
*           type
9250300      chkvlv
*           type         pos         add        leak
9250301          0          0       1.0e4         0.0
*
*            name         type
9260000     "1z209"         valve
*            from          to         area
9260101    929010001    923010002       9.5e-3
*         fwd. loss     rev. loss      efvcahs
9260102         0.2          0.2           0
*         discharge      thermal
9260103         1.0         0.14
*             hd        flood     intercept       slope
9260110       0.11          0.0          1.0         1.0
*           flow          vl          vv        unused
9260201          0         0.0         0.0         0.0
*           type
9260300      chkvlv
*           type         pos         add        leak
9260301          0          0       1.0e4         0.0
*
*            name         type
9270000    "unnamed"         pipe
*          ncells
9270001          3
*          x-area        volid
9270101       5.0e-3          3
*         x-length        volid
9270301         0.2           1
9270302        0.22           2
9270303       0.205           3
*          volume        volid
9270401         0.0           3
*        azim-angle        volid
9270501         0.0           3
*        vert-angle        volid
9270601        -90.0          1
9270602     -77.76125         2
9270603     -77.31962         3
*          x-elev        volid
9270701        -0.2           1
9270702       -0.215          2
9270703        -0.2           3
*          x-wall         xhd       volid
```

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9270801      1.0e-5         0.0          3
*          x-flags       volid
9271001          0          3
*     ebt     press   water-ie   steam-ie void none id
9271201 000 8.688111e5 1.166453e5 2.578569e6  0.0  0.0  1
9271202 000 8.708391e5 1.168101e5  2.57864e6  0.0  0.0  2
9271203 000 8.728671e5  1.16917e5  2.57871e6  0.0  0.0  3
*         fwd. loss     rev.loss       junid
9270901         0.2         0.2          1
9270902         0.0         0.0          2
*         jefvcahs      jun num
9271101     00000000           2
*             vl          vv       unused       junid
9271301  7.352485e-19  7.352485e-19         0.0          1
9271302  5.060103e-19  5.060103e-19         0.0          2
*
*            name        type
9280000    "unnamed"        pipe
*          ncells
9280001          3
*          x-area       volid
9280101       5.0e-3          3
*         x-length       volid
9280301         0.2          1
9280302        0.22          2
9280303       0.205          3
*          volume       volid
9280401         0.0          3
*       azim-angle       volid
9280501         0.0          3
*       vert-angle       volid
9280601       -90.0          1
9280602    -77.76125          2
9280603    -77.31962          3
*          x-elev       volid
9280701        -0.2          1
9280702      -0.215          2
9280703        -0.2          3
*          x-wall         xhd       volid
9280801      1.0e-5         0.0          3
*         x-flags       volid
9281001          0          3
*     ebt     press   water-ie   steam-ie void none id
9281201 000 6.764885e5 1.167876e5  2.57071e6  0.0  0.0  1
9281202 000 6.785162e5 1.188805e5 2.570807e6  0.0  0.0  2
9281203 000 6.805428e5 1.309313e5 2.570904e6  0.0  0.0  3
*         fwd. loss     rev.loss       junid
9280901         0.2         0.2          1
9280902         0.0         0.0          2
*         jefvcahs      jun num
9281101     00000000           2
*             vl          vv       unused       junid
9281301  3.361339e-8  3.361339e-8         0.0          1
9281302  7.052427e-8  7.052427e-8         0.0          2
*
*            name        type
9290000    "unnamed"        pipe
*          ncells
9290001          3
*          x-area       volid
9290101       5.0e-3          3
*         x-length       volid
9290301         0.2          1
9290302        0.22          2
9290303       0.205          3
*          volume       volid
9290401         0.0          3
*       azim-angle       volid
9290501         0.0          3
*       vert-angle       volid
9290601       -90.0          1
9290602    -77.76125          2
9290603    -77.31962          3
*          x-elev       volid
9290701        -0.2          1
9290702      -0.215          2
9290703        -0.2          3
*          x-wall         xhd       volid
9290801      1.0e-5         0.0          3
*         x-flags       volid
9291001          0          3
*     ebt     press   water-ie   steam-ie void none id
9291201 000 6.800875e5 1.154852e5 2.570882e6  0.0  0.0  1
9291202 000 6.821154e5  1.17296e5 2.570978e6  0.0  0.0  2
9291203 000 6.841423e5 1.283843e5 2.571074e6  0.0  0.0  3
*         fwd. loss     rev.loss       junid
9290901         0.2         0.2          1
9290902         0.0         0.0          2
*         jefvcahs      jun num
9291101     00000000           2
*             vl          vv       unused       junid
9291301  2.336231e-8  2.336231e-8         0.0          1
9291302  4.901669e-8  4.901669e-8         0.0          2
*
*            name        type
9300000    "unnamed"        pipe
*          ncells
9300001          4
*          x-area       volid
9300101      2.29e-3          1
9300102       5.0e-3          4
*         x-length       volid
9300301        0.29          1
9300302         0.4          2
9300303        0.45          3
9300304         0.4          4
*          volume       volid
9300401         0.0          4
*       azim-angle       volid
9300501         0.0          4
*       vert-angle       volid
9300601         0.0          1
9300602       -90.0          4
*          x-wall         xhd       volid
9300801      1.0e-5         0.0          4
*         x-flags       volid
9301001          0          4
*     ebt     press   water-ie   steam-ie void none id
9301201 000 6.671968e5   2.5828e5 2.570263e6  0.0  0.0  1
9301202 000 6.840512e5 2.582788e5 2.571069e6  0.0  0.0  2
9301203 000 6.883694e5 2.582787e5 2.571272e6  0.0  0.0  3
9301204 000 6.927046e5 2.582785e5 2.571474e6  0.0  0.0  4
*            area         jun
9300201      2.29e-3          1
9300202         0.0          3
*         fwd. loss     rev.loss       junid
9300901         0.2         0.2          1
9300902         0.0         0.0          3
*         jefvcahs      jun num
9301101     00000000           3
*             vl          vv       unused       junid
9301301   -5.4055901   -5.4055901         0.0          1
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9301302   -2.4757559   -2.4757559         0.0          2
9301303   -2.4757514   -2.4757514         0.0          3
*
*            name         type
9310000    "unnamed"         pipe
*           ncells
9310001          4
*          x-area        volid
9310101      2.29e-3          1
9310102       5.0e-3          4
*          x-length      volid
9310301         0.29          1
9310302          0.4          2
9310303         0.45          3
9310304          0.4          4
*           volume       volid
9310401          0.0          4
*         azim-angle      volid
9310501          0.0          4
*         vert-angle      volid
9310601          0.0          1
9310602        -90.0          4
*           x-wall        xhd       volid
9310801          0.0          0.0          4
*           x-flags       volid
9311001          0          4
*      ebt     press   water-ie   steam-ie void none id
9311201 000 6.590405e5  2.58266e5 2.569864e6  0.0  0.0  1
9311202 000 6.796658e5 2.582648e5 2.570862e6  0.0  0.0  2
9311203 000 6.840084e5 2.582646e5 2.571067e6  0.0  0.0  3
9311204 000 6.883721e5 2.582643e5 2.571272e6  0.0  0.0  4
*            area         jun
9310201      2.29e-3          1
9310202          0.0          3
*         fwd. loss     rev.loss       junid
9310901          0.2          0.2          1
9310902          0.0          0.0          3
*          jefvcahs      jun num
9311101     00000000           3
*             vl          vv       unused        junid
9311301   -6.0733056   -6.0733056         0.0          1
9311302   -2.7815695   -2.7815695         0.0          2
9311303    -2.781564    -2.781564         0.0          3
*
*            name         type
9320000    "unnamed"         pipe
*           ncells
9320001          4
*          x-area        volid
9320101      2.29e-3          1
9320102       5.0e-3          4
*          x-length      volid
9320301         0.29          1
9320302          0.4          2
9320303         0.45          3
9320304          0.4          4
*           volume       volid
9320401          0.0          4
*         azim-angle      volid
9320501          0.0          4
*         vert-angle      volid
9320601          0.0          1
9320602        -90.0          4
*           x-wall        xhd       volid
9320801          0.0          0.0          4
*           x-flags       volid
9321001          0          4
*      ebt     press   water-ie   steam-ie void none id
9321201 000 8.738444e5 1.244432e5 2.578744e6  0.0  0.0  1
9321202 000 8.757981e5  1.24357e5 2.578812e6  0.0  0.0  2
9321203 000 8.799498e5 1.235095e5 2.578956e6  0.0  0.0  3
9321204 000 8.841018e5 1.223206e5 2.579098e6  0.0  0.0  4
*            area         jun
9320201      2.29e-3          1
9320202          0.0          3
*          jefvcahs      jun num
9321101     00000000           3
*             vl          vv       unused        junid
9321301   7.62469e-19   7.62469e-19         0.0          1
9321302  1.426728e-18  1.426728e-18         0.0          2
9321303  1.286504e-18  1.286504e-18         0.0          3
*
*            name         type
9340000    "unnamed"         pump
*            area       length          vol
9340101      2.29e-3          0.2          0.0
*          az-angle     inc-angle           dz
9340102          0.0          0.0          0.0
*           flags
9340103          0
*            ebt        press      water-ie      steam-ie          void
9340200          000    6.140936e5    2.582641e5    2.567558e6          0.0
*             to         area         kfor         krev      jefvcahs
9340108     940010002          0.0          0.2          0.2           0
*           flow           vl           vv       unused
9340201          0     6.0735326     6.0735326          0.0
*             to         area         kfor         krev      jefvcahs
9340109     931040002          0.0          0.2          0.2           0
*           flow           vl           vv       unused
9340202          0     6.0734739     6.0734739          0.0
*      phase twophase tdiff mtorq tdvel ptrip rev
9340301    0     -1   -3   -1   -1   27   0
*           pvel       pratio        rflow        rhead
9340302        150.8          1.0       0.02139         12.2
*          rtorq      imoment        rdens        rmtor
9340303        22.47        0.058        988.0          0.0
*            tf2          tf0          tf1          tf3
9340304       0.2247       0.2247          0.0          0.0
*           type       regime
9341100          1          1
*            ind          dep
9341101        3.0e-3       1.123
9341102         0.212       1.148
9341103         0.387       1.148
9341104         0.547       1.139
9341105         0.696       1.107
9341106         0.805       1.074
9341107         0.912       1.041
9341108          1.0          1.0
*           type       regime
9341200          1          2
*            ind          dep
9341201          0.0         -0.3
9341202   0.10266667   -0.2890878
9341203         0.154       -0.264
9341204         0.257       -0.196
9341205         0.481        0.035
9341206         0.513        0.078
9341207          0.77        0.499
9341208         0.891        0.749
9341209          1.0          1.0
*           type       regime
```

```
9341300          1          3
*           ind         dep
9341301       -1.0        3.21
9341302       -0.6        2.52
9341303       -0.4         2.2
9341304       -0.2       1.962
9341305        0.0       1.123
*           type      regime
9341400          1          4
*           ind         dep
9341401       -1.0        3.21
9341402       -0.6         2.1
9341403       -0.4        1.72
9341404       -0.2        1.45
9341405        0.0         1.3
*           type      regime
9341500          1          5
*           ind         dep
9341501        0.0         0.0
9341502        0.2        0.11
9341503        0.4        0.13
9341504        0.6        0.26
9341505        0.8        0.49
9341506        1.0        0.83
*           type      regime
9341600          1          6
*           ind         dep
9341601        0.0         1.3
9341602        0.2        1.18
9341603        0.4        1.07
9341604        0.6        0.97
9341605        0.8        0.89
9341606        1.0        0.83
*           type      regime
9341700          1          7
*           ind         dep
9341701        0.0         1.3
9341702        0.2        1.18
9341703        0.4        1.07
9341704        0.6        0.97
9341705        0.8        0.89
9341706        1.0        0.83
*           type      regime
9341800          1          8
*           ind         dep
9341801       -1.0        -2.0
9341802      -0.75       -1.94
9341803       -0.5        -1.8
9341804        0.0        -0.3
*           type      regime
9341900          2          1
*           ind         dep
9341901     3.0e-3       0.506
9341902      0.212       0.566
9341903      0.387       0.667
9341904      0.547       0.761
9341905      0.696       0.833
9341906      0.805       0.894
9341907      0.912       0.952
9341908        1.0         1.0
*           type      regime
9342000          2          2
*           ind         dep
9342001        0.0        -4.5
9342002      0.103        -3.3
9342003      0.154        -2.6
9342004      0.257        -1.5
9342005      0.481       0.153
9342006      0.513       0.282
9342007       0.77       0.694
9342008      0.891       0.842
9342009        1.0         1.0
*           type      regime
9342100          2          3
*           ind         dep
9342101       -1.0         2.5
9342102       -0.6        1.86
9342103       -0.4        1.36
9342104       -0.2         1.0
9342105        0.0      3.0e-3
*           type      regime
9342200          2          4
*           ind         dep
9342201       -1.0         2.5
9342202       -0.6        0.93
9342203       -0.4        1.06
9342204       -0.2        1.23
9342205        0.0        1.44
*           type      regime
9342300          2          5
*           ind         dep
9342301        0.0        -1.0
9342302        0.2       -0.71
9342303        0.4       -0.43
9342304        0.6        0.07
9342305        0.8       0.314
9342306        1.0        0.57
*           type      regime
9342400          2          6
*           ind         dep
9342401        0.0        1.44
9342402        0.2        1.23
9342403        0.4        1.06
9342404        0.6        0.93
9342405        0.8         0.8
9342406        1.0        0.57
*           type      regime
9342500          2          7
*           ind         dep
9342501       -1.0        -2.0
9342502       -0.3      -2.225
9342503      -0.18        -2.5
9342504      -0.07       -2.75
9342505        0.0        -4.5
*           type      regime
9342600          2          8
*           ind         dep
9342601       -1.0        -2.0
9342602      -0.25        -1.8
9342603      -0.12        -1.5
9342604      -0.08        -1.4
9342605        0.0        -1.0
*
*           name        type
9350000    "unnamed"        pump
*           area      length         vol
9350101     2.29e-3         0.2         0.0
*        az-angle    inc-angle          dz
9350102        0.0         0.0         0.0
*           flags
9350103          0
*           ebt       press     water-ie     steam-ie         void
```

```
9350200        000   6.197322e5   2.582783e5   2.567858e6        0.0
*            to       area        kfor        krev     jefvcahs
9350108    941010002        0.0        0.2        0.2           0
*           flow         vl         vv      unused
9350201          0    5.4057918    5.4057918         0.0
*            to       area        kfor        krev     jefvcahs
9350109    930040002        0.0        0.2        0.2           0
*           flow         vl         vv      unused
9350202          0    5.4057369    5.4057369         0.0
*      phase twophase tdiff mtorq tdvel ptrip rev
9350301  934     -1   -3   -1   -1  1020   0
*           pvel      pratio       rflow       rhead
9350302       150.8         1.0      0.02139        12.2
*          rtorq     imoment       rdens       rmtor
9350303       22.47       0.058       988.0         0.0
*            tf2         tf0         tf1         tf3
9350304      0.2247      0.2247         0.0         0.0
*
*           name        type
9360000     "1z210"       valve
*           from          to        area
9360101    942050002    939010001      9.5e-3
*        fwd. loss    rev. loss     efvcahs
9360102         0.0         0.0         100
*        discharge     thermal
9360103         1.0        0.14
*            hd       flood    intercept       slope
9360110       0.11         0.0         1.0         1.0
*           flow         vl         vv      unused
9360201          0         0.0         0.0         0.0
*           type
9360300      mtrvlv
*          topen      tclose       vrate        ipos
9360301          2          1         1.0         0.0
*
*           name        type
9370000     "1z211"       valve
*           from          to        area
9370101    944050002    940010001      9.5e-3
*        fwd. loss    rev. loss     efvcahs
9370102         0.0         0.0         100
*        discharge     thermal
9370103         1.0        0.14
*            hd       flood    intercept       slope
9370110       0.11         0.0         1.0         1.0
*           flow         vl         vv      unused
9370201          0    1.4640408    1.4640408         0.0
*           type
9370300      mtrvlv
*          topen      tclose       vrate        ipos
9370301          1          2         1.0         1.0
*
*           name        type
9380000     "1z203"       valve
*           from          to        area
9380101    946100002    941010001      9.5e-3
*        fwd. loss    rev. loss     efvcahs
9380102         0.0         0.0         100
*        discharge     thermal
9380103         1.0        0.14
*            hd       flood    intercept       slope
9380110       0.11         0.0         1.0         1.0
*           flow         vl         vv      unused
9380201          0    1.3030801    1.3030801         0.0
*           type
9380300      mtrvlv
*          topen      tclose       vrate        ipos
9380301          1          2         1.0         1.0
*
*           name        type
9390000     "unnamed"       pipe
*           ncells
9390001          1
*         x-area       volid
9390101      0.0132           1
*         x-length       volid
9390301         0.3           1
*         volume       volid
9390401         0.0           1
*       azim-angle       volid
9390501         0.0           1
*       vert-angle       volid
9390601         0.0           1
*         x-wall        xhd       volid
9390801         0.0         0.0           1
*         x-flags       volid
9391001          0           1
*     ebt     press   water-ie steam-ie void none id
9391201 000 3.400665e5 1.239468e5 2.5475e6  0.0  0.0  1
*
*           name        type
9400000     "unnamed"       pipe
*           ncells
9400001          1
*         x-area       volid
9400101      0.0132           1
*         x-length       volid
9400301         0.3           1
*         volume       volid
9400401         0.0           1
*       azim-angle       volid
9400501         0.0           1
*       vert-angle       volid
9400601         0.0           1
*         x-wall        xhd       volid
9400801       1.0e-5         0.0           1
*         x-flags       volid
9401001          0           1
*     ebt     press   water-ie   steam-ie void none id
9401201 000 5.696677e5 2.581928e5 2.565076e6  0.0  0.0  1
*
*           name        type
9410000     "unnamed"       pipe
*           ncells
9410001          1
*         x-area       volid
9410101      0.0132           1
*         x-length       volid
9410301         0.3           1
*         volume       volid
9410401         0.0           1
*       azim-angle       volid
9410501         0.0           1
*       vert-angle       volid
9410601         0.0           1
*         x-wall        xhd       volid
9410801       1.0e-5         0.0           1
*         x-flags       volid
9411001          0           1
*     ebt     press   water-ie   steam-ie void none id
9411201 000 5.699959e5 2.581931e5 2.565095e6  0.0  0.0  1
*
```

```
*            name        type
9420000    "unnamed"        pipe
*           ncells
9420001          5
*          x-area       volid
9420101      0.0132          5
*         x-length       volid
9420301         0.3          2
9420302         0.2          3
9420303        0.48          4
9420304       0.365          5
*          volume       volid
9420401         0.0          5
*       azim-angle       volid
9420501         0.0          5
*       vert-angle       volid
9420601         0.0          3
9420602        90.0          4
9420603         0.0          5
*          x-wall        xhd       volid
9420801      1.0e-5          0.0          5
*          x-flags       volid
9421001           0          5
*      ebt     press   water-ie   steam-ie void none id
9421201 000 5.755049e5 1.367522e5 2.565414e6  0.0  0.0  1
9421202 000  5.75505e5 1.372633e5 2.565414e6  0.0  0.0  2
9421203 000  5.75505e5  1.36373e5 2.565414e6  0.0  0.0  3
9421204 000 5.731626e5 1.341733e5 2.565279e6  0.0  0.0  4
9421205 000 5.708202e5 1.289091e5 2.565143e6  0.0  0.0  5
*        fwd. loss     rev.loss        junid
9420901         0.0          0.0          2
9420902         0.4          0.4          4
*         jefvcahs      jun num
9421101     00000000           4
*            vl          vv       unused       junid
9421301 -1.671906e-7 -1.671906e-7          0.0          1
9421302 -1.299547e-7 -1.299547e-7          0.0          2
9421303 -1.051273e-7 -1.051273e-7          0.0          3
9421304 -4.548864e-8 -4.548864e-8          0.0          4
*
*            name        type
9430000    "unnamed"       branch
*           njuns
9430001          2
*           area       length          vol
9430101       0.0132          0.3          0.0
*         az-angle     inc-angle           dz
9430102          0.0          0.0          0.0
*          x-rough        x-hd       flags
9430103       1.0e-5          0.0          0
*            ebt        press      water-ie     steam-ie         void
9430200         000    5.755049e5    1.396401e5    2.565414e6          0.0
*            from          to        area
9431101    943010001    944030002      0.0229
*        fwd. loss     rev. loss      efvcahs
9431102          0.0          0.0          0
*            vl          vv       unused
9431201  1.393104e-7  1.393104e-7          0.0
*            from          to        area
9432101    943010002    942010001          0.0
*        fwd. loss     rev. loss      efvcahs
9432102          0.0          0.0          0
*            vl          vv       unused
9432201 -2.044578e-7 -2.044578e-7          0.0
*
*            name        type
9440000    "unnamed"        pipe
*           ncells
9440001          5
*          x-area       volid
9440101      0.0132          5
*         x-length       volid
9440301         0.3          3
9440302        0.48          4
9440303       0.365          5
*          volume       volid
9440401         0.0          5
*       azim-angle       volid
9440501         0.0          5
*       vert-angle       volid
9440601         0.0          3
9440602        90.0          4
9440603         0.0          5
*          x-wall        xhd       volid
9440801      1.0e-5          0.0          5
*          x-flags       volid
9441001           0          5
*      ebt     press   water-ie   steam-ie void none id
9441201 000 5.749981e5 2.581933e5 2.565385e6  0.0  0.0  1
9441202 000 5.749788e5 2.581932e5 2.565384e6  0.0  0.0  2
9441203 000 5.749596e5 2.581931e5 2.565383e6  0.0  0.0  3
9441204 000 5.725119e5  2.58193e5 2.565242e6  0.0  0.0  4
9441205 000 5.700622e5 2.581929e5 2.565099e6  0.0  0.0  5
*        fwd. loss     rev.loss        junid
9440901         0.0          0.0          2
9440902         0.2          0.2          4
*         jefvcahs      jun num
9441101     00000000           4
*            vl          vv       unused       junid
9441301    1.053663     1.053663          0.0          1
9441302   1.0536631    1.0536631          0.0          2
9441303   1.0536634    1.0536634          0.0          3
9441304   1.0536646    1.0536646          0.0          4
*
*            name        type
9450000    "unnamed"       branch
*           njuns
9450001          2
*           area       length          vol
9450101      0.0132          0.3          0.0
*         az-angle     inc-angle           dz
9450102          0.0          0.0          0.0
*          x-rough        x-hd       flags
9450103       1.0e-5          0.0          0
*            ebt        press      water-ie     steam-ie         void
9450200         000    5.750173e5    2.581934e5    2.565386e6          0.0
*            from          to        area
9451101    945010001    946080002          0.0
*        fwd. loss     rev. loss      efvcahs
9451102          0.0          0.0          0
*            vl          vv       unused
9451201   -1.0536636   -1.0536636          0.0
*            from          to        area
9452101    945010002    944010001          0.0
*        fwd. loss     rev. loss      efvcahs
9452102          0.0          0.0          0
*            vl          vv       unused
9452201     1.053663     1.053663          0.0
*
*            name        type
9460000    "unnamed"        pipe
*           ncells
```

```
9460001          10
*           x-area        volid
9460101       0.0132          10
*          x-length        volid
9460301         0.47           1
9460302          0.5           2
9460303          0.4           3
9460304         0.48           4
9460305       0.4285           8
9460306         0.48           9
9460307        0.365          10
*           volume        volid
9460401          0.0          10
*         azim-angle        volid
9460501          0.0          10
*         vert-angle        volid
9460601        -90.0           1
9460602          0.0           3
9460603        -90.0           4
9460604          0.0           8
9460605         90.0           9
9460606          0.0          10
*           x-wall         xhd        volid
9460801       1.0e-5         0.0          10
*           x-flags        volid
9461001            0          10
*      ebt     press   water-ie   steam-ie void none id
9461201 000 5.685876e5 2.581935e5 2.565013e6  0.0  0.0  1
9461202 000 5.703584e5 2.581935e5 2.565116e6  0.0  0.0  2
9461203 000 5.702639e5 2.581935e5 2.565111e6  0.0  0.0  3
9461204 000 5.720924e5 2.581935e5 2.565217e6  0.0  0.0  4
9461205 000 5.739178e5 2.581935e5 2.565323e6  0.0  0.0  5
9461206 000 5.738278e5 2.581935e5 2.565318e6  0.0  0.0  6
9461207 000 5.737378e5 2.581935e5 2.565312e6  0.0  0.0  7
9461208 000 5.736478e5 2.581935e5 2.565307e6  0.0  0.0  8
9461209 000 5.727307e5 2.581933e5 2.565254e6  0.0  0.0  9
9461210 000  5.70309e5 2.581932e5 2.565114e6  0.0  0.0 10
*          fwd. loss      rev.loss        junid
9460901          0.2           0.2           1
9460902          0.0           0.0           2
9460903          0.2           0.2           4
9460904          0.0           0.0           7
9460905          0.2           0.2           9
*          jefvcahs      jun num
9461101     00000000            9
*              vl           vv       unused        junid
9461301     1.9914888     1.9914888          0.0           1
9461302     1.9914874     1.9914874          0.0           2
9461303     1.9914875     1.9914875          0.0           3
9461304      1.991486      1.991486          0.0           4
9461305     1.9914845     1.9914845          0.0           5
9461306     1.9914846     1.9914846          0.0           6
9461307     1.9914848     1.9914848          0.0           7
9461308    0.93782133    0.93782133          0.0           8
9461309    0.93782175    0.93782175          0.0           9
*
*             name         type
9500000      "1z210"        valve
*             from           to         area
9500101     953020002     932010001      1.96e-3
*          fwd. loss     rev. loss      efvcahs
9500102          0.0           0.0          100
*          discharge      thermal
9500103          1.0          0.14
*              hd        flood     intercept        slope
9500110        0.05          0.0          1.0          1.0
*             flow           vl           vv       unused
9500201            0          0.0          0.0          0.0
*             type
9500300       mtrvlv
*            topen        tclose        vrate         ipos
9500301            2             1          1.0          0.0
*
*             name         type
9510000      "1z211"        valve
*             from           to         area
9510101     955010001     931010001      1.96e-3
*          fwd. loss     rev. loss      efvcahs
9510102          0.0           0.0          100
*          discharge      thermal
9510103          1.0          0.14
*              hd        flood     intercept        slope
9510110        0.05          0.0          1.0          1.0
*             flow           vl           vv       unused
9510201            0    -7.0959148    -7.0959148          0.0
*             type
9510300       mtrvlv
*            topen        tclose        vrate         ipos
9510301            1             2          1.0          1.0
*
*             name         type
9520000      "1z212"        valve
*             from           to         area
9520101     957010001     930010001      1.96e-3
*          fwd. loss     rev. loss      efvcahs
9520102          0.0           0.0          100
*          discharge      thermal
9520103          1.0          0.14
*              hd        flood     intercept        slope
9520110        0.05          0.0          1.0          1.0
*             flow           vl           vv       unused
9520201            0    -6.3157606    -6.3157606          0.0
*             type
9520300       mtrvlv
*            topen        tclose        vrate         ipos
9520301            1             2          1.0          1.0
*
*             name         type
9530000     "unnamed"         pipe
*           ncells
9530001            2
*           x-area         volid
9530101      2.29e-3             2
*          x-length        volid
9530301         0.175             2
*           volume         volid
9530401          0.0             2
*         azim-angle        volid
9530501          0.0             2
*         vert-angle        volid
9530601          0.0             2
*           x-wall         xhd        volid
9530801       1.0e-5         0.0            2
*           x-flags        volid
9531001            0             2
*      ebt     press   water-ie   steam-ie void none id
9531201 000 6.547669e5 1.384148e5 2.569653e6  0.0  0.0  1
9531202 000 6.547669e5 1.270308e5 2.569653e6  0.0  0.0  2
*          fwd. loss      rev.loss        junid
9530901         0.15          0.15           1
*          jefvcahs      jun num
9531101     00000000            1
```

```
*             vl          vv       unused       junid
9531301  -7.032485e-9  -7.032485e-9         0.0          1
*
*            name        type
9540000    "unnamed"       branch
*           njuns
9540001           3
*            area      length         vol
9540101      2.29e-3         0.2         0.0
*         az-angle     inc-angle          dz
9540102          0.0         0.0         0.0
*          x-rough        x-hd       flags
9540103          0.0         0.0           0
*             ebt       press     water-ie     steam-ie        void
9540200          000   6.547669e5    2.582938e5    2.569653e6         0.0
*            from          to        area
9541101    954010001    953010001     0.03435
*         fwd. loss     rev. loss      efvcahs
9541102          0.0         0.0           0
*             vl          vv       unused
9541201 -9.339254e-10 -9.339254e-10         0.0
*            from          to        area
9542101    954010002    955040002         0.0
*         fwd. loss     rev. loss      efvcahs
9542102          0.0         0.0           0
*             vl          vv       unused
9542201   -11.479356   -11.479356         0.0
*            from          to        area
9543101    954010002    983010001         0.0
*         fwd. loss     rev. loss      efvcahs
9543102          0.0         0.0           0
*             vl          vv       unused
9543201     11.47906     11.47906         0.0
*
*            name        type
9550000    "unnamed"        pipe
*           ncells
9550001           4
*           x-area       volid
9550101      2.29e-3           4
*         x-length       volid
9550301          0.3           1
9550302         0.37           4
*           volume       volid
9550401          0.0           4
*        azim-angle        volid
9550501          0.0           4
*        vert-angle        volid
9550601          0.0           4
*           x-wall         xhd       volid
9550801       1.0e-5         0.0           4
*           x-flags       volid
9551001           0           4
*      ebt     press   water-ie   steam-ie void none id
9551201 000 6.553212e5 2.582675e5 2.569681e6  0.0  0.0  1
9551202 000 6.062841e5 2.582805e5 2.567136e6  0.0  0.0  2
9551203 000 5.999422e5 2.582869e5  2.56679e6  0.0  0.0  3
9551204 000 5.936024e5 2.582934e5  2.56644e6  0.0  0.0  4
*          jefvcahs      jun num
9551101     00000000           3
*             vl          vv       unused       junid
9551301     6.0733705    6.0733705         0.0          1
9551302     11.479275    11.479275         0.0          2
9551303     11.479315    11.479315         0.0          3
*
*            name        type
9560000    "unnamed"       branch
*           njuns
9560001           2
*            area      length         vol
9560101      2.29e-3         0.3         0.0
*         az-angle     inc-angle          dz
9560102          0.0         0.0         0.0
*          x-rough        x-hd       flags
9560103          0.0         0.0           0
*             ebt       press     water-ie     steam-ie        void
9560200          000   6.586579e5    2.582866e5    2.569846e6         0.0
*            from          to        area
9561101    956010002    957050002         0.0
*         fwd. loss     rev. loss      efvcahs
9561102          0.0         0.0           0
*             vl          vv       unused
9561201    -5.4056501   -5.4056501         0.0
*            from          to        area
9562101    956010001    955020001         0.0
*         fwd. loss     rev. loss      efvcahs
9562102          0.0         0.0           0
*             vl          vv       unused
9562201    5.4056535    5.4056535         0.0
*
*            name        type
9570000    "unnamed"        pipe
*           ncells
9570001           5
*           x-area       volid
9570101      2.29e-3           5
*         x-length       volid
9570301         0.28           5
*           volume       volid
9570401          0.0           5
*        azim-angle        volid
9570501          0.0           5
*        vert-angle        volid
9570601          0.0           5
*           x-wall         xhd       volid
9570801       1.0e-5         0.0           5
*           x-flags       volid
9571001           0           5
*      ebt     press   water-ie   steam-ie void none id
9571201 000 6.641836e5 2.582811e5 2.570117e6  0.0  0.0  1
9571202 000 6.630675e5 2.582822e5 2.570062e6  0.0  0.0  2
9571203 000 6.619515e5 2.582834e5 2.570008e6  0.0  0.0  3
9571204 000 6.608355e5 2.582845e5 2.569953e6  0.0  0.0  4
9571205 000 6.597195e5 2.582856e5 2.569898e6  0.0  0.0  5
*          jefvcahs      jun num
9571101     00000000           4
*             vl          vv       unused       junid
9571301    5.4056368    5.4056368         0.0          1
9571302    5.4056401    5.4056401         0.0          2
9571303    5.4056435    5.4056435         0.0          3
9571304    5.4056468    5.4056468         0.0          4
*
*            name        type
9580000    "unnamed"      sngljun
*            from          to        area
9580101    929030002    930020001     5.14e-3
*         fwd. loss     rev. loss      efvcahs
9580102          0.0         0.0           0
*         discharge      thermal
9580103          1.0        0.14
*             flow          vl          vv       unused
9580201           0   7.073952e-8   7.073952e-8         0.0
```

```
*
*           name        type
9600000    "unnamed"     sngljun
*           from         to         area
9600101    928030002    931020001     5.14e-3
*        fwd. loss    rev. loss     efvcahs
9600102        0.0          0.0          0
*        discharge     thermal
9600103        1.0         0.14
*           flow         vl          vv       unused
9600201          0    1.01774e-7   1.01774e-7         0.0
*
*           name        type
9620000    "unnamed"     sngljun
*           from         to         area
9620101    927030002    932020001     5.14e-3
*        fwd. loss    rev. loss     efvcahs
9620102        0.0          0.0          0
*        discharge     thermal
9620103        1.0         0.14
*           flow         vl          vv       unused
9620201          0  1.326116e-18  1.326116e-18         0.0
*
*           name        type
9810000     "1z204"       valve
*           from         to         area
9810101    921010001    916040002      9.5e-3
*        fwd. loss    rev. loss     efvcahs
9810102        0.0          0.0         100
*        discharge     thermal
9810103        1.0         0.14
*            hd        flood     intercept       slope
9810110       0.11         0.0          1.0          1.0
*           flow         vl          vv       unused
9810201          0         0.0          0.0          0.0
*           type
9810300      mtrvlv
*          topen       tclose       vrate        ipos
9810301          2           1         1.0         0.0
*
*           name        type
9820000    "unnamed"     sngljun
*           from         to         area
9820101    983070002    608060001     2.333e-3
*        fwd. loss    rev. loss     efvcahs
9820102        0.8          0.8          0
*        discharge     thermal
9820103        1.0         0.14
*           flow         vl          vv       unused
9820201          0    11.267987    13.017678         0.0
*
*           name        type
9830000    "unnamed"        pipe
*          ncells
9830001          7
*          x-area       volid
9830101     2.333e-3           7
*        x-length       volid
9830301        0.33           1
9830302         0.3           2
9830303        0.25           6
9830304        0.15           7
*          volume       volid
9830401         0.0           7
*       azim-angle       volid
9830501         0.0           7
*       vert-angle       volid
9830601       -90.0           2
9830602         0.0           6
9830603       -90.0           7
*           x-wall         xhd       volid
9830801       1.0e-5         0.0           7
*          x-flags       volid
9831001           0           7
*     ebt     press   water-ie   steam-ie void none id
9831201 000 5.908911e5 2.582993e5 2.566288e6  0.0  0.0  1
9831202 000 5.887768e5 2.583042e5  2.56617e6  0.0  0.0  2
9831203 000 5.794859e5 2.583084e5 2.565643e6  0.0  0.0  3
9831204 000 5.754006e5 2.583125e5 2.565408e6  0.0  0.0  4
9831205 000 5.713156e5 2.583167e5 2.565172e6  0.0  0.0  5
9831206 000 5.672305e5 2.583208e5 2.564934e6  0.0  0.0  6
9831207 000 5.584422e5 2.583233e5 2.564414e6  0.0  0.0  7
*        fwd. loss     rev.loss       junid
9830901         0.0          0.0           1
9830902         0.1          0.1           2
9830903         0.0          0.0           5
9830904         0.1          0.1           6
*          jefvcahs      jun num
9831101     00000000           6
*             vl          vv       unused       junid
9831301    11.267798    14.212243          0.0           1
9831302    11.267816    14.427305          0.0           2
9831303    11.267866    11.267866          0.0           3
9831304    11.267891    11.267891          0.0           4
9831305    11.267917    11.267917          0.0           5
9831306    11.267942    11.267942          0.0           6
*
*           name        type
9850000    "unnamed"     sngljun
*           from         to         area
9850101    600150002    602010001     0.0314
*        fwd. loss    rev. loss     efvcahs
9850102        0.0          0.0          0
*        discharge     thermal
9850103        1.0         0.14
*           flow         vl          vv       unused
9850201          0    2.9623826    2.9623826         0.0
*
*           name        type
9880000     "LOCA6"       valve
*           from         to         area
9880101    767100002    989010002     1.963e-3
*        fwd. loss    rev. loss     efvcahs
9880102        0.0          0.0         100
*        discharge     thermal
9880103        1.0         0.14
*           flow         vl          vv       unused
9880201          0    18.279524    18.279524         0.0
*           type
9880300      mtrvlv
*          topen       tclose       vrate        ipos
9880301         39           2        1.0e4      1.21e-4
*
*           name        type
9890000    "unnamed"     tmdpvol
*           area       length          vol
9890101        50.0         50.0          0.0
*         az-angle     inc-angle          dz
9890102         0.0         90.0         50.0
*          x-rough        x-hd       flags
9890103         0.0          0.0           0
*           cword
```

```
9890200         3
*           srch       press        temp
9890201        0.0       1.0e5       293.0
*
*           name        type
9910000     "LOCA1"       valve
*           from          to        area
9910101    600040001    992010002    1.963e-3
*        fwd. loss    rev. loss     efvcahs
9910102        1.0         0.5         100
*        discharge     thermal
9910103        1.0        0.14
*           flow          vl          vv       unused
9910201         0         0.0         0.0         0.0
*           type
9910300      mtrvlv
*          topen       tclose       vrate        ipos
9910301         21          2       1.0e4         0.0
*
*           name        type
9920000    "unnamed"     tmdpvol
*           area       length         vol
9920101        50.0        50.0         0.0
*         az-angle    inc-angle          dz
9920102        0.0         90.0        50.0
*          x-rough        x-hd        flags
9920103        0.0         0.0           0
*           cword        trip
9920200         4          21
*           srch       press        temp       squal
9920201        0.0       1.0e5       293.0         1.0
*
*           name        type
9930000     "LOCA2"       valve
*           from          to        area
9930101    600020001    994010002    1.963e-3
*        fwd. loss    rev. loss     efvcahs
9930102        0.0         0.0         100
*        discharge     thermal
9930103        1.0        0.14
*           flow          vl          vv       unused
9930201         0         0.0         0.0         0.0
*           type
9930300      mtrvlv
*          topen       tclose       vrate        ipos
9930301         25          2       1.0e4         0.0
*
*           name        type
9940000    "unnamed"     tmdpvol
*           area       length         vol
9940101        50.0        50.0         0.0
*         az-angle    inc-angle          dz
9940102        0.0         90.0        50.0
*          x-rough        x-hd        flags
9940103        0.0         0.0           0
*           cword
9940200         3
*           srch       press        temp
9940201        0.0       1.0e5       293.0
*
*           name        type
9950000    "unnamed"       valve
*           from          to        area
9950101    695060002    694010001     0.07065
*        fwd. loss    rev. loss     efvcahs
9950102        0.0         0.0           0
*        discharge     thermal
9950103        1.0        0.14
*           flow          vl          vv       unused
9950201         0    2.5933955    2.5933955         0.0
*           type
9950300      trpvlv
*           trip
9950301         29
*
*           name        type
9960000    "unnamed"       valve
*           from          to        area
9960101    694010001    998010002     0.07065
*        fwd. loss    rev. loss     efvcahs
9960102        0.0         0.0           0
*        discharge     thermal
9960103        1.0        0.14
*           flow          vl          vv       unused
9960201         0         0.0         0.0         0.0
*           type
9960300      trpvlv
*           trip
9960301         28
*
*           name        type
9970000    "unnamed"       valve
*           from          to        area
9970101    695060002    999010002     0.07065
*        fwd. loss    rev. loss     efvcahs
9970102        0.0         0.0           0
*        discharge     thermal
9970103        1.0        0.14
*           flow          vl          vv       unused
9970201         0         0.0         0.0         0.0
*           type
9970300      trpvlv
*           trip
9970301         28
*
*           name        type
9980000    "unnamed"     tmdpvol
*           area       length         vol
9980101        50.0        50.0         0.0
*         az-angle    inc-angle          dz
9980102        0.0         90.0        50.0
*          x-rough        x-hd        flags
9980103        0.0         0.0           0
*           cword
9980200         3
*           srch       press        temp
9980201        0.0       1.0e5       293.0
*
*           name        type
9990000    "unnamed"     tmdpvol
*           area       length         vol
9990101        50.0        50.0         0.0
*         az-angle    inc-angle          dz
9990102        0.0         90.0        50.0
*          x-rough        x-hd        flags
9990103        0.0         0.0           0
*           cword
9990200         3
*           srch       press        temp
9990201        0.0       1.0e5       293.0
*
*********************************
```

```
*      Heat Structures      *
*********************************
*
*       nh   np     geom     ssif    leftcoord reflood
10010000  10   4       2       1       0.024      0
*            mesh       format
10010100          0          1
*         intervals       radius
10010101          3       0.026
*          material     interval
10010201          3          3
*            rpkf     interval
10010301         0.0          3
*            temp     interval
10010401        300.0          4
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10010501 65010000        0     101        1         0.1        1
10010502 45010000        0     101        1        0.05        2
10010503 70010000        0     101        1         0.2        3
10010504 70020000        0     101        1         0.4        4
10010505 70030000        0     101        1        0.56        5
10010506 70040000        0     101        1        0.56        6
10010507 70050000        0     101        1        0.55        7
10010508 70060000        0     101        1        0.32        8
10010509 70070000        0     101        1        0.16        9
10010510 70080000        0     101        1         0.1       10
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10010601 15010000        0     101        1         0.1        1
10010602 35010000        0     101        1        0.05        2
10010603 10080000        0     101        1         0.2        3
10010604 10070000        0     101        1         0.4        4
10010605 10060000        0     101        1        0.56        5
10010606 10050000        0     101        1        0.56        6
10010607 10040000        0     101        1        0.55        7
10010608 10030000        0     101        1        0.32        8
10010609 10020000        0     101        1        0.16        9
10010610 10010000        0     101        1         0.1       10
*            source         mult         dmhl         dmhr          num
10010701          0          0.0          0.0          0.0           10
*   Left Additional Boundary Condition Data
10010800          0
*        hthd  hlf  hlr gslf gslr glcf glcr lbf node
10010801 0.0 10.0 10.0  0.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10010900          0
*        hthd  hlf  hlr gslf gslr glcf glcr lbf node
10010901  0.0 10.0 10.0  0.0  0.0  0.0  0.0  0.0 1.0   10
*
*n: 5
*       nh   np     geom     ssif    leftcoord reflood
10025000  10   17       2       1       0.033      0
*            mesh       format
10025100          0          1
*         intervals       radius
10025101          4       0.0336
10025102          8       0.0344
10025103          4        0.035
*          material     interval
10025201          2          4
10025202          1         12
10025203          2         16
*            rpkf     interval
10025301         0.0          4
10025302         1.0         12
10025303         0.0         16
*            temp     interval
10025401        300.0         17
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10025501 25110000        0     101        1         0.1        1
10025502 25100000        0     101        1         0.1        2
10025503 25090000        0     101        1         0.1        3
10025504 25080000        0     101        1         0.1        4
10025505 25070000        0     101        1         0.1        5
10025506 25060000        0     101        1         0.1        6
10025507 25050000        0     101        1         0.1        7
10025508 25040000        0     101        1         0.1        8
10025509 25030000        0     101        1         0.1        9
10025510 25020000        0     101        1         0.1       10
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10025601 20110000        0     101        1         0.1        1
10025602 20100000        0     101        1         0.1        2
10025603 20090000        0     101        1         0.1        3
10025604 20080000        0     101        1         0.1        4
10025605 20070000        0     101        1         0.1        5
10025606 20060000        0     101        1         0.1        6
10025607 20050000        0     101        1         0.1        7
10025608 20040000        0     101        1         0.1        8
10025609 20030000        0     101        1         0.1        9
10025610 20020000        0     101        1         0.1       10
*            source         mult         dmhl         dmhr          num
10025701          1000     2.609e-3          0.0          0.0            1
10025702          1000     3.646e-3          0.0          0.0            2
10025703          1000     4.389e-3          0.0          0.0            3
10025704          1000     4.776e-3          0.0          0.0            5
10025705          1000     4.389e-3          0.0          0.0            6
10025706          1000     3.646e-3          0.0          0.0            7
10025707          1000     2.609e-3          0.0          0.0            8
10025708          1000     1.359e-3          0.0          0.0            9
10025709          1000      6.87e-4          0.0          0.0           10
*   Left Additional Boundary Condition Data
10025800          0
*        hthd  hlf  hlr gslf gslr glcf glcr lbf node
10025801 9.816e-3 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10025900          0
*        hthd  hlf  hlr gslf gslr glcf glcr lbf node
10025901 0.010697 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*       nh   np     geom     ssif    leftcoord reflood
10026000   2   4       2       1       0.033      0
*            mesh       format
10026100          0          1
*         intervals       radius
10026101          3       0.035
*          material     interval
10026201          2          3
*            rpkf     interval
10026301         0.0          3
*            temp     interval
10026401        300.0          4
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10026501 25010000        0     101        1        0.05        1
10026502 25120000        0     101        1        0.05        2
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10026601 20010000        0     101        1        0.05        1
10026602 20120000        0     101        1        0.05        2
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*           source        mult        dmhl        dmhr         num
10026701          0         0.0         0.0         0.0           2
*   Left Additional Boundary Condition Data
10026800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10026801 0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0    2
*   Right Additional Boundary Condition Data
10026900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10026901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0    2
*
*n: 4
*        nh   np     geom     ssif    leftcoord reflood
10030000  10  17        2        1       0.0285       0
*            mesh       format
10030100          0          1
*         intervals       radius
10030101          4       0.0291
10030102          8       0.0299
10030103          4       0.0305
*          material     interval
10030201          2          4
10030202          1         12
10030203          2         16
*             rpkf     interval
10030301         0.0          4
10030302         1.0         12
10030303         0.0         16
*             temp     interval
10030401        300.0         17
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10030501 30110000        0      101        1         0.1        1
10030502 30100000        0      101        1         0.1        2
10030503 30090000        0      101        1         0.1        3
10030504 30080000        0      101        1         0.1        4
10030505 30070000        0      101        1         0.1        5
10030506 30060000        0      101        1         0.1        6
10030507 30050000        0      101        1         0.1        7
10030508 30040000        0      101        1         0.1        8
10030509 30030000        0      101        1         0.1        9
10030510 30020000        0      101        1         0.1       10
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10030601 25110000        0      101        1         0.1        1
10030602 25100000        0      101        1         0.1        2
10030603 25090000        0      101        1         0.1        3
10030604 25080000        0      101        1         0.1        4
10030605 25070000        0      101        1         0.1        5
10030606 25060000        0      101        1         0.1        6
10030607 25050000        0      101        1         0.1        7
10030608 25040000        0      101        1         0.1        8
10030609 25030000        0      101        1         0.1        9
10030610 25020000        0      101        1         0.1       10
*           source        mult        dmhl        dmhr         num
10030701        1000    1.881e-3         0.0         0.0           1
10030702        1000     2.63e-3         0.0         0.0           2
10030703        1000    3.165e-3         0.0         0.0           3
10030704        1000    3.444e-3         0.0         0.0           5
10030705        1000    3.165e-3         0.0         0.0           6
10030706        1000     2.63e-3         0.0         0.0           7
10030707        1000    1.881e-3         0.0         0.0           8
10030708        1000      9.8e-4         0.0         0.0           9
10030709        1000     4.95e-4         0.0         0.0          10
*   Left Additional Boundary Condition Data
10030800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10030801 9.784e-3 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10030900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10030901 0.01083 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*        nh   np     geom     ssif    leftcoord reflood
10031000   2   4        2        1       0.0285       0
*            mesh       format
10031100          0          1
*         intervals       radius
10031101          3       0.0305
*          material     interval
10031201          2          3
*             rpkf     interval
10031301         0.0          3
*             temp     interval
10031401        300.0          4
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10031501 30010000        0      101        1         0.05       1
10031502 30120000        0      101        1         0.05       2
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10031601 25010000        0      101        1         0.05       1
10031602 25120000        0      101        1         0.05       2
*           source        mult        dmhl        dmhr         num
10031701          0         0.0         0.0         0.0           2
*   Left Additional Boundary Condition Data
10031800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10031801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0    2
*   Right Additional Boundary Condition Data
10031900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10031901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0    2
*
*n: 3
*        nh   np     geom     ssif    leftcoord reflood
10050000  10  17        2        1        0.024       0
*            mesh       format
10050100          0          1
*         intervals       radius
10050101          4       0.0246
10050102          8       0.0254
10050103          4        0.026
*          material     interval
10050201          2          4
10050202          1         12
10050203          2         16
*             rpkf     interval
10050301         0.0          4
10050302         1.0         12
10050303         0.0         16
*             temp     interval
10050401        300.0         17
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10050501 50020000        0      101        1         0.1        1
10050502 50030000        0      101        1         0.1        2
10050503 50040000        0      101        1         0.1        3
10050504 50050000        0      101        1         0.1        4
10050505 50060000        0      101        1         0.1        5
10050506 50070000        0      101        1         0.1        6
10050507 50080000        0      101        1         0.1        7
```

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10050508 50090000       0     101       1        0.1       8
10050509 50100000       0     101       1        0.1       9
10050510 50110000       0     101       1        0.1      10
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10050601 30110000       0     101       1        0.1       1
10050602 30100000       0     101       1        0.1       2
10050603 30090000       0     101       1        0.1       3
10050604 30080000       0     101       1        0.1       4
10050605 30070000       0     101       1        0.1       5
10050606 30060000       0     101       1        0.1       6
10050607 30050000       0     101       1        0.1       7
10050608 30040000       0     101       1        0.1       8
10050609 30030000       0     101       1        0.1       9
10050610 30020000       0     101       1        0.1      10
*           source        mult        dmhl        dmhr         num
10050701         1000     1.431e-3         0.0         0.0           1
10050702         1000      2.0e-3          0.0         0.0           2
10050703         1000     2.407e-3         0.0         0.0           3
10050704         1000     2.619e-3         0.0         0.0           5
10050705         1000     2.407e-3         0.0         0.0           6
10050706         1000      2.0e-3          0.0         0.0           7
10050707         1000     1.431e-3         0.0         0.0           8
10050708         1000      7.46e-4         0.0         0.0           9
10050709         1000      3.77e-4         0.0         0.0          10
*   Left Additional Boundary Condition Data
10050800          0
*         hthd  hlf  hlr gslf gslr glcf glcr lbf node
10050801 9.742e-3 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10050900          0
*         hthd  hlf  hlr gslf gslr glcf glcr lbf node
10050901 0.011028 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*       nh   np     geom     ssif    leftcoord reflood
10051000   2   4        2        1        0.024       0
*             mesh       format
10051100          0          1
*         intervals       radius
10051101          3        0.026
*          material     interval
10051201          2          3
*            rpkf     interval
10051301        0.0          3
*            temp     interval
10051401       300.0          4
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10051501 50010000       0     101       1        0.05       1
10051502 50120000       0     101       1        0.05       2
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10051601 30120000       0     101       1        0.05       1
10051602 30010000       0     101       1        0.05       2
*           source        mult        dmhl        dmhr         num
10051701          0         0.0         0.0         0.0           2
*   Left Additional Boundary Condition Data
10051800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10051801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   2
*   Right Additional Boundary Condition Data
10051900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10051901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   2
*
*n: 2
*       nh   np     geom     ssif    leftcoord reflood
10055000   10   17        2        1        0.0195       0
*             mesh       format
10055100          0          1
*         intervals       radius
10055101          4       0.0201
10055102          8       0.0209
10055103          4       0.0215
*          material     interval
10055201          2          4
10055202          1         12
10055203          2         16
*            rpkf     interval
10055301         0.0          4
10055302         1.0         12
10055303         0.0         16
*            temp     interval
10055401        300.0         17
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10055501 55020000       0     101       1        0.1       1
10055502 55030000       0     101       1        0.1       2
10055503 55040000       0     101       1        0.1       3
10055504 55050000       0     101       1        0.1       4
10055505 55060000       0     101       1        0.1       5
10055506 55070000       0     101       1        0.1       6
10055507 55080000       0     101       1        0.1       7
10055508 55090000       0     101       1        0.1       8
10055509 55100000       0     101       1        0.1       9
10055510 55110000       0     101       1        0.1      10
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10055601 50020000       0     101       1        0.1       1
10055602 50030000       0     101       1        0.1       2
10055603 50040000       0     101       1        0.1       3
10055604 50050000       0     101       1        0.1       4
10055605 50060000       0     101       1        0.1       5
10055606 50070000       0     101       1        0.1       6
10055607 50080000       0     101       1        0.1       7
10055608 50090000       0     101       1        0.1       8
10055609 50100000       0     101       1        0.1       9
10055610 50110000       0     101       1        0.1      10
*           source        mult        dmhl        dmhr         num
10055701         1000     1.115e-3         0.0         0.0           1
10055702         1000     1.558e-3         0.0         0.0           2
10055703         1000     1.875e-3         0.0         0.0           3
10055704         1000     2.041e-3         0.0         0.0           5
10055705         1000     1.875e-3         0.0         0.0           6
10055706         1000     1.558e-3         0.0         0.0           7
10055707         1000     1.115e-3         0.0         0.0           8
10055708         1000      5.81e-4         0.0         0.0           9
10055709         1000      2.93e-4         0.0         0.0          10
*   Left Additional Boundary Condition Data
10055800          0
*         hthd  hlf  hlr gslf gslr glcf glcr lbf node
10055801 0.09676 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10055900          0
*         hthd  hlf  hlr gslf gslr glcf glcr lbf node
10055901 0.011343 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*       nh   np     geom     ssif    leftcoord reflood
10056000   2   4        2        1        0.0195       0
*             mesh       format
10056100          0          1
*         intervals       radius
```

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10056101          3      0.0215
*          material     interval
10056201          2          3
*            rpkf     interval
10056301         0.0         3
*            temp     interval
10056401        300.0        4
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10056501 55120000       0     101       1        0.05       1
10056502 55010000       0     101       1        0.05       2
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10056601 50120000       0     101       1        0.05       1
10056602 50010000       0     101       1        0.05       2
*           source        mult        dmhl        dmhr         num
10056701          0         0.0         0.0         0.0           2
*   Left Additional Boundary Condition Data
10056800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10056801 0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   2
*   Right Additional Boundary Condition Data
10056900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10056901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   2
*
*n: 1
*        nh   np     geom     ssif    leftcoord reflood
10060000   10   17        2        1        0.015       0
*            mesh       format
10060100          0          1
*         intervals       radius
10060101          4       0.0156
10060102          8       0.0164
10060103          4        0.017
*          material     interval
10060201          2          4
10060202          1         12
10060203          2         16
*            rpkf     interval
10060301         0.0         4
10060302         1.0         12
10060303         0.0         16
*            temp     interval
10060401        300.0        17
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10060501 60020000       0     101       1         0.1       1
10060502 60030000       0     101       1         0.1       2
10060503 60040000       0     101       1         0.1       3
10060504 60050000       0     101       1         0.1       4
10060505 60060000       0     101       1         0.1       5
10060506 60070000       0     101       1         0.1       6
10060507 60080000       0     101       1         0.1       7
10060508 60090000       0     101       1         0.1       8
10060509 60100000       0     101       1         0.1       9
10060510 60110000       0     101       1         0.1      10
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10060601 55020000       0     101       1         0.1       1
10060602 55030000       0     101       1         0.1       2
10060603 55040000       0     101       1         0.1       3
10060604 55050000       0     101       1         0.1       4
10060605 55060000       0     101       1         0.1       5
10060606 55070000       0     101       1         0.1       6
10060607 55080000       0     101       1         0.1       7
10060608 55090000       0     101       1         0.1       8
10060609 55100000       0     101       1         0.1       9
10060610 55110000       0     101       1         0.1      10
*           source        mult        dmhl        dmhr         num
10060701          1000       8.7e-4         0.0         0.0           1
10060702          1000     1.215e-3         0.0         0.0           2
10060703          1000     1.463e-3         0.0         0.0           3
10060704          1000     1.592e-3         0.0         0.0           5
10060705          1000     1.463e-3         0.0         0.0           6
10060706          1000     1.215e-3         0.0         0.0           7
10060707          1000       8.7e-4         0.0         0.0           8
10060708          1000       4.53e-4        0.0         0.0           9
10060709          1000       2.29e-4        0.0         0.0          10
*   Left Additional Boundary Condition Data
10060800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10060801 9.563e-3 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10060900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10060901 0.011926 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*        nh   np     geom     ssif    leftcoord reflood
10061000   2   4        2        1        0.015       0
*            mesh       format
10061100          0          1
*         intervals       radius
10061101          3       0.017
*          material     interval
10061201          2          3
*            rpkf     interval
10061301         0.0         3
*            temp     interval
10061401        300.0        4
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10061501 60120000       0     101       1        0.05       1
10061502 60010000       0     101       1        0.05       2
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10061601 55120000       0     101       1        0.05       1
10061602 55010000       0     101       1        0.05       2
*           source        mult        dmhl        dmhr         num
10061701          0         0.0         0.0         0.0           2
*   Left Additional Boundary Condition Data
10061800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10061801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   2
*   Right Additional Boundary Condition Data
10061900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10061901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   2
*
*n: 0
*        nh   np     geom     ssif    leftcoord reflood
10065000   12   6        2        1        0.0105      0
*            mesh       format
10065100          0          1
*         intervals       radius
10065101          5       0.0125
*          material     interval
10065201          3          5
*            rpkf     interval
10065301         0.0         5
*            temp     interval
10065401        300.0        6
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*  Left Boundary Condition Data
*        bound     incr     type     code      factor     node
10065501 61010000      0     101        1        0.05        1
10065502 61020000      0     101        1         0.1        2
10065503 61030000      0     101        1         0.1        3
10065504 61040000      0     101        1         0.1        4
10065505 61050000      0     101        1         0.1        5
10065506 61060000      0     101        1         0.1        6
10065507 61070000      0     101        1         0.1        7
10065508 61080000      0     101        1         0.1        8
10065509 61090000      0     101        1         0.1        9
10065510 61100000      0     101        1         0.1       10
10065511 61110000      0     101        1         0.1       11
10065512 61120000      0     101        1        0.05       12
*  Right Boundary Condition Data
*        bound     incr     type     code      factor     node
10065601 60010000      0     101        1        0.05        1
10065602 60020000      0     101        1         0.1        2
10065603 60030000      0     101        1         0.1        3
10065604 60040000      0     101        1         0.1        4
10065605 60050000      0     101        1         0.1        5
10065606 60060000      0     101        1         0.1        6
10065607 60070000      0     101        1         0.1        7
10065608 60080000      0     101        1         0.1        8
10065609 60090000      0     101        1         0.1        9
10065610 60100000      0     101        1         0.1       10
10065611 60110000      0     101        1         0.1       11
10065612 60120000      0     101        1        0.05       12
*          source        mult        dmhl        dmhr         num
10065701         0         0.0         0.0         0.0          12
*  Left Additional Boundary Condition Data
10065800          0
*      hthd  hlf  hlr gslf gslr glcf glcr lbf node
10065801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   12
*  Right Additional Boundary Condition Data
10065900          0
*      hthd  hlf  hlr gslf gslr glcf glcr lbf node
10065901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   12
*
*       nh   np     geom     ssif    leftcoord reflood
10110000   10    4        2        1        0.024       0
*           mesh       format
10110100          0          1
*        intervals       radius
10110101          3        0.026
*         material     interval
10110201          3          3
*           rpkf     interval
10110301         0.0          3
*           temp     interval
10110401        300.0          4
*  Left Boundary Condition Data
*        bound     incr     type     code      factor     node
10110501 165010000      0     101        1         1.8        1
10110502 145010000      0     101        1         0.9        2
10110503 170010000      0     101        1         3.6        3
10110504 170020000      0     101        1         7.2        4
10110505 170030000      0     101        1       10.08        5
10110506 170040000      0     101        1       10.08        6
10110507 170050000      0     101        1         9.9        7
10110508 170060000      0     101        1        5.76        8
10110509 170070000      0     101        1        2.88        9
10110510 170080000      0     101        1         1.8       10
*  Right Boundary Condition Data
*        bound     incr     type     code      factor     node
10110601 115010000      0     101        1         1.8        1
10110602 135010000      0     101        1         0.9        2
10110603 110080000      0     101        1         3.6        3
10110604 110070000      0     101        1         7.2        4
10110605 110060000      0     101        1       10.08        5
10110606 110050000      0     101        1       10.08        6
10110607 110040000      0     101        1         9.9        7
10110608 110030000      0     101        1        5.76        8
10110609 110020000      0     101        1        2.88        9
10110610 110010000      0     101        1         1.8       10
*          source        mult        dmhl        dmhr         num
10110701         0         0.0         0.0         0.0          10
*  Left Additional Boundary Condition Data
10110800          0
*      hthd  hlf  hlr gslf gslr glcf glcr lbf node
10110801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*  Right Additional Boundary Condition Data
10110900          0
*      hthd  hlf  hlr gslf gslr glcf glcr lbf node
10110901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*n: 5
*       nh   np     geom     ssif    leftcoord reflood
10125000   10   17        2        1        0.033       0
*           mesh       format
10125100          0          1
*        intervals       radius
10125101          4       0.0336
10125102          8       0.0344
10125103          4        0.035
*         material     interval
10125201          2          4
10125202          1         12
10125203          2         16
*           rpkf     interval
10125301         0.0          4
10125302         1.0         12
10125303         0.0         16
*           temp     interval
10125401        300.0         17
*  Left Boundary Condition Data
*        bound     incr     type     code      factor     node
10125501 125020000      0     101        1         1.9        1
10125502 125030000      0     101        1         1.9        2
10125503 125040000      0     101        1         1.9        3
10125504 125050000      0     101        1         1.9        4
10125505 125060000      0     101        1         1.9        5
10125506 125070000      0     101        1         1.9        6
10125507 125080000      0     101        1         1.9        7
10125508 125090000      0     101        1         1.9        8
10125509 125100000      0     101        1         1.9        9
10125510 125110000      0     101        1         1.9       10
*  Right Boundary Condition Data
*        bound     incr     type     code      factor     node
10125601 120020000      0     101        1         1.9        1
10125602 120030000      0     101        1         1.9        2
10125603 120040000      0     101        1         1.9        3
10125604 120050000      0     101        1         1.9        4
10125605 120060000      0     101        1         1.9        5
10125606 120070000      0     101        1         1.9        6
10125607 120080000      0     101        1         1.9        7
10125608 120090000      0     101        1         1.9        8
10125609 120100000      0     101        1         1.9        9
10125610 120110000      0     101        1         1.9       10
*          source        mult        dmhl        dmhr         num
10125701        1000    0.022303         0.0         0.0          1
10125702        1000    0.031177         0.0         0.0          2
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10125703        1000    0.037525        0.0         0.0         3
10125704        1000    0.040833        0.0         0.0         5
10125705        1000    0.037525        0.0         0.0         6
10125706        1000    0.031177        0.0         0.0         7
10125707        1000    0.022303        0.0         0.0         8
10125708        1000    0.011622        0.0         0.0         9
10125709        1000    5.871e-3        0.0         0.0         10
*   Left Additional Boundary Condition Data
10125800        0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10125801 9.816e-3 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10125900        0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10125901 0.010697 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*n: 4
*       nh   np     geom     ssif    leftcoord reflood
10130000   10   17       2       1       0.0285      0
*           mesh       format
10130100        0          1
*       intervals       radius
10130101        4       0.0291
10130102        8       0.0299
10130103        4       0.0305
*         material     interval
10130201        2          4
10130202        1          12
10130203        2          16
*           rpkf     interval
10130301        0.0        4
10130302        1.0        12
10130303        0.0        16
*           temp     interval
10130401        300.0      17
*   Left Boundary Condition Data
*       bound     incr     type     code      factor     node
10130501 130020000       0     101       1        1.9       1
10130502 130030000       0     101       1        1.9       2
10130503 130040000       0     101       1        1.9       3
10130504 130050000       0     101       1        1.9       4
10130505 130060000       0     101       1        1.9       5
10130506 130070000       0     101       1        1.9       6
10130507 130080000       0     101       1        1.9       7
10130508 130090000       0     101       1        1.9       8
10130509 130100000       0     101       1        1.9       9
10130510 130110000       0     101       1        1.9      10
*   Right Boundary Condition Data
*       bound     incr     type     code      factor     node
10130601 125020000       0     101       1        1.9       1
10130602 125030000       0     101       1        1.9       2
10130603 125040000       0     101       1        1.9       3
10130604 125050000       0     101       1        1.9       4
10130605 125060000       0     101       1        1.9       5
10130606 125070000       0     101       1        1.9       6
10130607 125080000       0     101       1        1.9       7
10130608 125090000       0     101       1        1.9       8
10130609 125100000       0     101       1        1.9       9
10130610 125110000       0     101       1        1.9      10
*           source        mult        dmhl        dmhr         num
10130701        1000    0.016085        0.0         0.0         1
10130702        1000    0.022485        0.0         0.0         2
10130703        1000    0.027063        0.0         0.0         3
10130704        1000    0.029449        0.0         0.0         5
10130705        1000    0.027063        0.0         0.0         6
10130706        1000    0.022485        0.0         0.0         7
10130707        1000    0.016085        0.0         0.0         8
10130708        1000    8.382e-3        0.0         0.0         9
10130709        1000    4.234e-3        0.0         0.0         10
*   Left Additional Boundary Condition Data
10130800        0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10130801 9.784e-3 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10130900        0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10130901 0.01083 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*n: 3
*       nh   np     geom     ssif    leftcoord reflood
10150000   10   17       2       1       0.024       0
*           mesh       format
10150100        0          1
*       intervals       radius
10150101        4       0.0246
10150102        8       0.0254
10150103        4       0.026
*         material     interval
10150201        2          4
10150202        1          12
10150203        2          16
*           rpkf     interval
10150301        0.0        4
10150302        1.0        12
10150303        0.0        16
*           temp     interval
10150401        300.0      17
*   Left Boundary Condition Data
*       bound     incr     type     code      factor     node
10150501 150020000       0     101       1        1.9       1
10150502 150030000       0     101       1        1.9       2
10150503 150040000       0     101       1        1.9       3
10150504 150050000       0     101       1        1.9       4
10150505 150060000       0     101       1        1.9       5
10150506 150070000       0     101       1        1.9       6
10150507 150080000       0     101       1        1.9       7
10150508 150090000       0     101       1        1.9       8
10150509 150100000       0     101       1        1.9       9
10150510 150110000       0     101       1        1.9      10
*   Right Boundary Condition Data
*       bound     incr     type     code      factor     node
10150601 130020000       0     101       1        1.9       1
10150602 130030000       0     101       1        1.9       2
10150603 130040000       0     101       1        1.9       3
10150604 130050000       0     101       1        1.9       4
10150605 130060000       0     101       1        1.9       5
10150606 130070000       0     101       1        1.9       6
10150607 130080000       0     101       1        1.9       7
10150608 130090000       0     101       1        1.9       8
10150609 130100000       0     101       1        1.9       9
10150610 130110000       0     101       1        1.9      10
*           source        mult        dmhl        dmhr         num
10150701        1000    0.012233        0.0         0.0         1
10150702        1000      0.0171        0.0         0.0         2
10150703        1000    0.020582        0.0         0.0         3
10150704        1000    0.022396        0.0         0.0         5
10150705        1000    0.020582        0.0         0.0         6
10150706        1000      0.0171        0.0         0.0         7
10150707        1000    0.012233        0.0         0.0         8
10150708        1000    6.375e-3        0.0         0.0         9
10150709        1000    3.22e-3         0.0         0.0         10
*   Left Additional Boundary Condition Data
```

```
10150800          0
*         thhd  hlf  hlr gslf gslr glcf glcr lbf node
10150801 9.742e-3 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10150900          0
*         thhd  hlf  hlr gslf gslr glcf glcr lbf node
10150901 0.011028 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*n: 2
*        nh   np     geom     ssif    leftcoord reflood
10155000   10   17        2        1       0.0195       0
*             mesh       format
10155100          0          1
*         intervals       radius
10155101          4       0.0201
10155102          8       0.0209
10155103          4       0.0215
*          material     interval
10155201          2          4
10155202          1         12
10155203          2         16
*             rpkf     interval
10155301         0.0          4
10155302         1.0         12
10155303         0.0         16
*             temp     interval
10155401        300.0         17
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10155501 155020000        0      101        1         1.9        1
10155502 155030000        0      101        1         1.9        2
10155503 155040000        0      101        1         1.9        3
10155504 155050000        0      101        1         1.9        4
10155505 155060000        0      101        1         1.9        5
10155506 155070000        0      101        1         1.9        6
10155507 155080000        0      101        1         1.9        7
10155508 155090000        0      101        1         1.9        8
10155509 155100000        0      101        1         1.9        9
10155510 155110000        0      101        1         1.9       10
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10155601 150020000        0      101        1         1.9        1
10155602 150030000        0      101        1         1.9        2
10155603 150040000        0      101        1         1.9        3
10155604 150050000        0      101        1         1.9        4
10155605 150060000        0      101        1         1.9        5
10155606 150070000        0      101        1         1.9        6
10155607 150080000        0      101        1         1.9        7
10155608 150090000        0      101        1         1.9        8
10155609 150100000        0      101        1         1.9        9
10155610 150110000        0      101        1         1.9       10
*            source         mult         dmhl         dmhr          num
10155701         1000     9.529e-3          0.0          0.0            1
10155702         1000     0.013321          0.0          0.0            2
10155703         1000     0.016033          0.0          0.0            3
10155704         1000     0.017447          0.0          0.0            5
10155705         1000     0.016033          0.0          0.0            6
10155706         1000     0.013321          0.0          0.0            7
10155707         1000     9.529e-3          0.0          0.0            8
10155708         1000     4.966e-3          0.0          0.0            9
10155709         1000     2.508e-3          0.0          0.0           10
*   Left Additional Boundary Condition Data
10155800          0
*         thhd  hlf  hlr gslf gslr glcf glcr lbf node
10155801 0.09676 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10155900          0
*         thhd  hlf  hlr gslf gslr glcf glcr lbf node
10155901 0.011343 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*n: 1
*        nh   np     geom     ssif    leftcoord reflood
10160000   10   17        2        1        0.015       0
*             mesh       format
10160100          0          1
*         intervals       radius
10160101          4       0.0156
10160102          8       0.0164
10160103          4        0.017
*          material     interval
10160201          2          4
10160202          1         12
10160203          2         16
*             rpkf     interval
10160301         0.0          4
10160302         1.0         12
10160303         0.0         16
*             temp     interval
10160401        300.0         17
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10160501 160020000        0      101        1         1.9        1
10160502 160030000        0      101        1         1.9        2
10160503 160040000        0      101        1         1.9        3
10160504 160050000        0      101        1         1.9        4
10160505 160060000        0      101        1         1.9        5
10160506 160070000        0      101        1         1.9        6
10160507 160080000        0      101        1         1.9        7
10160508 160090000        0      101        1         1.9        8
10160509 160100000        0      101        1         1.9        9
10160510 160110000        0      101        1         1.9       10
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10160601 155020000        0      101        1         1.9        1
10160602 155030000        0      101        1         1.9        2
10160603 155040000        0      101        1         1.9        3
10160604 155050000        0      101        1         1.9        4
10160605 155060000        0      101        1         1.9        5
10160606 155070000        0      101        1         1.9        6
10160607 155080000        0      101        1         1.9        7
10160608 155090000        0      101        1         1.9        8
10160609 155100000        0      101        1         1.9        9
10160610 155110000        0      101        1         1.9       10
*            source         mult         dmhl         dmhr          num
10160701         1000     7.434e-3          0.0          0.0            1
10160702         1000     0.010392          0.0          0.0            2
10160703         1000     0.012508          0.0          0.0            3
10160704         1000     0.013611          0.0          0.0            5
10160705         1000     0.012508          0.0          0.0            6
10160706         1000     0.010392          0.0          0.0            7
10160707         1000     7.434e-3          0.0          0.0            8
10160708         1000     3.874e-3          0.0          0.0            9
10160709         1000     1.957e-3          0.0          0.0           10
*   Left Additional Boundary Condition Data
10160800          0
*         thhd  hlf  hlr gslf gslr glcf glcr lbf node
10160801 9.563e-3 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10160900          0
*         thhd  hlf  hlr gslf gslr glcf glcr lbf node
10160901 0.011926 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
```

```
*n: 0
*       nh   np     geom     ssif    leftcoord reflood
10165000  12   6       2        1       0.0105      0
*             mesh       format
10165100          0          1
*         intervals       radius
10165101          5       0.0125
*          material     interval
10165201          3          5
*             rpkf     interval
10165301         0.0          5
*             temp     interval
10165401        300.0          6
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10165501 161010000        0      101        1        0.95       1
10165502 161020000        0      101        1         1.9       2
10165503 161030000        0      101        1         1.9       3
10165504 161040000        0      101        1         1.9       4
10165505 161050000        0      101        1         1.9       5
10165506 161060000        0      101        1         1.9       6
10165507 161070000        0      101        1         1.9       7
10165508 161080000        0      101        1         1.9       8
10165509 161090000        0      101        1         1.9       9
10165510 161100000        0      101        1         1.9      10
10165511 161110000        0      101        1         1.9      11
10165512 161120000        0      101        1        0.95      12
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10165601 160010000        0      101        1        0.95       1
10165602 160020000        0      101        1         1.9       2
10165603 160030000        0      101        1         1.9       3
10165604 160040000        0      101        1         1.9       4
10165605 160050000        0      101        1         1.9       5
10165606 160060000        0      101        1         1.9       6
10165607 160070000        0      101        1         1.9       7
10165608 160080000        0      101        1         1.9       8
10165609 160090000        0      101        1         1.9       9
10165610 160100000        0      101        1         1.9      10
10165611 160110000        0      101        1         1.9      11
10165612 160120000        0      101        1        0.95      12
*           source         mult        dmhl        dmhr         num
10165701           0          0.0          0.0          0.0          12
*   Left Additional Boundary Condition Data
10165800           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10165801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   12
*   Right Additional Boundary Condition Data
10165900           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10165901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   12
*
*       nh   np     geom     ssif    leftcoord reflood
10210000  10   4       2        1        0.024      0
*             mesh       format
10210100          0          1
*         intervals       radius
10210101          3        0.026
*          material     interval
10210201          3          3
*             rpkf     interval
10210301         0.0          3
*             temp     interval
10210401        300.0          4
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10210501 265010000        0      101        1         0.1       1
10210502 245010000        0      101        1        0.05       2
10210503 270010000        0      101        1         0.2       3
10210504 270020000        0      101        1         0.4       4
10210505 270030000        0      101        1        0.56       5
10210506 270040000        0      101        1        0.56       6
10210507 270050000        0      101        1        0.55       7
10210508 270060000        0      101        1        0.32       8
10210509 270070000        0      101        1        0.16       9
10210510 270080000        0      101        1         0.1      10
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10210601 215010000        0      101        1         0.1       1
10210602 235010000        0      101        1        0.05       2
10210603 210080000        0      101        1         0.2       3
10210604 210070000        0      101        1         0.4       4
10210605 210060000        0      101        1        0.56       5
10210606 210050000        0      101        1        0.56       6
10210607 210040000        0      101        1        0.55       7
10210608 210030000        0      101        1        0.32       8
10210609 210020000        0      101        1        0.16       9
10210610 210010000        0      101        1         0.1      10
*           source         mult        dmhl        dmhr         num
10210701           0          0.0          0.0          0.0          10
*   Left Additional Boundary Condition Data
10210800           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10210801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10210900           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10210901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*n: 5
*       nh   np     geom     ssif    leftcoord reflood
10225000  10   17       2        1       0.033      0
*             mesh       format
10225100          0          1
*         intervals       radius
10225101          4       0.0336
10225102          8       0.0344
10225103          4        0.035
*          material     interval
10225201          2          4
10225202          1         12
10225203          2         16
*             rpkf     interval
10225301         0.0          4
10225302         1.0         12
10225303         0.0         16
*             temp     interval
10225401        300.0         17
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10225501 225020000        0      101        1         0.1       1
10225502 225030000        0      101        1         0.1       2
10225503 225040000        0      101        1         0.1       3
10225504 225050000        0      101        1         0.1       4
10225505 225060000        0      101        1         0.1       5
10225506 225070000        0      101        1         0.1       6
10225507 225080000        0      101        1         0.1       7
10225508 225090000        0      101        1         0.1       8
10225509 225100000        0      101        1         0.1       9
10225510 225110000        0      101        1         0.1      10
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
```

```
10225601 220020000       0     101       1        0.1       1
10225602 220030000       0     101       1        0.1       2
10225603 220040000       0     101       1        0.1       3
10225604 220050000       0     101       1        0.1       4
10225605 220060000       0     101       1        0.1       5
10225606 220070000       0     101       1        0.1       6
10225607 220080000       0     101       1        0.1       7
10225608 220090000       0     101       1        0.1       8
10225609 220100000       0     101       1        0.1       9
10225610 220110000       0     101       1        0.1      10
*           source        mult        dmhl        dmhr          num
10225701        1000     4.35e-4         0.0         0.0           1
10225702        1000     6.08e-4         0.0         0.0           2
10225703        1000     7.31e-4         0.0         0.0           3
10225704        1000     7.96e-4         0.0         0.0           5
10225705        1000     7.31e-4         0.0         0.0           6
10225706        1000     6.08e-4         0.0         0.0           7
10225707        1000     4.35e-4         0.0         0.0           8
10225708        1000     2.27e-4         0.0         0.0           9
10225709        1000     1.14e-4         0.0         0.0          10
*   Left Additional Boundary Condition Data
10225800           0
*          thhd  hlf  hlr gslf gslr glcf glcr lbf node
10225801 9.816e-3 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10225900           0
*          thhd  hlf  hlr gslf gslr glcf glcr lbf node
10225901 0.010697 10.0 10.0  0.0  0.0  0.0  0.0 0.1   10
*
*n: 4
*        nh   np     geom      ssif     leftcoord reflood
10230000   10   17        2         1        0.0285       0
*             mesh        format
10230100           0           1
*          intervals        radius
10230101           4        0.0291
10230102           8        0.0299
10230103           4        0.0305
*           material      interval
10230201           2           4
10230202           1          12
10230203           2          16
*             rpkf      interval
10230301         0.0           4
10230302         1.0          12
10230303         0.0          16
*             temp      interval
10230401        300.0          17
*   Left Boundary Condition Data
*          bound      incr      type      code       factor      node
10230501 230020000       0     101       1        0.1       1
10230502 230030000       0     101       1        0.1       2
10230503 230040000       0     101       1        0.1       3
10230504 230050000       0     101       1        0.1       4
10230505 230060000       0     101       1        0.1       5
10230506 230070000       0     101       1        0.1       6
10230507 230080000       0     101       1        0.1       7
10230508 230090000       0     101       1        0.1       8
10230509 230100000       0     101       1        0.1       9
10230510 230110000       0     101       1        0.1      10
*   Right Boundary Condition Data
*          bound      incr      type      code       factor      node
10230601 225020000       0     101       1        0.1       1
10230602 225030000       0     101       1        0.1       2
10230603 225040000       0     101       1        0.1       3
10230604 225050000       0     101       1        0.1       4
10230605 225060000       0     101       1        0.1       5
10230606 225070000       0     101       1        0.1       6
10230607 225080000       0     101       1        0.1       7
10230608 225090000       0     101       1        0.1       8
10230609 225100000       0     101       1        0.1       9
10230610 225110000       0     101       1        0.1      10
*           source        mult        dmhl        dmhr          num
10230701        1000     3.14e-4         0.0         0.0           1
10230702        1000     4.38e-4         0.0         0.0           2
10230703        1000     5.28e-4         0.0         0.0           3
10230704        1000     5.74e-4         0.0         0.0           5
10230705        1000     5.28e-4         0.0         0.0           6
10230706        1000     4.38e-4         0.0         0.0           7
10230707        1000     3.14e-4         0.0         0.0           8
10230708        1000     1.63e-4         0.0         0.0           9
10230709        1000      8.3e-5         0.0         0.0          10
*   Left Additional Boundary Condition Data
10230800           0
*          thhd  hlf  hlr gslf gslr glcf glcr lbf node
10230801 9.784e-3 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10230900           0
*          thhd  hlf  hlr gslf gslr glcf glcr lbf node
10230901 0.01083 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*n: 3
*        nh   np     geom      ssif     leftcoord reflood
10250000   10   17        2         1        0.024       0
*             mesh        format
10250100           0           1
*          intervals        radius
10250101           4        0.0246
10250102           8        0.0254
10250103           4         0.026
*           material      interval
10250201           2           4
10250202           1          12
10250203           2          16
*             rpkf      interval
10250301         0.0           4
10250302         1.0          12
10250303         0.0          16
*             temp      interval
10250401        300.0          17
*   Left Boundary Condition Data
*          bound      incr      type      code       factor      node
10250501 250020000       0     101       1        0.1       1
10250502 250030000       0     101       1        0.1       2
10250503 250040000       0     101       1        0.1       3
10250504 250050000       0     101       1        0.1       4
10250505 250060000       0     101       1        0.1       5
10250506 250070000       0     101       1        0.1       6
10250507 250080000       0     101       1        0.1       7
10250508 250090000       0     101       1        0.1       8
10250509 250100000       0     101       1        0.1       9
10250510 250110000       0     101       1        0.1      10
*   Right Boundary Condition Data
*          bound      incr      type      code       factor      node
10250601 230020000       0     101       1        0.1       1
10250602 230030000       0     101       1        0.1       2
10250603 230040000       0     101       1        0.1       3
10250604 230050000       0     101       1        0.1       4
10250605 230060000       0     101       1        0.1       5
10250606 230070000       0     101       1        0.1       6
10250607 230080000       0     101       1        0.1       7
10250608 230090000       0     101       1        0.1       8
```

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10250609 230100000      0     101      1       0.1      9
10250610 230110000      0     101      1       0.1     10
*          source       mult       dmhl       dmhr       num
10250701       1000     2.38e-4       0.0       0.0        1
10250702       1000     3.33e-4       0.0       0.0        2
10250703       1000     4.01e-4       0.0       0.0        3
10250704       1000     4.37e-4       0.0       0.0        5
10250705       1000     4.01e-4       0.0       0.0        6
10250706       1000     3.33e-4       0.0       0.0        7
10250707       1000     2.38e-4       0.0       0.0        8
10250708       1000     1.24e-4       0.0       0.0        9
10250709       1000      6.3e-5       0.0       0.0       10
*  Left Additional Boundary Condition Data
10250800          0
*        hthd  hlf  hlr gslf gslr glcf glcr lbf node
10250801 9.742e-3 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*  Right Additional Boundary Condition Data
10250900          0
*        hthd  hlf  hlr gslf gslr glcf glcr lbf node
10250901 0.011028 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*n: 2
*       nh   np     geom     ssif    leftcoord reflood
10255000   10   17       2       1       0.0195      0
*            mesh       format
10255100          0          1
*        intervals       radius
10255101          4       0.0201
10255102          8       0.0209
10255103          4       0.0215
*          material     interval
10255201          2          4
10255202          1         12
10255203          2         16
*            rpkf     interval
10255301        0.0          4
10255302        1.0         12
10255303        0.0         16
*            temp     interval
10255401       300.0         17
*  Left Boundary Condition Data
*        bound     incr     type     code      factor     node
10255501 255020000      0     101      1       0.1      1
10255502 255030000      0     101      1       0.1      2
10255503 255040000      0     101      1       0.1      3
10255504 255050000      0     101      1       0.1      4
10255505 255060000      0     101      1       0.1      5
10255506 255070000      0     101      1       0.1      6
10255507 255080000      0     101      1       0.1      7
10255508 255090000      0     101      1       0.1      8
10255509 255100000      0     101      1       0.1      9
10255510 255110000      0     101      1       0.1     10
*  Right Boundary Condition Data
*        bound     incr     type     code      factor     node
10255601 250020000      0     101      1       0.1      1
10255602 250030000      0     101      1       0.1      2
10255603 250040000      0     101      1       0.1      3
10255604 250050000      0     101      1       0.1      4
10255605 250060000      0     101      1       0.1      5
10255606 250070000      0     101      1       0.1      6
10255607 250080000      0     101      1       0.1      7
10255608 250090000      0     101      1       0.1      8
10255609 250100000      0     101      1       0.1      9
10255610 250110000      0     101      1       0.1     10
*          source       mult       dmhl       dmhr       num
10255701       1000     1.86e-4       0.0       0.0        1
10255702       1000      2.6e-4       0.0       0.0        2
10255703       1000     3.13e-4       0.0       0.0        3
10255704       1000      3.4e-4       0.0       0.0        5
10255705       1000     3.13e-4       0.0       0.0        6
10255706       1000      2.6e-4       0.0       0.0        7
10255707       1000     1.86e-4       0.0       0.0        8
10255708       1000      9.7e-5       0.0       0.0        9
10255709       1000      4.9e-5       0.0       0.0       10
*  Left Additional Boundary Condition Data
10255800          0
*        hthd  hlf  hlr gslf gslr glcf glcr lbf node
10255801 0.09676 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*  Right Additional Boundary Condition Data
10255900          0
*        hthd  hlf  hlr gslf gslr glcf glcr lbf node
10255901 0.011343 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*n: 1
*       nh   np     geom     ssif    leftcoord reflood
10260000   10   17       2       1       0.015      0
*            mesh       format
10260100          0          1
*        intervals       radius
10260101          4       0.0156
10260102          8       0.0164
10260103          4        0.017
*          material     interval
10260201          2          4
10260202          1         12
10260203          2         16
*            rpkf     interval
10260301        0.0          4
10260302        1.0         12
10260303        0.0         16
*            temp     interval
10260401       300.0         17
*  Left Boundary Condition Data
*        bound     incr     type     code      factor     node
10260501 260020000      0     101      1       0.1      1
10260502 260030000      0     101      1       0.1      2
10260503 260040000      0     101      1       0.1      3
10260504 260050000      0     101      1       0.1      4
10260505 260060000      0     101      1       0.1      5
10260506 260070000      0     101      1       0.1      6
10260507 260080000      0     101      1       0.1      7
10260508 260090000      0     101      1       0.1      8
10260509 260100000      0     101      1       0.1      9
10260510 260110000      0     101      1       0.1     10
*  Right Boundary Condition Data
*        bound     incr     type     code      factor     node
10260601 255020000      0     101      1       0.1      1
10260602 255030000      0     101      1       0.1      2
10260603 255040000      0     101      1       0.1      3
10260604 255050000      0     101      1       0.1      4
10260605 255060000      0     101      1       0.1      5
10260606 255070000      0     101      1       0.1      6
10260607 255080000      0     101      1       0.1      7
10260608 255090000      0     101      1       0.1      8
10260609 255100000      0     101      1       0.1      9
10260610 255110000      0     101      1       0.1     10
*          source       mult       dmhl       dmhr       num
10260701       1000     1.45e-4       0.0       0.0        1
10260702       1000     2.03e-4       0.0       0.0        2
10260703       1000     2.44e-4       0.0       0.0        3
10260704       1000     2.65e-4       0.0       0.0        5
10260705       1000     2.44e-4       0.0       0.0        6
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10260706        1000      2.03e-4         0.0         0.0          7
10260707        1000      1.45e-4         0.0         0.0          8
10260708        1000       7.6e-5         0.0         0.0          9
10260709        1000       3.8e-5         0.0         0.0         10
*   Left Additional Boundary Condition Data
10260800          0
*         hthd  hlf  hlr gslf gslr glcf glcr lbf node
10260801 9.563e-3 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10260900          0
*         hthd  hlf  hlr gslf gslr glcf glcr lbf node
10260901 0.011926 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*n: 0
*       nh   np     geom     ssif    leftcoord reflood
10265000   12   6        2        1       0.0105       0
*             mesh       format
10265100          0          1
*         intervals       radius
10265101          5       0.0125
*          material     interval
10265201          3          5
*             rpkf     interval
10265301         0.0          5
*             temp     interval
10265401        300.0          6
*   Left Boundary Condition Data
*         bound      incr     type     code      factor      node
10265501 261010000        0      101         1        0.05         1
10265502 261020000        0      101         1         0.1         2
10265503 261030000        0      101         1         0.1         3
10265504 261040000        0      101         1         0.1         4
10265505 261050000        0      101         1         0.1         5
10265506 261060000        0      101         1         0.1         6
10265507 261070000        0      101         1         0.1         7
10265508 261080000        0      101         1         0.1         8
10265509 261090000        0      101         1         0.1         9
10265510 261100000        0      101         1         0.1        10
10265511 261110000        0      101         1         0.1        11
10265512 261120000        0      101         1        0.05        12
*   Right Boundary Condition Data
*         bound      incr     type     code      factor      node
10265601 260010000        0      101         1        0.05         1
10265602 260020000        0      101         1         0.1         2
10265603 260030000        0      101         1         0.1         3
10265604 260040000        0      101         1         0.1         4
10265605 260050000        0      101         1         0.1         5
10265606 260060000        0      101         1         0.1         6
10265607 260070000        0      101         1         0.1         7
10265608 260080000        0      101         1         0.1         8
10265609 260090000        0      101         1         0.1         9
10265610 260100000        0      101         1         0.1        10
10265611 260110000        0      101         1         0.1        11
10265612 260120000        0      101         1        0.05        12
*           source         mult         dmhl         dmhr          num
10265701          0          0.0          0.0          0.0           12
*   Left Additional Boundary Condition Data
10265800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10265801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   12
*   Right Additional Boundary Condition Data
10265900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10265901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   12
*
*       nh   np     geom     ssif    leftcoord reflood
10310000   10   4        2        1        0.024       0
*             mesh       format
10310100          0          1
*         intervals       radius
10310101          3        0.026
*          material     interval
10310201          3          3
*             rpkf     interval
10310301         0.0          3
*             temp     interval
10310401        300.0          4
*   Left Boundary Condition Data
*         bound      incr     type     code      factor      node
10310501 365010000        0      101         1         0.1         1
10310502 345010000        0      101         1        0.05         2
10310503 370010000        0      101         1         0.6         3
10310504 370020000        0      101         1         1.2         4
10310505 370030000        0      101         1        1.68         5
10310506 370040000        0      101         1        1.68         6
10310507 370050000        0      101         1        1.65         7
10310508 370060000        0      101         1        0.96         8
10310509 370070000        0      101         1        0.48         9
10310510 370080000        0      101         1         0.3        10
*   Right Boundary Condition Data
*         bound      incr     type     code      factor      node
10310601 315010000        0      101         1         0.1         1
10310602 335010000        0      101         1        0.05         2
10310603 310080000        0      101         1         0.6         3
10310604 310070000        0      101         1         1.2         4
10310605 310060000        0      101         1        1.68         5
10310606 310050000        0      101         1        1.68         6
10310607 310040000        0      101         1        1.65         7
10310608 310030000        0      101         1        0.96         8
10310609 310020000        0      101         1        0.48         9
10310610 310010000        0      101         1         0.3        10
*           source         mult         dmhl         dmhr          num
10310701          0          0.0          0.0          0.0           10
*   Left Additional Boundary Condition Data
10310800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10310801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10310900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10310901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*n: 5
*       nh   np     geom     ssif    leftcoord reflood
10325000   10   17       2        1        0.033       0
*             mesh       format
10325100          0          1
*         intervals       radius
10325101          4       0.0336
10325102          8       0.0344
10325103          4        0.035
*          material     interval
10325201          2          4
10325202          1         12
10325203          2         16
*             rpkf     interval
10325301         0.0          4
10325302         1.0         12
10325303         0.0         16
*             temp     interval
10325401        300.0         17
*   Left Boundary Condition Data
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*        bound     incr     type     code      factor     node
10325501 325020000       0      101       1        0.3       1
10325502 325030000       0      101       1        0.3       2
10325503 325040000       0      101       1        0.3       3
10325504 325050000       0      101       1        0.3       4
10325505 325060000       0      101       1        0.3       5
10325506 325070000       0      101       1        0.3       6
10325507 325080000       0      101       1        0.3       7
10325508 325090000       0      101       1        0.3       8
10325509 325100000       0      101       1        0.3       9
10325510 325110000       0      101       1        0.3      10
*   Right Boundary Condition Data
*        bound     incr     type     code      factor     node
10325601 320020000       0      101       1        0.3       1
10325602 320030000       0      101       1        0.3       2
10325603 320040000       0      101       1        0.3       3
10325604 320050000       0      101       1        0.3       4
10325605 320060000       0      101       1        0.3       5
10325606 320070000       0      101       1        0.3       6
10325607 320080000       0      101       1        0.3       7
10325608 320090000       0      101       1        0.3       8
10325609 320100000       0      101       1        0.3       9
10325610 320110000       0      101       1        0.3      10
*          source        mult        dmhl        dmhr         num
10325701        1000      8.3e-4        0.0         0.0           1
10325702        1000     1.16e-3        0.0         0.0           2
10325703        1000    1.397e-3        0.0         0.0           3
10325704        1000     1.52e-3        0.0         0.0           5
10325705        1000    1.397e-3        0.0         0.0           6
10325706        1000     1.16e-3        0.0         0.0           7
10325707        1000      8.3e-4        0.0         0.0           8
10325708        1000     4.33e-4        0.0         0.0           9
10325709        1000     2.19e-4        0.0         0.0          10
*   Left Additional Boundary Condition Data
10325800           0
*        hthd  hlf  hlr gslf gslr glcf glcr lbf node
10325801 9.816e-3 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10325900           0
*        hthd  hlf  hlr gslf gslr glcf glcr lbf node
10325901 0.010697 10.0 10.0  0.0  0.0  0.0  0.0 0.1   10
*
*n: 4
*       nh   np     geom     ssif    leftcoord reflood
10330000   10   17        2        1       0.0285      0
*            mesh       format
10330100           0           1
*        intervals       radius
10330101           4       0.0291
10330102           8       0.0299
10330103           4       0.0305
*          material     interval
10330201           2           4
10330202           1          12
10330203           2          16
*            rpkf     interval
10330301         0.0           4
10330302         1.0          12
10330303         0.0          16
*            temp     interval
10330401       300.0          17
*   Left Boundary Condition Data
*        bound     incr     type     code      factor     node
10330501 330020000       0      101       1        0.3       1
10330502 330030000       0      101       1        0.3       2
10330503 330040000       0      101       1        0.3       3
10330504 330050000       0      101       1        0.3       4
10330505 330060000       0      101       1        0.3       5
10330506 330070000       0      101       1        0.3       6
10330507 330080000       0      101       1        0.3       7
10330508 330090000       0      101       1        0.3       8
10330509 330100000       0      101       1        0.3       9
10330510 330110000       0      101       1        0.3      10
*   Right Boundary Condition Data
*        bound     incr     type     code      factor     node
10330601 325020000       0      101       1        0.3       1
10330602 325030000       0      101       1        0.3       2
10330603 325040000       0      101       1        0.3       3
10330604 325050000       0      101       1        0.3       4
10330605 325060000       0      101       1        0.3       5
10330606 325070000       0      101       1        0.3       6
10330607 325080000       0      101       1        0.3       7
10330608 325090000       0      101       1        0.3       8
10330609 325100000       0      101       1        0.3       9
10330610 325110000       0      101       1        0.3      10
*          source        mult        dmhl        dmhr         num
10330701        1000     5.99e-4        0.0         0.0           1
10330702        1000     8.37e-4        0.0         0.0           2
10330703        1000    1.007e-3        0.0         0.0           3
10330704        1000    1.096e-3        0.0         0.0           5
10330705        1000    1.007e-3        0.0         0.0           6
10330706        1000     8.37e-4        0.0         0.0           7
10330707        1000     5.99e-4        0.0         0.0           8
10330708        1000     3.12e-4        0.0         0.0           9
10330709        1000     1.58e-4        0.0         0.0          10
*   Left Additional Boundary Condition Data
10330800           0
*        hthd  hlf  hlr gslf gslr glcf glcr lbf node
10330801 9.784e-3 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10330900           0
*        hthd  hlf  hlr gslf gslr glcf glcr lbf node
10330901 0.01083 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*n: 3
*       nh   np     geom     ssif    leftcoord reflood
10350000   10   17        2        1       0.024      0
*            mesh       format
10350100           0           1
*        intervals       radius
10350101           4       0.0246
10350102           8       0.0254
10350103           4        0.026
*          material     interval
10350201           2           4
10350202           1          12
10350203           2          16
*            rpkf     interval
10350301         0.0           4
10350302         1.0          12
10350303         0.0          16
*            temp     interval
10350401       300.0          17
*   Left Boundary Condition Data
*        bound     incr     type     code      factor     node
10350501 350020000       0      101       1        0.3       1
10350502 350030000       0      101       1        0.3       2
10350503 350040000       0      101       1        0.3       3
10350504 350050000       0      101       1        0.3       4
10350505 350060000       0      101       1        0.3       5
10350506 350070000       0      101       1        0.3       6
10350507 350080000       0      101       1        0.3       7
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10350508 350090000       0     101       1        0.3       8
10350509 350100000       0     101       1        0.3       9
10350510 350110000       0     101       1        0.3      10
*   Right Boundary Condition Data
*          bound     incr     type     code      factor     node
10350601 330020000       0     101       1        0.3       1
10350602 330030000       0     101       1        0.3       2
10350603 330040000       0     101       1        0.3       3
10350604 330050000       0     101       1        0.3       4
10350605 330060000       0     101       1        0.3       5
10350606 330070000       0     101       1        0.3       6
10350607 330080000       0     101       1        0.3       7
10350608 330090000       0     101       1        0.3       8
10350609 330100000       0     101       1        0.3       9
10350610 330110000       0     101       1        0.3      10
*            source         mult        dmhl        dmhr         num
10350701         1000     4.55e-4         0.0         0.0           1
10350702         1000     6.36e-4         0.0         0.0           2
10350703         1000     7.66e-4         0.0         0.0           3
10350704         1000     8.34e-4         0.0         0.0           5
10350705         1000     7.66e-4         0.0         0.0           6
10350706         1000     6.36e-4         0.0         0.0           7
10350707         1000     4.55e-4         0.0         0.0           8
10350708         1000     2.37e-4         0.0         0.0           9
10350709         1000      1.2e-4         0.0         0.0          10
*   Left Additional Boundary Condition Data
10350800           0
*          hthd  hlf  hlr gslf gslr glcf glcr lbf node
10350801 9.742e-3 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10350900           0
*          hthd  hlf  hlr gslf gslr glcf glcr lbf node
10350901 0.011028 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*n: 2
*        nh   np     geom      ssif     leftcoord reflood
10355000   10   17        2         1        0.0195       0
*             mesh       format
10355100           0           1
*          intervals       radius
10355101           4       0.0201
10355102           8       0.0209
10355103           4       0.0215
*           material     interval
10355201           2            4
10355202           1           12
10355203           2           16
*             rpkf      interval
10355301         0.0            4
10355302         1.0           12
10355303         0.0           16
*             temp      interval
10355401        300.0           17
*   Left Boundary Condition Data
*          bound     incr     type     code      factor     node
10355501 355020000       0     101       1        0.3       1
10355502 355030000       0     101       1        0.3       2
10355503 355040000       0     101       1        0.3       3
10355504 355050000       0     101       1        0.3       4
10355505 355060000       0     101       1        0.3       5
10355506 355070000       0     101       1        0.3       6
10355507 355080000       0     101       1        0.3       7
10355508 355090000       0     101       1        0.3       8
10355509 355100000       0     101       1        0.3       9
10355510 355110000       0     101       1        0.3      10
*   Right Boundary Condition Data
*          bound     incr     type     code      factor     node
10355601 350020000       0     101       1        0.3       1
10355602 350030000       0     101       1        0.3       2
10355603 350040000       0     101       1        0.3       3
10355604 350050000       0     101       1        0.3       4
10355605 350060000       0     101       1        0.3       5
10355606 350070000       0     101       1        0.3       6
10355607 350080000       0     101       1        0.3       7
10355608 350090000       0     101       1        0.3       8
10355609 350100000       0     101       1        0.3       9
10355610 350110000       0     101       1        0.3      10
*            source         mult        dmhl        dmhr         num
10355701         1000     3.55e-4         0.0         0.0           1
10355702         1000     4.96e-4         0.0         0.0           2
10355703         1000     5.97e-4         0.0         0.0           3
10355704         1000     6.49e-4         0.0         0.0           5
10355705         1000     5.97e-4         0.0         0.0           6
10355706         1000     4.96e-4         0.0         0.0           7
10355707         1000     3.55e-4         0.0         0.0           8
10355708         1000     1.85e-4         0.0         0.0           9
10355709         1000      9.3e-5         0.0         0.0          10
*   Left Additional Boundary Condition Data
10355800           0
*          hthd  hlf  hlr gslf gslr glcf glcr lbf node
10355801 0.09676 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10355900           0
*          hthd  hlf  hlr gslf gslr glcf glcr lbf node
10355901 0.011343 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*n: 1
*        nh   np     geom      ssif     leftcoord reflood
10360000   10   17        2         1        0.015       0
*             mesh       format
10360100           0           1
*          intervals       radius
10360101           4       0.0156
10360102           8       0.0164
10360103           4        0.017
*           material     interval
10360201           2            4
10360202           1           12
10360203           2           16
*             rpkf      interval
10360301         0.0            4
10360302         1.0           12
10360303         0.0           16
*             temp      interval
10360401        300.0           17
*   Left Boundary Condition Data
*          bound     incr     type     code      factor     node
10360501 360020000       0     101       1        0.3       1
10360502 360030000       0     101       1        0.3       2
10360503 360040000       0     101       1        0.3       3
10360504 360050000       0     101       1        0.3       4
10360505 360060000       0     101       1        0.3       5
10360506 360070000       0     101       1        0.3       6
10360507 360080000       0     101       1        0.3       7
10360508 360090000       0     101       1        0.3       8
10360509 360100000       0     101       1        0.3       9
10360510 360110000       0     101       1        0.3      10
*   Right Boundary Condition Data
*          bound     incr     type     code      factor     node
10360601 355020000       0     101       1        0.3       1
10360602 355030000       0     101       1        0.3       2
10360603 355040000       0     101       1        0.3       3
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10360604 355050000      0     101      1       0.3      4
10360605 355060000      0     101      1       0.3      5
10360606 355070000      0     101      1       0.3      6
10360607 355080000      0     101      1       0.3      7
10360608 355090000      0     101      1       0.3      8
10360609 355100000      0     101      1       0.3      9
10360610 355110000      0     101      1       0.3     10
*          source       mult       dmhl       dmhr        num
10360701       1000     2.77e-4       0.0        0.0          1
10360702       1000     3.87e-4       0.0        0.0          2
10360703       1000     4.66e-4       0.0        0.0          3
10360704       1000     5.07e-4       0.0        0.0          5
10360705       1000     4.66e-4       0.0        0.0          6
10360706       1000     3.87e-4       0.0        0.0          7
10360707       1000     2.77e-4       0.0        0.0          8
10360708       1000     1.44e-4       0.0        0.0          9
10360709       1000      7.3e-5       0.0        0.0         10
*  Left Additional Boundary Condition Data
10360800          0
*        hthd  hlf  hlr gslf gslr glcf glcr lbf node
10360801 9.563e-3 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*  Right Additional Boundary Condition Data
10360900          0
*        hthd  hlf  hlr gslf gslr glcf glcr lbf node
10360901 0.011926 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*n: 0
*       nh   np     geom     ssif    leftcoord reflood
10365000   12    6       2       1       0.0105      0
*            mesh       format
10365100          0          1
*        intervals       radius
10365101          5       0.0125
*         material     interval
10365201          3          5
*            rpkf     interval
10365301        0.0          5
*            temp     interval
10365401      300.0          6
*  Left Boundary Condition Data
*        bound     incr     type     code      factor     node
10365501 361010000      0     101      1       0.15       1
10365502 361020000      0     101      1        0.3       2
10365503 361030000      0     101      1        0.3       3
10365504 361040000      0     101      1        0.3       4
10365505 361050000      0     101      1        0.3       5
10365506 361060000      0     101      1        0.3       6
10365507 361070000      0     101      1        0.3       7
10365508 361080000      0     101      1        0.3       8
10365509 361090000      0     101      1        0.3       9
10365510 361100000      0     101      1        0.3      10
10365511 361110000      0     101      1        0.3      11
10365512 361120000      0     101      1       0.15      12
*  Right Boundary Condition Data
*        bound     incr     type     code      factor     node
10365601 360010000      0     101      1       0.15       1
10365602 360020000      0     101      1        0.3       2
10365603 360030000      0     101      1        0.3       3
10365604 360040000      0     101      1        0.3       4
10365605 360050000      0     101      1        0.3       5
10365606 360060000      0     101      1        0.3       6
10365607 360070000      0     101      1        0.3       7
10365608 360080000      0     101      1        0.3       8
10365609 360090000      0     101      1        0.3       9
10365610 360100000      0     101      1        0.3      10
10365611 360110000      0     101      1        0.3      11
10365612 360120000      0     101      1       0.15      12
*          source       mult       dmhl       dmhr        num
10365701          0        0.0        0.0        0.0         12
*  Left Additional Boundary Condition Data
10365800          0
*      hthd  hlf  hlr gslf gslr glcf glcr lbf node
10365801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   12
*  Right Additional Boundary Condition Data
10365900          0
*      hthd  hlf  hlr gslf gslr glcf glcr lbf node
10365901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   12
*
*n: 1HP-basen
*       nh   np     geom     ssif    leftcoord reflood
10510000   15    4       2       1       0.0375      0
*            mesh       format
10510100          0          1
*        intervals       radius
10510101          3       0.0395
*         material     interval
10510201          4          3
*            rpkf     interval
10510301        0.0          3
*            temp     interval
10510401      300.0          4
*  Left Boundary Condition Data
*        bound     incr     type     code      factor     node
10510501  40010000      0     101      1       0.05       1
10510502  35010000      0     101      1       0.05       2
10510503  20120000      0     101      1       0.05       3
10510504  20110000      0     101      1        0.1       4
10510505  20100000      0     101      1        0.1       5
10510506  20090000      0     101      1        0.1       6
10510507  20080000      0     101      1        0.1       7
10510508  20070000      0     101      1        0.1       8
10510509  20060000      0     101      1        0.1       9
10510510  20050000      0     101      1        0.1      10
10510511  20040000      0     101      1        0.1      11
10510512  20030000      0     101      1        0.1      12
10510513  20020000      0     101      1        0.1      13
10510514  20010000      0     101      1       0.05      14
10510515  15010000      0     101      1        0.1      15
*  Right Boundary Condition Data
*        bound     incr     type     code      factor     node
10510601 520010000      0     101      1       0.05       1
10510602 520010000      0     101      1       0.05       2
10510603 520010000      0     101      1       0.05       3
10510604 520010000      0     101      1        0.1       4
10510605 520020000      0     101      1        0.1       5
10510606 520020000      0     101      1        0.1       6
10510607 520030000      0     101      1        0.1       7
10510608 520030000      0     101      1        0.1       8
10510609 520040000      0     101      1        0.1       9
10510610 520040000      0     101      1        0.1      10
10510611 520050000      0     101      1        0.1      11
10510612 520050000      0     101      1        0.1      12
10510613 520060000      0     101      1        0.1      13
10510614 520060000      0     101      1       0.05      14
10510615 520060000      0     101      1        0.1      15
*          source       mult       dmhl       dmhr        num
10510701          0        0.0        0.0        0.0         15
*  Left Additional Boundary Condition Data
10510800          0
*      hthd  hlf  hlr gslf gslr glcf glcr lbf node
10510801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   15
*  Right Additional Boundary Condition Data
```

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10510900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10510901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   15
*
*n: 1LP-basen
*        nh  np     geom     ssif    leftcoord reflood
10515000  15   4        2        1       0.0375       0
*             mesh       format
10515100          0          1
*         intervals       radius
10515101          3       0.0395
*          material     interval
10515201          4          3
*             rpkf     interval
10515301        0.0          3
*             temp     interval
10515401       300.0          4
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10515501 240010000        0      101        1        0.05        1
10515502 235010000        0      101        1        0.05        2
10515503 220120000        0      101        1        0.05        3
10515504 220110000        0      101        1         0.1        4
10515505 220100000        0      101        1         0.1        5
10515506 220090000        0      101        1         0.1        6
10515507 220080000        0      101        1         0.1        7
10515508 220070000        0      101        1         0.1        8
10515509 220060000        0      101        1         0.1        9
10515510 220050000        0      101        1         0.1       10
10515511 220040000        0      101        1         0.1       11
10515512 220030000        0      101        1         0.1       12
10515513 220020000        0      101        1         0.1       13
10515514 220010000        0      101        1        0.05       14
10515515 215010000        0      101        1         0.1       15
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10515601 520010000        0      101        1        0.05        1
10515602 520010000        0      101        1        0.05        2
10515603 520010000        0      101        1        0.05        3
10515604 520010000        0      101        1         0.1        4
10515605 520020000        0      101        1         0.1        5
10515606 520020000        0      101        1         0.1        6
10515607 520030000        0      101        1         0.1        7
10515608 520030000        0      101        1         0.1        8
10515609 520040000        0      101        1         0.1        9
10515610 520040000        0      101        1         0.1       10
10515611 520050000        0      101        1         0.1       11
10515612 520050000        0      101        1         0.1       12
10515613 520060000        0      101        1         0.1       13
10515614 520060000        0      101        1        0.05       14
10515615 520060000        0      101        1         0.1       15
*            source         mult         dmhl         dmhr          num
10515701          0          0.0          0.0          0.0           15
*   Left Additional Boundary Condition Data
10515800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10515801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   15
*   Right Additional Boundary Condition Data
10515900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10515901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   15
*
*n: 3ELP-basen
*        nh  np     geom     ssif    leftcoord reflood
10520000  15   4        2        1       0.0375       0
*             mesh       format
10520100          0          1
*         intervals       radius
10520101          3       0.0395
*          material     interval
10520201          4          3
*             rpkf     interval
10520301        0.0          3
*             temp     interval
10520401       300.0          4
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10520501 340010000        0      101        1        0.15        1
10520502 335010000        0      101        1        0.15        2
10520503 320120000        0      101        1        0.15        3
10520504 320110000        0      101        1         0.3        4
10520505 320100000        0      101        1         0.3        5
10520506 320090000        0      101        1         0.3        6
10520507 320080000        0      101        1         0.3        7
10520508 320070000        0      101        1         0.3        8
10520509 320060000        0      101        1         0.3        9
10520510 320050000        0      101        1         0.3       10
10520511 320040000        0      101        1         0.3       11
10520512 320030000        0      101        1         0.3       12
10520513 320020000        0      101        1         0.3       13
10520514 320010000        0      101        1        0.15       14
10520515 315010000        0      101        1         0.3       15
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10520601 520010000        0      101        1        0.15        1
10520602 520010000        0      101        1        0.15        2
10520603 520010000        0      101        1        0.15        3
10520604 520010000        0      101        1         0.3        4
10520605 520020000        0      101        1         0.3        5
10520606 520020000        0      101        1         0.3        6
10520607 520030000        0      101        1         0.3        7
10520608 520030000        0      101        1         0.3        8
10520609 520040000        0      101        1         0.3        9
10520610 520040000        0      101        1         0.3       10
10520611 520050000        0      101        1         0.3       11
10520612 520050000        0      101        1         0.3       12
10520613 520060000        0      101        1         0.3       13
10520614 520060000        0      101        1        0.15       14
10520615 520060000        0      101        1         0.3       15
*            source         mult         dmhl         dmhr          num
10520701          0          0.0          0.0          0.0           15
*   Left Additional Boundary Condition Data
10520800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10520801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   15
*   Right Additional Boundary Condition Data
10520900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10520901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   15
*
*n: 18MP-basen
*        nh  np     geom     ssif    leftcoord reflood
10525000  15   4        2        1       0.0375       0
*             mesh       format
10525100          0          1
*         intervals       radius
10525101          3       0.0395
*          material     interval
10525201          4          3
*             rpkf     interval
10525301        0.0          3
*             temp     interval
```

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10525401      300.0          4
*  Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10525501 140010000       0     101        1        0.95       1
10525502 135010000       0     101        1        0.95       2
10525503 120120000       0     101        1        0.95       3
10525504 120110000       0     101        1         1.9       4
10525505 120100000       0     101        1         1.9       5
10525506 120090000       0     101        1         1.9       6
10525507 120080000       0     101        1         1.9       7
10525508 120070000       0     101        1         1.9       8
10525509 120060000       0     101        1         1.9       9
10525510 120050000       0     101        1         1.9      10
10525511 120040000       0     101        1         1.9      11
10525512 120030000       0     101        1         1.9      12
10525513 120020000       0     101        1         1.9      13
10525514 120010000       0     101        1        0.95      14
10525515 115010000       0     101        1         1.9      15
*  Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10525601 520010000       0     101        1        0.95       1
10525602 520010000       0     101        1        0.95       2
10525603 520010000       0     101        1        0.95       3
10525604 520010000       0     101        1         1.9       4
10525605 520020000       0     101        1         1.9       5
10525606 520020000       0     101        1         1.9       6
10525607 520030000       0     101        1         1.9       7
10525608 520030000       0     101        1         1.9       8
10525609 520040000       0     101        1         1.9       9
10525610 520040000       0     101        1         1.9      10
10525611 520050000       0     101        1         1.9      11
10525612 520050000       0     101        1         1.9      12
10525613 520060000       0     101        1         1.9      13
10525614 520060000       0     101        1        0.95      14
10525615 520060000       0     101        1         1.9      15
*           source         mult        dmhl        dmhr         num
10525701           0          0.0          0.0          0.0          15
*  Left Additional Boundary Condition Data
10525800           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10525801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   15
*  Right Additional Boundary Condition Data
10525900           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10525901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   15
*
*n: Graphite Blocks
*        nh   np     geom      ssif     leftcoord reflood
10530000    6    4        2        1          0.0       0
*             mesh       format
10530100           0           2
*          thickness      interval
10530101     0.23333333           3
*           material      interval
10530201           5           3
*             rpkf      interval
10530301         1.0           3
*             temp      interval
10530401        340.0           4
*  Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10530501       0        0        0        1        46.0        1
10530502       0        0        0        1        36.8        2
10530503       0        0        0        1        36.8        3
10530504       0        0        0        1        36.8        4
10530505       0        0        0        1        36.8        5
10530506       0        0        0        1        46.0        6
*  Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10530601 520010000       0     101        1        46.0        1
10530602 520020000       0     101        1        36.8        2
10530603 520030000       0     101        1        36.8        3
10530604 520040000       0     101        1        36.8        4
10530605 520050000       0     101        1        36.8        5
10530606 520060000       0     101        1        46.0        6
*           source         mult        dmhl        dmhr         num
10530701           7         0.19          0.0          0.0           1
10530702           7        0.155          0.0          0.0           5
10530703           7         0.19          0.0          0.0           6
*  Right Additional Boundary Condition Data
10530900           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10530901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   6
*
*n: Poll Exchan
*        nh   np     geom      ssif     leftcoord reflood
10531000    6    4        2        1          8.0e-3       0
*             mesh       format
10531100           0           2
*          thickness      interval
10531101       4.0e-4           2
10531102       8.0e-4           3
*           material      interval
10531201           7           3
*             rpkf      interval
10531301          0.0           3
*             temp      interval
10531401        300.0           4
*  Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10531501 565010000       0     101        1        350.0       1
10531502 565020000       0     101        1        350.0       2
10531503 565030000       0     101        1        350.0       3
10531504 565040000       0     101        1        350.0       4
10531505 565050000       0     101        1        350.0       5
10531506 565060000       0     101        1        350.0       6
*  Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10531601 560060000       0     101        1        350.0       1
10531602 560050000       0     101        1        350.0       2
10531603 560040000       0     101        1        350.0       3
10531604 560030000       0     101        1        350.0       4
10531605 560020000       0     101        1        350.0       5
10531606 560010000       0     101        1        350.0       6
*           source         mult        dmhl        dmhr         num
10531701           0          0.0          0.0          0.0           6
*  Left Additional Boundary Condition Data
10531800           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10531801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   6
*  Right Additional Boundary Condition Data
10531900           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10531901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   6
*
*n: 1HPkan-basen
*        nh   np     geom      ssif     leftcoord reflood
10535000    8    4        2        1         0.0375       0
*             mesh       format
10535100           0           1
*          intervals       radius
10535101           3       0.0395
```

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*          material     interval
10535201          4          3
*            rpkf     interval
10535301         0.0          3
*            temp     interval
10535401        300.0          4
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10535501 10080000        0     101        1         0.2        1
10535502 10070000        0     101        1         0.4        2
10535503 10060000        0     101        1        0.56        3
10535504 10050000        0     101        1        0.56        4
10535505 10040000        0     101        1        0.55        5
10535506 10030000        0     101        1        0.32        6
10535507 10020000        0     101        1        0.16        7
10535508 10010000        0     101        1         0.1        8
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10535601 530010000        0     101        1         0.2        1
10535602 535010000        0     101        1         0.4        2
10535603 535020000        0     101        1        0.56        3
10535604 535030000        0     101        1        0.56        4
10535605 535040000        0     101        1        0.55        5
10535606 540010000        0     101        1        0.32        6
10535607 545010000        0     101        1        0.16        7
10535608 550010000        0     101        1         0.1        8
*           source         mult        dmhl        dmhr         num
10535701          0         0.0         0.0         0.0          8
*   Left Additional Boundary Condition Data
10535800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10535801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   8
*   Right Additional Boundary Condition Data
10535900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10535901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   8
*
*n: 1LPkan-basen
*        nh   np     geom     ssif    leftcoord reflood
10540000   8   4        2        1       0.0375      0
*            mesh       format
10540100          0          1
*         intervals       radius
10540101          3       0.0395
*          material     interval
10540201          4          3
*            rpkf     interval
10540301         0.0          3
*            temp     interval
10540401        300.0          4
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10540501 210080000        0     101        1         0.2        1
10540502 210070000        0     101        1         0.4        2
10540503 210060000        0     101        1        0.56        3
10540504 210050000        0     101        1        0.56        4
10540505 210040000        0     101        1        0.55        5
10540506 210030000        0     101        1        0.32        6
10540507 210020000        0     101        1        0.16        7
10540508 210010000        0     101        1         0.1        8
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10540601 530010000        0     101        1         0.2        1
10540602 535010000        0     101        1         0.4        2
10540603 535020000        0     101        1        0.56        3
10540604 535030000        0     101        1        0.56        4
10540605 535040000        0     101        1        0.55        5
10540606 540010000        0     101        1        0.32        6
10540607 545010000        0     101        1        0.16        7
10540608 550010000        0     101        1         0.1        8
*           source         mult        dmhl        dmhr         num
10540701          0         0.0         0.0         0.0          8
*   Left Additional Boundary Condition Data
10540800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10540801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   8
*   Right Additional Boundary Condition Data
10540900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10540901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   8
*
*n: 3ELPkan-basen
*        nh   np     geom     ssif    leftcoord reflood
10545000   8   4        2        1       0.0375      0
*            mesh       format
10545100          0          1
*         intervals       radius
10545101          3       0.0395
*          material     interval
10545201          4          3
*            rpkf     interval
10545301         0.0          3
*            temp     interval
10545401        300.0          4
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10545501 310080000        0     101        1         0.6        1
10545502 310070000        0     101        1         1.2        2
10545503 310060000        0     101        1        1.68        3
10545504 310050000        0     101        1        1.68        4
10545505 310040000        0     101        1        1.65        5
10545506 310030000        0     101        1        0.96        6
10545507 310020000        0     101        1        0.48        7
10545508 310010000        0     101        1         0.3        8
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10545601 530010000        0     101        1         0.6        1
10545602 535010000        0     101        1         1.2        2
10545603 535020000        0     101        1        1.68        3
10545604 535030000        0     101        1        1.68        4
10545605 535040000        0     101        1        1.65        5
10545606 540010000        0     101        1        0.96        6
10545607 545010000        0     101        1        0.48        7
10545608 550010000        0     101        1         0.3        8
*           source         mult        dmhl        dmhr         num
10545701          0         0.0         0.0         0.0          8
*   Left Additional Boundary Condition Data
10545800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10545801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   8
*   Right Additional Boundary Condition Data
10545900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10545901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   8
*
*n: 18MPkan-basen
*        nh   np     geom     ssif    leftcoord reflood
10550000   8   4        2        1       0.0375      0
*            mesh       format
10550100          0          1
*         intervals       radius
10550101          3       0.0395
```

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*          material     interval
10550201          4          3
*             rpkf     interval
10550301         0.0          3
*             temp     interval
10550401        300.0          4
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10550501 110080000        0     101        1         3.8        1
10550502 110070000        0     101        1         7.6        2
10550503 110060000        0     101        1       10.64        3
10550504 110050000        0     101        1       10.64        4
10550505 110040000        0     101        1       10.45        5
10550506 110030000        0     101        1        6.08        6
10550507 110020000        0     101        1        3.04        7
10550508 110010000        0     101        1         1.9        8
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10550601 530010000        0     101        1         3.8        1
10550602 535010000        0     101        1         7.6        2
10550603 535020000        0     101        1       10.64        3
10550604 535030000        0     101        1       10.64        4
10550605 535040000        0     101        1       10.45        5
10550606 540010000        0     101        1        6.08        6
10550607 545010000        0     101        1        3.04        7
10550608 550010000        0     101        1         1.9        8
*           source         mult         dmhl         dmhr          num
10550701          0          0.0          0.0          0.0            8
*   Left Additional Boundary Condition Data
10550800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10550801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0    8
*   Right Additional Boundary Condition Data
10550900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10550901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0    8
*
*n: kolWy-basen
*         nh   np     geom     ssif     leftcoord reflood
10555000   20    4        2        1          0.15       0
*             mesh       format
10555100          0          1
*          intervals       radius
10555101          3        0.162
*          material     interval
10555201          7          3
*             rpkf     interval
10555301         0.0          3
*             temp     interval
10555401        300.0          4
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10555501 441010000        0     101        1         0.35       1
10555502 440010000        0     101        1         1.12       2
10555503 440020000        0     101        1          1.0       3
10555504 440030000        0     101        1          1.0       4
10555505 440040000        0     101        1          1.0       5
10555506 440050000        0     101        1          0.8       6
10555507 440060000        0     101        1          0.4       7
10555508 445010000        0     101        1         0.23       8
10555509 450010000        0     101        1          0.5       9
10555510 455010000        0     101        1          1.0      10
10555511 455020000        0     101        1          1.0      11
10555512 455030000        0     101        1          1.0      12
10555513 455040000        0     101        1         1.15      13
10555514 455050000        0     101        1          1.0      14
10555515 455060000        0     101        1          1.0      15
10555516 455070000        0     101        1          1.0      16
10555517 455080000        0     101        1          1.0      17
10555518 460010000        0     101        1          0.5      18
10555519 601010000        0     101        1          0.5      19
10555520 601020000        0     101        1          0.5      20
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10555601 550010000        0     101        1         0.35       1
10555602 550010000        0     101        1         1.12       2
10555603 550010000        0     101        1          1.0       3
10555604 550010000        0     101        1          1.0       4
10555605 550010000        0     101        1          1.0       5
10555606 550010000        0     101        1          0.8       6
10555607 550010000        0     101        1          0.4       7
10555608 550010000        0     101        1         0.23       8
10555609 550010000        0     101        1          0.5       9
10555610 550010000        0     101        1          1.0      10
10555611 550010000        0     101        1          1.0      11
10555612 550010000        0     101        1          1.0      12
10555613 550010000        0     101        1         1.15      13
10555614 550010000        0     101        1          1.0      14
10555615 550010000        0     101        1          1.0      15
10555616 550010000        0     101        1          1.0      16
10555617 550010000        0     101        1          1.0      17
10555618 550010000        0     101        1          0.5      18
10555619 550010000        0     101        1          0.5      19
10555620 550010000        0     101        1          0.5      20
*           source         mult         dmhl         dmhr          num
10555701          0          0.0          0.0          0.0           20
*   Left Additional Boundary Condition Data
10555800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10555801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   20
*   Right Additional Boundary Condition Data
10555900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10555901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   20
*
*n: kolWl-basen
*         nh   np     geom     ssif     leftcoord reflood
10560000   16    4        2        1          0.15       0
*             mesh       format
10560100          0          1
*          intervals       radius
10560101          3        0.162
*          material     interval
10560201          7          3
*             rpkf     interval
10560301         0.0          3
*             temp     interval
10560401        300.0          4
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10560501 437010000        0     101        1          0.7       1
10560502 436010000        0     101        1          0.4       2
10560503 435010000        0     101        1          1.0       3
10560504 435020000        0     101        1          1.2       4
10560505 435030000        0     101        1         1.24       5
10560506 435040000        0     101        1          1.2       6
10560507 435050000        0     101        1          1.0       7
10560508 435060000        0     101        1          0.8       8
10560509 425010000        0     101        1          0.5       9
10560510 420010000        0     101        1         0.59      10
10560511 415010000        0     101        1         0.65      11
10560512 410010000        0     101        1          1.0      12
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10560513 410020000       0     101       1        1.2      13
10560514 410030000       0     101       1        1.0      14
10560515 405010000       0     101       1        0.5      15
10560516 694210000       0     101       1        1.0      16
*   Right Boundary Condition Data
*          bound      incr     type     code       factor     node
10560601 550010000       0     101       1        0.7       1
10560602 550010000       0     101       1        0.4       2
10560603 550010000       0     101       1        1.0       3
10560604 550010000       0     101       1        1.2       4
10560605 550010000       0     101       1       1.24       5
10560606 550010000       0     101       1        1.2       6
10560607 550010000       0     101       1        1.0       7
10560608 550010000       0     101       1        0.8       8
10560609 550010000       0     101       1        0.5       9
10560610 550010000       0     101       1       0.59      10
10560611 550010000       0     101       1       0.65      11
10560612 550010000       0     101       1        1.0      12
10560613 550010000       0     101       1        1.2      13
10560614 550010000       0     101       1        1.0      14
10560615 550010000       0     101       1        0.5      15
10560616 550010000       0     101       1        1.0      16
*            source         mult        dmhl        dmhr         num
10560701           0          0.0         0.0         0.0          16
*   Left Additional Boundary Condition Data
10560800           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10560801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   16
*   Right Additional Boundary Condition Data
10560900           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10560901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   16
*
*n: 1HP-40mm
*         nh   np     geom     ssif    leftcoord reflood
10565000  10   4       2        1        0.02      0
*             mesh       format
10565100           0          2
*          thickness      interval
10565101   8.333333e-4           3
*           material      interval
10565201           7          3
*             rpkf      interval
10565301         0.0          3
*             temp      interval
10565401        300.0          4
*   Left Boundary Condition Data
*          bound      incr     type     code       factor     node
10565501  95010000       0     101       1        0.15       1
10565502  95020000       0     101       1         0.3       2
10565503  95030000       0     101       1        0.35       3
10565504  95040000       0     101       1        0.56       4
10565505  96010000       0     101       1        0.65       5
10565506  96020000       0     101       1        0.65       6
10565507  96030000       0     101       1         0.3       7
10565508  96040000       0     101       1         0.3       8
10565509  96050000       0     101       1        0.16       9
10565510  96060000       0     101       1        0.08      10
*   Right Boundary Condition Data
*          bound      incr     type     code       factor     node
10565601 550010000       0     101       1        0.15       1
10565602 550010000       0     101       1         0.3       2
10565603 550010000       0     101       1        0.35       3
10565604 550010000       0     101       1        0.56       4
10565605 550010000       0     101       1        0.65       5
10565606 550010000       0     101       1        0.65       6
10565607 550010000       0     101       1         0.3       7
10565608 550010000       0     101       1         0.3       8
10565609 550010000       0     101       1        0.16       9
10565610 550010000       0     101       1        0.08      10
*            source         mult        dmhl        dmhr         num
10565701           0          0.0         0.0         0.0          10
*   Left Additional Boundary Condition Data
10565800           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10565801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10565900           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10565901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*n: 3LP-40mm
*         nh   np     geom     ssif    leftcoord reflood
10570000  10   4       2        1        0.02      0
*             mesh       format
10570100         565          2
*             temp      interval
10570401        300.0          4
*   Left Boundary Condition Data
*          bound      incr     type     code       factor     node
10570501 395010000       0     101       1        0.45       1
10570502 395020000       0     101       1         0.9       2
10570503 395030000       0     101       1        1.05       3
10570504 395040000       0     101       1        1.68       4
10570505 395050000       0     101       1        1.95       5
10570506 395060000       0     101       1        1.95       6
10570507 395070000       0     101       1         0.9       7
10570508 395080000       0     101       1         0.9       8
10570509 395090000       0     101       1        0.48       9
10570510 395100000       0     101       1        0.24      10
*   Right Boundary Condition Data
*          bound      incr     type     code       factor     node
10570601 550010000       0     101       1        0.45       1
10570602 550010000       0     101       1         0.9       2
10570603 550010000       0     101       1        1.05       3
10570604 550010000       0     101       1        1.68       4
10570605 550010000       0     101       1        1.95       5
10570606 550010000       0     101       1        1.95       6
10570607 550010000       0     101       1         0.9       7
10570608 550010000       0     101       1         0.9       8
10570609 550010000       0     101       1        0.48       9
10570610 550010000       0     101       1        0.24      10
*            source         mult        dmhl        dmhr         num
10570701           0          0.0         0.0         0.0          10
*   Left Additional Boundary Condition Data
10570800           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10570801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10570900           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10570901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*n: 18MP-40mm
*         nh   np     geom     ssif    leftcoord reflood
10575000  10   4       2        1        0.02      0
*             mesh       format
10575100         565          2
*             temp      interval
10575401        300.0          4
*   Left Boundary Condition Data
*          bound      incr     type     code       factor     node
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10575501 195010000       0     101       1       2.85       1
10575502 195020000       0     101       1        5.7       2
10575503 195030000       0     101       1       6.65       3
10575504 195040000       0     101       1      10.64       4
10575505 195050000       0     101       1      12.35       5
10575506 195060000       0     101       1      12.35       6
10575507 195070000       0     101       1       6.65       7
10575508 195080000       0     101       1       6.65       8
10575509 195090000       0     101       1       3.04       9
10575510 195100000       0     101       1       1.52      10
*   Right Boundary Condition Data
*          bound     incr     type     code      factor     node
10575601 550010000       0     101       1       2.85       1
10575602 550010000       0     101       1        5.7       2
10575603 550010000       0     101       1       6.65       3
10575604 550010000       0     101       1      10.64       4
10575605 550010000       0     101       1      12.35       5
10575606 550010000       0     101       1      12.35       6
10575607 550010000       0     101       1       6.65       7
10575608 550010000       0     101       1       6.65       8
10575609 550010000       0     101       1       3.04       9
10575610 550010000       0     101       1       1.52      10
*            source         mult         dmhl         dmhr          num
10575701           0          0.0          0.0          0.0           10
*   Left Additional Boundary Condition Data
10575800           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10575801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10575900           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10575901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*n: 1LP-40mm
*        nh   np     geom     ssif     leftcoord reflood
10580000   10   4        2        1         0.02       0
*             mesh       format
10580100          565           2
*             temp      interval
10580401        300.0           4
*   Left Boundary Condition Data
*          bound     incr     type     code      factor     node
10580501 295010000       0     101       1        0.15       1
10580502 295020000       0     101       1         0.3       2
10580503 295030000       0     101       1        0.35       3
10580504 295040000       0     101       1        0.56       4
10580505 295050000       0     101       1        0.65       5
10580506 295060000       0     101       1        0.65       6
10580507 295070000       0     101       1         0.3       7
10580508 295080000       0     101       1         0.3       8
10580509 295090000       0     101       1        0.16       9
10580510 295100000       0     101       1        0.08      10
*   Right Boundary Condition Data
*          bound     incr     type     code      factor     node
10580601 550010000       0     101       1        0.15       1
10580602 550010000       0     101       1         0.3       2
10580603 550010000       0     101       1        0.35       3
10580604 550010000       0     101       1        0.56       4
10580605 550010000       0     101       1        0.65       5
10580606 550010000       0     101       1        0.65       6
10580607 550010000       0     101       1         0.3       7
10580608 550010000       0     101       1         0.3       8
10580609 550010000       0     101       1        0.16       9
10580610 550010000       0     101       1        0.08      10
*            source         mult         dmhl         dmhr          num
10580701           0          0.0          0.0          0.0           10
*   Left Additional Boundary Condition Data
10580800           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10580801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*   Right Additional Boundary Condition Data
10580900           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10580901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   10
*
*n: 1HP-40mm
*        nh   np     geom     ssif     leftcoord reflood
10585000   11   4        2        1         0.02       0
*             mesh       format
10585100          565           2
*             temp      interval
10585401        300.0           4
*   Left Boundary Condition Data
*          bound     incr     type     code      factor     node
10585501  90010000       0     101       1        0.08       1
10585502  90020000       0     101       1        0.16       2
10585503  90030000       0     101       1        0.32       3
10585504  90040000       0     101       1         0.6       4
10585505  90050000       0     101       1        0.92       5
10585506  90060000       0     101       1        0.92       6
10585507  90070000       0     101       1         0.8       7
10585508  90080000       0     101       1         0.4       8
10585509  90090000       0     101       1         0.2       9
10585510  90100000       0     101       1         0.3      10
10585511  90110000       0     101       1        0.15      11
*   Right Boundary Condition Data
*          bound     incr     type     code      factor     node
10585601 550010000       0     101       1        0.08       1
10585602 550010000       0     101       1        0.16       2
10585603 550010000       0     101       1        0.32       3
10585604 550010000       0     101       1         0.6       4
10585605 550010000       0     101       1        0.92       5
10585606 550010000       0     101       1        0.92       6
10585607 550010000       0     101       1         0.8       7
10585608 550010000       0     101       1         0.4       8
10585609 550010000       0     101       1         0.2       9
10585610 550010000       0     101       1         0.3      10
10585611 550010000       0     101       1        0.15      11
*            source         mult         dmhl         dmhr          num
10585701           0          0.0          0.0          0.0           11
*   Left Additional Boundary Condition Data
10585800           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10585801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   11
*   Right Additional Boundary Condition Data
10585900           0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10585901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   11
*
*n: 3LP-40mm
*        nh   np     geom     ssif     leftcoord reflood
10590000   11   4        2        1         0.02       0
*             mesh       format
10590100          565           2
*             temp      interval
10590401        300.0           4
*   Left Boundary Condition Data
*          bound     incr     type     code      factor     node
10590501 390010000       0     101       1        0.32       1
10590502 390020000       0     101       1        0.48       2
10590503 390030000       0     101       1        0.96       3
10590504 390040000       0     101       1         1.8       4
```

```
10590505 390050000       0     101       1       2.76       5
10590506 390060000       0     101       1       2.76       6
10590507 390070000       0     101       1        2.4       7
10590508 390080000       0     101       1        1.2       8
10590509 390090000       0     101       1        0.6       9
10590510 390100000       0     101       1        0.9      10
10590511 390110000       0     101       1       0.45      11
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10590601 550010000       0     101       1       0.32       1
10590602 550010000       0     101       1       0.48       2
10590603 550010000       0     101       1       0.96       3
10590604 550010000       0     101       1        1.8       4
10590605 550010000       0     101       1       2.76       5
10590606 550010000       0     101       1       2.76       6
10590607 550010000       0     101       1        2.4       7
10590608 550010000       0     101       1        1.2       8
10590609 550010000       0     101       1        0.6       9
10590610 550010000       0     101       1        0.9      10
10590611 550010000       0     101       1       0.45      11
*           source        mult        dmhl        dmhr         num
10590701          0         0.0         0.0         0.0          11
*   Left Additional Boundary Condition Data
10590800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10590801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   11
*   Right Additional Boundary Condition Data
10590900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10590901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   11
*
*n: 18MP-40mm
*        nh   np     geom     ssif     leftcoord reflood
10595000   11   4        2        1         0.02       0
*             mesh       format
10595100          565          2
*             temp      interval
10595401        300.0          4
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10595501 190010000       0     101       1        1.52       1
10595502 190020000       0     101       1        3.04       2
10595503 190030000       0     101       1        6.08       3
10595504 190040000       0     101       1       10.64       4
10595505 190050000       0     101       1       17.48       5
10595506 190060000       0     101       1       17.48       6
10595507 190070000       0     101       1        15.2       7
10595508 190080000       0     101       1         7.6       8
10595509 190090000       0     101       1         3.8       9
10595510 190100000       0     101       1         5.7      10
10595511 190110000       0     101       1        2.85      11
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10595601 550010000       0     101       1        1.52       1
10595602 550010000       0     101       1        3.04       2
10595603 550010000       0     101       1        6.08       3
10595604 550010000       0     101       1       10.64       4
10595605 550010000       0     101       1       17.48       5
10595606 550010000       0     101       1       17.48       6
10595607 550010000       0     101       1        15.2       7
10595608 550010000       0     101       1         7.6       8
10595609 550010000       0     101       1         3.8       9
10595610 550010000       0     101       1         5.7      10
10595611 550010000       0     101       1        2.85      11
*           source        mult        dmhl        dmhr         num
10595701          0         0.0         0.0         0.0          11
*   Left Additional Boundary Condition Data
10595800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10595801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   11
*   Right Additional Boundary Condition Data
10595900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10595901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   11
*
*n: 1LP-40mm
*        nh   np     geom     ssif     leftcoord reflood
10600000   11   4        2        1         0.02       0
*             mesh       format
10600100          565          2
*             temp      interval
10600401        300.0          4
*   Left Boundary Condition Data
*         bound     incr     type     code      factor     node
10600501 290010000       0     101       1        0.08       1
10600502 290020000       0     101       1        0.16       2
10600503 290030000       0     101       1        0.32       3
10600504 290040000       0     101       1         0.6       4
10600505 290050000       0     101       1        0.92       5
10600506 290060000       0     101       1        0.92       6
10600507 290070000       0     101       1         0.8       7
10600508 290080000       0     101       1         0.4       8
10600509 290090000       0     101       1         0.2       9
10600510 290100000       0     101       1         0.3      10
10600511 290110000       0     101       1        0.15      11
*   Right Boundary Condition Data
*         bound     incr     type     code      factor     node
10600601 550010000       0     101       1        0.08       1
10600602 550010000       0     101       1        0.16       2
10600603 550010000       0     101       1        0.32       3
10600604 550010000       0     101       1         0.6       4
10600605 550010000       0     101       1        0.92       5
10600606 550010000       0     101       1        0.92       6
10600607 550010000       0     101       1         0.8       7
10600608 550010000       0     101       1         0.4       8
10600609 550010000       0     101       1         0.2       9
10600610 550010000       0     101       1         0.3      10
10600611 550010000       0     101       1        0.15      11
*           source        mult        dmhl        dmhr         num
10600701          0         0.0         0.0         0.0          11
*   Left Additional Boundary Condition Data
10600800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10600801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   11
*   Right Additional Boundary Condition Data
10600900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10600901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   11
*
*n: HeatEx1
*        nh   np     geom     ssif     leftcoord reflood
10810000   14   4        2        1        6.4e-3       0
*             mesh       format
10810100          0          2
*          thickness      interval
10810101   5.333333e-4          3
*           material      interval
10810201          7          3
*             rpkf      interval
10810301         0.0          3
*             temp      interval
10810401        300.0          4
```

```
*  Left Boundary Condition Data
*        bound     incr     type     code      factor     node
10810501 826030000      0     101        1        79.0        1
10810502 826040000      0     101        1        79.0        2
10810503 826050000      0     101        1        79.0        3
10810504 826060000      0     101        1        79.0        4
10810505 826070000      0     101        1        79.0        5
10810506 826080000      0     101        1        79.0        6
10810507 826090000      0     101        1        79.0        7
10810508 826100000      0     101        1        79.0        8
10810509 826110000      0     101        1        79.0        9
10810510 826120000      0     101        1        79.0       10
10810511 826130000      0     101        1        79.0       11
10810512 826140000      0     101        1        79.0       12
10810513 826150000      0     101        1        79.0       13
10810514 826160000      0     101        1        79.0       14
*  Right Boundary Condition Data
*        bound     incr     type     code      factor     node
10810601 800150000      0     101        1        79.0        1
10810602 800140000      0     101        1        79.0        2
10810603 800130000      0     101        1        79.0        3
10810604 800120000      0     101        1        79.0        4
10810605 800110000      0     101        1        79.0        5
10810606 800100000      0     101        1        79.0        6
10810607 800090000      0     101        1        79.0        7
10810608 800080000      0     101        1        79.0        8
10810609 800070000      0     101        1        79.0        9
10810610 800060000      0     101        1        79.0       10
10810611 800050000      0     101        1        79.0       11
10810612 800040000      0     101        1        79.0       12
10810613 800030000      0     101        1        79.0       13
10810614 800020000      0     101        1        79.0       14
*          source         mult        dmhl        dmhr         num
10810701          0          0.0         0.0         0.0          14
*  Left Additional Boundary Condition Data
10810800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10810801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   14
*  Right Additional Boundary Condition Data
10810900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10810901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   14
*
*n: HeatEx2
*        nh   np     geom      ssif     leftcoord reflood
10820000   14    4        2         1       6.4e-3       0
*            mesh       format
10820100          0           2
*         thickness      interval
10820101   5.333333e-4           3
*          material      interval
10820201           7           3
*             rpkf      interval
10820301         0.0           3
*             temp      interval
10820401        300.0           4
*  Left Boundary Condition Data
*        bound     incr     type     code      factor     node
10820501 828030000      0     101        1        79.0        1
10820502 828040000      0     101        1        79.0        2
10820503 828050000      0     101        1        79.0        3
10820504 828060000      0     101        1        79.0        4
10820505 828070000      0     101        1        79.0        5
10820506 828080000      0     101        1        79.0        6
10820507 828090000      0     101        1        79.0        7
10820508 828100000      0     101        1        79.0        8
10820509 828110000      0     101        1        79.0        9
10820510 828120000      0     101        1        79.0       10
10820511 828130000      0     101        1        79.0       11
10820512 828140000      0     101        1        79.0       12
10820513 828150000      0     101        1        79.0       13
10820514 828160000      0     101        1        79.0       14
*  Right Boundary Condition Data
*        bound     incr     type     code      factor     node
10820601 805150000      0     101        1        79.0        1
10820602 805140000      0     101        1        79.0        2
10820603 805130000      0     101        1        79.0        3
10820604 805120000      0     101        1        79.0        4
10820605 805110000      0     101        1        79.0        5
10820606 805100000      0     101        1        79.0        6
10820607 805090000      0     101        1        79.0        7
10820608 805080000      0     101        1        79.0        8
10820609 805070000      0     101        1        79.0        9
10820610 805060000      0     101        1        79.0       10
10820611 805050000      0     101        1        79.0       11
10820612 805040000      0     101        1        79.0       12
10820613 805030000      0     101        1        79.0       13
10820614 805020000      0     101        1        79.0       14
*          source         mult        dmhl        dmhr         num
10820701          0          0.0         0.0         0.0          14
*  Left Additional Boundary Condition Data
10820800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10820801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   14
*  Right Additional Boundary Condition Data
10820900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10820901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   14
*
*n: HeatEx3
*        nh   np     geom      ssif     leftcoord reflood
10830000   14    4        2         1       6.4e-3       0
*            mesh       format
10830100          0           2
*         thickness      interval
10830101   5.333333e-4           3
*          material      interval
10830201           7           3
*             rpkf      interval
10830301         0.0           3
*             temp      interval
10830401        300.0           4
*  Left Boundary Condition Data
*        bound     incr     type     code      factor     node
10830501 830030000      0     101        1        79.0        1
10830502 830040000      0     101        1        79.0        2
10830503 830050000      0     101        1        79.0        3
10830504 830060000      0     101        1        79.0        4
10830505 830070000      0     101        1        79.0        5
10830506 830080000      0     101        1        79.0        6
10830507 830090000      0     101        1        79.0        7
10830508 830100000      0     101        1        79.0        8
10830509 830110000      0     101        1        79.0        9
10830510 830120000      0     101        1        79.0       10
10830511 830130000      0     101        1        79.0       11
10830512 830140000      0     101        1        79.0       12
10830513 830150000      0     101        1        79.0       13
10830514 830160000      0     101        1        79.0       14
*  Right Boundary Condition Data
*        bound     incr     type     code      factor     node
10830601 810150000      0     101        1        79.0        1
10830602 810140000      0     101        1        79.0        2
```

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10830603 810130000       0     101       1       79.0       3
10830604 810120000       0     101       1       79.0       4
10830605 810110000       0     101       1       79.0       5
10830606 810100000       0     101       1       79.0       6
10830607 810090000       0     101       1       79.0       7
10830608 810080000       0     101       1       79.0       8
10830609 810070000       0     101       1       79.0       9
10830610 810060000       0     101       1       79.0       10
10830611 810050000       0     101       1       79.0       11
10830612 810040000       0     101       1       79.0       12
10830613 810030000       0     101       1       79.0       13
10830614 810020000       0     101       1       79.0       14
*           source         mult        dmhl        dmhr          num
10830701          0         0.0         0.0         0.0          14
*   Left Additional Boundary Condition Data
10830800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10830801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   14
*   Right Additional Boundary Condition Data
10830900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10830901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   14
*
*n: HeatEx4
*        nh  np     geom     ssif     leftcoord reflood
10840000  14   4        2        1       6.4e-3       0
*             mesh       format
10840100          0            2
*          thickness     interval
10840101   5.333333e-4           3
*           material     interval
10840201          7            3
*             rpkf      interval
10840301         0.0           3
*             temp      interval
10840401        300.0           4
*   Left Boundary Condition Data
*          bound      incr      type      code       factor      node
10840501 832030000       0     101       1       79.0       1
10840502 832040000       0     101       1       79.0       2
10840503 832050000       0     101       1       79.0       3
10840504 832060000       0     101       1       79.0       4
10840505 832070000       0     101       1       79.0       5
10840506 832080000       0     101       1       79.0       6
10840507 832090000       0     101       1       79.0       7
10840508 832100000       0     101       1       79.0       8
10840509 832110000       0     101       1       79.0       9
10840510 832120000       0     101       1       79.0       10
10840511 832130000       0     101       1       79.0       11
10840512 832140000       0     101       1       79.0       12
10840513 832150000       0     101       1       79.0       13
10840514 832160000       0     101       1       79.0       14
*   Right Boundary Condition Data
*          bound      incr      type      code       factor      node
10840601 815150000       0     101       1       79.0       1
10840602 815140000       0     101       1       79.0       2
10840603 815130000       0     101       1       79.0       3
10840604 815120000       0     101       1       79.0       4
10840605 815110000       0     101       1       79.0       5
10840606 815100000       0     101       1       79.0       6
10840607 815090000       0     101       1       79.0       7
10840608 815080000       0     101       1       79.0       8
10840609 815070000       0     101       1       79.0       9
10840610 815060000       0     101       1       79.0       10
10840611 815050000       0     101       1       79.0       11
10840612 815040000       0     101       1       79.0       12
10840613 815030000       0     101       1       79.0       13
10840614 815020000       0     101       1       79.0       14
*           source         mult        dmhl        dmhr          num
10840701          0         0.0         0.0         0.0          14
*   Left Additional Boundary Condition Data
10840800          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10840801  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   14
*   Right Additional Boundary Condition Data
10840900          0
*       hthd  hlf  hlr gslf gslr glcf glcr lbf node
10840901  0.0 10.0 10.0  0.0  0.0  0.0  0.0 1.0   14
*
******************************
*      Point Kinetics      *
******************************
*             type      feedback
30000000        point     separabl
*         decay      power react      dnf fpyf u239 fpt time units
30000001 gamma-ac 1.806285e7   0.0 45.03311  1.0  1.0 0.0 10.0
day
*           control
30000011          2 * General Table 2 (PK + PAR)
30000012          3 * General Table 3 (PB)
.
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10. SUPPLEMENTARY NOTES

K. Tien, NRC Project Manager

11. ABSTRACT *(200 words or less)*

The development of the model started in 2010 with modelling a single fuel channel with highly enriched fuel (HEU). Fulfilling the international agreement on the Global Threat Reduction Initiative, Poland agreed to change the fuel type in the RR 'Maria' from the HEU fuel to Low Enriched Uranium fuel (LEU) and in 2011 a new analysis had to be performed. A new model was prepared in 2012 but it was still limited to only one fuel channel. The model and the results of calculations are available for reading in NUREG/IA-0422 "Transient Analysis of the Research Reactor MARIA MC Fuel Elements Using RELAP5 Mod 3.3" published by US NRC in 2013. Following the modernization of pumps in 2013, further work led to the improvement of the model that covered not only one fuel channel but the whole primary cooling loop. This report may be considered as a continuation of the previous analysis performed and described in the NUREG/IA-0422 report.The steady state results showed that the RELAP5 code could be used for modelling the research reactor and the results were good and realistic in comparison to the actual reactor operation parameters. The transient analysis seems good but the qualification of the model is difficult. The RR 'Maria' is a unique design, there are only a few similar designs and no integral test facilities nor separate effect test facilities for this types of reactors have been performed. The transient analysis performed covered loss of coolant (small break, medium break, large break, double guillotine break), loss of flow and loss of heat sink scenarios.

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

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Research Reactor 'Maria'
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National Centre for Nuclear Research
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Loss of Flow Accident (LOFA)
Loss Of Coolant Accident (LOCA)
Highly Enriched Uranium (HEU)
Low Enriched Uranium fuel (LEU)

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