Spent Fuel Pool Analysis of a BWR-4 Fuel Bundle Under Loss of Coolant Conditions Using TRACE

For the period of
January 7, 2013 through May 1, 2013

Submitted to
Dr. Seungjin Kim
As a part of
NucE 431W

by

Zachary I. Franiewski, Dominic M. Geleskie, Bo E. Grove and Kyle G. Maguire

The Pennsylvania State University
Department of Mechanical and Nuclear Engineering
University Park, PA 16802

5/1/2013

NucE431W S2013

Spent Fuel Pool Analysis of a BWR-4 Fuel Bundle Under Loss of Coolant Conditions Using TRACE

by

Zachary I. Franiewski, Dominic M. Geleskie, Bo E. Grove and Kyle G. Maguire

The Pennsylvania State University
Department of Mechanical and Nuclear Engineering
University Park, PA 16802

5/1/2013

ACKNOWLEDGEMENT

We would like to give special thanks to the following individuals for their support and guidance throughout this project for without this would not have been possible:

- Dr. Stephen Bajorek – Senior Technical Advisor for Thermal-Hydraulics, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission

- Dr. Seungjin Kim – Associate Professor of Mechanical and Nuclear Engineering, The Pennsylvania State University

- Dr. Justin Watson – Research Associate-Advanced Fluid-Thermal Modeling Department, Applied Research Laboratory, The Pennsylvania State University

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

NOMENCLATURE

Acronyms

BWR	Boiling Water Reactor
CHAN	Channel Component
COBRA-SFP	Coolant Boiling in Rod Arrays – Spent Fuel Pool
LOCA	Loss Of Coolant Accident
MELCOR	Severe Accident Analysis Code
RPV	Reactor Pressure Vessel
SFP	Spent Fuel Pool
SNAP	Symbolic Nuclear Analysis Package
TRACE	TRAC/RELAP Advanced Computational Engine

English Symbols

atm	Atmosphere
C	Celsius
cm	Centimeter
eV	Electron Volt
g	Gram
H	Hydrogen
hr	Hours
hrs	Hours
k	Boltzman Constant\
kW	Kilowatt
K	Kelvin
min	Minute
O_2	Oxygen
s	Second
slpm	Standard Liters per Minute
T	Temperature
W	Watts
Zr	Zirconium

ABSTRACT

The purpose of this project was to investigate the ability of TRACE to accurately model a single fuel bundle within a spent fuel pool and to determine the conditions for when a fuel bundle might initiate rapid oxidation of its zirconium cladding. Three models were developed and simulated using the TRACE thermal-hydraulics system code: a full height BWR bundle cooled by air, a partial height test composed of five BWR fuel bundles, and a full-height BWR bundle initially filled with water. The first two models represented experiments recently completed at the Sandia National Laboratory, while the third is a model of a planned experiment. Each model was used to estimate the time at which breakaway (rapid oxidation of the cladding) would begin, which is at approximately 1100 K based on experimental data. It was found from the full-scale air test that TRACE has the ability to approximately model a fuel bundle heat up within a spent fuel pool up to approximately 1073 K. The data prior to 1073 K has been determined to be an accurate representation with regards to the specified input parameters. It was found that fuel bundles will undergo ignition (the point in TRACE where the metal water reaction calculations begin and where the temperature increase jumps to several degrees per second – also known as the breakaway point) within eight hours for power levels above 4 kW for the full-scale water model. Additionally, it was found that there exists a clear direct relationship between the coolant flow rate and collapsed water height. More importantly, the TRACE results provided data indicating the ignition time as a function of bundle power.

EXECUTIVE SUMMERY

Initial tests conducted at the Sandia National Laboratory assumed that the worst case scenario for heat up of a fuel bundle in a spent fuel pool would be the case of complete fuel uncovery. Cooling of the bundle would occur by natural convection to air in this case, with flow entering through the bottom nozzle and exiting through the top of the bundle. This case while a significant threat to the safety of the fuel bundles may in fact not be the worst case scenario. The worst case scenario occurs when there exists only a small amount of water at the bottom of the fuel bundles which will cause a blockage in air flow through the bundle. This case would effectively reduce the heat transfer rates from the fuel causing the fuel to heat up at a higher rate than if natural circulation was occurring. Understanding the behavior of spent fuel bundles under beyond-design basis scenarios such as fuel bundle ignition has become important. In order to understand fuel bundle behavior in these situations, computer models and physical tests must be performed and benchmarked against one another before any one program can be considered reliable to produce accurate models.

In order to determine the modeling capabilities of TRACE two models were created and benchmarked against tests performed by Sandia National Laboratories. These models were the Full Length BWR-4 Full Bundle in Air, the 1x4 Partial Length BWR-4 Fuel Bundle Configuration in Air and the Full Length BWR-4 Fuel Bundle in Water. After determining the modeling capabilities with regards to the experimental data a third model, Full Length BWR-4 Fuel Bundle in Water, was generated based upon the original Full Length BWR-4 Full Bundle in Air model. This third model was generated in order to provide a starting point to develop a Full Scale Water ignition test at Sandia National Laboratory. The Full Scale Air test currently uses two “break” components within TRACE to create a pressure differential to drive the flow through the bundle whereas the actual test had a controlled forced flow which gives rise to some variations in the observed data from TRACE and that provided by Sandia National Laboratory.

Ultimately it was found that the bundle heat up and ignition behavior of the experiment conducted by Sandia National Laboratory is accurately modeled by TRACE. From here the water model was created by changing the working fluid from air to water and modifying the bottom “break” component in TRACE to a “fill” component to provide a controlled forced flow through the model. Varying bundle powers were examined in addition to three distinct flow rates. Relationships were generated for time to breakaway as a function of bundle power and collapsed water height as a function of flow rate. From these relationships it was found that increased powers reduce the time to breakaway and higher flow rates result in larger collapsed water heights for all examined cases which is to be expected.

CHAPTER 1. INTRODUCTION

1.1. Spent Fuel Pool

The Fukushima-Daiichi accident has caused the nuclear industry and regulatory bodies to re-examine several assumptions concerning beyond-design basis events such as a station blackout. Among these concerns is the safety of fuel stored in the spent fuel pool (SFP). The Fukushima-Daiichi SFPs became a major concern following the tsunami. The station blackout event resulted in a failure of the SFP cooling systems. Without these cooling systems, water in a SFP will heat up and evaporate, eventually uncovering the spent fuel. The time required for a SFP to reach temperatures high enough to result in fuel overheating could range from several days to weeks. The major factors in the time required for fuel overheating to occur are the initial water levels in the pool and the decay heat generated by the spent fuel. Other contributing factors include the overall design and loading patterns within the SFP [1].

In the event of a loss of coolant to a SFP, the ability to maintain safe temperatures depends on the natural circulation within the pool and convective heat transfer rates between the fuel rods and water and water with surrounding atmosphere. Should the natural forces not be enough to adequately cool the pool, the fuel will begin to heat up. The first noticeable event aside from increasing temperature will be the presence of two-phase flow conditions on and around the fuel bundle due to boiling.

The two accident scenarios to be considered in this study are complete and partial LOCAs. The complete LOCA is defined as complete and near instantaneous loss of water from SFP, whereas a partial LOCA is defined as the loss of water such that the water level in the SFP drains below the top of the fuel bundle [2]. In the partial LOCA situation, the fuel rods experience partial exposure to air. The water remaining in the lower regions of the fuel bundle during a partial LOCA initially “blocks” the flow of any air or water through the bundle. As the temperatures increase the lower submerged portion of the rod begins to boil the water and create steam. This steam then rises and provides some cooling to the upper uncovered portion of the fuel rods. In a complete LOCA, air is able to flow up through the bottom of the assembly and provide some cooling [3].

As the temperature of the fuel bundle continues to increase beyond normal conditions in the SFP several phenomena may occur depending on the severity of the loss of inventory.

For a partial LOCA, at approximately 930 K the Boral plates enclosing each fuel bundle will melt. Once this happens, neutrons that would have been absorbed by the Boral plates are no longer restricted within the fuel bundle’s channel and are able to diffuse throughout SFP. If the fuel bundles are arranged close enough, these neutrons could begin to interact with the remaining fissile material in the fuel bundle resulting in possible fission events which will further increase

the temperature of the fuel. Additionally, this would cause an increase in decay products which will have a delayed effect on temperature increase.

At roughly 950 K, the fuel rods begin to balloon and rupture, releasing noble gases, such as xenon and krypton. Some aerosol particles of water soluble substances, such as cesium iodide (CsI) and strontium hydroxide ($Sr(OH)_2$), may also be released. Some of the isotopes for these gases and other elements are radioactive and thus possess certain risks and concerns when out of containment. For a more complete list of radionuclides released during rod ballooning and fuel failure please see Table 2 in Appendix 1 [2]. Once a containment breach occurs the potential for radionuclide escape into the surrounding environment becomes more likely and thus a more significant concern.

At approximately 1100 K the reaction rate between the Zirconium cladding and steam (or air) can become significant. At higher temperatures, the fuel rods oxidize rapidly and hydrogen gas is generated due to the oxidation reaction [2]. At this point the chance of complete fuel failure and possible fuel melt becomes highly likely. As a result, the potential for radionuclide release also increases considerably. Therefore, the understanding of how fuel bundles heat up and behave during a LOCA incident or loss of forced circulation within a SFP is desirable in order to best prepare for these accident scenarios.

1.1.1. Zirconium Ignition

Zirconium plays a very important role in the analysis and understanding of SFP loss of either coolant or forced circulation situations. For the tests discussed in this report the fuel cladding is comprised of Zircaloy-4 and it experiences no neutron irradiation. The oxidation of the zirconium cladding is an important concern in both the RPV and SFP. As the fuel temperature increases, the zirconium cladding heats up. Once the cladding heats up it begins to react with the dissolved oxygen present in the coolant forming a thin oxidation layer several micrometers thick. This occurs in three phases. The first being the pre-transition phase which lasts until an oxide layer of 2 to 3 μm is reached. The second phase includes a continued buildup of the oxidation layer in a tetragonal zirconia crystal structure with a transition to a monoclinic structure. The third stage of typical oxidation occurs when the tetragonal structure begins to crack due to the stresses applied by the outer monoclinic structures. Under normal operating conditions and temperatures the oxidation rate of Zircaloy can be expressed as [3]:

$$Oxidation\ rate\ \left[\frac{g}{cm^2\ s}\right] = 13.9\ \left[\frac{g}{cm^2\ s\ atm^{1/6}}\right] e^{\frac{-1.47\ eV}{kT}} P^{1/6}\ \left(atm^{1/6}\right) \quad (1)$$

While it is important to understand how the fuel cladding behaves under typical operating conditions, it is also important to understand how the oxidation process behaves under accident conditions. During an accident scenario, such as the loss of forced circulation or loss of coolant, the fuel bundle heats up and at high temperature the zirconium oxidation reaches its ignition

point. This is highly detrimental to the stability of the fuel cladding (the exact point of ignition varies with other parameters such as pressure and rod power).

In the event of a complete LOCA, all water is rapidly lost from the SFP and the working fluid in the pool providing the cooling is now air. At 1100 K, zirconium ignition occurs. The reaction for both pre and post ignition occurs as the cladding begins to react with the oxygen present in the air via the following zirconium fuel cladding metal-water oxidation reaction [1] [2]:

$$Oxidation\ with\ oxygen\ gas: Zr + O_2 \rightarrow ZrO_2 \quad (2)$$

In the event of a partial LOCA, the lower submerged region of the fuel bundle boils the water. The steam created then rises to the hot upper regions of the fuel bundle which are no longer submerged in a single-phase liquid coolant (they may be covered by a two-phase mixture or single phase gas). Once the steam reaches the hot upper region of the fuel bundle it begins to react with the zirconium in the cladding via the following oxidation reaction [2]:

$$Oxidation\ with\ water\ molecules: Zr + 2H_2O \rightarrow ZrO_2 + 2H_2(g) \quad (3)$$

The reaction of zirconium with steam is far less ideal than with oxygen due to the creation of hydrogen gas. In both partial and complete LOCA both reactions are present; in the partial there is a significant steam presence whereas in the complete the water vapor present is dependent on that of the air within the containment building which for all practical purposes is negligible. The production of hydrogen gas creates the potential for explosions to occur and therefore raises many safety issues related to the presence of explosive gases. This process, occurring within the RPV as opposed to the SFP is believed to be the cause of the explosions occurring at the Fukushima Daiichi plant in Japan following the tsunami in March 2011 [1]

1.2. Sandia National Laboratory Test

The previous tests done at the Sandia Laboratory attempted to characterize the oxidation (ignition) of a model fuel bundle in an air environment. This test provided valuable time table information for a complete LOCA incident in a SFP and led to a greater understanding of the zirconium ignition event. However, due to the unlikeliness of a fuel bundle being completely exposed during a LOCA in a SFP, the application of these results is limited. A test that investigates fuel bundle ignition behavior in a water environment is planned for the future, and work is currently underway using the TRACE code to provide details to the test planners.

1.2.1. Experimental Heater Design

The heater design utilized in the air ignition tests at the Sandia Nation laboratory is the Watlow heater design. The heated rod is composed of nichrome heating wire surrounded by magnesium oxide which is then enclosed within Zircaloy (zirconium) cladding [6]. A cross section of an experimental fuel rod can be seen in figure 1.

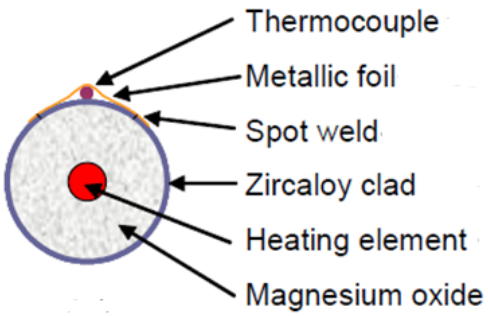

Figure 1: Experimental Electric Heater Rod Cutaway [6]

The resistor style heater shown in figure 1 does not match the power output of the decay heat present in an actual fuel rod perfectly. The difference in power between the simulated fuel rod and actual fuel rod was determined to be within an acceptable range [6]. The following figure, figure 2, shows the normalized power output of the electrically heated rod compared to that of an actual fuel rod as a function of height.

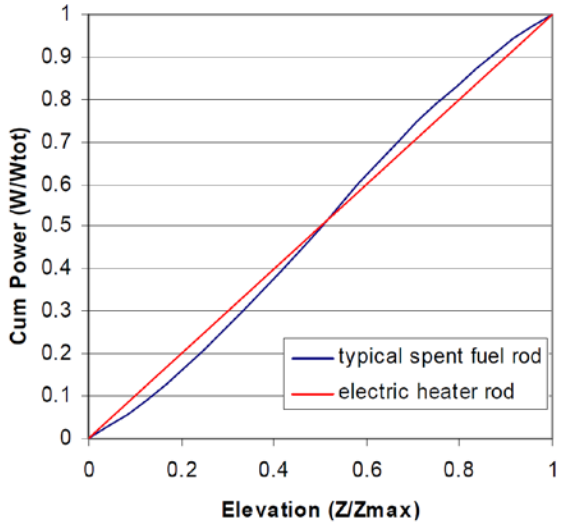

Figure 2: Normalized Power Comparisons of the Experimental Fuel Rod and Typical Spent Fuel Rod [6]

For the heater ignition test, 12 electric heater rods are placed into a bundle which is then encased in a quartz tube and surrounded by insulating material. To get an axial temperature profile of the rod, bundle thermocouples are installed in six inch intervals (including the inlet and outlet) along the heater test section. A schematic of the test section from the Sandia Report is seen in figure 3.

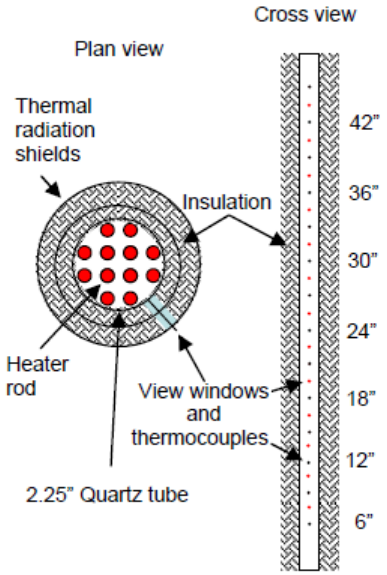

Figure 3: Cutaway and Thermocouple diagrams of the Heater Test Bundle Section [6]

In the beginning of the test, air is heated in the air preheater to a temperature of 327 C. At a time of 53.9 minutes test time, the heated air was injected into the rod bundle at a rate of 30.0 slpm (standard liters per minute) [6].

The power supplied to the rod bundle during the test uses a constant power control. This method causes the power supplied to the functional rods to increase slightly as the other rods fail during the test. This occurs in order to maintain constant bundle power by increasing the current through the remaining functional rods. Table 1 shows the evolution of the power through the rods during the test and the event which triggered the increase [6].

Table 1: Power Evolution through Heater Ignition Test

Test Time (min)	Rod Power (W)	Reason for Increase
132.6	975	Initial power set
172.1	1000	Single rod failure
193.6	1050	Single rod failure (power remains till ignition event)

1.2.2. Heater Test Results and Analysis

The thermocouple data becomes crucial in analyzing the results of the test. The key events occurring during the test can be clearly seen in figure 4, with the legend indicating the axial location in inches of the thermocouples. The initial increase in rod temperature is from the injection of the 327 C heated air and followed by the temperature increase from the rod power

being turned on. The breakaway ignition event is visible by the sharp increase in temperature followed by a sudden and sharp drop-off resulting from thermocouple failure.

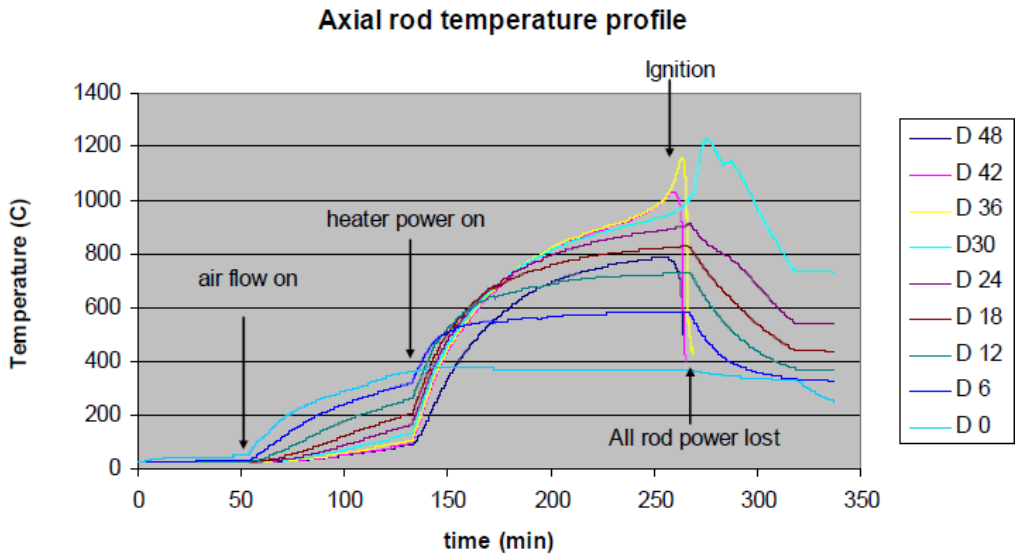

Figure 4: Axial Temperature Profile with Respect to Time in Rod D [6]

The data collected from the heater test provides details on the behavior that will be expected in the full-scale bundle ignition test. With this ignition data, the full-scale test can be planned so that ignition of the costly bundle occurs when desired.

1.2.3. Full-Scale Bundle Ignition Test

A mock 9x9 BWR fuel bundle was constructed for the full-scale ignition test utilizing the previously tested Watlow heater design. The bundle would be pre-tested at lower than expected ignition powers to ensure proper functioning of the thermocouples and other data monitoring equipment before the bundle was ignited. Data from MELCOR predicted ignition to occur at a power of 5000 W [6]. A schematic of the experimental bundle can be seen in figure 5.

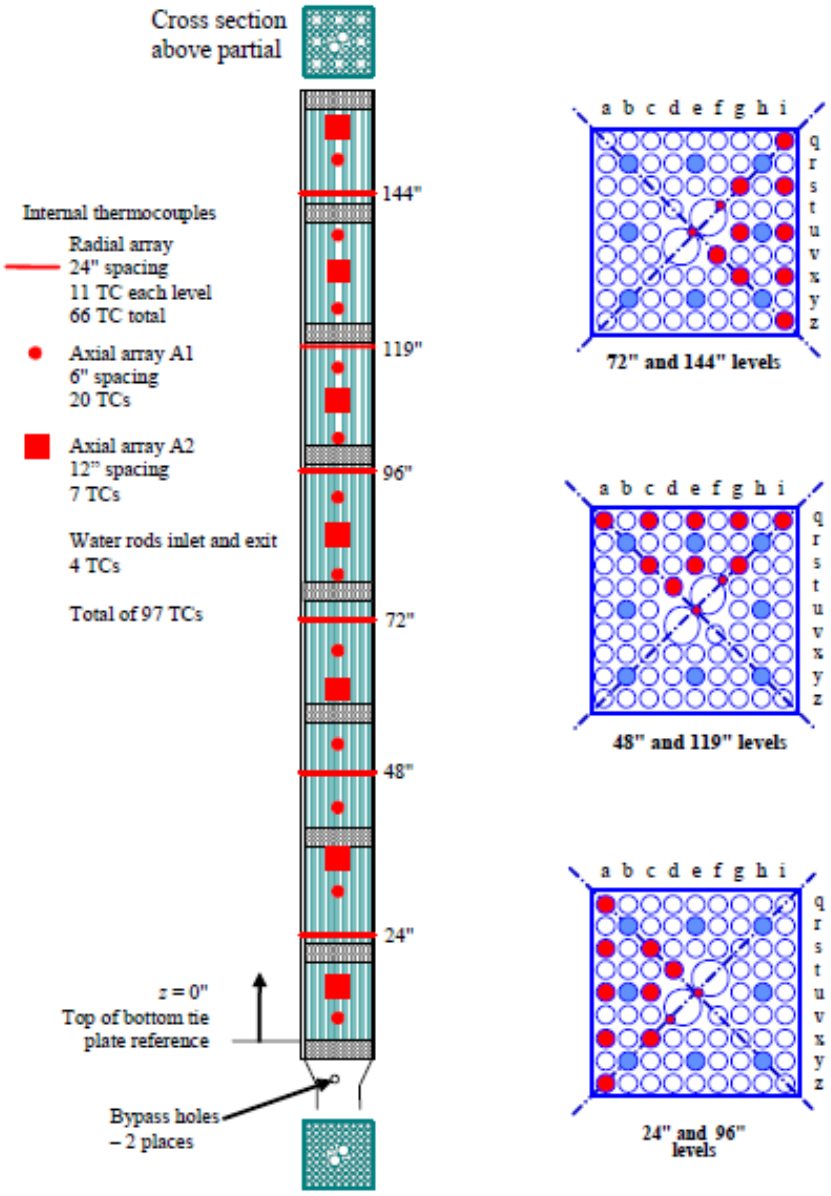

Figure 5: Experimental Diagram for Full Scale Ignition Test [6]

After the pre-ignition tests were completed, a power of 5000 W was supplied to the bundle and the ignition test was begun. An axial temperature profile for the full-scale bundle during ignition can be seen in figure 6.

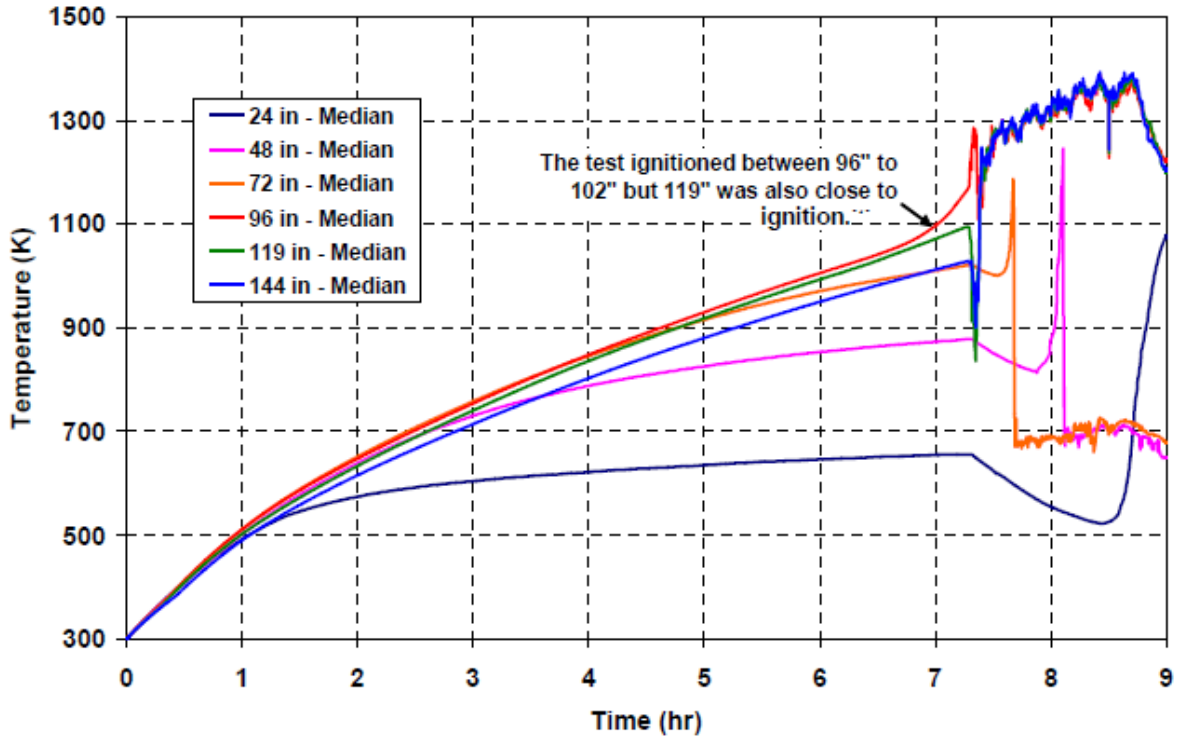

Figure 6: Median Axial Temperature Profile for the Full Scale Bundle During the Ignition Test [6]

This temperature profile will be the basis for benchmarking a TRACE model, specifically the onset of the Zirconium ignition event at a temperature of 1100 K and a time of 7 hours. The TRACE model will then be used to predict the behavior of the future zirconium ignition test in water. The input conditions for the model will mimic those used in the Sandia test and the bundle dimensions will be modeled accordingly. If the model can accurately reproduce these results it will add validity to the predictions given by the code for the water test.

Additionally the mass flow rate of air through the experimental bundle will be compared to that output by TRACE. The flow rate measured by Sandia National Laboratory can be seen in figure 7.

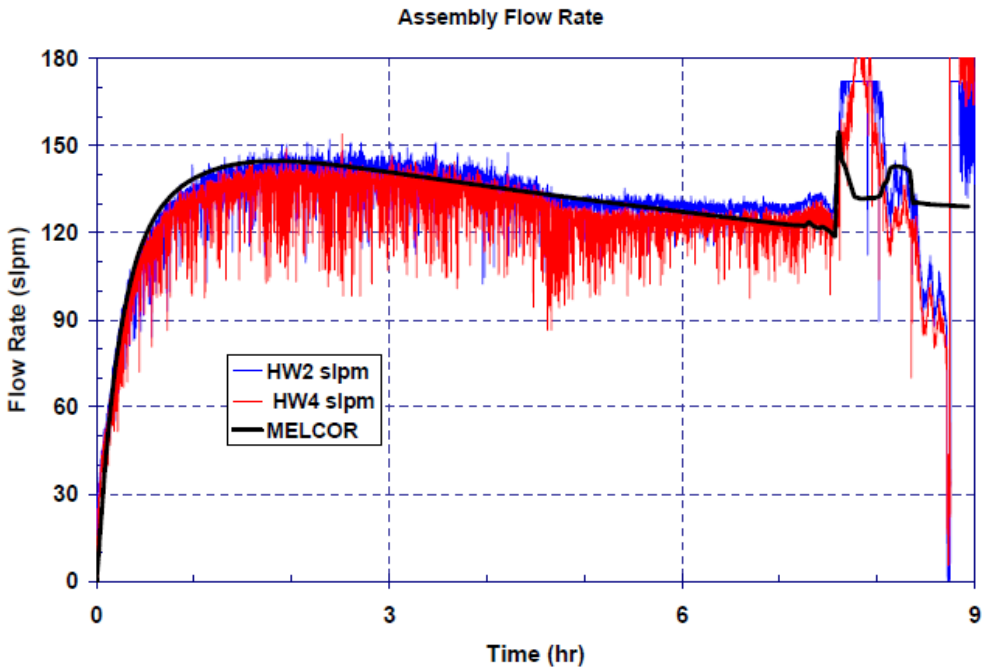

Figure 7: Flow Rate measured through the Experimental Fuel Bundle [6]

1.3. Modeling

In the original test, conducted by Sandia National Laboratory, the BWR fuel assemblies in the spent fuel pool were modeled using both MELCOR and COBRA-SFP codes. TRACE, which is being used to model the fuel assemblies in this test, is inherently different from MELCOR and COBRA-SFP.

1.3.1. TRACE/SNAP

TRACE is a best estimate reactor systems code that combines the previous codes the NRC has developed into one multi-functioning tool. TRACE is able to model the neutronics, thermal and hydraulic behavior of a reactor system. The code is component based so that each part of the system can be physically modeled with a specific component in the code. Additionally, each component can be nodalized in order to further break down the system to see how different values change throughout a specific component. There are many different pre-defined TRACE components that can be used to create a model [5].

COBRA-SFP and MELCOR, which were used in the Sandia National Lab experiment, use different methods than TRACE to model a scenario; therefore, it is important to mention some of the code differences. COBRA-SFP is a FORTRAN based code that uses a lumped parameter finite difference method to conduct a thermal hydraulic analysis. One important

difference is the limitation to single-phase calculations. On the other hand, COBRA-SFP has a very similar rod layout for the fuel bundle compared to that of TRACE. MELCOR is a two phase thermal hydraulic code that deals specifically with severe accident analysis. More specifically, MELCOR includes modeling of steam and air oxidation with hydrogen production as well as fuel structure degradation, which is of concern in this test. One setback of the MELCOR code is its inability to separately model a water rod. Therefore, the surface area and mass of the water rods must be included in the data for the canister wall instead of explicitly modeling the water rods. MELCOR also requires that the cladding, canister, and water rods be declared as the same material. Consequently, in the Sandia test, the Zircaloy cladding was defined as Inconel instead of Zircaloy. As a result, the MELCOR Zircaloy oxidation kinetics model was turned off [4].

In this model, the channel component (CHAN) is used to model the BWR fuel bundle. Essentially, the CHAN component represents a BWR fuel bundle or bundles including the outer canister(s). The component is often used inside a vessel component, but does not have to be. In the case of this experiment, the CHAN will be used outside a vessel since a single fuel bundle is being modeled. The CHAN component models all full length fuel rods, partial length fuel rods, and the water rods. Figure 5 shows the physical meaning of a CHAN component and how it models the various rods [4].

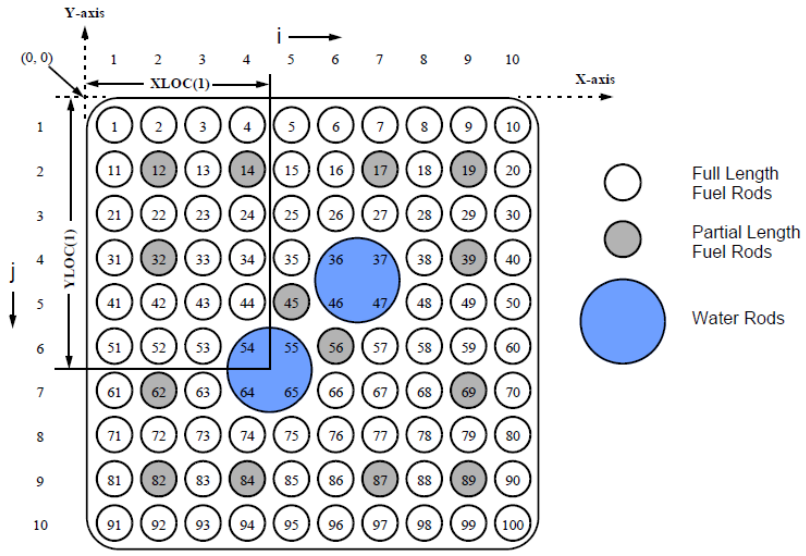

Figure 8: Physical Depiction of CHAN Component Modeling Fuel Bundle in TRACE [7]

Figure 5 also shows that the rod array in the CHAN component is based on an i,j index system. When constructing the TRACE input for the CHAN component each location in the CHAN must be labeled in an array to designate which type of rod is in that location [5]. Therefore, in order to designate a full length fuel rod a “1” is used in the array, a “2” is used for partial length fuel rods,

and a “3” is used for water rods. Figure 6 shows an example 10x10 fuel bundle defined in TRACE [5].

```
1    1    1    1    1 s   *  First row-all full length rods.
1    1    1    1    1 s.
1    2    1    2    1 s   *  Second row - mixed partial and full.
1    2    1    2    1 s
1    1    1    1    1 s   *  Third row - all full length rods.
1    1    1    1    1 s.
1    2    1    1    1 s   *  Fourth row - full, partial, and water rod.
3    3    1    2    1 s
1    1    1    1    2 s   *  Fifth row - full, partial, and water rod.
3    3    1    1    1 s
1    1    1    3    3 s   *  Sixth row - full, partial, and water rod.
2    1    1    1    1 s
1    2    1    3    3 s   *  Seventh row - full, partial, and water rod.
1    1    1    2    1 s
1    1    1    1    1 s   *  Eighth row - all full length rods.
1    1    1    1    1 s.
1    2    1    2    1 s   *  Ninth row - mixed partial and full.
1    2    1    2    1 s
1    1    1    1    1 s   *  Tenth row - all full length rods.
1    1    1    1    1 s.
4e                       *  Last rod group - channel box/canister wall.
```

Figure 9: Rod Array Input in TRACE [7]

In addition to using TRACE to model the various scenarios, SNAP was used as an interface to create the models. SNAP is a program that allows the creation and editing of input models for various engineering analysis codes. SNAP is compatible with TRACE and many other codes that were not used in this analysis. Model Editor is the main interface inside SNAP, and allows the user to create or edit input models with a physical representation of the components instead of just defining the components using text and numbers [6].

CHAPTER 2. TRACE MODELS

2.1. Full Length BWR-4 Full Bundle in Air

In order for the predictions given by TRACE for the proposed water ignition test to have physical meaning, the TRACE code must effectively replicate the air ignition test conducted by the Sandia Laboratory. The TRACE model used to simulate the experimental full-scale air ignition test is based off a 9x9 advanced BWR fuel bundle and can be seen in figure 10.

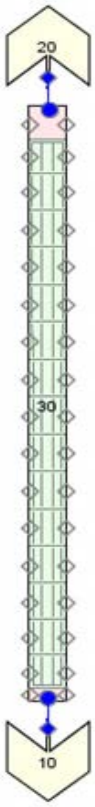

Figure 10: TRACE Model for Full-Scale Air Ignition Test

The temperature behavior of the bundle during ignition was of great interest for verifying the ability of TRACE to model the zirconium heat up and ignition event. The power supplied to the bundle was 5 kW for the test event and this power was supplied to the TRACE model as well. The target of 7 hours for an ignition time was modeled through changing the pressure differential in the two breaks that supplied the bundle with air. To attempt to match the experimental data the secant method was used to find the correct pressure differential. The exit fill was set at atmospheric pressure and the inlet fill was altered to change the ignition times, which were the dependent variables. Below is the secant method calculation:

$$x_n = x_{n-1} - f(x_{n-1})\left(\frac{x_{n-1} - x_{n-2}}{f(x_{n-1}) - f(x_{n-2})}\right) \quad (4)$$

$$with\ f(x_n) = Given\ value - n_{th}Approximation \quad (5)$$

With a pressure differential of 82.6 Pa, the TRACE model predicted an ignition time of 25,140 seconds and this ignition event began at 1072.9 K. When compared to the experimental values of 25,200 seconds and 1100K for an ignition time and ignition temperature respectively, the TRACE model appears to be capable of quantitatively modeling the zirconium ignition event in a BWR fuel bundle. The temperature behavior of the TRACE bundle also qualitatively matches the experimental data as seen in figure 11, fitting within 10 percent error bars of the data points taken from the Sandia Laboratory report detailing the test [6].

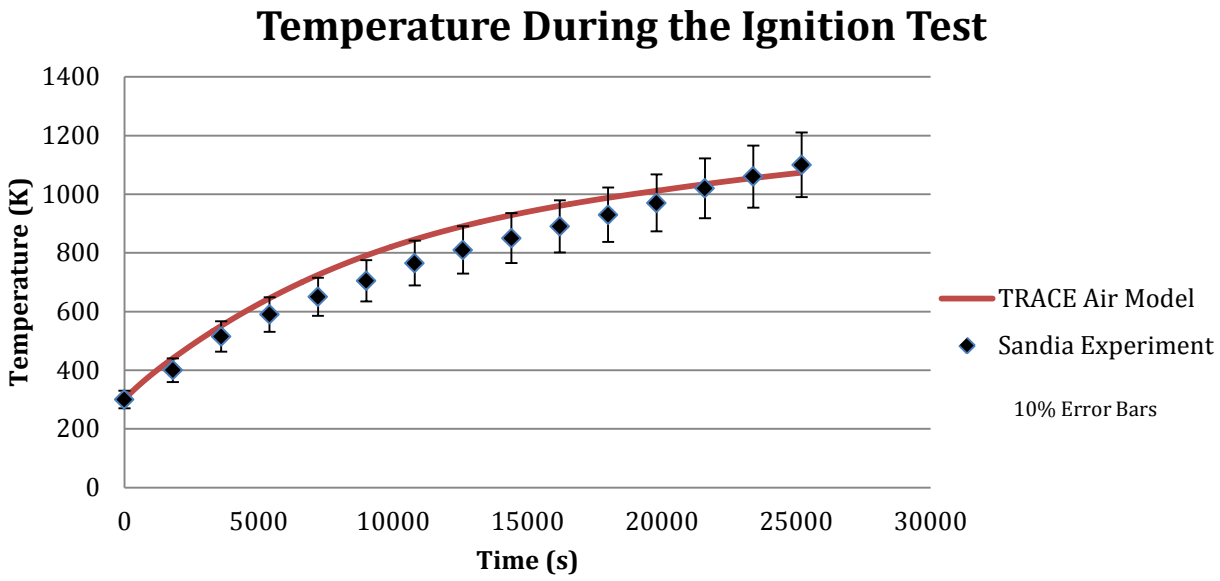

Figure 11: Comparison of the Maximum Rod Temperatures during the Ignition Test

While TRACE appears to have to have successfully benchmarked the behavior of the temperature profile of the fuel bundle during ignition, the flow rate through the bundle is not in good agreement with data. While similar behaviors of the flow can be seen, the overall values do not match as seen in figure 12.

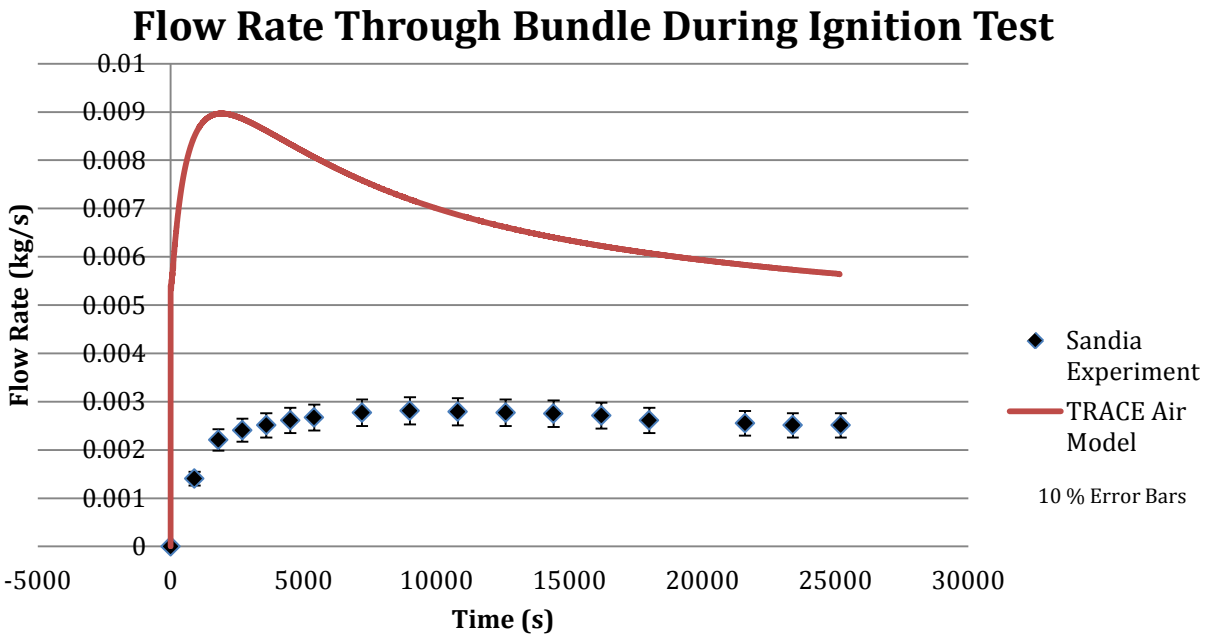

Figure 12: Comparison of the Bundle Flow Rates during the Ignition Test

While this discrepancy raises some concern, the Sandia experiment utilized techniques to alter the flow through the bundle during the ignition test. This includes a bypass valve that allowed air to not pass through the bundle during the test to slow ignition time. With these geometric specifics not being currently modeled; some deviation is to be expected.

2.2. 1x4 Partial Length BWR-4 Fuel Bundle Configuration in Air

In addition to the full scale air model, Sandia National Lab also conducted a 1x4 bundle test in air. In order to further benchmark TRACE, a model was constructed to replicate this 1x4 test that Sandia completed. Instead of a full length test, Sandia used 48 inch heated rods to model the top 48 inches of a full scale bundle. The center bundle of the arrangement was powered to 4.87 kW while the other four outer bundles were unpowered. This arrangement can be seen on the following page in figure 13.

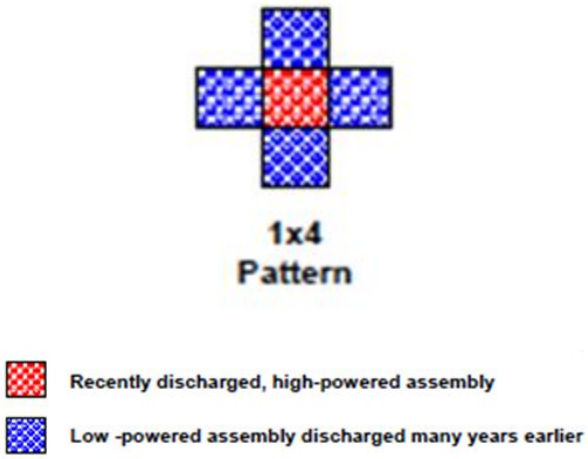

Figure 13: Diagram of powered and unpowered rods [6]

The TRACE model also modeled a 4.87 kW central bundle and unpowered peripheral bundles. The model also retains the geometry of the Sandia test using 48 inch 9x9 fuel bundles. The TRACE model 1x4 arrangement was placed within a vessel component and can be seen below in figure 14.

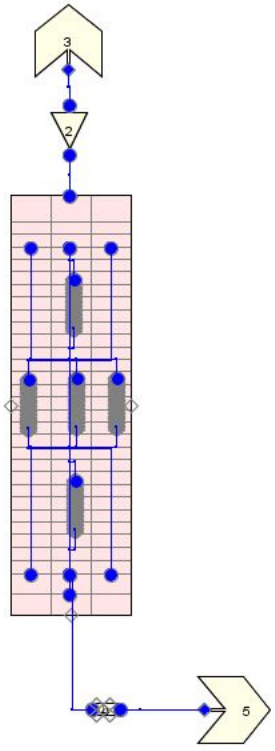

Figure 14: TRACE model for 1x4 air ignition test

A pressure differential between the two “breaks” was set to establish an air flow throughout the bundle during the TRACE simulation. This pressure differential was set equal to a 48 inch gravity head due to the 48 inch heated length of the bundle. After running the simulation, TRACE predicted an ignition time of 17820 seconds at a temperature of 1073 K. This model predicts a different time and temperature of ignition than that of what the Sandia National Laboratory test found experimentally. Sandia National Laboratory found ignition in the central bundle to take place at 17350 seconds at a temperature of 1200 K. The following figure, figure 15, displaying the temperature profiles from both Sandia and the TRACE model portray the differences between the data.

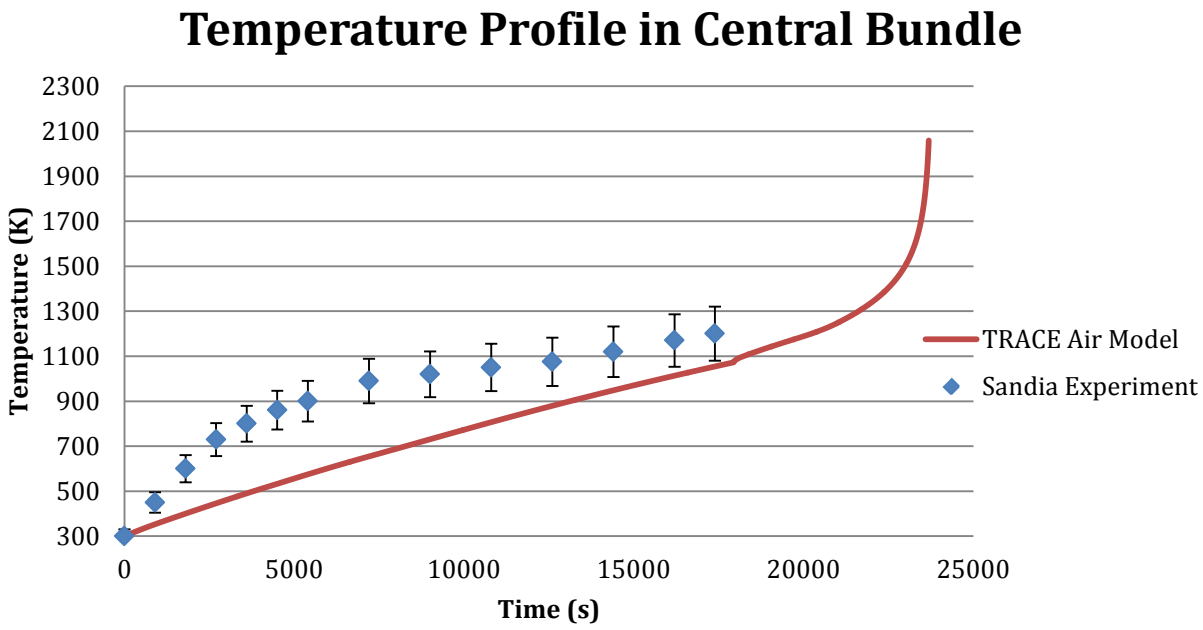

Figure 15: Comparison of the temperature profiles during the ignition test

The behavior of the temperature profiles in the central bundles vary from one another. This difference in behavior could be due to multiple factors in the TRACE model. First, the flow rates in the Sandia test where controlled for each bundle individually. In the TRACE model, the lower bundle geometry distributed the flow from the break throughout the five channels. As seen in figure 16 and figure 17 below, the flow rates through the central and southern bundle are significantly different in the TRACE model than the flow rates in the Sandia experiment.

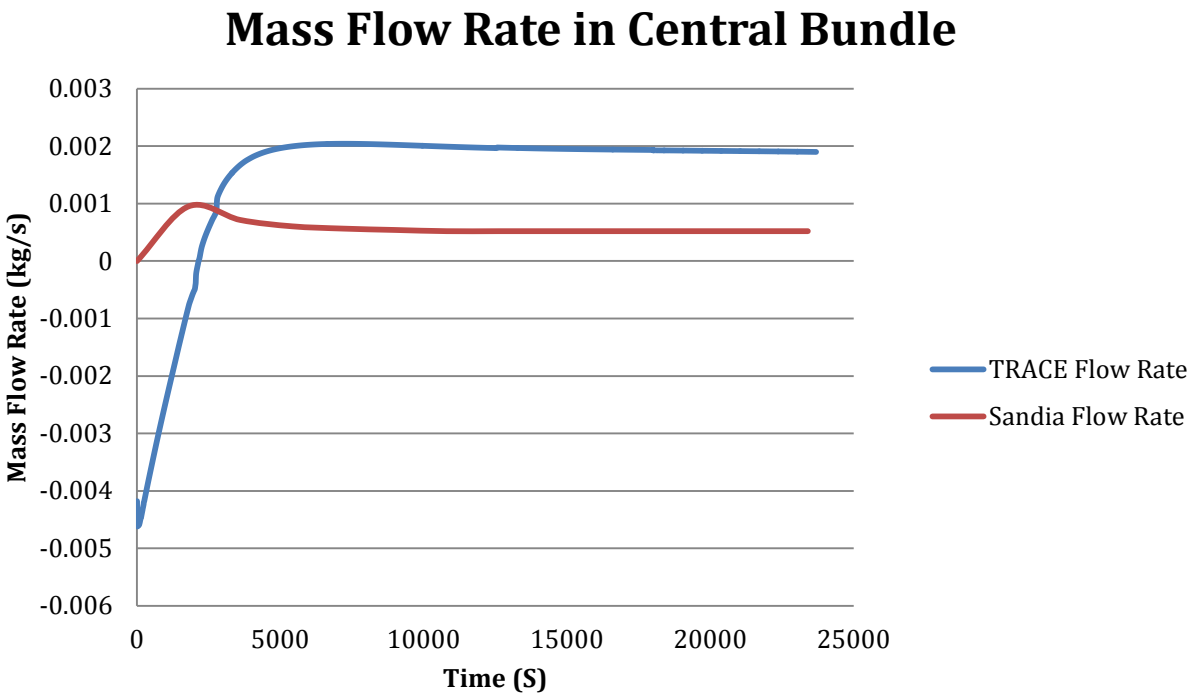

Figure 16: Comparison of flow rates through central bundle

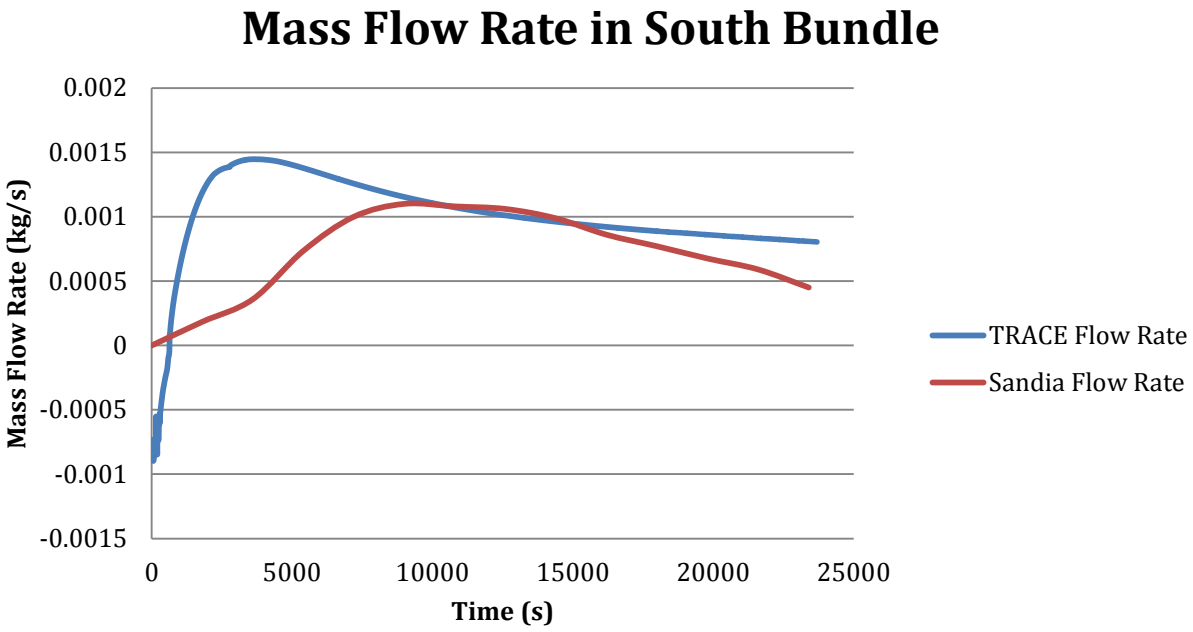

Figure 17: Comparison of flow rates through south bundle

This flow rate difference between the TRACE simulation and the Sandia National Laboratory test could result in large differences in the temperature profiles between the test and model. In addition to different flow rates between the test and model, the input temperatures of the air also varied. The Sandia test used air heaters to increase the temperature of the air flow to model the top 48 inch section of a full scale bundle. In other words, Sandia set the inlet temperature of the test bundle to be equivalent to the temperatures that would have been found if the test bundle truly was the top 48 inch portion of a full scale bundle. In the TRACE model the inlet temperature was set to 300 K for the entirety of the simulation. Another assumption made in the TRACE model was that heat transfer to surrounding air would not take place. This was achieved by setting the heat flux of the outside surfaces to zero and adding insulation in the four corners that were not occupied by fuel bundles.

2.3. Full Length BWR-4 Fuel Bundle in Water

The water model is used for full scale simulations of three different forced flow rates through the bundle: 0.00 kg/s, $1*10^{-4}$ kg/s, and $1*10^{-3}$ kg/s. This model is based on an advanced BWR fuel bundle in a 9x9 grid. The fuel bundle contains two full length water rods and eight partial length fuel rods. The purpose of this model is to act as a mathematical precursor to a full scale boil off test of an advanced BWR fuel bundle using electrically heated fuel rods as done in the original Sandia National Labs air test [4]. This model was developed to determine the critical decay power as a function of time to breakaway in a full scale test in an effort to preserve the testing bundle through multiple simulations.

The Full Scale Water Model was used to simulate different fuel rod decay powers ranging from 0.1199 kW to 21.8 kW, the maximum power of the heating elements. The point of ignition was found to not be accurately predicted by TRACE in the Air model thus the same technique was used to define the breakaway point. The point at which breakaway is defined is the point at which TRACE predicts a large increase in temperature, between 2 and 3 degrees K in 1 second. This is better shown in figure 18.

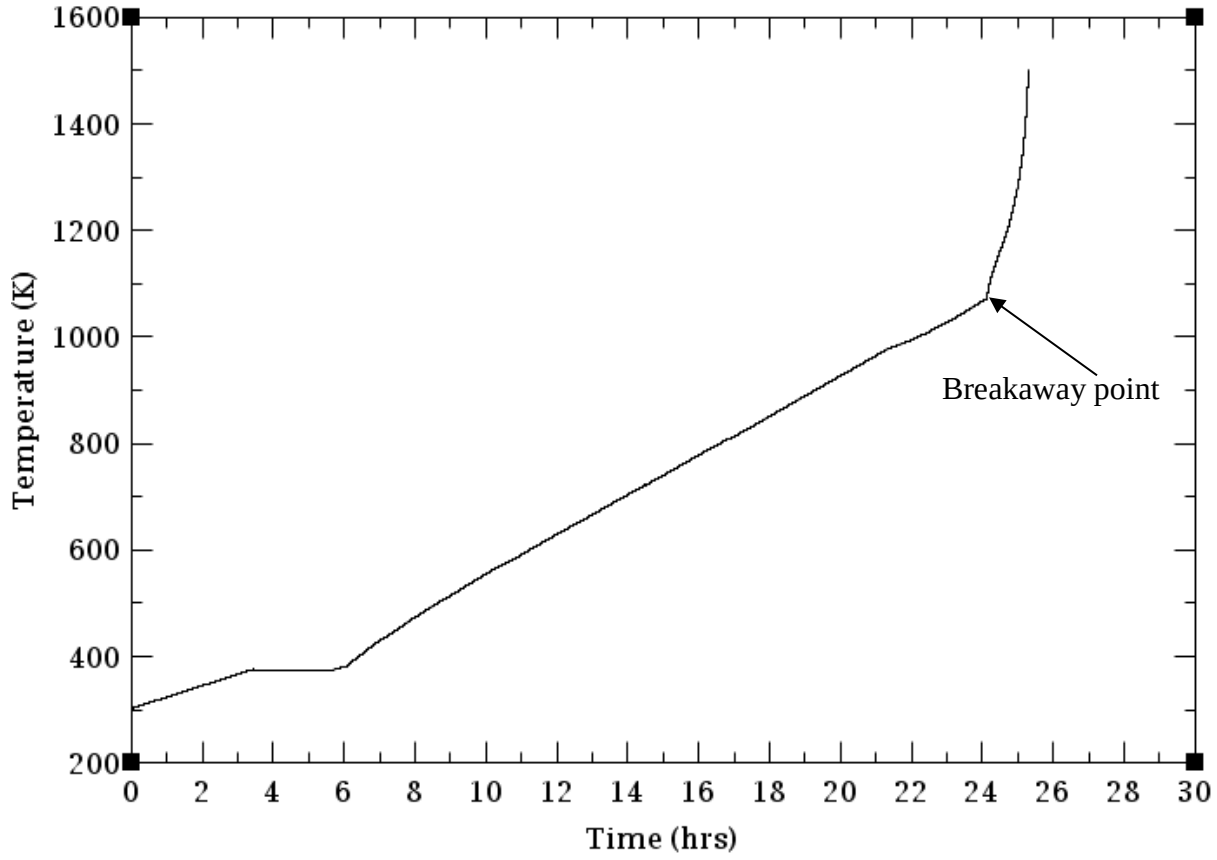

Figure 18: Cladding Temperature vs. Time (1.199 kW at 0.00 kg/s)

Figure 18 also shows the four distinct regions of the rise in temperature of the cladding. These can be explained due to the heat loss by water from the cladding. When the twelve iterations of the model outputs were plotted on the same graph, figure 19, an approximate temperature of breakaway can be seen.

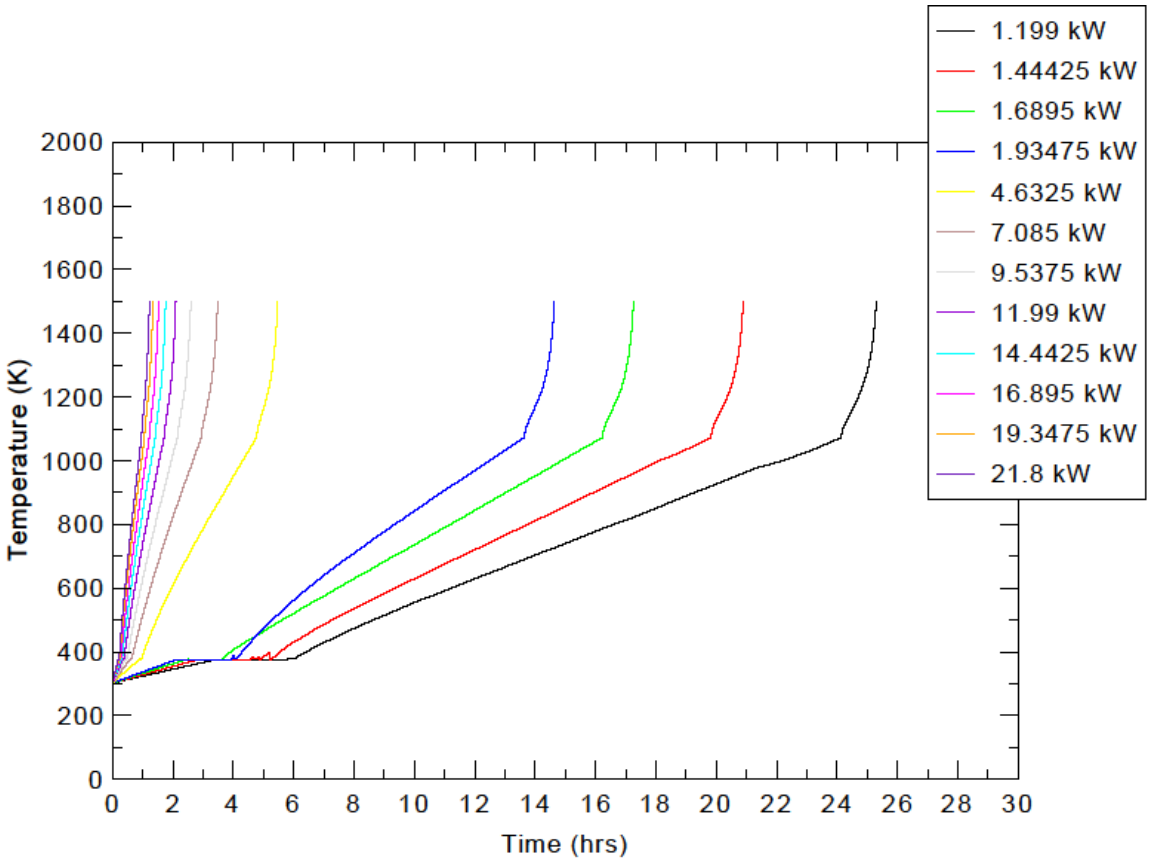

Figure 19: Cladding Temperature vs. Time (Flow Rate of 0.00 kg/s)

All iterations of the model, at all three flow rates, reached breakaway at approximately 1073 K. This is the point at which TRACE begins to calculate the metal water reaction and thus the rapid oxidation. The breakaway point was found to be fit a power regression for each of the three flow rates. This is demonstrated in figure 20. The trend lines each had an R^2 of greater than 0.98 thus allowing for good approximations for the breakaway point at any power between 1.199 kW and 21.8 kW. For the $1*10^{-3}$ the valid range is only 4.6325 kW to 21.8 kW as the models failed to reach a breakaway point within 200 hours. The time to reach the breakaway temperature is displayed by flow rate in figures 21 through 23.

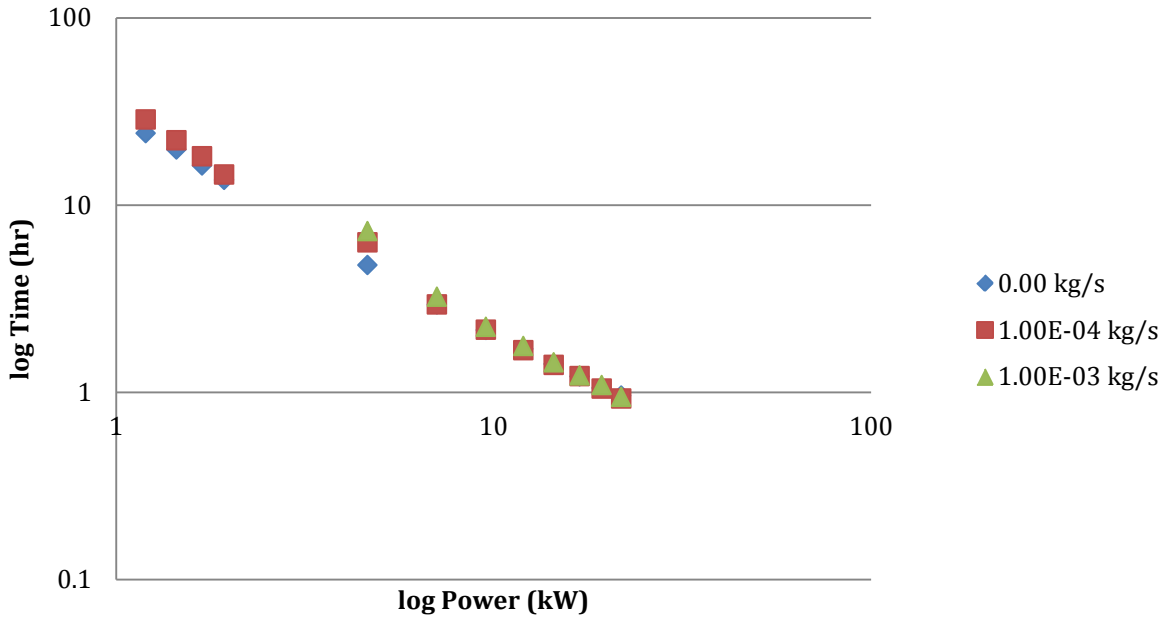

Figure 20: Time to Reach Breakaway Point vs. Power

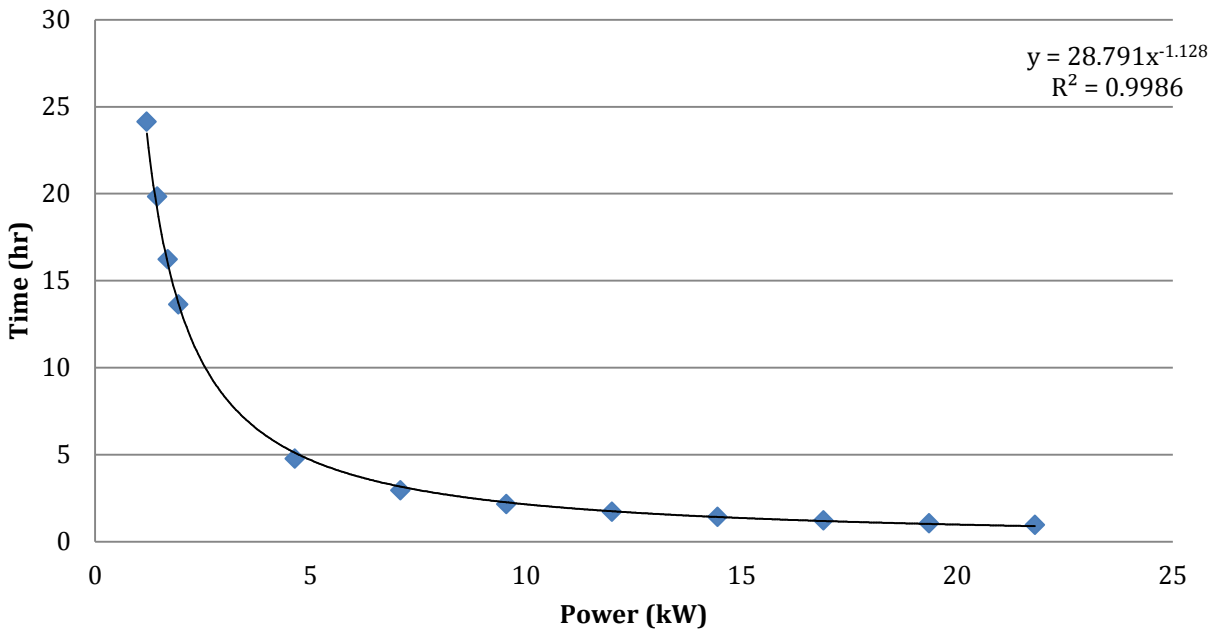

Figure 21: Time to Reach Breakaway Point vs. Power (Flow Rate of0.00 kg/s)

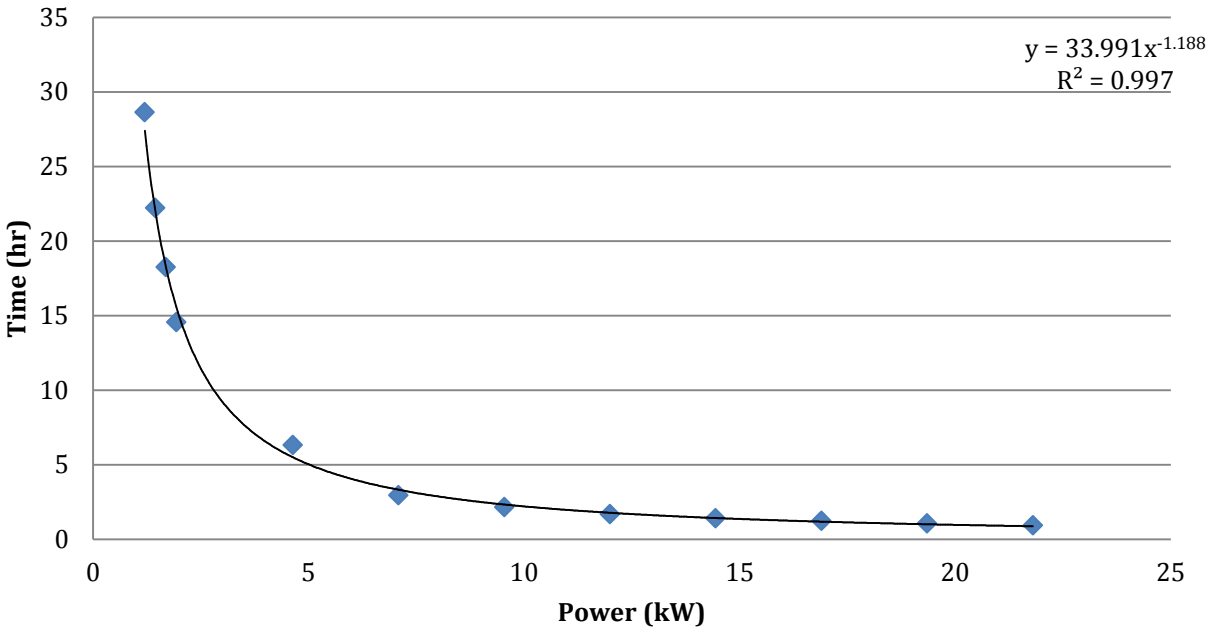

Figure 22: Time to Reach Breakaway Point vs. Power (Flow Rate of $1*10^{-4}$ kg/s)

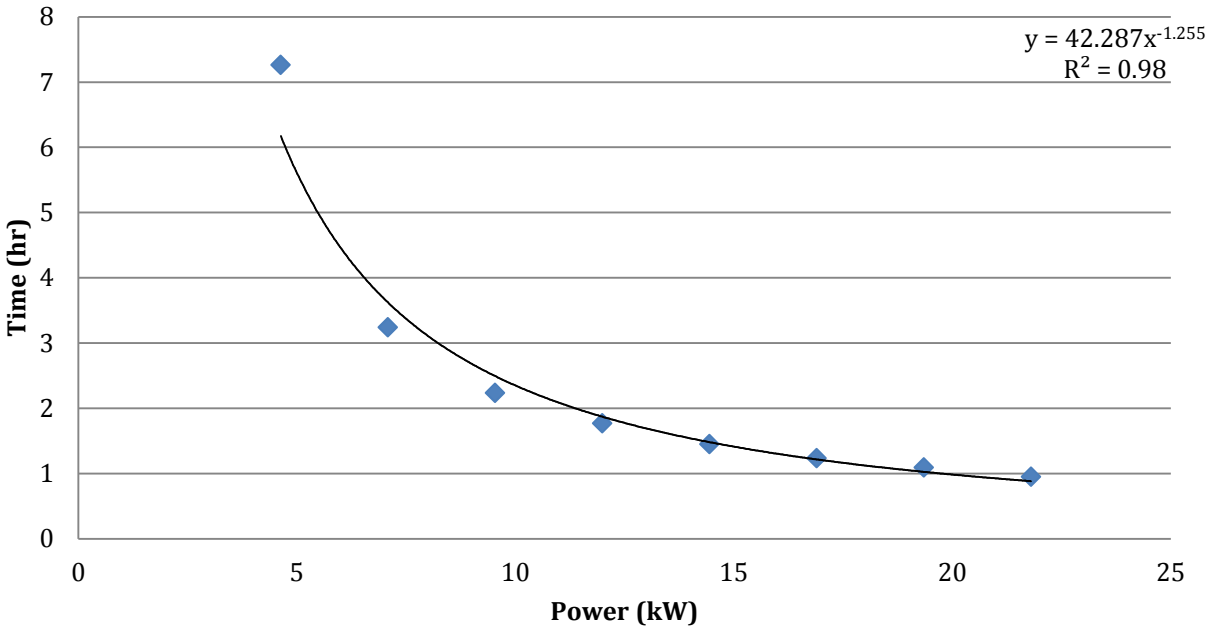

Figure 23: Time to Reach Breakaway Point vs. Power (Flow Rate of $1*10^{-3}$ kg/s)

The collapsed water height, total height of liquid water, within the fuel bundle was determined at the time of breakaway. This was then compared between both the power levels and the flow

rates. There was a connection between the power level and the collapsed water height however the exact trend is unknown. Figure 24 shows this connection with the increase in water height

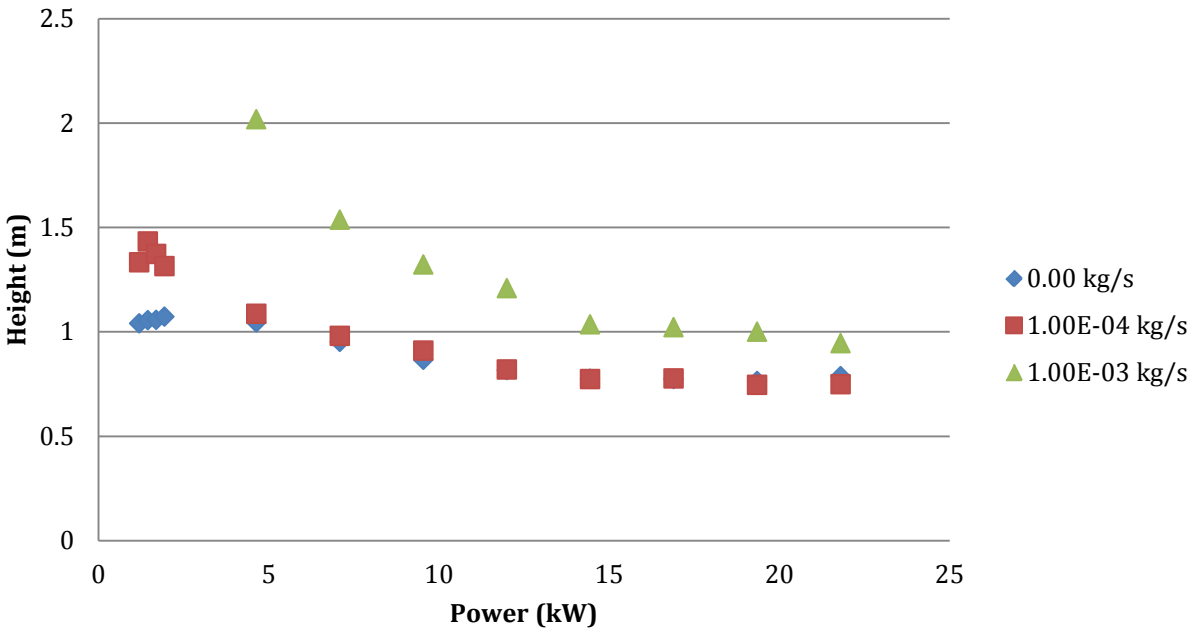

Figure 24: Collapsed Water Height at Breakaway Point vs. Power

inverse to the power from 21.8 kW to 4.6325 kW for the 0.00 kg/s and $1*10^{-4}$ kg/s. This trend does not continue under 4.6325 kW but instead appears as a parabola between 1.199 kW and 4.6325 kW. No statement can be made for the collapsed water height for the $1*10^{-3}$ kg/s less than 4.6325 kW due to a lack of data.

CHAPTER 3. FINAL REMARKS

3.1. Summary and Conclusion

In order to determine the modeling capabilities of TRACE two models were created and benchmarked against tests performed by Sandia National Laboratories. These models were the Full Length BWR-4 Fuel Bundle in Air, the 1x4 Partial Length BWR-4 Fuel Bundle Configuration in Air and the Full Length BWR-4 Fuel Bundle in Water. After determining the modeling capabilities with regards to the experimental data a third model, Full Length BWR-4 Fuel Bundle in Water, was generated based upon the original Full Length BWR-4 Full Bundle in Air model. This third model was generated in order to provide a starting point to develop a Full Scale Water ignition test at Sandia National Laboratory.

TRACE modeled the full bundle ignition test done be Sandia National Laboratory within 10% error using a secant method to fit the breakaway time. This gave validation to TRACE's ability to model the SFP Zr ignition event in air, something that was of question before this project as this was not an event TRACE was initially intended to model. Varying bundle powers were examined in addition to three distinct water flow rates: 0.00 kg/s, $1*10^{-4}$ kg/s, and $1*10^{-3}$ kg/s . Relationships were generated for time to breakaway as a function of bundle power for each flow rate. All relationships were found to have an R^2 of greater than or equal to 0.98. The collapsed water height was found to be a function of flow rate. From these relationships it was found that increased powers reduce the time to breakaway and higher flow rates result in larger collapsed water heights for all examined cases which is to be expected.

3.2. Recommendations for Further Work

It is recommended that further work be completed using the provided input files in Appendix 3. The first steps should include improvements on the Full Length BWR-4 Full Bundle in Air model. Specifically, this model should be modified in such a way as to reflect the coolant flow rates used in the Sandia National Laboratory experiment for the full length in air bundle test (Currently the flow rate is driven by a pressure differential resulting from a gravity head generated using two "Break" components in TRACE).

For the 1x4 configuration, the flow rates will need to be adjusted to model the variations that occurred during the test at Sandia National Laboratory. Additionally, the inlet temperatures will need to be varied to reflect the prior testing.

Additional investigations of the Full Length BWR-4 Fuel Bundle in Water should also be conducted using a broader range of parameters. Such parameters include coolant flow rates and

bundle powers. These investigations will lead to more a more complete understanding of key test parameters for future full scale water tests by Sandia National Laboratory.

For all models, work should be done to better model the heat transfer from the fuel bundle to the surroundings. Current models have adiabatic boundaries on the sides which is not the case in a physical test.

One of the limiting factors in benchmarking the TRACE models with the Sandia National Laboratory tests was the built in ignition temperature for the zirconium alloy in TRACE. For a more accurate comparison to experimental data, it should be investigated to see if the ignition temperature of the zirconium can be altered.

REFERENCES

[1] The American Nuclear Society Special Comittee on Fukushima, "FUKUSHIMA DAIICHI: ANS Comittee Report," American Nuclear Society, 2012.

[2] Division of System Analysis, Office of Nuclear Regulatory Research;, *Investigations of Zirconium Fires during Spent Fuel Pool LOCAs,* Washington D.C.: United States Nuclear Regulatory Comission, 2013.

[3] S. M. Bajorek, *PSU Sr. Design Project (NucE 431) Introduction,* Washington D.C.: United States Nuclear Regulatory Comission, 2013.

[4] F. E. Haskin, A. L. Camp, S. A. Hodge and D. A. Powers, "Perspectives on Reactor Safety," ERI Consulting, Albuquerque, 2002.

[5] R. A. Causey, D. F. Cowgill and R. H. Nilson, "Review of the Oxidation Rate of Zirconium Alloys," Sandia National Laboratories, Livermore, 2005.

[6] E. R. Lindgren and S. G. Durbin, *Characterization of Thermal-Hydraulic and Ignition Phenomena in Prototypic, Full-Length Boiling Water Reactor Spent Fuel Pool Assemblies after a Complete Loss-of-Coolant Accident,* Albuquerque: Sandia National Laboratories, 2007.

[7] Division of Safety Analysis, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, "TRACE V5.0 USER'S MANUAL Volume 1: Input Specification," U.S. Nuclear Regulatory Commission, Washington D.C., 2010.

[8] Applied Programming Technology, Inc., "Symbolic Nuclear Analysis Package (SNAP)," Bloomsburg PA, 2012.

APPENDIX 1.
SUPPLEMENTAL DATA TABLES

Table 2: Radioactive materials in a large [3300-MWt] light water reactor core grouped by relative volatility. [3]

Group	Isotope	Half-life	Core Inventory (Ci)	Group Total (Ci)
Noble Gases	Kr-85	10.72 y	6.69E+05	3.84E+08
	Kr-85m	4.48 h	3.13E+07	
	Kr-87	1.27 h	5.72E+07	
	Kr-88	2.54 h	7.74E+07	
	Xe-133	5.245 d	1.83E+08	
	Xe-135	9.09 h	3.44E+07	
Halogens	I-131	8.04 d	8.66E+07	7.71E+08
	I-132	2.30 h	1.28E+08	
	I-133	20.8 h	1.83E+08	
	I-134	52.6 m	2.01E+08	
	I-135	6.61 h	1.73E+08	
Alkali Metals	Cs-134	2.062 y	1.17E+07	2.18E+07
	Cs-136	13.16 d	3.56E+06	
	Cs-137	30.17 y	6.53E+06	
	Rb-86	18.66 d	5.10E+04	
Tellurium Group	Sb-127	3.85 d	7.53E+06	2.13E+08
	Sb-129	4.40 h	2.67E+07	
	Te-127m	109 d	9.63E+05	
	Te-129	1.16 h	2.50E+07	
	Te-129m	33.6 d	6.60E+06	
	Te-131m	30 h	1.26E+07	
	Te-132	3.26 d	1.26E+08	
Barium, Strontium	Ba-139	1.396 h	1.70E+08	6.95E+08
	Ba-140	12.746 d	1.68E+08	
	Sr-89	50.52 d	9.70E+07	
	Sr-90	29.1 y	5.24E+06	
	Sr-91	9.5 h	1.25E+08	
	Sr-92	2.71 h	1.30E+08	
Noble Metals	Co-58	70.88 d	8.71E+05	5.94E+08
	Co-60	5.271 d	6.66E+05	
	Mo-99	2.7476 d	1.65E+08	
	Rh-105	35.4 h	5.53E+07	
	Ru-103	39.27 d	1.23E+08	
	Ru-105	4.44 h	7.98E+07	
	Ru-106	1.02 y	2.79E+07	
	Tc-99m	6.01 h	1.42E+08	
Lanthanides	Am-241	432.7 y	3.13E+03	1.54E+09
	Cm-242	162.8 d	1.20E+06	
	Cm-244	18.1 y	7.02E+04	
	La-140	1.678 d	1.72E+08	
	La-141	3.90 h	1.57E+08	
	La-142	1.54 h	1.52E+08	
	Nb-95	34.97 d	1.41E+08	
	Nd-147	10.98 d	6.52E+07	
	Pr-143	13.57 d	1.46E+08	
	Y-90	2.67 d	5.62E+06	
	Y-91	58.5 d	1.18E+08	
	Y-92	3.54 d	1.30E+08	
	Y-93	10.2 h	1.47E+08	
	Zr-95	64.02 d	1.49E+08	
	Zr-97	16.8 h	1.56E+08	
Cerium Group	Ce-141	32.50 d	1.53E+08	2.15E+09
	Ce-143	1.38 d	1.48E+08	
	Np-239	2.355 d	1.75E+09	
	Pu-238	87.7 y	9.90E+04	
	Pu-239	24100 y	2.23E+04	
	Pu-240	6560 y	2.82E+04	
	Pu-241	14.4 y	4.74E+06	

APPENDIX 2.
TRACE INPUT FILES

Appendix 2.1.
Full Length BWR-4 Full Bundle in Air

```
free format
*m: SNAP:Symbolic Nuclear Analysis Package,  Version 2.2.0, September 04,
2012
*m: PLUGIN:TRACE Version 3.2.4
*m: CODE:TRACE V 5.0 Patch 3
*m: DATE:4/8/13
*m: Franiewski, Geleskie, Grove, Maguire
*
*
*************
* main data *
*************
*
*       numtcr           ieos          inopt           nmat           id2o
                  1              0               1                0
0

*
*
*****************
* namelist data *
*****************
*
 &inopts
  dtstrt=-1.0,
  ikfac=1,
  noair=0,
  usesjc=3,
  npower=1
 &end
*
***************
* Model Flags *
***************
*
*        dstep         timet
             0           0.0
*       stdyst        transi         ncomp           njun           ipak
             0             1             4              2              1
*         epso          epss
          1.0E-4        1.0E-4
*       oitmax        sitmax        isolut        ncontr         nccfl
            10            10             0             0             0
*         ntsv          ntcb          ntcf          ntrp          ntcp
             2             0             0             0             0
*
*************************
* component-number data *
*************************
*
*  Component input order (IORDER)
*-- type ---- num ------------ name ---------------  +    jun1   jun2
jun3
```

```
* BREAK    *     10 s * Inlet Boundary Condition       +      10
* BREAK    *     20 s * Outlet Boundary Condition      +      20
* CHAN     *     30 s *                                +      10     20
* POWER    *     40 e *                                +
*
*
************************************************
* Starting Signal Variable Section of Model      *
************************************************
*
*         idsv          isvn          ilcn          icn1          icn2
             1             0             0             0             0
*n: Collapsed Water Height
*
*         idsv          isvn          ilcn          icn1          icn2
             2            20            30             1            17
************************************************
* Finished Signal Variable Section of Model      *
************************************************
*
*
*
*
*d: Outlet Boundary Condition
*d: Constant Pressure BC
*******   type           num        userid                component name
break                     10             0       Inlet Boundary Condition
*         jun1          ibty          isat          ioff      adjpress
            10             0             0             0             0
*         dxin         volin         alpin           tin           pin
          0.15     1.4685E-3           1.0         300.0    1.014079E5
*         pain        concin          rbmx          poff          belv
    1.014079E5           0.0        1.0E20           0.0           0.0
*
*
*d: Outlet Boundary Condition
*d: Constant Pressure BC
*******   type           num        userid                component name
break                     20             0      Outlet Boundary Condition
*         jun1          ibty          isat          ioff      adjpress
            20             0             0             0             0
*         dxin         volin         alpin           tin           pin
    0.16666667    1.76667E-3           1.0         300.0    1.013529E5
*         pain        concin          rbmx          poff          belv
    1.013529E5           0.0        1.0E20           0.0           0.0
*
*
*******   type           num        userid                component name
chan                      30             0                       unnamed
*        ncell         nodes          jun1          jun2          epsw
            17             2            10            20        1.0E-5
*       nsides
             2
* Water Rod inlet junction
*         nclk         junlk        ncmpto        nclkto        nlevto
             2          3001             0             0             0
*        theta
          90.0
* Water Rod outlet junction
*         nclk         junlk        ncmpto        nclkto        nlevto
            16          3002             0             0             0
*        theta
          90.0
*         ichf         iconc        iaxcnd        liqlev         nhcom
```

```
             2             0             0             0             0
*        width            th         houtl         houtv         toutl
       0.53624       1.91E-3           0.0           0.0         350.0
*        toutv       advbwrf       quadsym      numwrods       nvfrays
         300.0             1             0             1             0
*         ngrp        nchans        nodesr          nrow          ncrz
            3             1             9             9            15
*        icrnk         icrlh         nmwrx          nfci         nfcil
            1             1             1             0             0
*         fmon       reflood         nzmax        nzmaxw         ibeam
            0             0           100            76             0
*        dznht        dznhtw        dtxht1        dtxht2
          0.01           0.1           2.0          10.0
*        hgapo         pdrat          pldr        fucrac         norad
       4600.0        1.2973           0.0           1.0             0
*       emcif1        emcif2        emcif3         noani
          0.67           0.0           0.0             0
*       emcof1        emcof2        emcof3
          0.67           0.0           0.0
* dx    *    0.0775208   0.2362835   0.2362835    0.254254s
* dx    *     0.254254    0.255524    0.255524   0.2561082s
* dx    *    0.2561082   0.2561082   0.2561082   0.2566035s
* dx    *    0.2566035   0.2554097   0.2554097    0.227711s
* dx    *     0.227711e
* vol   *    7.5893E-4   2.3132E-3   2.3132E-3   2.4891E-3s
* vol   *    2.4891E-3   2.5016E-3   2.5016E-3   2.5073E-3s
* vol   *    2.5073E-3   2.5073E-3   2.5073E-3     2.72E-3s
* vol   *      2.72E-3   2.7073E-3   2.7073E-3   2.4137E-3s
* vol   *    2.4137E-3e
* fa    *      9.79E-3     9.79E-3     9.79E-3     9.79E-3s
* fa    *      9.79E-3     9.79E-3     9.79E-3     9.79E-3s
* fa    *      9.79E-3     9.79E-3     9.79E-3      0.0106s
* fa    *       0.0106      0.0106      0.0106      0.0106s
* fa    *       0.0106      0.0106e
* kfac  *          0.1         0.5         0.0         0.5s
* kfac  *          0.0         0.5         0.0         0.5s
* kfac  *          0.0         0.5         0.0         0.5s
* kfac  *          0.0         0.5         0.0         0.5s
* kfac  *          0.0         0.5e
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0e
* hd    *       0.0119      0.0119      0.0119      0.0119s
* hd    *       0.0119      0.0119      0.0119      0.0119s
* hd    *       0.0119      0.0119      0.0119      0.0141s
* hd    *       0.0141      0.0141      0.0141      0.0141s
* hd    *       0.0141      0.0141e
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1e
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0e
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0e
```

```
* vv    *         0.0         0.0         0.0         0.0s
* vv    *         0.0         0.0         0.0         0.0s
* vv    *         0.0         0.0         0.0         0.0s
* vv    *         0.0         0.0         0.0         0.0s
* vv    *         0.0         0.0e
* tl    *       300.0       300.0       300.0       300.0s
* tl    *       300.0       300.0       300.0       300.0s
* tl    *       300.0       300.0       300.0       300.0s
* tl    *       300.0       300.0       300.0       300.0s
* tl    *       300.0e
* tv    *       300.0       300.0       300.0       300.0s
* tv    *       300.0       300.0       300.0       300.0s
* tv    *       300.0       300.0       300.0       300.0s
* tv    *       300.0       300.0       300.0       300.0s
* tv    *       300.0e
* p     *   1.013529E5  1.013529E5  1.013529E5  1.013529E5s
* p     *   1.013529E5  1.013529E5  1.013529E5  1.013529E5s
* p     *   1.013529E5  1.013529E5  1.013529E5  1.013529E5s
* p     *   1.013529E5  1.013529E5  1.013529E5  1.013529E5s
* p     *   1.013529E5e
* pa    *     101352.9    101352.9    101352.9    101352.9s
* pa    *     101352.9    101352.9    101352.9    101352.9s
* pa    *     101352.9    101352.9    101352.9    101352.9s
* pa    *     101352.9    101352.9    101352.9    101352.9s
* pa    *     101352.9e
*  qppp * f 0.0e
* mat   *          2 e
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0e
*  rdx  *        66.0         8.0         2.0e
* radrd *         0.0   6.604E-4   1.3208E-3     2.54E-3    3.048E-3s
* radrd *     3.556E-3  4.8388E-3  5.1944E-3     5.55E-3e
* matrd *           5           5           4           4 s
* matrd *           4           4           2           2 e
*  nfax *           0           0           0          0s
*  nfax *           0           0           0          0s
*  nfax *           0           0           0          0s
*  nfax *           0           0          0e
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
```

```
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0e
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0         0.0         0.0         0.0s
*  rftn *        0.0         0.0         0.0         0.0s
*  rftn *        0.0         0.0         0.0         0.0s
*  rftn *        0.0         0.0         0.0         0.0s
*  rftn *        0.0         0.0         0.0         0.0s
*  rftn *        0.0         0.0         0.0         0.0s
*  rftn *        0.0         0.0         0.0         0.0s
*  rftn *        0.0         0.0         0.0         0.0s
*  rftn *        0.0         0.0         0.0         0.0s
*  rftn *        0.0         0.0         0.0         0.0s
*  rftn *        0.0         0.0         0.0         0.0s
*  rftn *        0.0         0.0         0.0         0.0s
*  rftn *        0.0         0.0         0.0         0.0s
*  rftn *        0.0         0.0         0.0e
* rdpwr *        1.0         1.0         0.0         0.0         0.0s
* rdpwr *        0.0         0.0         0.0         0.0e
* cpowr *        1.0         1.0e
* radpw *  0.95791667  0.95791667  0.95791667  0.95791667  0.95791667s
* radpw *  0.95791667  0.95791667  0.95791667  0.95791667  0.95791667s
* radpw *  0.95791667  0.95791667  0.95791667  0.95791667  0.95791667e
* fpuo2 *        0.0         0.0e
*   ftd *       0.95        0.95e
*  gmix * f      0.0e
* pgapt *        0.0         0.0e
*  burn *      3.0E4       3.0E4       3.0E4       3.0E4s
*  burn *      3.0E4       3.0E4       3.0E4       3.0E4s
*  burn *      3.0E4       3.0E4       3.0E4       3.0E4s
*  burn *      3.0E4       3.0E4       3.0E4e
*  burn *      3.0E4       3.0E4       3.0E4       3.0E4s
*  burn *      3.0E4       3.0E4       3.0E4       3.0E4s
*  burn *      3.0E4       3.0E4       3.0E4       3.0E4s
```

```
*  burn *       3.0E4       3.0E4       3.0E4e
* mrod *           1           1           1           1           1s
* mrod *           1           1           1           1           1s
* mrod *           2           1           1           2           1s
* mrod *           1           2           1           1           1s
* mrod *           1           1           1           1           1s
* mrod *           1           1           1           1           1s
* mrod *           1           3           3           1           1s
* mrod *           1           1           2           1           3s
* mrod *           3           3           1           2           1s
* mrod *           1           1           1           3           3s
* mrod *           1           1           1           1           1s
* mrod *           1           1           1           1           1s
* mrod *           1           1           1           1           2s
* mrod *           1           1           2           1           1s
* mrod *           2           1           1           1           1s
* mrod *           1           1           1           1           1s
* mrod *           1           4e
*    partial length rods
*             i             j         levrod
              2             2             10
              5             2             10
              8             2             10
              2             5             10
              8             5             10
              2             8             10
              5             8             10
              8             8             10
             -1
*
*     water rod locations *
*             i             j          flag          xloc          yloc
              5             4             1       0.07722      -0.05684
              6             4             1           0.0           0.0
              5             5             1           0.0           0.0
              6             5             1           0.0           0.0
              4             5             1       0.05684      -0.07722
              4             6             1           0.0           0.0
              5             6             1           0.0           0.0
-1
*     water rod data sets
*
*        igeom       wrnodes
              1             4
*      wrinlet      wroutlet           dia          sidea          sideb
              2            16       0.02489            0.0            0.0
*           th       rcorner      flowarea      flwareai      flwareao
         7.6E-4           0.0           0.0           0.0           0.0
*           hd          hdri          hdro      thrmdiai      thrmdiao
            0.0           0.0           0.0           0.0           0.0
*     wrflossi      wrflosso      wrrlossi      wrrlosso
     0.1404795    0.13868901    0.1404795    0.13868901
*  matwr   * f              2 e
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
```

```
*    tw   *       300.0       300.0       300.0       300.0       300.0e
*
*
****************************************
*     Starting Power Components         *
****************************************
*
*******   type           num        userid                component name
power                     40             0                       unnamed
*       numpwr       chanpow
             1             1
* htnum *          30 e
*       irpwty          ndgx          ndhx          nrts         nhist
             5             0             0           100             0
*       izpwtr        izpwsv        nzpwtb        nzpwsv        nzpwrf
             0             1             1             0             0
*       ipwrad        ipwdep      promheat      decaheat      wtbypass
             0             0           0.0           0.0           0.0
*        nzpwz         nzpwi        nfbpwt         nrpwr         nrpwi
            25             0             0             1             0
*        react         tneut        rpwoff        rrpwmx        rpwscl
          0.0           0.0           0.0        1.0E20           1.0
*       rpowri         zpwin        zpwoff        rzpwmx
       5000.0           0.0      -1.0E19        1.0E20
*       extsou         pldr          pdrat        fucrac
          0.0           0.0           1.0           1.0
* zpwzt *          0.0  0.16666667  0.33333334  0.50000001  0.66666668s
* zpwzt *  0.83333335          1.0   1.1666667   1.3333334          1.5s
* zpwzt *   1.6666667   1.8333334          2.0   2.1666667   2.3333334s
* zpwzt *          2.5   2.6666667   2.8333334   3.0000001   3.1666667s
* zpwzt *   3.3333334   3.5000001   3.6666667   3.8333334   4.0000001e
* zpwtb1*          0.0s
* zpwtb1*          1.0         1.0         1.0         1.0         1.0s
* zpwtb1*          1.0         1.0         1.0         1.0         1.0s
* zpwtb1*          1.0         1.0         1.0         1.0         1.0s
* zpwtb1*          1.0         1.0         1.0         1.0         1.0s
* zpwtb1*          1.0         1.0         1.0         1.0         1.0e
****************************************
*     Finished Power Components         *
****************************************
*
*
*
end
*
*****************
* Timestep Data *
*****************
*        dtmin         dtmax          tend         rtwfp
       1.0E-6        1.0E-4           1.0          10.0
*        edint         gfint        dmpint        sedint
         100.0           1.0         100.0           1.0
*
*        dtmin         dtmax          tend         rtwfp
       1.0E-6        1.0E-3          10.0          10.0
*        edint         gfint        dmpint        sedint
         100.0           1.0         100.0           1.0
*
*        dtmin         dtmax          tend         rtwfp
       1.0E-6           0.1         1.0E5          10.0
*        edint         gfint        dmpint        sedint
         100.0           5.0         100.0           1.0
*
*      endflag
```

```
-1.0
```

Appendix 2.2.
1x4 Partial Length BWR-4 Fuel Bundle Configuration in Air

```
free format
*m: SNAP:Symbolic Nuclear Analysis Package,  Version 2.2.0, September 04,
2012
*m: PLUGIN:TRACE Version 3.2.4
*m: CODE:TRACE V 5.0 Patch 3
*m: DATE:4/17/13
*m: Franiewski, Geleskie, Grove, Maguire
*
*
*************
* main data *
*************
*
*       numtcr          ieos         inopt          nmat          id2o
           11             0             1             1             0
-----------------------------------------------------
Cartesian Geometry SFP with 4 Channels
Josh Whitman
NRC
2013
Based On:
Fukushima Dai-ichi Unit 4 SFP Boil-off Model
Dean Wang
Oak Ridge National Laboratory
2011
-----------------------------------------------------
*
*
*****************
* namelist data *
*****************
*
 &inopts
  dtstrt=-1.0,
  iadded=1,
  ikfac=1,
  ipowr=1,
  noair=0,
  nolt3d=1,
  nosets=0,
  use_IAPWS_st=.TRUE.,
  usesjc=3,
  npower=1,
  nhtstr=8
 &end
*
***************
* Model Flags *
***************
*
*        dstep         timet
            0           0.0
*       stdyst        transi         ncomp          njun          ipak
            0             1            19            14             1
*         epso          epss
        1.0E-4        1.0E-4
*       oitmax        sitmax        isolut        ncontr         nccfl
           10            10             0             0             2
*         ntsv          ntcb          ntcf          ntrp          ntcp
```

```
            1             0             0             0             0
*
************************
* component-number data *
************************
*
*  Component input order (IORDER)
*-- type ---- num ------------ name ----------------  +    jun1   jun2
jun3
* VESSEL   *      1 s *                                +
* PIPE     *      2 s * SJC                            +    2004   2002
* BREAK    *      3 s * Laboratory Pressure            +    2004
* PIPE     *      4 s * Inlet                          +    2001   2003
* BREAK    *      5 s * Air Source                     +    2003
* CHAN     *      7 s * SOUTH                          +    2067   2068
* CHAN     *      9 s * CENTRAL                        +    2083   2084
* CHAN     *     10 s * NORTH                          +    2085   2086
* CHAN     *     11 s * EAST                           +    2087   2088
* CHAN     *     13 s * WEST                           +    2103   2104
* POWER    *     15 s * Decay Power                    +
* HTSTR    *     17 s * CH13to17toCH9                  +
* HTSTR    *     20 s * CH7to20toCH9                   +
* HTSTR    *     30 s * CH11to30toCH9                  +
* HTSTR    *     40 s * CH10to40toCH9                  +
* HTSTR    *     50 s * CH13to50toInsulation           +
* HTSTR    *     60 s * CH10to60toInsulation           +
* HTSTR    *     70 s * CH11to70toInsulation           +
* HTSTR    *     80 e * CH7to80toInsulation            +
*
*************
* ccfl data *
*************
*
*  cbeta*         1.0         1.0e
*
*  ccflm*         1.0        0.59e
*
*  ccflc*   2.0493902         1.0e
*
***********************
* material properties *
***********************
*
*   matb*          50 e
*  ptbln*           2 e
*  User Defined Material : 50
*
*
*  prptb         temp         rho          cp        cond        emis
*  prptb*       200.0      265.00      1800.0        0.10        0.64 s
*  prptb*      3000.0      265.00      1800.0        0.10        0.64 e
*
*
*
************************************************
* Starting Signal Variable Section of Model      *
************************************************
*
*         idsv          isvn          ilcn          icn1          icn2
            59             0             0             0             0
************************************************
* Finished Signal Variable Section of Model      *
************************************************
*
```

```
*
*
*
*******   type            num         userid                  component name
vessel                      1              0                          unnamed
*          nasx           nrsx           ntsx           ncsr         ivssbf
             31              3              3             12              0
*          idcu           idcl           idcr           icru           icrl
              0              0              0              0              0
*          icrr          ilcsp          iucsp          iuhp          iconc
              0              0              0              0              0
*         igeom          nvent          nvvtb         nsgrid      vesstype
              1              0              0              0              0
*         shelv           epsw
            0.0            0.0
*    z    *       0.0762       0.1524       0.2032       0.254s
*    z    *   0.30089231   0.34778462   0.39467692   0.44156923s
*    z    *   0.48846154   0.53535385   0.58224615   0.62913846s
*    z    *   0.67603077   0.72292308   0.76981538   0.81670769s
*    z    *       0.8636   0.91049231   0.95738462    1.0042769s
*    z    *    1.0511692    1.0980615    1.1449538    1.1918462s
*    z    *    1.2387385    1.2856308    1.3325231    1.3794154s
*    z    *    1.4263077       1.4732       1.5748e
*    x    *         0.15          0.3          0.45e
*    y    *         0.15          0.3          0.45e
*          lisrl          lisrc          lisrf          ljuns          zfrac
              1              5              2          2001
              2              2              2          2087
              2              4              2          2067
              2              5              2          2083
              2              6              2          2085
              2              8              2          2103
             29              2             -2          2088
             29              4             -2          2068
             29              5             -2          2084
             29              6             -2          2086
             29              8             -2          2104
             31              5              2          2002
* level 1
*
*  cfzlyt *          0.0          0.0          0.0          0.0s
*  cfzlyt *          0.0          0.0          0.0          0.0s
*  cfzlyt *          0.0e
*  cfzlz  *          0.0          0.0          0.0          0.0s
*  cfzlz  *          0.0          0.0          0.0          0.0s
*  cfzlz  *          0.0e
*  cfzlxr *          0.0          0.0          0.0          0.0s
*  cfzlxr *          0.0          0.0          0.0          0.0s
*  cfzlxr *          0.0e
*  cfzvyt *          0.0          0.0          0.0          0.0s
*  cfzvyt *          0.0          0.0          0.0          0.0s
*  cfzvyt *          0.0e
*  cfzvz  *          0.0          0.0          0.0          0.0s
*  cfzvz  *          0.0          0.0          0.0          0.0s
*  cfzvz  *          0.0e
*  cfzvxr *          0.0          0.0          0.0          0.0s
*  cfzvxr *          0.0          0.0          0.0          0.0s
*  cfzvxr *          0.0e
*  lccfl  *            0            0            0            0s
*  lccfl  *            0            0            0            0s
*  lccfl  *           0e
*   frvol *          1.0    0.9996336          1.0    0.9996336s
*   frvol *    0.9996336    0.9996336          1.0    0.9996336s
*   frvol *          1.0e
```

```
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0   0.0330578         1.0   0.0330578s
*  frfaz  *   0.0330578   0.0330578         1.0   0.0330578s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 2
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
```

```
*  cfzvyt *         0.0e
*  cfzvz  *         0.0          0.0          0.0          0.0s
*  cfzvz  *         0.0          0.0          0.0          0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0          0.0          0.0          0.0s
*  cfzvxr *         0.0          0.0          0.0          0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0            0            0            0s
*  lccfl  *           0            0            0            0s
*  lccfl  *           0e
*   frvol *         1.0    0.9996336          1.0    0.9996336s
*   frvol *   0.9996336    0.9996336          1.0    0.9996336s
*   frvol *         1.0e
*  frfayt *         0.0          0.0          0.0          0.0s
*  frfayt *         0.0          0.0          0.0          0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0    0.0330578          1.0    0.0330578s
*  frfaz  *   0.0330578    0.0330578          1.0    0.0330578s
*  frfaz  *         1.0e
*  frfaxr *         0.0          0.0          0.0          0.0s
*  frfaxr *         0.0          0.0          0.0          0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212      0.01212      0.01212      0.01212s
*    hdyt *     0.01212      0.01212      0.01212      0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212      0.01212      0.01212      0.01212s
*    hdz  *     0.01212      0.01212      0.01212      0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212      0.01212      0.01212      0.01212s
*    hdxr *     0.01212      0.01212      0.01212      0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0          1.0          1.0          1.0s
*   alpn  *         1.0          1.0          1.0          1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0          0.0          0.0          0.0s
*   vvnyt *         0.0          0.0          0.0          0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0          0.0          0.0          0.0s
*   vvnz  *         0.0          0.0          0.0          0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0          0.0          0.0          0.0s
*   vvnxr *         0.0          0.0          0.0          0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0          0.0          0.0          0.0s
*   vlnyt *         0.0          0.0          0.0          0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0          0.0          0.0          0.0s
*   vlnz  *         0.0          0.0          0.0          0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0          0.0          0.0          0.0s
*   vlnxr *         0.0          0.0          0.0          0.0s
*   vlnxr *         0.0e
*     tvn *       300.0        300.0        300.0        300.0s
*     tvn *       300.0        300.0        300.0        300.0s
*     tvn *       300.0e
*     tln *       300.0        300.0        300.0        300.0s
*     tln *       300.0        300.0        300.0        300.0s
*     tln *       300.0e
*      pn *   1.01325E5    1.01325E5    1.01325E5    1.01325E5s
*      pn *   1.01325E5    1.01325E5    1.01325E5    1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5    1.01325E5    1.01325E5    1.01325E5s
*     pan *   1.01325E5    1.01325E5    1.01325E5    1.01325E5s
*     pan *   1.01325E5e
```

```
* level 3
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
```

```
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 4
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
```

```
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 5
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
```

```
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 6
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
```

```
*   frvol *         1.0e
*  frfayt *         0.0          0.0          0.0          0.0s
*  frfayt *         0.0          0.0          0.0          0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0          0.3          1.0          0.3s
*  frfaz  *         0.3          0.3          1.0          0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0          0.0          0.0          0.0s
*  frfaxr *         0.0          0.0          0.0          0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212      0.01212      0.01212      0.01212s
*    hdyt *     0.01212      0.01212      0.01212      0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212      0.01212      0.01212      0.01212s
*    hdz  *     0.01212      0.01212      0.01212      0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212      0.01212      0.01212      0.01212s
*    hdxr *     0.01212      0.01212      0.01212      0.01212s
*    hdxr *     0.01212e
*   alpn  *          1.0          1.0          1.0          1.0s
*   alpn  *          1.0          1.0          1.0          1.0s
*   alpn  *          1.0e
*   vvnyt *          0.0          0.0          0.0          0.0s
*   vvnyt *          0.0          0.0          0.0          0.0s
*   vvnyt *          0.0e
*   vvnz  *          0.0          0.0          0.0          0.0s
*   vvnz  *          0.0          0.0          0.0          0.0s
*   vvnz  *          0.0e
*   vvnxr *          0.0          0.0          0.0          0.0s
*   vvnxr *          0.0          0.0          0.0          0.0s
*   vvnxr *          0.0e
*   vlnyt *          0.0          0.0          0.0          0.0s
*   vlnyt *          0.0          0.0          0.0          0.0s
*   vlnyt *          0.0e
*   vlnz  *          0.0          0.0          0.0          0.0s
*   vlnz  *          0.0          0.0          0.0          0.0s
*   vlnz  *          0.0e
*   vlnxr *          0.0          0.0          0.0          0.0s
*   vlnxr *          0.0          0.0          0.0          0.0s
*   vlnxr *          0.0e
*     tvn *        300.0        300.0        300.0        300.0s
*     tvn *        300.0        300.0        300.0        300.0s
*     tvn *        300.0e
*     tln *        300.0        300.0        300.0        300.0s
*     tln *        300.0        300.0        300.0        300.0s
*     tln *        300.0e
*      pn *    1.01325E5    1.01325E5    1.01325E5    1.01325E5s
*      pn *    1.01325E5    1.01325E5    1.01325E5    1.01325E5s
*      pn *    1.01325E5e
*     pan *    1.01325E5    1.01325E5    1.01325E5    1.01325E5s
*     pan *    1.01325E5    1.01325E5    1.01325E5    1.01325E5s
*     pan *    1.01325E5e
* level 7
*
*  cfzlyt *         0.0          0.0          0.0          0.0s
*  cfzlyt *         0.0          0.0          0.0          0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0          0.0          0.0          0.0s
*  cfzlz  *         0.0          0.0          0.0          0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0          0.0          0.0          0.0s
*  cfzlxr *         0.0          0.0          0.0          0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0          0.0          0.0          0.0s
```

```
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
```

```
*     pan *   1.01325E5e
* level 8
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
```

```
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 9
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
```

```
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 10
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
```

```
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 11
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
```

```
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 12
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
```

```
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
```

```
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 13
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
```

```
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 14
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
```

```
*   vvnyt *         0.0e
*   vvnz  *         0.0          0.0          0.0          0.0s
*   vvnz  *         0.0          0.0          0.0          0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0          0.0          0.0          0.0s
*   vvnxr *         0.0          0.0          0.0          0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0          0.0          0.0          0.0s
*   vlnyt *         0.0          0.0          0.0          0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0          0.0          0.0          0.0s
*   vlnz  *         0.0          0.0          0.0          0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0          0.0          0.0          0.0s
*   vlnxr *         0.0          0.0          0.0          0.0s
*   vlnxr *         0.0e
*     tvn *       300.0        300.0        300.0        300.0s
*     tvn *       300.0        300.0        300.0        300.0s
*     tvn *       300.0e
*     tln *       300.0        300.0        300.0        300.0s
*     tln *       300.0        300.0        300.0        300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 15
*
*  cfzlyt *         0.0          0.0          0.0          0.0s
*  cfzlyt *         0.0          0.0          0.0          0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0          0.0          0.0          0.0s
*  cfzlz  *         0.0          0.0          0.0          0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0          0.0          0.0          0.0s
*  cfzlxr *         0.0          0.0          0.0          0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0          0.0          0.0          0.0s
*  cfzvyt *         0.0          0.0          0.0          0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0          0.0          0.0          0.0s
*  cfzvz  *         0.0          0.0          0.0          0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0          0.0          0.0          0.0s
*  cfzvxr *         0.0          0.0          0.0          0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0            0            0            0s
*  lccfl  *           0            0            0            0s
*  lccfl  *           0e
*   frvol *         1.0          0.3          1.0          0.3s
*   frvol *         0.3          0.3          1.0          0.3s
*   frvol *         1.0e
*  frfayt *         0.0          0.0          0.0          0.0s
*  frfayt *         0.0          0.0          0.0          0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0          0.3          1.0          0.3s
*  frfaz  *         0.3          0.3          1.0          0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0          0.0          0.0          0.0s
*  frfaxr *         0.0          0.0          0.0          0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212      0.01212      0.01212      0.01212s
```

```
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 16
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
```

```
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 17
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
```

```
*  cfzlxr *         0.0e
*  cfzvyt *         0.0          0.0          0.0          0.0s
*  cfzvyt *         0.0          0.0          0.0          0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0          0.0          0.0          0.0s
*  cfzvz  *         0.0          0.0          0.0          0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0          0.0          0.0          0.0s
*  cfzvxr *         0.0          0.0          0.0          0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0            0            0            0s
*  lccfl  *           0            0            0            0s
*  lccfl  *           0e
*   frvol *         1.0          0.3          1.0          0.3s
*   frvol *         0.3          0.3          1.0          0.3s
*   frvol *         1.0e
*  frfayt *         0.0          0.0          0.0          0.0s
*  frfayt *         0.0          0.0          0.0          0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0          0.3          1.0          0.3s
*  frfaz  *         0.3          0.3          1.0          0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0          0.0          0.0          0.0s
*  frfaxr *         0.0          0.0          0.0          0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212      0.01212      0.01212      0.01212s
*    hdyt *     0.01212      0.01212      0.01212      0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212      0.01212      0.01212      0.01212s
*    hdz  *     0.01212      0.01212      0.01212      0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212      0.01212      0.01212      0.01212s
*    hdxr *     0.01212      0.01212      0.01212      0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0          1.0          1.0          1.0s
*   alpn  *         1.0          1.0          1.0          1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0          0.0          0.0          0.0s
*   vvnyt *         0.0          0.0          0.0          0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0          0.0          0.0          0.0s
*   vvnz  *         0.0          0.0          0.0          0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0          0.0          0.0          0.0s
*   vvnxr *         0.0          0.0          0.0          0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0          0.0          0.0          0.0s
*   vlnyt *         0.0          0.0          0.0          0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0          0.0          0.0          0.0s
*   vlnz  *         0.0          0.0          0.0          0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0          0.0          0.0          0.0s
*   vlnxr *         0.0          0.0          0.0          0.0s
*   vlnxr *         0.0e
*     tvn *       300.0        300.0        300.0        300.0s
*     tvn *       300.0        300.0        300.0        300.0s
*     tvn *       300.0e
*     tln *       300.0        300.0        300.0        300.0s
*     tln *       300.0        300.0        300.0        300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
```

```
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 18
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
```

```
*   vlnz  *         0.0e
*   vlnxr *         0.0          0.0          0.0          0.0s
*   vlnxr *         0.0          0.0          0.0          0.0s
*   vlnxr *         0.0e
*     tvn *       300.0        300.0        300.0        300.0s
*     tvn *       300.0        300.0        300.0        300.0s
*     tvn *       300.0e
*     tln *       300.0        300.0        300.0        300.0s
*     tln *       300.0        300.0        300.0        300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 19
*
*  cfzlyt *         0.0          0.0          0.0          0.0s
*  cfzlyt *         0.0          0.0          0.0          0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0          0.0          0.0          0.0s
*  cfzlz  *         0.0          0.0          0.0          0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0          0.0          0.0          0.0s
*  cfzlxr *         0.0          0.0          0.0          0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0          0.0          0.0          0.0s
*  cfzvyt *         0.0          0.0          0.0          0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0          0.0          0.0          0.0s
*  cfzvz  *         0.0          0.0          0.0          0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0          0.0          0.0          0.0s
*  cfzvxr *         0.0          0.0          0.0          0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0            0            0            0s
*  lccfl  *           0            0            0            0s
*  lccfl  *           0e
*   frvol *         1.0          0.3          1.0          0.3s
*   frvol *         0.3          0.3          1.0          0.3s
*   frvol *         1.0e
*  frfayt *         0.0          0.0          0.0          0.0s
*  frfayt *         0.0          0.0          0.0          0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0          0.3          1.0          0.3s
*  frfaz  *         0.3          0.3          1.0          0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0          0.0          0.0          0.0s
*  frfaxr *         0.0          0.0          0.0          0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212      0.01212      0.01212      0.01212s
*    hdyt *     0.01212      0.01212      0.01212      0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212      0.01212      0.01212      0.01212s
*    hdz  *     0.01212      0.01212      0.01212      0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212      0.01212      0.01212      0.01212s
*    hdxr *     0.01212      0.01212      0.01212      0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0          1.0          1.0          1.0s
*   alpn  *         1.0          1.0          1.0          1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0          0.0          0.0          0.0s
```

```
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 20
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
```

```
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 21
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
```

```
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 22
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
```

```
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
```

```
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 23
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
```

```
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 24
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
```

```
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 25
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
```

```
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 26
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
```

```
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 27
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
```

```
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
```

```
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 28
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
```

```
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 29
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
```

```
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 30
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
```

```
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
* level 31
*
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0         0.0         0.0         0.0s
*  cfzlyt *         0.0e
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0         0.0         0.0         0.0s
*  cfzlz  *         0.0e
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0         0.0         0.0         0.0s
*  cfzlxr *         0.0e
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0         0.0         0.0         0.0s
*  cfzvyt *         0.0e
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0         0.0         0.0         0.0s
*  cfzvz  *         0.0e
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0         0.0         0.0         0.0s
*  cfzvxr *         0.0e
```

```
*  lccfl  *           0           0           0           0s
*  lccfl  *           0           0           0           0s
*  lccfl  *           0e
*   frvol *         1.0         0.3         1.0         0.3s
*   frvol *         0.3         0.3         1.0         0.3s
*   frvol *         1.0e
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0         0.0         0.0         0.0s
*  frfayt *         0.0e
*  frfaz  *         1.0         0.3         1.0         0.3s
*  frfaz  *         0.3         0.3         1.0         0.3s
*  frfaz  *         1.0e
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0         0.0         0.0         0.0s
*  frfaxr *         0.0e
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212     0.01212     0.01212     0.01212s
*    hdyt *     0.01212e
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212     0.01212     0.01212     0.01212s
*    hdz  *     0.01212e
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212     0.01212     0.01212     0.01212s
*    hdxr *     0.01212e
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0         1.0         1.0         1.0s
*   alpn  *         1.0e
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0         0.0         0.0         0.0s
*   vvnyt *         0.0e
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0         0.0         0.0         0.0s
*   vvnz  *         0.0e
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0         0.0         0.0         0.0s
*   vvnxr *         0.0e
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0         0.0         0.0         0.0s
*   vlnyt *         0.0e
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0         0.0         0.0         0.0s
*   vlnz  *         0.0e
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0         0.0         0.0         0.0s
*   vlnxr *         0.0e
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0       300.0       300.0       300.0s
*     tvn *       300.0e
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0       300.0       300.0       300.0s
*     tln *       300.0e
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*      pn *   1.01325E5e
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5   1.01325E5   1.01325E5   1.01325E5s
*     pan *   1.01325E5e
*
*
* single junction
*******   type           num        userid               component name
pipe                       2             0                         SJC
*       ncells         nodes          jun1          jun2          epsw
             0             0          2004          2002           0.0
```

```
*         ichf          iconc      pipetype          ipow        npipes
             1              0             0             0             1
*        radin            th         houtl         houtv         toutl
           0.0           0.0           0.0           0.0           0.0
*        toutv          pwin         pwoff         rpwmx         pwscl
           0.0           0.0           0.0           0.0           0.0
* dx     *    f 0.0000e+00e
* vol    *    f 0.0000e+00e
* fa     *  f   0.13165233e
* kfac   *  f          0.0e
* grav   *  f         -1.0e
* hd     *  f        10.93e
* nff    *  f           -1e
* lccfl  *  f            0e
* alp    *    f 0.0000e+00e
* vl     *  f          0.0e
* vv     *  f          0.0e
* tl     *    f 0.0000e+00e
* tv     *    f 0.0000e+00e
* p      *    f 0.0000e+00e
* pa     *    f 0.0000e+00e
*
*
*******   type           num        userid                component name
break                      3             0           Laboratory Pressure
*         jun1          ibty          isat          ioff      adjpress
          2004             0             0             1             0
*         dxin         volin         alpin          tin           pin
           0.8   0.026330466           1.0         300.0     1.01325E5
*         pain         concin          rbmx         poff          belv
     1.01325E5           0.0        1.0E20          0.0           0.0
*
*
*******   type           num        userid                component name
pipe                       4             0                         Inlet
*       ncells         nodes          jun1          jun2          epsw
             2             0          2001          2003           0.0
*       nsides
             0
*         ichf          iconc      pipetype          ipow        npipes
             1              0             0             0             1
*        radin            th         houtl         houtv         toutl
           0.0           0.0           0.0           0.0           0.0
*        toutv          pwin         pwoff         rpwmx         pwscl
           0.0           0.0           0.0           0.0           0.0
* dx     *          0.5          0.5e
* vol    *          1.5          1.5e
* fa     *       0.1745       0.1745       0.1745e
* kfac   *          1.0          1.0          1.0e
* grav   *          0.0          0.0          0.0e
* hd     *      1.95441      1.95441      1.95441e
* nff    *            1            1            1e
* lccfl  *            0            0            0e
* alp    *          1.0          1.0e
* vl     *          0.0          0.0          0.0e
* vv     *          0.0          0.0          0.0e
* tl     *        300.0        300.0e
* tv     *        300.0        300.0e
* p      *     1.0132E5     1.0132E5e
* pa     *     101320.0     101320.0e
*
*
*******   type           num        userid                component name
break                      5             0                     Air Source
```

```
*         jun1          ibty          isat          ioff      adjpress
          2003             0             0             0             0
*         dxin         volin         alpin           tin           pin
           0.5           1.5           1.0         300.0     1.01345E5
*         pain        concin          rbmx         poff          belv
     1.01345E5           0.0        1.0E20           0.0           0.0
*
*
*******   type           num        userid                component name
chan                       7             0                         SOUTH
*        ncell         nodes          jun1          jun2          epsw
            28             2          2067          2068        1.0E-5
*       nsides
             2
* Water Rod inlet junction
*         nclk         junlk        ncmpto        nclkto        nlevto
             3          3701             0             0             0
*        theta
          90.0
* Water Rod outlet junction
*         nclk         junlk        ncmpto        nclkto        nlevto
            26          3702             0             0             0
*        theta
          90.0
*         ichf         iconc        iaxcnd        liqlev         nhcom
             2             0             0             0             0
*        width            th         houtl         houtv         toutl
       0.53624       1.91E-3           0.0           0.0           0.0
*        toutv       advbwrf      quadsym      numwrods       nvfrays
           0.0             1             0             1             0
*         ngrp        nchans        nodesr          nrow          ncrz
             3             1             9             9            24
*        icrnk         icrlh         nmwrx         nfci         nfcil
             2             2             1             0             0
*         fmon       reflood         nzmax        nzmaxw         ibeam
             0             0           100           100             1
*        dznht        dznhtw        dtxht1        dtxht2
          0.01        1.0E-3           2.0          10.0
*        hgapo         pdrat          pldr        fucrac         norad
       4600.0       1.28636           0.0           1.0             0
*       emcif1        emcif2        emcif3         noani
          0.67           0.0           0.0             0
*       emcof1        emcof2        emcof3
          0.67           0.0           0.0
* dx    *       0.0508      0.0508 0.046892308 0.046892308s
* dx    *  0.046892308 0.046892308 0.046892308 0.046892308s
* dx    *  0.046892308 0.046892308 0.046892308 0.046892308s
* dx    *  0.046892308 0.046892308 0.046892308 0.046892308s
* dx    *  0.046892308 0.046892308 0.046892308 0.046892308s
* dx    *  0.046892308 0.046892308 0.046892308 0.046892308s
* dx    *  0.046892308 0.046892308 0.046892308 0.046892308e
* vol   *   6.11424E-4   7.3039E-4    1.505E-3    1.505E-3s
* vol   *     1.505E-3    1.505E-3    1.505E-3    1.505E-3s
* vol   *     1.505E-3    1.505E-3    1.505E-3    1.505E-3s
* vol   *     1.505E-3    1.505E-3    1.505E-3    1.505E-3s
* vol   *     1.505E-3  1.62626E-3  1.62626E-3  1.62626E-3s
* vol   *   1.62626E-3  1.62626E-3  1.62626E-3  1.62626E-3s
* vol   *   1.62626E-3  1.62626E-3  3.39328E-3  1.25376E-3e
* fa    *     6.567E-3  9.73983E-3  9.73983E-3  9.73983E-3s
* fa    *   9.73983E-3  9.73983E-3  9.73983E-3  9.73983E-3s
* fa    *   9.73983E-3  9.73983E-3  9.73983E-3  9.73983E-3s
* fa    *   9.73983E-3  9.73983E-3  9.73983E-3  9.73983E-3s
* fa    *   9.73983E-3 0.010524616 0.010524616 0.010524616s
* fa    *  0.010524616 0.010524616 0.010524616 0.010524616s
```

```
* fa    *  0.010524616 0.010524616 0.010524616 0.010524616s
* fa    *  0.010524616e
* kfac  *          1.0         0.0         2.0         0.0s
* kfac  *          0.0     1.21266         0.0         0.0s
* kfac  *      1.21266         0.0         0.0     1.21266s
* kfac  *          0.0         0.0     1.21266         0.0s
* kfac  *          0.0     1.21266         0.0         0.0s
* kfac  *          0.0     1.21266         0.0         0.0s
* kfac  *      1.21266         0.0         0.0         0.0s
* kfac  *          1.8e
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0e
* hd    *  0.011838791 0.011838791 0.011838791 0.011838791s
* hd    *  0.011838791 0.011838791 0.011838791 0.011838791s
* hd    *  0.011838791 0.011838791 0.011838791 0.011838791s
* hd    *  0.011838791 0.011838791 0.011838791 0.011838791s
* hd    *  0.011838791 0.013986504 0.013986504 0.013986504s
* hd    *  0.013986504 0.013986504 0.013986504 0.013986504s
* hd    *  0.013986504 0.013986504 0.013986504 0.013986504s
* hd    *  0.013986504e
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1e
* lccfl *            2           0           0           0s
* lccfl *            0           0           0           0s
* lccfl *            0           0           0           0s
* lccfl *            0           0           0           0s
* lccfl *            0           0           0           0s
* lccfl *            0           0           0           0s
* lccfl *            0           0           0           0s
* lccfl *            1e
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0e
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0e
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
```

```
* vv    *          0.0e
* tl    *         300.0       300.0       300.0       300.0s
* tl    *         300.0       300.0       300.0       300.0s
* tl    *         300.0       300.0       300.0       300.0s
* tl    *         300.0       300.0       300.0       300.0s
* tl    *         300.0       300.0       300.0       300.0s
* tl    *         300.0       300.0       300.0       300.0s
* tl    *         300.0       300.0       300.0       300.0e
* tv    *         300.0       300.0       300.0       300.0s
* tv    *         300.0       300.0       300.0       300.0s
* tv    *         300.0       300.0       300.0       300.0s
* tv    *         300.0       300.0       300.0       300.0s
* tv    *         300.0       300.0       300.0       300.0s
* tv    *         300.0       300.0       300.0       300.0s
* tv    *         300.0       300.0       300.0       300.0e
* p     *     1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *     1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *     1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *     1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *     1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *     1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *     1.01325E5   1.01325E5   1.01325E5   1.01325E5e
* pa    *      101325.0    101325.0    101325.0    101325.0s
* pa    *      101325.0    101325.0    101325.0    101325.0s
* pa    *      101325.0    101325.0    101325.0    101325.0s
* pa    *      101325.0    101325.0    101325.0    101325.0s
* pa    *      101325.0    101325.0    101325.0    101325.0s
* pa    *      101325.0    101325.0    101325.0    101325.0s
* pa    *      101325.0    101325.0    101325.0    101325.0e
*  qppp * f 0.0e
* mat   *           2 e
* tw    *        300.0       300.0       300.0       300.0       300.0s
* tw    *        300.0       300.0       300.0       300.0       300.0s
* tw    *        300.0       300.0       300.0       300.0       300.0s
* tw    *        300.0       300.0       300.0       300.0       300.0s
* tw    *        300.0       300.0       300.0       300.0       300.0s
* tw    *        300.0       300.0       300.0       300.0       300.0s
* tw    *        300.0       300.0       300.0       300.0       300.0s
* tw    *        300.0       300.0       300.0       300.0       300.0s
* tw    *        300.0       300.0       300.0       300.0       300.0s
* tw    *        300.0       300.0       300.0       300.0       300.0s
* tw    *        300.0       300.0       300.0       300.0       300.0s
* tw    *        300.0e
*  rdx  *         66.0         8.0         2.0e
* radrd *          0.0   9.4301E-4  1.88611E-3  2.82912E-3  3.77222E-3s
* radrd *  4.77523E-3  4.78791E-3  5.21494E-3    5.588E-3e
* matrd *            1           1           1           1 s
* matrd *            1           3           2           2 e
*  nfax *            3           3           3           3s
*  nfax *            3           3           3           3s
*  nfax *            3           3           3           3s
*  nfax *            3           3           3           3s
*  nfax *            3           3           3           3s
*  nfax *            3           3           3           3e
*  rftn *        300.0       300.0       300.0       300.0s
*  rftn *        300.0       300.0       300.0       300.0s
*  rftn *        300.0       300.0       300.0       300.0s
*  rftn *        300.0       300.0       300.0       300.0s
*  rftn *        300.0       300.0       300.0       300.0s
*  rftn *        300.0       300.0       300.0       300.0s
*  rftn *        300.0       300.0       300.0       300.0s
*  rftn *        300.0       300.0       300.0       300.0s
*  rftn *        300.0       300.0       300.0       300.0s
```

```
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0e
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
```

```
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0e
* rdpwr *   1.3640629   1.3640629   1.3640629   1.3640629   1.3640629s
* rdpwr *   1.3640629         0.0         0.0         0.0e
* cpowr *         1.0         1.0e
* radpw *  0.20835096  0.34725159  0.48615222   0.5903277  0.69450319s
* radpw *  0.76395351  0.83340381  0.86812897  0.88896407  0.90285413s
* radpw *  0.90285413  0.88896407  0.87507401  0.86118396  0.85423891s
* radpw *  0.83340381  0.79867867  0.72922835  0.62505286  0.55560254s
* radpw *  0.48615222  0.41670192  0.34725159  0.20835096e
* fpuo2 *         0.0         0.0e
*   ftd *        0.95        0.95e
*  gmix * f       0.0e
* pgapt *         0.0   1.01325E6e
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4e
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4e
*viewgrp0*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp0*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp0*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp0*    0.215031e
*beamlen0*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen0*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
```

```
*beamlen0*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen0*  0.02372862e
*viewgrp1*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp1*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp1*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp1*    0.215031e
*beamlen1*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen1*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen1*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen1*  0.02372862e
*viewgrp2*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp2*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp2*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp2*    0.215031e
*beamlen2*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen2*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen2*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen2*  0.02372862e
*viewgrp3*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp3*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp3*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp3*    0.215031e
*beamlen3*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen3*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen3*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen3*  0.02372862e
*viewgrp4*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp4*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp4*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp4*    0.215031e
*beamlen4*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen4*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen4*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen4*  0.02372862e
*viewgrp5*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp5*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp5*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp5*    0.215031e
*beamlen5*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen5*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen5*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen5*  0.02372862e
*viewgrp6*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp6*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp6*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp6*    0.215031e
*beamlen6*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen6*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen6*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen6*  0.02372862e
*viewgrp7*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp7*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp7*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp7*    0.215031e
*beamlen7*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen7*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen7*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen7*  0.02372862e
*viewgrp8*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp8*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp8*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp8*    0.215031e
*beamlen8*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen8*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
```

```
*beamlen8*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen8*  0.02372862e
*viewgrp9*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp9*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp9*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp9*    0.215031e
*beamlen9*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen9*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen9*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen9*  0.02372862e
*viewgrp10*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp10*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp10*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp10*    0.215031e
*beamlen10*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen10*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen10*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen10*  0.02372862e
*viewgrp11*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp11*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp11*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp11*    0.215031e
*beamlen11*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen11*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen11*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen11*  0.02372862e
*viewgrp12*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp12*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp12*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp12*    0.215031e
*beamlen12*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen12*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen12*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen12*  0.02372862e
*viewgrp13*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp13*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp13*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp13*    0.215031e
*beamlen13*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen13*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen13*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen13*  0.02372862e
*viewgrp14*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp14*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp14*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp14*    0.215031e
*beamlen14*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen14*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen14*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen14*  0.02372862e
*viewgrp15*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp15*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp15*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp15*    0.215031e
*beamlen15*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen15*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen15*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen15*  0.02372862e
*viewgrp16*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp16*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp16*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp16*  0.21455062e
*beamlen16* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen16*         0.0         0.0         0.0  0.01228735         0.0s
```

```
*beamlen16*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen16*  0.02372862e
*viewgrp17*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp17*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp17*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp17*  0.21455062e
*beamlen17* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen17*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen17*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen17*  0.02372862e
*viewgrp18*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp18*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp18*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp18*  0.21455062e
*beamlen18* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen18*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen18*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen18*  0.02372862e
*viewgrp19*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp19*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp19*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp19*  0.21455062e
*beamlen19* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen19*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen19*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen19*  0.02372862e
*viewgrp20*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp20*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp20*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp20*  0.21455062e
*beamlen20* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen20*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen20*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen20*  0.02372862e
*viewgrp21*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp21*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp21*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp21*  0.21455062e
*beamlen21* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen21*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen21*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen21*  0.02372862e
*viewgrp22*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp22*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp22*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp22*  0.21455062e
*beamlen22* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen22*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen22*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen22*  0.02372862e
*viewgrp23*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp23*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp23*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp23*  0.21455062e
*beamlen23* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen23*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen23*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen23*  0.02372862e
*levelrod*          26          18e
* wrodflg*           0           0           1e
*     water rod data sets
*
*        igeom       wrnodes
             1             4
```

```
*      wrinlet      wroutlet           dia          sidea          sideb
             3            26       0.02489            0.0            0.0
*           th       rcorner      flowarea      flwareai      flwareao
         7.6E-4           0.0   4.289506E-4   4.289506E-4   4.289506E-4
*           hd          hdri          hdro     thrmdiai     thrmdiao
        0.02337       0.02337       0.02337      0.02337   0.011838791
*     wrflossi      wrflosso      wrrlossi      wrrlosso
     0.01973449   0.019234641    0.01973449   0.019234641
*  matwr  * f              2 e
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0e
*
*
*******   type           num        userid                component name
chan                       9             0                       CENTRAL
*        ncell         nodes          jun1          jun2          epsw
            28             2          2083          2084        1.0E-5
*       nsides
             2
* Water Rod inlet junction
*         nclk         junlk        ncmpto        nclkto        nlevto
             3          4501             0             0             0
*        theta
          90.0
* Water Rod outlet junction
*         nclk         junlk        ncmpto        nclkto        nlevto
            26          4502             0             0             0
*        theta
          90.0
*         ichf         iconc        iaxcnd        liqlev         nhcom
             2             0             0             0             0
*        width            th         houtl         houtv         toutl
       0.53624       1.91E-3           0.0           0.0           0.0
*        toutv       advbwrf      quadsym      numwrods       nvfrays
           0.0             1             0             1             0
*         ngrp        nchans        nodesr          nrow          ncrz
             3             1             9             9            24
*        icrnk         icrlh         nmwrx         nfci         nfcil
             2             2             1             0             0
*         fmon       reflood         nzmax        nzmaxw         ibeam
             0             0           100           100             1
*        dznht        dznhtw        dtxht1        dtxht2
          0.01        1.0E-3           2.0          10.0
*        hgapo         pdrat          pldr        fucrac         norad
       4600.0       1.28636           0.0           1.0             0
*       emcif1        emcif2        emcif3         noani
```

```
          0.67           0.0           0.0             0
*        emcof1         emcof2        emcof3
          0.67           0.0           0.0
* dx     *        0.0508       0.0508 0.046892308 0.046892308s
* dx     *   0.046892308 0.046892308 0.046892308 0.046892308s
* dx     *   0.046892308 0.046892308 0.046892308 0.046892308s
* dx     *   0.046892308 0.046892308 0.046892308 0.046892308s
* dx     *   0.046892308 0.046892308 0.046892308 0.046892308s
* dx     *   0.046892308 0.046892308 0.046892308 0.046892308s
* dx     *   0.046892308 0.046892308 0.046892308 0.046892308e
* vol    *    6.11424E-4   7.3039E-4    1.505E-3    1.505E-3s
* vol    *     1.505E-3    1.505E-3    1.505E-3    1.505E-3s
* vol    *     1.505E-3    1.505E-3    1.505E-3    1.505E-3s
* vol    *     1.505E-3    1.505E-3    1.505E-3    1.505E-3s
* vol    *     1.505E-3  1.62626E-3  1.62626E-3  1.62626E-3s
* vol    *   1.62626E-3  1.62626E-3  1.62626E-3  1.62626E-3s
* vol    *   1.62626E-3  1.62626E-3  3.39328E-3  1.25376E-3e
* fa     *     6.567E-3  9.73983E-3  9.73983E-3  9.73983E-3s
* fa     *   9.73983E-3  9.73983E-3  9.73983E-3  9.73983E-3s
* fa     *   9.73983E-3  9.73983E-3  9.73983E-3  9.73983E-3s
* fa     *   9.73983E-3  9.73983E-3  9.73983E-3  9.73983E-3s
* fa     *   9.73983E-3 0.010524616 0.010524616 0.010524616s
* fa     *  0.010524616 0.010524616 0.010524616 0.010524616s
* fa     *  0.010524616 0.010524616 0.010524616 0.010524616s
* fa     *  0.010524616e
* kfac   *          1.0         0.0         2.0         0.0s
* kfac   *          0.0     1.21266         0.0         0.0s
* kfac   *      1.21266         0.0         0.0     1.21266s
* kfac   *          0.0         0.0     1.21266         0.0s
* kfac   *          0.0     1.21266         0.0         0.0s
* kfac   *          0.0     1.21266         0.0         0.0s
* kfac   *      1.21266         0.0         0.0         0.0s
* kfac   *          1.8e
* grav   *          1.0         1.0         1.0         1.0s
* grav   *          1.0         1.0         1.0         1.0s
* grav   *          1.0         1.0         1.0         1.0s
* grav   *          1.0         1.0         1.0         1.0s
* grav   *          1.0         1.0         1.0         1.0s
* grav   *          1.0         1.0         1.0         1.0s
* grav   *          1.0         1.0         1.0         1.0s
* grav   *          1.0e
* hd     *  0.011838791 0.011838791 0.011838791 0.011838791s
* hd     *  0.011838791 0.011838791 0.011838791 0.011838791s
* hd     *  0.011838791 0.011838791 0.011838791 0.011838791s
* hd     *  0.011838791 0.011838791 0.011838791 0.011838791s
* hd     *  0.011838791 0.013986504 0.013986504 0.013986504s
* hd     *  0.013986504 0.013986504 0.013986504 0.013986504s
* hd     *  0.013986504 0.013986504 0.013986504 0.013986504s
* hd     *  0.013986504e
* nff    *            1           1           1           1s
* nff    *            1           1           1           1s
* nff    *            1           1           1           1s
* nff    *            1           1           1           1s
* nff    *            1           1           1           1s
* nff    *            1           1           1           1s
* nff    *            1           1           1           1s
* nff    *            1e
* lccfl  *            2           0           0           0s
* lccfl  *            0           0           0           0s
* lccfl  *            0           0           0           0s
* lccfl  *            0           0           0           0s
* lccfl  *            0           0           0           0s
* lccfl  *            0           0           0           0s
* lccfl  *            0           0           0           0s
```

```
* lccfl *           1e
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0e
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0e
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0e
* tl    *        300.0       300.0       300.0       300.0s
* tl    *        300.0       300.0       300.0       300.0s
* tl    *        300.0       300.0       300.0       300.0s
* tl    *        300.0       300.0       300.0       300.0s
* tl    *        300.0       300.0       300.0       300.0s
* tl    *        300.0       300.0       300.0       300.0s
* tl    *        300.0       300.0       300.0       300.0e
* tv    *        300.0       300.0       300.0       300.0s
* tv    *        300.0       300.0       300.0       300.0s
* tv    *        300.0       300.0       300.0       300.0s
* tv    *        300.0       300.0       300.0       300.0s
* tv    *        300.0       300.0       300.0       300.0s
* tv    *        300.0       300.0       300.0       300.0s
* tv    *        300.0       300.0       300.0       300.0e
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5e
* pa    *     101325.0    101325.0    101325.0    101325.0s
* pa    *     101325.0    101325.0    101325.0    101325.0s
* pa    *     101325.0    101325.0    101325.0    101325.0s
* pa    *     101325.0    101325.0    101325.0    101325.0s
* pa    *     101325.0    101325.0    101325.0    101325.0s
* pa    *     101325.0    101325.0    101325.0    101325.0s
* pa    *     101325.0    101325.0    101325.0    101325.0e
*  qppp * f 0.0e
* mat   *             2 e
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
```

```
* tw     *       300.0       300.0       300.0       300.0       300.0s
* tw     *       300.0e
*  rdx   *        66.0         8.0         2.0e
* radrd  *         0.0   9.4301E-4  1.88611E-3  2.82912E-3  3.77222E-3s
* radrd  *  4.77523E-3  4.78791E-3  5.21494E-3    5.588E-3e
* matrd  *           1           1           1           1 s
* matrd  *           1           3           2           2 e
*  nfax  *           3           3           3           3s
*  nfax  *           3           3           3           3s
*  nfax  *           3           3           3           3s
*  nfax  *           3           3           3           3s
*  nfax  *           3           3           3           3s
*  nfax  *           3           3           3           3e
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
*  rftn  *       300.0       300.0       300.0       300.0s
```

```
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0e
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0e
* rdpwr *  1.3640629  1.3640629  1.3640629  1.3640629  1.3640629s
* rdpwr *  1.3640629        0.0        0.0        0.0e
* cpowr *        1.0        1.0e
* radpw * 0.20835096 0.34725159 0.48615222  0.5903277 0.69450319s
* radpw * 0.76395351 0.83340381 0.86812897 0.88896407 0.90285413s
* radpw * 0.90285413 0.88896407 0.87507401 0.86118396 0.85423891s
* radpw * 0.83340381 0.79867867 0.72922835 0.62505286 0.55560254s
```

```
* radpw *  0.48615222  0.41670192  0.34725159  0.20835096e
* fpuo2 *         0.0         0.0e
*   ftd *        0.95        0.95e
*  gmix * f       0.0e
* pgapt *         0.0   1.01325E6e
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4e
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4e
*viewgrp0*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp0*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp0*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp0*    0.215031e
*beamlen0*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen0*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen0*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen0*  0.02372862e
*viewgrp1*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp1*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp1*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp1*    0.215031e
*beamlen1*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen1*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen1*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen1*  0.02372862e
*viewgrp2*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp2*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp2*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp2*    0.215031e
*beamlen2*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen2*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen2*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen2*  0.02372862e
*viewgrp3*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp3*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp3*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp3*    0.215031e
*beamlen3*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen3*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen3*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen3*  0.02372862e
*viewgrp4*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp4*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp4*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp4*    0.215031e
*beamlen4*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen4*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen4*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen4*  0.02372862e
*viewgrp5*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp5*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp5*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp5*    0.215031e
*beamlen5*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen5*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen5*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
```

```
*beamlen5*  0.02372862e
*viewgrp6*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp6*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp6*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp6*    0.215031e
*beamlen6*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen6*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen6*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen6*  0.02372862e
*viewgrp7*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp7*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp7*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp7*    0.215031e
*beamlen7*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen7*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen7*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen7*  0.02372862e
*viewgrp8*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp8*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp8*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp8*    0.215031e
*beamlen8*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen8*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen8*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen8*  0.02372862e
*viewgrp9*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp9*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp9*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp9*    0.215031e
*beamlen9*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen9*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen9*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen9*  0.02372862e
*viewgrp10*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp10*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp10*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp10*    0.215031e
*beamlen10*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen10*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen10*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen10*  0.02372862e
*viewgrp11*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp11*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp11*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp11*    0.215031e
*beamlen11*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen11*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen11*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen11*  0.02372862e
*viewgrp12*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp12*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp12*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp12*    0.215031e
*beamlen12*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen12*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen12*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen12*  0.02372862e
*viewgrp13*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp13*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp13*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp13*    0.215031e
*beamlen13*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen13*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen13*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
```

```
*beamlen13*  0.02372862e
*viewgrp14*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp14*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp14*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp14*    0.215031e
*beamlen14*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen14*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen14*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen14*  0.02372862e
*viewgrp15*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp15*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp15*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp15*    0.215031e
*beamlen15*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen15*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen15*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen15*  0.02372862e
*viewgrp16*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp16*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp16*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp16*  0.21455062e
*beamlen16* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen16*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen16*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen16*  0.02372862e
*viewgrp17*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp17*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp17*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp17*  0.21455062e
*beamlen17* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen17*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen17*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen17*  0.02372862e
*viewgrp18*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp18*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp18*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp18*  0.21455062e
*beamlen18* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen18*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen18*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen18*  0.02372862e
*viewgrp19*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp19*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp19*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp19*  0.21455062e
*beamlen19* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen19*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen19*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen19*  0.02372862e
*viewgrp20*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp20*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp20*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp20*  0.21455062e
*beamlen20* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen20*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen20*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen20*  0.02372862e
*viewgrp21*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp21*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp21*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp21*  0.21455062e
*beamlen21* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen21*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen21*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
```

```
*beamlen21*  0.02372862e
*viewgrp22*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp22*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp22*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp22*  0.21455062e
*beamlen22* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen22*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen22*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen22*  0.02372862e
*viewgrp23*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp23*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp23*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp23*  0.21455062e
*beamlen23* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen23*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen23*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen23*  0.02372862e
*levelrod*          26          18e
* wrodflg*           0           0           1e
*     water rod data sets
*
*        igeom       wrnodes
               1             4
*      wrinlet      wroutlet           dia         sidea         sideb
               3            26       0.02489           0.0           0.0
*           th       rcorner      flowarea      flwareai      flwareao
         7.6E-4           0.0   4.289506E-4   4.289506E-4   4.289506E-4
*           hd          hdri          hdro      thrmdiai      thrmdiao
        0.02337       0.02337       0.02337       0.02337   0.011838791
*     wrflossi      wrflosso      wrrlossi      wrrlosso
     0.01973449   0.019234641    0.01973449   0.019234641
*  matwr   * f             2 e
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0e
*
*
*******   type          num        userid               component name
chan                     10             0                       NORTH
*        ncell        nodes          jun1          jun2          epsw
            28            2          2085          2086        1.0E-5
*       nsides
               2
* Water Rod inlet junction
*         nclk        junlk       ncmpto       nclkto       nlevto
               3         4601            0            0            0
*        theta
```

```
          90.0
* Water Rod outlet junction
*          nclk          junlk         ncmpto         nclkto         nlevto
             26           4602              0              0              0
*         theta
          90.0
*          ichf          iconc         iaxcnd         liqlev          nhcom
             2              0              0              0              0
*         width             th          houtl          houtv          toutl
       0.53624        1.91E-3            0.0            0.0            0.0
*          toutv        advbwrf       quadsym      numwrods       nvfrays
           0.0              1              0              1              0
*          ngrp         nchans         nodesr           nrow           ncrz
             3              1              9              9             24
*         icrnk          icrlh          nmwrx           nfci          nfcil
             2              2              1              0              0
*          fmon        reflood          nzmax         nzmaxw          ibeam
             0              0            100            100              1
*         dznht         dznhtw         dtxht1         dtxht2
          0.01         1.0E-3            2.0           10.0
*         hgapo          pdrat           pldr         fucrac          norad
        4600.0        1.28636            0.0            1.0              0
*        emcif1         emcif2         emcif3          noani
          0.67            0.0            0.0              0
*        emcof1         emcof2         emcof3
          0.67            0.0            0.0
* dx     *        0.0508       0.0508 0.046892308 0.046892308s
* dx     *   0.046892308 0.046892308 0.046892308 0.046892308s
* dx     *   0.046892308 0.046892308 0.046892308 0.046892308s
* dx     *   0.046892308 0.046892308 0.046892308 0.046892308s
* dx     *   0.046892308 0.046892308 0.046892308 0.046892308s
* dx     *   0.046892308 0.046892308 0.046892308 0.046892308s
* dx     *   0.046892308 0.046892308 0.046892308 0.046892308e
* vol    *    6.11424E-4   7.3039E-4    1.505E-3    1.505E-3s
* vol    *      1.505E-3    1.505E-3    1.505E-3    1.505E-3s
* vol    *      1.505E-3    1.505E-3    1.505E-3    1.505E-3s
* vol    *      1.505E-3    1.505E-3    1.505E-3    1.505E-3s
* vol    *      1.505E-3   1.62626E-3  1.62626E-3  1.62626E-3s
* vol    *    1.62626E-3   1.62626E-3  1.62626E-3  1.62626E-3s
* vol    *    1.62626E-3   1.62626E-3  3.39328E-3  1.25376E-3e
* fa     *      6.567E-3   9.73983E-3  9.73983E-3  9.73983E-3s
* fa     *    9.73983E-3   9.73983E-3  9.73983E-3  9.73983E-3s
* fa     *    9.73983E-3   9.73983E-3  9.73983E-3  9.73983E-3s
* fa     *    9.73983E-3   9.73983E-3  9.73983E-3  9.73983E-3s
* fa     *    9.73983E-3 0.010524616 0.010524616 0.010524616s
* fa     *   0.010524616 0.010524616 0.010524616 0.010524616s
* fa     *   0.010524616 0.010524616 0.010524616 0.010524616s
* fa     *   0.010524616e
* kfac   *           1.0         0.0         2.0         0.0s
* kfac   *           0.0     1.21266         0.0         0.0s
* kfac   *       1.21266         0.0         0.0     1.21266s
* kfac   *           0.0         0.0     1.21266         0.0s
* kfac   *           0.0     1.21266         0.0         0.0s
* kfac   *           0.0     1.21266         0.0         0.0s
* kfac   *       1.21266         0.0         0.0         0.0s
* kfac   *           1.8e
* grav   *           1.0         1.0         1.0         1.0s
* grav   *           1.0         1.0         1.0         1.0s
* grav   *           1.0         1.0         1.0         1.0s
* grav   *           1.0         1.0         1.0         1.0s
* grav   *           1.0         1.0         1.0         1.0s
* grav   *           1.0         1.0         1.0         1.0s
* grav   *           1.0         1.0         1.0         1.0s
* grav   *           1.0e
```

```
* hd    *  0.011838791 0.011838791 0.011838791 0.011838791s
* hd    *  0.011838791 0.011838791 0.011838791 0.011838791s
* hd    *  0.011838791 0.011838791 0.011838791 0.011838791s
* hd    *  0.011838791 0.011838791 0.011838791 0.011838791s
* hd    *  0.011838791 0.013986504 0.013986504 0.013986504s
* hd    *  0.013986504 0.013986504 0.013986504 0.013986504s
* hd    *  0.013986504 0.013986504 0.013986504 0.013986504s
* hd    *  0.013986504e
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1e
* lccfl *            2           0           0           0s
* lccfl *            0           0           0           0s
* lccfl *            0           0           0           0s
* lccfl *            0           0           0           0s
* lccfl *            0           0           0           0s
* lccfl *            0           0           0           0s
* lccfl *            0           0           0           0s
* lccfl *            1e
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0e
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0e
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0e
* tl    *        300.0       300.0       300.0       300.0s
* tl    *        300.0       300.0       300.0       300.0s
* tl    *        300.0       300.0       300.0       300.0s
* tl    *        300.0       300.0       300.0       300.0s
* tl    *        300.0       300.0       300.0       300.0s
* tl    *        300.0       300.0       300.0       300.0s
* tl    *        300.0       300.0       300.0       300.0e
* tv    *        300.0       300.0       300.0       300.0s
* tv    *        300.0       300.0       300.0       300.0s
* tv    *        300.0       300.0       300.0       300.0s
* tv    *        300.0       300.0       300.0       300.0s
* tv    *        300.0       300.0       300.0       300.0s
* tv    *        300.0       300.0       300.0       300.0s
* tv    *        300.0       300.0       300.0       300.0e
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5s
```

```
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5e
* pa    *     101325.0    101325.0    101325.0    101325.0s
* pa    *     101325.0    101325.0    101325.0    101325.0s
* pa    *     101325.0    101325.0    101325.0    101325.0s
* pa    *     101325.0    101325.0    101325.0    101325.0s
* pa    *     101325.0    101325.0    101325.0    101325.0s
* pa    *     101325.0    101325.0    101325.0    101325.0s
* pa    *     101325.0    101325.0    101325.0    101325.0e
*  qppp * f 0.0e
* mat   *          2 e
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0e
*  rdx  *        66.0         8.0         2.0e
* radrd *         0.0   9.4301E-4  1.88611E-3  2.82912E-3  3.77222E-3s
* radrd *   4.77523E-3  4.78791E-3  5.21494E-3    5.588E-3e
* matrd *           1           1           1           1 s
* matrd *           1           3           2           2 e
*  nfax *           3           3           3           3s
*  nfax *           3           3           3           3s
*  nfax *           3           3           3           3s
*  nfax *           3           3           3           3s
*  nfax *           3           3           3           3s
*  nfax *           3           3           3           3e
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
```

```
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0e
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *        0.0         0.0         0.0         0.0s
*  rftn *        0.0         0.0         0.0         0.0s
```

```
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0e
* rdpwr *   1.3640629   1.3640629   1.3640629   1.3640629   1.3640629s
* rdpwr *   1.3640629         0.0         0.0         0.0e
* cpowr *         1.0         1.0e
* radpw *  0.20835096  0.34725159  0.48615222   0.5903277  0.69450319s
* radpw *  0.76395351  0.83340381  0.86812897  0.88896407  0.90285413s
* radpw *  0.90285413  0.88896407  0.87507401  0.86118396  0.85423891s
* radpw *  0.83340381  0.79867867  0.72922835  0.62505286  0.55560254s
* radpw *  0.48615222  0.41670192  0.34725159  0.20835096e
* fpuo2 *         0.0         0.0e
*   ftd *        0.95        0.95e
*  gmix * f       0.0e
* pgapt *         0.0   1.01325E6e
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4e
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4e
*viewgrp0*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp0*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp0*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp0*    0.215031e
*beamlen0*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen0*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen0*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen0*  0.02372862e
*viewgrp1*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp1*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp1*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp1*    0.215031e
*beamlen1*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen1*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen1*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen1*  0.02372862e
*viewgrp2*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp2*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp2*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp2*    0.215031e
*beamlen2*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen2*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen2*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen2*  0.02372862e
```

```
*viewgrp3*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp3*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp3*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp3*    0.215031e
*beamlen3*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen3*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen3*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen3*  0.02372862e
*viewgrp4*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp4*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp4*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp4*    0.215031e
*beamlen4*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen4*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen4*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen4*  0.02372862e
*viewgrp5*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp5*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp5*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp5*    0.215031e
*beamlen5*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen5*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen5*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen5*  0.02372862e
*viewgrp6*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp6*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp6*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp6*    0.215031e
*beamlen6*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen6*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen6*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen6*  0.02372862e
*viewgrp7*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp7*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp7*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp7*    0.215031e
*beamlen7*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen7*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen7*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen7*  0.02372862e
*viewgrp8*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp8*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp8*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp8*    0.215031e
*beamlen8*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen8*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen8*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen8*  0.02372862e
*viewgrp9*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp9*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp9*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp9*    0.215031e
*beamlen9*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen9*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen9*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen9*  0.02372862e
*viewgrp10*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp10*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp10*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp10*    0.215031e
*beamlen10*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen10*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen10*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen10*  0.02372862e
```

```
*viewgrp11*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp11*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp11*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp11*    0.215031e
*beamlen11*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen11*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen11*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen11*  0.02372862e
*viewgrp12*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp12*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp12*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp12*    0.215031e
*beamlen12*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen12*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen12*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen12*  0.02372862e
*viewgrp13*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp13*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp13*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp13*    0.215031e
*beamlen13*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen13*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen13*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen13*  0.02372862e
*viewgrp14*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp14*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp14*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp14*    0.215031e
*beamlen14*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen14*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen14*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen14*  0.02372862e
*viewgrp15*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp15*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp15*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp15*    0.215031e
*beamlen15*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen15*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen15*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen15*  0.02372862e
*viewgrp16*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp16*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp16*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp16*  0.21455062e
*beamlen16* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen16*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen16*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen16*  0.02372862e
*viewgrp17*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp17*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp17*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp17*  0.21455062e
*beamlen17* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen17*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen17*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen17*  0.02372862e
*viewgrp18*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp18*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp18*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp18*  0.21455062e
*beamlen18* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen18*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen18*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen18*  0.02372862e
```

```
*viewgrp19*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp19*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp19*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp19*  0.21455062e
*beamlen19* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen19*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen19*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen19*  0.02372862e
*viewgrp20*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp20*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp20*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp20*  0.21455062e
*beamlen20* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen20*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen20*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen20*  0.02372862e
*viewgrp21*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp21*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp21*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp21*  0.21455062e
*beamlen21* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen21*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen21*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen21*  0.02372862e
*viewgrp22*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp22*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp22*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp22*  0.21455062e
*beamlen22* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen22*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen22*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen22*  0.02372862e
*viewgrp23*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp23*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp23*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp23*  0.21455062e
*beamlen23* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen23*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen23*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen23*  0.02372862e
*levelrod*          26          18e
* wrodflg*           0           0           1e
*     water rod data sets
*
*        igeom       wrnodes
             1             4
*      wrinlet      wroutlet           dia         sidea         sideb
             3            26       0.02489           0.0           0.0
*           th       rcorner      flowarea      flwareai      flwareao
         7.6E-4           0.0   4.289506E-4   4.289506E-4   4.289506E-4
*           hd          hdri          hdro      thrmdiai      thrmdiao
        0.02337       0.02337       0.02337       0.02337   0.011838791
*     wrflossi      wrflosso      wrrlossi      wrrlosso
     0.01973449   0.019234641    0.01973449   0.019234641
*  matwr  * f              2 e
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
```

```
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0e
*
*
*******   type           num        userid                component name
chan                      11             0                          EAST
*        ncell         nodes          jun1          jun2          epsw
            28             2          2087          2088        1.0E-5
*       nsides
             2
* Water Rod inlet junction
*         nclk         junlk        ncmpto        nclkto        nlevto
             3          4701             0             0             0
*        theta
            90.0
* Water Rod outlet junction
*         nclk         junlk        ncmpto        nclkto        nlevto
            26          4702             0             0             0
*        theta
            90.0
*         ichf         iconc        iaxcnd        liqlev         nhcom
             2             0             0             0             0
*        width            th         houtl         houtv         toutl
       0.53624       1.91E-3           0.0           0.0           0.0
*        toutv       advbwrf      quadsym     numwrods      nvfrays
           0.0             1             0             1             0
*         ngrp        nchans        nodesr          nrow          ncrz
             3             1             9             9            24
*        icrnk         icrlh         nmwrx          nfci         nfcil
             2             2             1             0             0
*         fmon       reflood         nzmax        nzmaxw         ibeam
             0             0           100           100             1
*        dznht        dznhtw        dtxht1        dtxht2
            0.01        1.0E-3           2.0          10.0
*        hgapo         pdrat         pldr        fucrac         norad
       4600.0       1.28636           0.0           1.0             0
*       emcif1        emcif2        emcif3         noani
            0.67          0.0           0.0             0
*       emcof1        emcof2        emcof3
            0.67          0.0           0.0
* dx    *         0.0508      0.0508 0.046892308 0.046892308s
* dx    *  0.046892308 0.046892308 0.046892308 0.046892308s
* dx    *  0.046892308 0.046892308 0.046892308 0.046892308s
* dx    *  0.046892308 0.046892308 0.046892308 0.046892308s
* dx    *  0.046892308 0.046892308 0.046892308 0.046892308s
* dx    *  0.046892308 0.046892308 0.046892308 0.046892308s
* dx    *  0.046892308 0.046892308 0.046892308 0.046892308e
* vol   *   6.11424E-4   7.3039E-4    1.505E-3    1.505E-3s
* vol   *     1.505E-3    1.505E-3    1.505E-3    1.505E-3s
* vol   *     1.505E-3    1.505E-3    1.505E-3    1.505E-3s
* vol   *     1.505E-3    1.505E-3    1.505E-3    1.505E-3s
* vol   *     1.505E-3  1.62626E-3  1.62626E-3  1.62626E-3s
* vol   *   1.62626E-3  1.62626E-3  1.62626E-3  1.62626E-3s
* vol   *   1.62626E-3  1.62626E-3  3.39328E-3  1.25376E-3e
* fa    *     6.567E-3  9.73983E-3  9.73983E-3  9.73983E-3s
```

```
* fa    *   9.73983E-3  9.73983E-3  9.73983E-3  9.73983E-3s
* fa    *   9.73983E-3  9.73983E-3  9.73983E-3  9.73983E-3s
* fa    *   9.73983E-3  9.73983E-3  9.73983E-3  9.73983E-3s
* fa    *   9.73983E-3 0.010524616 0.010524616 0.010524616s
* fa    *  0.010524616 0.010524616 0.010524616 0.010524616s
* fa    *  0.010524616 0.010524616 0.010524616 0.010524616s
* fa    *  0.010524616e
* kfac  *          1.0         0.0         2.0         0.0s
* kfac  *          0.0     1.21266         0.0         0.0s
* kfac  *      1.21266         0.0         0.0     1.21266s
* kfac  *          0.0         0.0     1.21266         0.0s
* kfac  *          0.0     1.21266         0.0         0.0s
* kfac  *          0.0     1.21266         0.0         0.0s
* kfac  *      1.21266         0.0         0.0         0.0s
* kfac  *          1.8e
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0e
* hd    *  0.011838791 0.011838791 0.011838791 0.011838791s
* hd    *  0.011838791 0.011838791 0.011838791 0.011838791s
* hd    *  0.011838791 0.011838791 0.011838791 0.011838791s
* hd    *  0.011838791 0.011838791 0.011838791 0.011838791s
* hd    *  0.011838791 0.013986504 0.013986504 0.013986504s
* hd    *  0.013986504 0.013986504 0.013986504 0.013986504s
* hd    *  0.013986504 0.013986504 0.013986504 0.013986504s
* hd    *  0.013986504e
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1e
* lccfl *            2           0           0           0s
* lccfl *            0           0           0           0s
* lccfl *            0           0           0           0s
* lccfl *            0           0           0           0s
* lccfl *            0           0           0           0s
* lccfl *            0           0           0           0s
* lccfl *            0           0           0           0s
* lccfl *            1e
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0s
* alp   *          1.0         1.0         1.0         1.0e
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0e
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
```

```
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0e
* tl    *        300.0       300.0       300.0       300.0s
* tl    *        300.0       300.0       300.0       300.0s
* tl    *        300.0       300.0       300.0       300.0s
* tl    *        300.0       300.0       300.0       300.0s
* tl    *        300.0       300.0       300.0       300.0s
* tl    *        300.0       300.0       300.0       300.0s
* tl    *        300.0       300.0       300.0       300.0e
* tv    *        300.0       300.0       300.0       300.0s
* tv    *        300.0       300.0       300.0       300.0s
* tv    *        300.0       300.0       300.0       300.0s
* tv    *        300.0       300.0       300.0       300.0s
* tv    *        300.0       300.0       300.0       300.0s
* tv    *        300.0       300.0       300.0       300.0s
* tv    *        300.0       300.0       300.0       300.0e
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5s
* p     *    1.01325E5   1.01325E5   1.01325E5   1.01325E5e
* pa    *     101325.0    101325.0    101325.0    101325.0s
* pa    *     101325.0    101325.0    101325.0    101325.0s
* pa    *     101325.0    101325.0    101325.0    101325.0s
* pa    *     101325.0    101325.0    101325.0    101325.0s
* pa    *     101325.0    101325.0    101325.0    101325.0s
* pa    *     101325.0    101325.0    101325.0    101325.0s
* pa    *     101325.0    101325.0    101325.0    101325.0e
*  qppp * f 0.0e
* mat   *           2 e
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0e
*  rdx  *        66.0         8.0         2.0e
* radrd *         0.0   9.4301E-4  1.88611E-3  2.82912E-3  3.77222E-3s
* radrd *  4.77523E-3  4.78791E-3  5.21494E-3    5.588E-3e
* matrd *           1           1           1           1 s
* matrd *           1           3           2           2 e
*  nfax *           3           3           3           3s
*  nfax *           3           3           3           3s
*  nfax *           3           3           3           3s
*  nfax *           3           3           3           3s
*  nfax *           3           3           3           3s
*  nfax *           3           3           3           3e
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
```

```
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0e
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
```

```
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0e
* rdpwr *   1.3640629   1.3640629   1.3640629   1.3640629   1.3640629s
* rdpwr *   1.3640629         0.0         0.0         0.0e
* cpowr *         1.0         1.0e
* radpw *  0.20835096  0.34725159  0.48615222   0.5903277  0.69450319s
* radpw *  0.76395351  0.83340381  0.86812897  0.88896407  0.90285413s
* radpw *  0.90285413  0.88896407  0.87507401  0.86118396  0.85423891s
* radpw *  0.83340381  0.79867867  0.72922835  0.62505286  0.55560254s
* radpw *  0.48615222  0.41670192  0.34725159  0.20835096e
* fpuo2 *         0.0         0.0e
*   ftd *        0.95        0.95e
*  gmix * f       0.0e
* pgapt *         0.0   1.01325E6e
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4e
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4e
*viewgrp0*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
```

```
*viewgrp0*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp0*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp0*    0.215031e
*beamlen0*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen0*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen0*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen0*  0.02372862e
*viewgrp1*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp1*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp1*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp1*    0.215031e
*beamlen1*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen1*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen1*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen1*  0.02372862e
*viewgrp2*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp2*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp2*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp2*    0.215031e
*beamlen2*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen2*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen2*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen2*  0.02372862e
*viewgrp3*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp3*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp3*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp3*    0.215031e
*beamlen3*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen3*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen3*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen3*  0.02372862e
*viewgrp4*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp4*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp4*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp4*    0.215031e
*beamlen4*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen4*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen4*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen4*  0.02372862e
*viewgrp5*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp5*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp5*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp5*    0.215031e
*beamlen5*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen5*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen5*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen5*  0.02372862e
*viewgrp6*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp6*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp6*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp6*    0.215031e
*beamlen6*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen6*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen6*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen6*  0.02372862e
*viewgrp7*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp7*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp7*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp7*    0.215031e
*beamlen7*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen7*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen7*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen7*  0.02372862e
*viewgrp8*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
```

```
*viewgrp8*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp8*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp8*    0.215031e
*beamlen8*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen8*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen8*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen8*  0.02372862e
*viewgrp9*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp9*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp9*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp9*    0.215031e
*beamlen9*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen9*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen9*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen9*  0.02372862e
*viewgrp10*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp10*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp10*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp10*    0.215031e
*beamlen10*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen10*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen10*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen10*  0.02372862e
*viewgrp11*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp11*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp11*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp11*    0.215031e
*beamlen11*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen11*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen11*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen11*  0.02372862e
*viewgrp12*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp12*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp12*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp12*    0.215031e
*beamlen12*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen12*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen12*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen12*  0.02372862e
*viewgrp13*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp13*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp13*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp13*    0.215031e
*beamlen13*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen13*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen13*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen13*  0.02372862e
*viewgrp14*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp14*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp14*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp14*    0.215031e
*beamlen14*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen14*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen14*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen14*  0.02372862e
*viewgrp15*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp15*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp15*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp15*    0.215031e
*beamlen15*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen15*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen15*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen15*  0.02372862e
*viewgrp16*  0.79111363         0.0 0.028126575   0.1807598         0.0s
```

```
*viewgrp16*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp16*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp16*  0.21455062e
*beamlen16* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen16*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen16*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen16*  0.02372862e
*viewgrp17*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp17*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp17*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp17*  0.21455062e
*beamlen17* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen17*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen17*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen17*  0.02372862e
*viewgrp18*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp18*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp18*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp18*  0.21455062e
*beamlen18* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen18*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen18*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen18*  0.02372862e
*viewgrp19*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp19*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp19*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp19*  0.21455062e
*beamlen19* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen19*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen19*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen19*  0.02372862e
*viewgrp20*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp20*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp20*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp20*  0.21455062e
*beamlen20* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen20*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen20*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen20*  0.02372862e
*viewgrp21*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp21*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp21*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp21*  0.21455062e
*beamlen21* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen21*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen21*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen21*  0.02372862e
*viewgrp22*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp22*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp22*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp22*  0.21455062e
*beamlen22* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen22*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen22*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen22*  0.02372862e
*viewgrp23*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp23*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp23*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp23*  0.21455062e
*beamlen23* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen23*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen23*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen23*  0.02372862e
*levelrod*          26          18e
```

```
* wrodflg*           0           0           1e
*     water rod data sets
*
*        igeom       wrnodes
               1             4
*      wrinlet      wroutlet           dia          sidea          sideb
               3            26       0.02489            0.0            0.0
*           th       rcorner      flowarea      flwareai      flwareao
         7.6E-4           0.0   4.289506E-4   4.289506E-4   4.289506E-4
*           hd          hdri          hdro     thrmdiai     thrmdiao
        0.02337       0.02337       0.02337       0.02337   0.011838791
*     wrflossi      wrflosso      wrrlossi      wrrlosso
     0.01973449   0.019234641    0.01973449   0.019234641
*  matwr   * f              2 e
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0       300.0       300.0       300.0       300.0s
*    tw    *       300.0e
*
*
*******   type           num        userid                component name
chan                      13             0                          WEST
*        ncell         nodes          jun1          jun2          epsw
            28             2          2103          2104        1.0E-5
*       nsides
               2
* Water Rod inlet junction
*         nclk         junlk        ncmpto        nclkto        nlevto
               3          5501             0             0             0
*        theta
            90.0
* Water Rod outlet junction
*         nclk         junlk        ncmpto        nclkto        nlevto
              26          5502             0             0             0
*        theta
            90.0
*         ichf         iconc        iaxcnd        liqlev         nhcom
               2             0             0             0             0
*        width            th         houtl         houtv         toutl
         0.53624       1.91E-3           0.0           0.0           0.0
*        toutv       advbwrf      quadsym     numwrods      nvfrays
             0.0             1             0             1             0
*         ngrp        nchans        nodesr          nrow          ncrz
               3             1             9             9            24
*        icrnk         icrlh         nmwrx          nfci         nfcil
               2             2             1             0             0
*         fmon       reflood         nzmax        nzmaxw         ibeam
               0             0           100           100             1
```

```
*        dznht        dznhtw        dtxht1        dtxht2
          0.01        1.0E-3           2.0          10.0
*        hgapo         pdrat          pldr         fucrac         norad
        4600.0       1.28636           0.0           1.0             0
*       emcif1        emcif2        emcif3         noani
          0.67           0.0           0.0             0
*       emcof1        emcof2        emcof3
          0.67           0.0           0.0
* dx    *       0.0508      0.0508 0.046892308 0.046892308s
* dx    *  0.046892308 0.046892308 0.046892308 0.046892308s
* dx    *  0.046892308 0.046892308 0.046892308 0.046892308s
* dx    *  0.046892308 0.046892308 0.046892308 0.046892308s
* dx    *  0.046892308 0.046892308 0.046892308 0.046892308s
* dx    *  0.046892308 0.046892308 0.046892308 0.046892308s
* dx    *  0.046892308 0.046892308 0.046892308 0.046892308e
* vol   *   6.11424E-4   7.3039E-4    1.505E-3    1.505E-3s
* vol   *     1.505E-3    1.505E-3    1.505E-3    1.505E-3s
* vol   *     1.505E-3    1.505E-3    1.505E-3    1.505E-3s
* vol   *     1.505E-3    1.505E-3    1.505E-3    1.505E-3s
* vol   *     1.505E-3   1.62626E-3  1.62626E-3  1.62626E-3s
* vol   *   1.62626E-3   1.62626E-3  1.62626E-3  1.62626E-3s
* vol   *   1.62626E-3   1.62626E-3  3.39328E-3  1.25376E-3e
* fa    *     6.567E-3   9.73983E-3  9.73983E-3  9.73983E-3s
* fa    *   9.73983E-3   9.73983E-3  9.73983E-3  9.73983E-3s
* fa    *   9.73983E-3   9.73983E-3  9.73983E-3  9.73983E-3s
* fa    *   9.73983E-3   9.73983E-3  9.73983E-3  9.73983E-3s
* fa    *   9.73983E-3  0.010524616 0.010524616 0.010524616s
* fa    *  0.010524616 0.010524616 0.010524616 0.010524616s
* fa    *  0.010524616 0.010524616 0.010524616 0.010524616s
* fa    *  0.010524616e
* kfac  *          1.0         0.0         2.0         0.0s
* kfac  *          0.0     1.21266         0.0         0.0s
* kfac  *      1.21266         0.0         0.0     1.21266s
* kfac  *          0.0         0.0     1.21266         0.0s
* kfac  *          0.0     1.21266         0.0         0.0s
* kfac  *          0.0     1.21266         0.0         0.0s
* kfac  *      1.21266         0.0         0.0         0.0s
* kfac  *          1.8e
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0e
* hd    *  0.011838791 0.011838791 0.011838791 0.011838791s
* hd    *  0.011838791 0.011838791 0.011838791 0.011838791s
* hd    *  0.011838791 0.011838791 0.011838791 0.011838791s
* hd    *  0.011838791 0.011838791 0.011838791 0.011838791s
* hd    *  0.011838791 0.013986504 0.013986504 0.013986504s
* hd    *  0.013986504 0.013986504 0.013986504 0.013986504s
* hd    *  0.013986504 0.013986504 0.013986504 0.013986504s
* hd    *  0.013986504e
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1e
* lccfl *            2           0           0           0s
* lccfl *            0           0           0           0s
```

```
* lccfl *           0          0          0          0s
* lccfl *           0          0          0          0s
* lccfl *           0          0          0          0s
* lccfl *           0          0          0          0s
* lccfl *           0          0          0          0s
* lccfl *          1e
* alp   *         1.0        1.0        1.0        1.0s
* alp   *         1.0        1.0        1.0        1.0s
* alp   *         1.0        1.0        1.0        1.0s
* alp   *         1.0        1.0        1.0        1.0s
* alp   *         1.0        1.0        1.0        1.0s
* alp   *         1.0        1.0        1.0        1.0s
* alp   *         1.0        1.0        1.0        1.0e
* vl    *         0.0        0.0        0.0        0.0s
* vl    *         0.0        0.0        0.0        0.0s
* vl    *         0.0        0.0        0.0        0.0s
* vl    *         0.0        0.0        0.0        0.0s
* vl    *         0.0        0.0        0.0        0.0s
* vl    *         0.0        0.0        0.0        0.0s
* vl    *         0.0        0.0        0.0        0.0s
* vl    *        0.0e
* vv    *         0.0        0.0        0.0        0.0s
* vv    *         0.0        0.0        0.0        0.0s
* vv    *         0.0        0.0        0.0        0.0s
* vv    *         0.0        0.0        0.0        0.0s
* vv    *         0.0        0.0        0.0        0.0s
* vv    *         0.0        0.0        0.0        0.0s
* vv    *         0.0        0.0        0.0        0.0s
* vv    *        0.0e
* tl    *       300.0      300.0      300.0      300.0s
* tl    *       300.0      300.0      300.0      300.0s
* tl    *       300.0      300.0      300.0      300.0s
* tl    *       300.0      300.0      300.0      300.0s
* tl    *       300.0      300.0      300.0      300.0s
* tl    *       300.0      300.0      300.0      300.0s
* tl    *       300.0      300.0      300.0      300.0e
* tv    *       300.0      300.0      300.0      300.0s
* tv    *       300.0      300.0      300.0      300.0s
* tv    *       300.0      300.0      300.0      300.0s
* tv    *       300.0      300.0      300.0      300.0s
* tv    *       300.0      300.0      300.0      300.0s
* tv    *       300.0      300.0      300.0      300.0s
* tv    *       300.0      300.0      300.0      300.0e
* p     *   1.01325E5  1.01325E5  1.01325E5  1.01325E5s
* p     *   1.01325E5  1.01325E5  1.01325E5  1.01325E5s
* p     *   1.01325E5  1.01325E5  1.01325E5  1.01325E5s
* p     *   1.01325E5  1.01325E5  1.01325E5  1.01325E5s
* p     *   1.01325E5  1.01325E5  1.01325E5  1.01325E5s
* p     *   1.01325E5  1.01325E5  1.01325E5  1.01325E5s
* p     *   1.01325E5  1.01325E5  1.01325E5  1.01325E5e
* pa    *    101325.0   101325.0   101325.0   101325.0s
* pa    *    101325.0   101325.0   101325.0   101325.0s
* pa    *    101325.0   101325.0   101325.0   101325.0s
* pa    *    101325.0   101325.0   101325.0   101325.0s
* pa    *    101325.0   101325.0   101325.0   101325.0s
* pa    *    101325.0   101325.0   101325.0   101325.0s
* pa    *    101325.0   101325.0   101325.0   101325.0e
*  qppp * f 0.0e
* mat   *           2 e
* tw    *       300.0      300.0      300.0      300.0      300.0s
* tw    *       300.0      300.0      300.0      300.0      300.0s
* tw    *       300.0      300.0      300.0      300.0      300.0s
* tw    *       300.0      300.0      300.0      300.0      300.0s
* tw    *       300.0      300.0      300.0      300.0      300.0s
```

```
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0       300.0       300.0       300.0       300.0s
* tw    *       300.0e
*  rdx  *        66.0         8.0        2.0e
* radrd *         0.0  9.4301E-4  1.88611E-3  2.82912E-3  3.77222E-3s
* radrd *  4.77523E-3  4.78791E-3  5.21494E-3    5.588E-3e
* matrd *           1           1           1           1 s
* matrd *           1           3           2           2 e
*  nfax *           3           3           3           3s
*  nfax *           3           3           3           3s
*  nfax *           3           3           3           3s
*  nfax *           3           3           3           3s
*  nfax *           3           3           3           3s
*  nfax *           3           3           3           3e
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
```

```
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0e
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *      300.0      300.0      300.0      300.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0s
*  rftn *        0.0        0.0        0.0        0.0e
* rdpwr *  1.3640629  1.3640629  1.3640629  1.3640629  1.3640629s
* rdpwr *  1.3640629        0.0        0.0        0.0e
```

```
* cpowr *         1.0         1.0e
* radpw *  0.20835096  0.34725159  0.48615222   0.5903277  0.69450319s
* radpw *  0.76395351  0.83340381  0.86812897  0.88896407  0.90285413s
* radpw *  0.90285413  0.88896407  0.87507401  0.86118396  0.85423891s
* radpw *  0.83340381  0.79867867  0.72922835  0.62505286  0.55560254s
* radpw *  0.48615222  0.41670192  0.34725159  0.20835096e
* fpuo2 *         0.0         0.0e
*   ftd *        0.95        0.95e
*  gmix * f       0.0e
* pgapt *         0.0   1.01325E6e
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4e
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4s
*  burn *     4.305E4     4.305E4     4.305E4     4.305E4e
*viewgrp0*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp0*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp0*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp0*    0.215031e
*beamlen0*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen0*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen0*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen0*  0.02372862e
*viewgrp1*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp1*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp1*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp1*    0.215031e
*beamlen1*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen1*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen1*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen1*  0.02372862e
*viewgrp2*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp2*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp2*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp2*    0.215031e
*beamlen2*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen2*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen2*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen2*  0.02372862e
*viewgrp3*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp3*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp3*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp3*    0.215031e
*beamlen3*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen3*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen3*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen3*  0.02372862e
*viewgrp4*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp4*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp4*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp4*    0.215031e
*beamlen4*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen4*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen4*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen4*  0.02372862e
*viewgrp5*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp5*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
```

```
*viewgrp5*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp5*    0.215031e
*beamlen5*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen5*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen5*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen5*  0.02372862e
*viewgrp6*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp6*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp6*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp6*    0.215031e
*beamlen6*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen6*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen6*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen6*  0.02372862e
*viewgrp7*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp7*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp7*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp7*    0.215031e
*beamlen7*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen7*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen7*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen7*  0.02372862e
*viewgrp8*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp8*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp8*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp8*    0.215031e
*beamlen8*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen8*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen8*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen8*  0.02372862e
*viewgrp9*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp9*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp9*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp9*    0.215031e
*beamlen9*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen9*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen9*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen9*  0.02372862e
*viewgrp10*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp10*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp10*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp10*    0.215031e
*beamlen10*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen10*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen10*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen10*  0.02372862e
*viewgrp11*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp11*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp11*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp11*    0.215031e
*beamlen11*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen11*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen11*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen11*  0.02372862e
*viewgrp12*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp12*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp12*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp12*    0.215031e
*beamlen12*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen12*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen12*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen12*  0.02372862e
*viewgrp13*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp13*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
```

```
*viewgrp13*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp13*    0.215031e
*beamlen13*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen13*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen13*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen13*  0.02372862e
*viewgrp14*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp14*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp14*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp14*    0.215031e
*beamlen14*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen14*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen14*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen14*  0.02372862e
*viewgrp15*  0.73942064 0.057132602 0.027652657   0.1757941  0.47134397s
*viewgrp15*  0.48309326  4.50354E-3 0.041059233  0.40974372  8.08864E-3s
*viewgrp15*  0.56916678 0.013000855  0.75967054 0.021506903  3.79156E-3s
*viewgrp15*    0.215031e
*beamlen15*  9.40925E-3  9.24929E-3 0.011855135  9.20527E-3  9.24929E-3s
*beamlen15*         0.0 0.022811248 0.022701727 0.011855135 0.022811248s
*beamlen15*  9.27311E-3  0.05416928  9.20527E-3 0.022701727  0.05416928s
*beamlen15*  0.02372862e
*viewgrp16*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp16*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp16*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp16*  0.21455062e
*beamlen16* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen16*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen16*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen16*  0.02372862e
*viewgrp17*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp17*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp17*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp17*  0.21455062e
*beamlen17* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen17*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen17*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen17*  0.02372862e
*viewgrp18*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp18*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp18*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp18*  0.21455062e
*beamlen18* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen18*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen18*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen18*  0.02372862e
*viewgrp19*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp19*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp19*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp19*  0.21455062e
*beamlen19* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen19*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen19*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen19*  0.02372862e
*viewgrp20*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp20*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp20*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp20*  0.21455062e
*beamlen20* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen20*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen20*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen20*  0.02372862e
*viewgrp21*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp21*         1.0         0.0         0.0  0.41676601         0.0s
```

```
*viewgrp21*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp21*  0.21455062e
*beamlen21* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen21*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen21*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen21*  0.02372862e
*viewgrp22*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp22*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp22*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp22*  0.21455062e
*beamlen22* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen22*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen22*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen22*  0.02372862e
*viewgrp23*  0.79111363         0.0 0.028126575   0.1807598         0.0s
*viewgrp23*         1.0         0.0         0.0  0.41676601         0.0s
*viewgrp23*  0.56842034 0.014813659  0.78112913         0.0  4.32024E-3s
*viewgrp23*  0.21455062e
*beamlen23* 0.011892605         0.0  0.01228735  9.69866E-3         0.0s
*beamlen23*         0.0         0.0         0.0  0.01228735         0.0s
*beamlen23*  9.27311E-3  0.05416928  9.69866E-3         0.0  0.05416928s
*beamlen23*  0.02372862e
*levelrod*          26          18e
* wrodflg*           0           0           1e
*     water rod data sets
*
*        igeom       wrnodes
            1             4
*      wrinlet      wroutlet           dia         sidea         sideb
            3            26       0.02489           0.0           0.0
*           th       rcorner      flowarea      flwareai      flwareao
       7.6E-4           0.0   4.289506E-4   4.289506E-4   4.289506E-4
*           hd          hdri          hdro      thrmdiai      thrmdiao
      0.02337       0.02337       0.02337       0.02337   0.011838791
*     wrflossi      wrflosso      wrrlossi      wrrlosso
   0.01973449   0.019234641    0.01973449   0.019234641
*  matwr  * f              2 e
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0       300.0       300.0       300.0       300.0s
*    tw   *       300.0e
*
*
********************************************
* Starting Heat Structure Section of Model *
********************************************
*
*******   type           num        userid                component name
```

```
htstr                    17            1                  CH13to17toCH9
*       nzhstr          ittc         hscyl          ichf
             28             0             0             1
*    nofuelrod         plane        liqlev        iaxcnd         pdrat
              1             3             0             0          1.00
*        nmwrx          nfci         nfcil          hdri          hdro
              0             0             0           0.0           0.0
*        width
           0.15
*         nhot         nodes          fmon         nzmax       reflood
              0             5             0           212             0
*     dtxht(1)      dtxht(2)         dznht         hgapo
            0.0           0.0       1.0E-3        6300.0
*
*  idbcin *           2           2           2           2s
*  idbcin *           2           2           2           2s
*  idbcin *           2           2           2           2s
*  idbcin *           2           2           2           2s
*  idbcin *           2           2           2           2s
*  idbcin *           2           2           2           2s
*  idbcin *           2           2           2           2e
*  idbcon *           2           2           2           2s
*  idbcon *           2           2           2           2s
*  idbcon *           2           2           2           2s
*  idbcon *           2           2           2           2s
*  idbcon *           2           2           2           2s
*  idbcon *           2           2           2           2s
*  idbcon *           2           2           2           2e
* hcomon1 *           1           2           2           3e
* hcomon1 *           1           2           2           4e
* hcomon1 *           1           2           2           5e
* hcomon1 *           1           2           2           6e
* hcomon1 *           1           2           2           7e
* hcomon1 *           1           2           2           8e
* hcomon1 *           1           2           2           9e
* hcomon1 *           1           2           2          10e
* hcomon1 *           1           2           2          11e
* hcomon1 *           1           2           2          12e
* hcomon1 *           1           2           2          13e
* hcomon1 *           1           2           2          14e
* hcomon1 *           1           2           2          15e
* hcomon1 *           1           2           2          16e
* hcomon1 *           1           2           2          17e
* hcomon1 *           1           2           2          18e
* hcomon1 *           1           2           2          19e
* hcomon1 *           1           2           2          21e
* hcomon1 *           1           2           2          22e
* hcomon1 *           1           2           2          23e
* hcomon1 *           1           2           2          24e
* hcomon1 *           1           2           2          25e
* hcomon1 *           1           2           2          26e
* hcomon1 *           1           2           2          27e
* hcomon1 *           1           2           2          28e
* hcomon1 *           1           2           2          29e
* hcomon1 *           1           2           2          30e
* hcomon1 *           1           2           2          31e
* hcomon2 *           1           1           2           3e
* hcomon2 *           1           1           2           4e
* hcomon2 *           1           1           2           5e
* hcomon2 *           1           1           2           6e
* hcomon2 *           1           1           2           7e
* hcomon2 *           1           1           2           8e
* hcomon2 *           1           1           2           9e
* hcomon2 *           1           1           2          10e
```

```
* hcomon2 *          1          1          2          11e
* hcomon2 *          1          1          2          12e
* hcomon2 *          1          1          2          13e
* hcomon2 *          1          1          2          14e
* hcomon2 *          1          1          2          15e
* hcomon2 *          1          1          2          16e
* hcomon2 *          1          1          2          17e
* hcomon2 *          1          1          2          18e
* hcomon2 *          1          1          2          19e
* hcomon2 *          1          1          2          21e
* hcomon2 *          1          1          2          22e
* hcomon2 *          1          1          2          23e
* hcomon2 *          1          1          2          24e
* hcomon2 *          1          1          2          25e
* hcomon2 *          1          1          2          26e
* hcomon2 *          1          1          2          27e
* hcomon2 *          1          1          2          28e
* hcomon2 *          1          1          2          29e
* hcomon2 *          1          1          2          30e
* hcomon2 *          1          1          2          31e
* dhtstrz *     0.0508     0.0508 0.046892308 0.046892308s
* dhtstrz * 0.046892308 0.046892308 0.046892308 0.046892308s
* dhtstrz * 0.046892308 0.046892308 0.046892308 0.046892308s
* dhtstrz * 0.046892308 0.046892308 0.046892308 0.046892308s
* dhtstrz * 0.046892308 0.046892308 0.046892308 0.046892308s
* dhtstrz * 0.046892308 0.046892308 0.046892308 0.046892308s
* dhtstrz * 0.046892308 0.046892308 0.046892308 0.046892308e
*   rdx   *        1.0e
*  radrd  *        0.0      4.5E-3      9.0E-3      0.0135        0.018e
*  matrd  *         50         50         50          50 e
*    nfax *          1          1          1           1s
*    nfax *          1          1          1           1s
*    nfax *          1          1          1           1s
*    nfax *          1          1          1           1s
*    nfax *          1          1          1           1s
*    nfax *          1          1          1           1s
*    nfax *          1          1          1           1e
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
*    rftn *      300.0      300.0      300.0       300.0s
```

```
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0e
*
*******   type           num        userid                component name
htstr                     20             1                   CH7to20toCH9
*       nzhstr          ittc         hscyl          ichf
             28             0             0             1
*    nofuelrod         plane        liqlev       iaxcnd         pdrat
              1             3             0             0          1.00
*        nmwrx          nfci         nfcil         hdri          hdro
              0             0             0          0.0           0.0
*        width
           0.15
*         nhot         nodes          fmon         nzmax       reflood
              0             5             0           212             0
*     dtxht(1)      dtxht(2)         dznht         hgapo
            0.0           0.0       1.0E-3       6300.0
*
*  idbcin *           2           2           2           2s
*  idbcin *           2           2           2           2s
*  idbcin *           2           2           2           2s
*  idbcin *           2           2           2           2s
*  idbcin *           2           2           2           2s
*  idbcin *           2           2           2           2s
*  idbcin *           2           2           2           2e
*  idbcon *           2           2           2           2s
*  idbcon *           2           2           2           2s
*  idbcon *           2           2           2           2s
*  idbcon *           2           2           2           2s
*  idbcon *           2           2           2           2s
*  idbcon *           2           2           2           2s
*  idbcon *           2           2           2           2e
* hcomon1 *           1           2           2           3e
* hcomon1 *           1           2           2           4e
* hcomon1 *           1           2           2           5e
* hcomon1 *           1           2           2           6e
* hcomon1 *           1           2           2           7e
* hcomon1 *           1           2           2           8e
* hcomon1 *           1           2           2           9e
* hcomon1 *           1           2           2          10e
* hcomon1 *           1           2           2          11e
* hcomon1 *           1           2           2          12e
* hcomon1 *           1           2           2          13e
* hcomon1 *           1           2           2          14e
* hcomon1 *           1           2           2          15e
* hcomon1 *           1           2           2          16e
* hcomon1 *           1           2           2          17e
* hcomon1 *           1           2           2          18e
* hcomon1 *           1           2           2          19e
* hcomon1 *           1           2           2          21e
* hcomon1 *           1           2           2          22e
* hcomon1 *           1           2           2          23e
* hcomon1 *           1           2           2          24e
* hcomon1 *           1           2           2          25e
* hcomon1 *           1           2           2          26e
* hcomon1 *           1           2           2          27e
* hcomon1 *           1           2           2          28e
* hcomon1 *           1           2           2          29e
```

```
* hcomon1 *           1           2           2          30e
* hcomon1 *           1           2           2          31e
* hcomon2 *           1           2           1           3e
* hcomon2 *           1           2           1           4e
* hcomon2 *           1           2           1           5e
* hcomon2 *           1           2           1           6e
* hcomon2 *           1           2           1           7e
* hcomon2 *           1           2           1           8e
* hcomon2 *           1           2           1           9e
* hcomon2 *           1           2           1          10e
* hcomon2 *           1           2           1          11e
* hcomon2 *           1           2           1          12e
* hcomon2 *           1           2           1          13e
* hcomon2 *           1           2           1          14e
* hcomon2 *           1           2           1          15e
* hcomon2 *           1           2           1          16e
* hcomon2 *           1           2           1          17e
* hcomon2 *           1           2           1          18e
* hcomon2 *           1           2           1          19e
* hcomon2 *           1           2           1          21e
* hcomon2 *           1           2           1          22e
* hcomon2 *           1           2           1          23e
* hcomon2 *           1           2           1          24e
* hcomon2 *           1           2           1          25e
* hcomon2 *           1           2           1          26e
* hcomon2 *           1           2           1          27e
* hcomon2 *           1           2           1          28e
* hcomon2 *           1           2           1          29e
* hcomon2 *           1           2           1          30e
* hcomon2 *           1           2           1          31e
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714e
*   rdx   *          1.0e
*  radrd  *         0.0      7.6E-6     1.52E-5     2.28E-5     3.04E-5e
*  matrd  *          50          50          50          50 e
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1e
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
```

```
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0e
*
*******   type           num        userid                component name
htstr                     30             1                  CH11to30toCH9
*       nzhstr         ittc         hscyl         ichf
             28            0             0            1
*    nofuelrod        plane        liqlev       iaxcnd         pdrat
              1            3             0            0          1.00
*        nmwrx         nfci         nfcil         hdri         hdro
              0            0             0          0.0          0.0
*        width
           0.25
*         nhot        nodes          fmon        nzmax       reflood
              0            5             0          212             0
*     dtxht(1)     dtxht(2)         dznht        hgapo
            0.0          0.0        1.0E-3       6300.0
*
*  idbcin *          2          2          2          2s
*  idbcin *          2          2          2          2s
*  idbcin *          2          2          2          2s
*  idbcin *          2          2          2          2s
*  idbcin *          2          2          2          2s
*  idbcin *          2          2          2          2s
*  idbcin *          2          2          2          2e
*  idbcon *          2          2          2          2s
*  idbcon *          2          2          2          2s
*  idbcon *          2          2          2          2s
*  idbcon *          2          2          2          2s
*  idbcon *          2          2          2          2s
*  idbcon *          2          2          2          2s
*  idbcon *          2          2          2          2e
* hcomon1 *          1          2          2          3e
* hcomon1 *          1          2          2          4e
* hcomon1 *          1          2          2          5e
* hcomon1 *          1          2          2          6e
* hcomon1 *          1          2          2          7e
* hcomon1 *          1          2          2          8e
* hcomon1 *          1          2          2          9e
* hcomon1 *          1          2          2         10e
* hcomon1 *          1          2          2         11e
* hcomon1 *          1          2          2         12e
* hcomon1 *          1          2          2         13e
* hcomon1 *          1          2          2         14e
* hcomon1 *          1          2          2         15e
* hcomon1 *          1          2          2         16e
* hcomon1 *          1          2          2         17e
* hcomon1 *          1          2          2         18e
```

```
* hcomon1 *           1           2           2          19e
* hcomon1 *           1           2           2          21e
* hcomon1 *           1           2           2          22e
* hcomon1 *           1           2           2          23e
* hcomon1 *           1           2           2          24e
* hcomon1 *           1           2           2          25e
* hcomon1 *           1           2           2          26e
* hcomon1 *           1           2           2          27e
* hcomon1 *           1           2           2          28e
* hcomon1 *           1           2           2          29e
* hcomon1 *           1           2           2          30e
* hcomon1 *           1           2           2          31e
* hcomon2 *           1           3           2           3e
* hcomon2 *           1           3           2           4e
* hcomon2 *           1           3           2           5e
* hcomon2 *           1           3           2           6e
* hcomon2 *           1           3           2           7e
* hcomon2 *           1           3           2           8e
* hcomon2 *           1           3           2           9e
* hcomon2 *           1           3           2          10e
* hcomon2 *           1           3           2          11e
* hcomon2 *           1           3           2          12e
* hcomon2 *           1           3           2          13e
* hcomon2 *           1           3           2          14e
* hcomon2 *           1           3           2          15e
* hcomon2 *           1           3           2          16e
* hcomon2 *           1           3           2          17e
* hcomon2 *           1           3           2          18e
* hcomon2 *           1           3           2          19e
* hcomon2 *           1           3           2          21e
* hcomon2 *           1           3           2          22e
* hcomon2 *           1           3           2          23e
* hcomon2 *           1           3           2          24e
* hcomon2 *           1           3           2          25e
* hcomon2 *           1           3           2          26e
* hcomon2 *           1           3           2          27e
* hcomon2 *           1           3           2          28e
* hcomon2 *           1           3           2          29e
* hcomon2 *           1           3           2          30e
* hcomon2 *           1           3           2          31e
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714e
*   rdx   *         1.0e
*  radrd  *         0.0      7.6E-6     1.52E-5     2.28E-5     3.04E-5e
*  matrd  *          50          50          50          50 e
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1e
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
```

```
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0e
*
*******   type            num        userid                 component name
htstr                      40             1                   CH10to40toCH9
*       nzhstr           ittc         hscyl          ichf
            28              0             0             1
*    nofuelrod          plane        liqlev        iaxcnd          pdrat
             1              3             0             0           1.00
*        nmwrx           nfci         nfcil          hdri           hdro
             0              0             0           0.0            0.0
*        width
          0.25
*         nhot          nodes          fmon         nzmax        reflood
             0              5             0           212              0
*     dtxht(1)       dtxht(2)         dznht         hgapo
           0.0            0.0       1.0E-3        6300.0
*
*  idbcin *             2           2           2           2s
*  idbcin *             2           2           2           2s
*  idbcin *             2           2           2           2s
*  idbcin *             2           2           2           2s
*  idbcin *             2           2           2           2s
*  idbcin *             2           2           2           2s
*  idbcin *             2           2           2           2e
*  idbcon *             2           2           2           2s
*  idbcon *             2           2           2           2s
*  idbcon *             2           2           2           2s
*  idbcon *             2           2           2           2s
*  idbcon *             2           2           2           2s
*  idbcon *             2           2           2           2s
*  idbcon *             2           2           2           2e
* hcomon1 *             1           2           2           3e
* hcomon1 *             1           2           2           4e
* hcomon1 *             1           2           2           5e
* hcomon1 *             1           2           2           6e
* hcomon1 *             1           2           2           7e
* hcomon1 *             1           2           2           8e
```

```
* hcomon1 *           1           2           2           9e
* hcomon1 *           1           2           2          10e
* hcomon1 *           1           2           2          11e
* hcomon1 *           1           2           2          12e
* hcomon1 *           1           2           2          13e
* hcomon1 *           1           2           2          14e
* hcomon1 *           1           2           2          15e
* hcomon1 *           1           2           2          16e
* hcomon1 *           1           2           2          17e
* hcomon1 *           1           2           2          18e
* hcomon1 *           1           2           2          19e
* hcomon1 *           1           2           2          21e
* hcomon1 *           1           2           2          22e
* hcomon1 *           1           2           2          23e
* hcomon1 *           1           2           2          24e
* hcomon1 *           1           2           2          25e
* hcomon1 *           1           2           2          26e
* hcomon1 *           1           2           2          27e
* hcomon1 *           1           2           2          28e
* hcomon1 *           1           2           2          29e
* hcomon1 *           1           2           2          30e
* hcomon1 *           1           2           2          31e
* hcomon2 *           1           2           3           3e
* hcomon2 *           1           2           3           4e
* hcomon2 *           1           2           3           5e
* hcomon2 *           1           2           3           6e
* hcomon2 *           1           2           3           7e
* hcomon2 *           1           2           3           8e
* hcomon2 *           1           2           3           9e
* hcomon2 *           1           2           3          10e
* hcomon2 *           1           2           3          11e
* hcomon2 *           1           2           3          12e
* hcomon2 *           1           2           3          13e
* hcomon2 *           1           2           3          14e
* hcomon2 *           1           2           3          15e
* hcomon2 *           1           2           3          16e
* hcomon2 *           1           2           3          17e
* hcomon2 *           1           2           3          18e
* hcomon2 *           1           2           3          19e
* hcomon2 *           1           2           3          21e
* hcomon2 *           1           2           3          22e
* hcomon2 *           1           2           3          23e
* hcomon2 *           1           2           3          24e
* hcomon2 *           1           2           3          25e
* hcomon2 *           1           2           3          26e
* hcomon2 *           1           2           3          27e
* hcomon2 *           1           2           3          28e
* hcomon2 *           1           2           3          29e
* hcomon2 *           1           2           3          30e
* hcomon2 *           1           2           3          31e
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714e
*   rdx   *         1.0e
*  radrd  *         0.0      7.6E-6     1.52E-5     2.28E-5     3.04E-5e
*  matrd  *          50          50          50          50 e
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
```

```
*    nfax *         1         1         1         1s
*    nfax *         1         1         1         1s
*    nfax *         1         1         1         1e
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0s
*    rftn *     300.0     300.0     300.0     300.0e
*
*******   type          num      userid            component name
htstr                    50           1       CH13to50toInsulation
*       nzhstr         ittc       hscyl        ichf
            28            0           0           1
*    nofuelrod        plane      liqlev      iaxcnd        pdrat
             1            3           0           0         1.00
*        nmwrx         nfci       nfcil        hdri         hdro
             0            0           1         0.0          0.0
*        width
          0.25
*         nhot        nodes        fmon       nzmax      reflood
             0            5           0         212            0
*     dtxht(1)     dtxht(2)       dznht       hgapo
           0.0          0.0     1.0E-3      6300.0
*
*  idbcin *         2         2         2         2s
*  idbcin *         2         2         2         2s
*  idbcin *         2         2         2         2s
*  idbcin *         2         2         2         2s
*  idbcin *         2         2         2         2s
*  idbcin *         2         2         2         2s
*  idbcin *         2         2         2         2e
*  idbcon *         0         0         0         0s
*  idbcon *         0         0         0         0s
*  idbcon *         0         0         0         0s
```

```
*  idbcon *          0          0          0          0s
*  idbcon *          0          0          0          0s
*  idbcon *          0          0          0          0s
*  idbcon *          0          0          0          0e
* hcomon1 *          1          1          2          3e
* hcomon1 *          1          1          2          4e
* hcomon1 *          1          1          2          5e
* hcomon1 *          1          1          2          6e
* hcomon1 *          1          1          2          7e
* hcomon1 *          1          1          2          8e
* hcomon1 *          1          1          2          9e
* hcomon1 *          1          1          2         10e
* hcomon1 *          1          1          2         11e
* hcomon1 *          1          1          2         12e
* hcomon1 *          1          1          2         13e
* hcomon1 *          1          1          2         14e
* hcomon1 *          1          1          2         15e
* hcomon1 *          1          1          2         16e
* hcomon1 *          1          1          2         17e
* hcomon1 *          1          1          2         18e
* hcomon1 *          1          1          2         19e
* hcomon1 *          1          1          2         21e
* hcomon1 *          1          1          2         22e
* hcomon1 *          1          1          2         23e
* hcomon1 *          1          1          2         24e
* hcomon1 *          1          1          2         25e
* hcomon1 *          1          1          2         26e
* hcomon1 *          1          1          2         27e
* hcomon1 *          1          1          2         28e
* hcomon1 *          1          1          2         29e
* hcomon1 *          1          1          2         30e
* hcomon1 *          1          1          2         31e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
```

```
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714e
*   rdx   *        1.0e
*
*  radrd  *         0.0        0.06        0.12        0.18        0.36e
*
*  matrd  *          50          50          50          50 e
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1e
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0e
*
*******   type            num        userid             component name
htstr                      60             1          CH10to60toInsulation
*        nzhstr          ittc         hscyl          ichf
             28             0             0             1
*    nofuelrod          plane        liqlev        iaxcnd         pdrat
              1             3             0             0          1.00
*         nmwrx          nfci         nfcil          hdri          hdro
              0             0             1           0.0           0.0
*         width
           0.25
*          nhot         nodes          fmon         nzmax       reflood
              0             5             0           212             0
*      dtxht(1)      dtxht(2)         dznht         hgapo
```

```
            0.0             0.0          1.0E-3        6300.0
*
*  idbcin *           2            2            2            2s
*  idbcin *           2            2            2            2s
*  idbcin *           2            2            2            2s
*  idbcin *           2            2            2            2s
*  idbcin *           2            2            2            2s
*  idbcin *           2            2            2            2s
*  idbcin *           2            2            2            2e
*  idbcon *           0            0            0            0s
*  idbcon *           0            0            0            0s
*  idbcon *           0            0            0            0s
*  idbcon *           0            0            0            0s
*  idbcon *           0            0            0            0s
*  idbcon *           0            0            0            0s
*  idbcon *           0            0            0            0e
* hcomon1 *           1            2            3            3e
* hcomon1 *           1            2            3            4e
* hcomon1 *           1            2            3            5e
* hcomon1 *           1            2            3            6e
* hcomon1 *           1            2            3            7e
* hcomon1 *           1            2            3            8e
* hcomon1 *           1            2            3            9e
* hcomon1 *           1            2            3           10e
* hcomon1 *           1            2            3           11e
* hcomon1 *           1            2            3           12e
* hcomon1 *           1            2            3           13e
* hcomon1 *           1            2            3           14e
* hcomon1 *           1            2            3           15e
* hcomon1 *           1            2            3           16e
* hcomon1 *           1            2            3           17e
* hcomon1 *           1            2            3           18e
* hcomon1 *           1            2            3           19e
* hcomon1 *           1            2            3           21e
* hcomon1 *           1            2            3           22e
* hcomon1 *           1            2            3           23e
* hcomon1 *           1            2            3           24e
* hcomon1 *           1            2            3           25e
* hcomon1 *           1            2            3           26e
* hcomon1 *           1            2            3           27e
* hcomon1 *           1            2            3           28e
* hcomon1 *           1            2            3           29e
* hcomon1 *           1            2            3           30e
* hcomon1 *           1            2            3           31e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
```

```
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714e
*   rdx   *         1.0e
*
*  radrd  *        0.0         0.06        0.12        0.18        0.36e
*
*  matrd  *         50          50          50          50 e
*    nfax *          1           1           1           1s
*    nfax *          1           1           1           1s
*    nfax *          1           1           1           1s
*    nfax *          1           1           1           1s
*    nfax *          1           1           1           1s
*    nfax *          1           1           1           1s
*    nfax *          1           1           1           1e
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0e
*
*******   type          num       userid              component name
```

```
htstr                    70           1          CH11to70toInsulation
*       nzhstr         ittc         hscyl         ichf
             28            0             0            1
*    nofuelrod        plane        liqlev       iaxcnd         pdrat
              1            3             0            0          1.00
*        nmwrx         nfci         nfcil         hdri         hdro
              0            0             1          0.0          0.0
*        width
           0.25
*         nhot        nodes          fmon        nzmax       reflood
              0            5             0          212             0
*     dtxht(1)     dtxht(2)         dznht        hgapo
            0.0          0.0        1.0E-3       6300.0
*
*  idbcin *           2          2          2          2s
*  idbcin *           2          2          2          2s
*  idbcin *           2          2          2          2s
*  idbcin *           2          2          2          2s
*  idbcin *           2          2          2          2s
*  idbcin *           2          2          2          2s
*  idbcin *           2          2          2          2e
*  idbcon *           0          0          0          0s
*  idbcon *           0          0          0          0s
*  idbcon *           0          0          0          0s
*  idbcon *           0          0          0          0s
*  idbcon *           0          0          0          0s
*  idbcon *           0          0          0          0s
*  idbcon *           0          0          0          0e
* hcomon1 *           1          3          2          3e
* hcomon1 *           1          3          2          4e
* hcomon1 *           1          3          2          5e
* hcomon1 *           1          3          2          6e
* hcomon1 *           1          3          2          7e
* hcomon1 *           1          3          2          8e
* hcomon1 *           1          3          2          9e
* hcomon1 *           1          3          2         10e
* hcomon1 *           1          3          2         11e
* hcomon1 *           1          3          2         12e
* hcomon1 *           1          3          2         13e
* hcomon1 *           1          3          2         14e
* hcomon1 *           1          3          2         15e
* hcomon1 *           1          3          2         16e
* hcomon1 *           1          3          2         17e
* hcomon1 *           1          3          2         18e
* hcomon1 *           1          3          2         19e
* hcomon1 *           1          3          2         21e
* hcomon1 *           1          3          2         22e
* hcomon1 *           1          3          2         23e
* hcomon1 *           1          3          2         24e
* hcomon1 *           1          3          2         25e
* hcomon1 *           1          3          2         26e
* hcomon1 *           1          3          2         27e
* hcomon1 *           1          3          2         28e
* hcomon1 *           1          3          2         29e
* hcomon1 *           1          3          2         30e
* hcomon1 *           1          3          2         31e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
```

```
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
*qflxbco2 *         0.0e
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714e
*   rdx   *          1.0e
*
*  radrd  *         0.0        0.06        0.12        0.18        0.36e
*
*  matrd  *          50          50          50          50 e
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1s
*    nfax *           1           1           1           1e
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
```

```
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0e
*
*******   type           num        userid               component name
htstr                     80             1           CH7to80toInsulation
*       nzhstr          ittc         hscyl         ichf
             28             0             0            1
*    nofuelrod         plane        liqlev       iaxcnd         pdrat
              1             3             0            0          1.00
*        nmwrx          nfci         nfcil         hdri          hdro
              0             0             1          0.0           0.0
*        width
           0.25
*         nhot         nodes          fmon         nzmax       reflood
              0             5             0           212             0
*     dtxht(1)      dtxht(2)         dznht        hgapo
            0.0           0.0       1.0E-3       6300.0
*
*  idbcin *           2           2           2           2s
*  idbcin *           2           2           2           2s
*  idbcin *           2           2           2           2s
*  idbcin *           2           2           2           2s
*  idbcin *           2           2           2           2s
*  idbcin *           2           2           2           2s
*  idbcin *           2           2           2           2e
*  idbcon *           0           0           0           0s
*  idbcon *           0           0           0           0s
*  idbcon *           0           0           0           0s
*  idbcon *           0           0           0           0s
*  idbcon *           0           0           0           0s
*  idbcon *           0           0           0           0s
*  idbcon *           0           0           0           0e
* hcomon1 *           1           2           1           3e
* hcomon1 *           1           2           1           4e
* hcomon1 *           1           2           1           5e
* hcomon1 *           1           2           1           6e
* hcomon1 *           1           2           1           7e
* hcomon1 *           1           2           1           8e
* hcomon1 *           1           2           1           9e
* hcomon1 *           1           2           1          10e
* hcomon1 *           1           2           1          11e
* hcomon1 *           1           2           1          12e
* hcomon1 *           1           2           1          13e
* hcomon1 *           1           2           1          14e
* hcomon1 *           1           2           1          15e
* hcomon1 *           1           2           1          16e
* hcomon1 *           1           2           1          17e
* hcomon1 *           1           2           1          18e
* hcomon1 *           1           2           1          19e
* hcomon1 *           1           2           1          21e
* hcomon1 *           1           2           1          22e
* hcomon1 *           1           2           1          23e
* hcomon1 *           1           2           1          24e
* hcomon1 *           1           2           1          25e
* hcomon1 *           1           2           1          26e
* hcomon1 *           1           2           1          27e
```

```
* hcomon1 *          1           2           1          28e
* hcomon1 *          1           2           1          29e
* hcomon1 *          1           2           1          30e
* hcomon1 *          1           2           1          31e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
*qflxbco2 *        0.0e
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714s
* dhtstrz *  0.14285714  0.14285714  0.14285714  0.14285714e
*   rdx   *         1.0e
*
*  radrd  *        0.0        0.06        0.12        0.18        0.36e
*
*  matrd  *         50          50          50          50 e
*    nfax *          1           1           1           1s
*    nfax *          1           1           1           1s
*    nfax *          1           1           1           1s
*    nfax *          1           1           1           1s
*    nfax *          1           1           1           1s
*    nfax *          1           1           1           1s
*    nfax *          1           1           1           1e
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
*    rftn *      300.0       300.0       300.0       300.0s
```

```
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0s
*    rftn *       300.0       300.0       300.0       300.0e
*****************************************
* Finished Heat Structure Section of Model *
*****************************************
*
*
*
*
***************************************
*     Starting Power Components         *
***************************************
*
*******   type           num        userid                component name
power                     15             0                    Decay Power
*       numpwr       chanpow
             5             1
* htnum *           7           9          10          11          13 e
*       irpwty          ndgx         ndhx         nrts         nhist
             6             0            0          100             0
*       irpwtr        irpwsv       nrpwtb       nrpwsv       nrpwrf
             0            59          -21            0            0
*       izpwtr        izpwsv       nzpwtb       nzpwsv       nzpwrf
             0            59            1            0            0
*       ipwrad        ipwdep     promheat     decaheat     wtbypass
             0             0          0.0          0.0          0.0
*        nzpwz         nzpwi       nfbpwt        nrpwr        nrpwi
             4             0            0            1            0
*        react         tneut       rpwoff       rrpwmx       rpwscl
           0.0           0.0          0.0       1.0E20          1.0
*       rpowri         zpwin       zpwoff       rzpwmx
       5000.0           0.0      -1.0E19       1.0E20
*       extsou          pldr        pdrat       fucrac
           0.0           0.0          1.0          1.0
* zpwzt *          0.0         0.3         1.5      1.5748e
* zpwtb1*          0.0s
* zpwtb1*          0.0         1.0         1.0         0.0e
* rpwtbr*          0.0      5000.0s
* rpwtbr*      8.64E4       5000.0s
* rpwtbr*     1.728E5       5000.0s
* rpwtbr*     2.592E5       5000.0s
* rpwtbr*     3.456E5       5000.0s
* rpwtbr*      4.32E5       5000.0s
* rpwtbr*     5.184E5       5000.0s
```

```
* rpwtbr*     6.048E5      5000.0s
* rpwtbr*     6.912E5      5000.0s
* rpwtbr*     7.776E5      5000.0s
* rpwtbr*      8.64E5      5000.0s
* rpwtbr*     9.504E5      5000.0s
* rpwtbr*    1.0368E6      5000.0s
* rpwtbr*    1.1232E6      5000.0s
* rpwtbr*    1.2096E6      5000.0s
* rpwtbr*     1.296E6      5000.0s
* rpwtbr*    1.3824E6      5000.0s
* rpwtbr*    1.4688E6      5000.0s
* rpwtbr*    1.5552E6    5489.337s
* rpwtbr*    1.6416E6    5466.489s
* rpwtbr*     1.728E6     5443.64e
****************************************
*     Finished Power Components         *
****************************************
*
*
*
end
*
*****************
* Timestep Data *
*****************
*        dtmin         dtmax          tend         rtwfp
         1.0E-6        0.001           0.1          10.0
*        edint         gfint         dmpint        sedint
         100.0           0.1          100.0           1.0
*
*        dtmin         dtmax          tend         rtwfp
         1.0E-6        0.050           1.0          10.0
*        edint         gfint         dmpint        sedint
         1.5E4           0.5       14400.0          10.0
*
*        dtmin         dtmax          tend         rtwfp
         1.0E-6         0.10           3.0          10.0
*        edint         gfint         dmpint        sedint
         1.5E4           1.0       14400.0          10.0
*
*        dtmin         dtmax          tend         rtwfp
         1.0E-6          1.0          18000.        10.0
*        edint         gfint         dmpint        sedint
         1.5E4           5.0       14400.0          10.0
*
*        dtmin         dtmax          tend         rtwfp
         1.0E-6          0.5          28800.        10.0
*        edint         gfint         dmpint        sedint
         1.5E4           1.0       14400.0          10.0
*
*      endflag
          -1.0
```

Appendix 2.3.
Full Length BWR-4 Fuel Bundle in Water

```
free format
*m: SNAP:Symbolic Nuclear Analysis Package,  Version 2.2.3, March 20, 2013
*m: PLUGIN:TRACE Version 3.2.7
*m: CODE:TRACE V 5.0 Patch 3
*m: DATE:4/8/13
*m: Franiewski, Geleskie, Grove, Maguire
*
*
*************
* main data *
*************
*
*       numtcr          ieos         inopt          nmat          id2o
            1             0             1             0             0

*
*
*****************
* namelist data *
*****************
*
 &inopts
  dtstrt=-1.0,
  ikfac=1,
  usesjc=3,
  npower=1
 &end
*
***************
* Model Flags *
***************
*
*        dstep         timet
             0           0.0
*       stdyst        transi         ncomp          njun          ipak
             0             1             4             2             1
*         epso          epss
          1.0E-4        1.0E-4
*       oitmax        sitmax        isolut        ncontr         nccfl
            10            10             0             0             0
*         ntsv          ntcb          ntcf          ntrp          ntcp
            2             0             0             0             0
*
************************
* component-number data *
************************
*
*  Component input order (IORDER)
*-- type ---- num ------------ name ----------------  +    jun1   jun2
jun3
* FILL     *     10 s * Inlet Boundary Condition       +      10
* BREAK    *     20 s * Outlet Boundary Condition      +      20
* CHAN     *     30 s *                                +      10     20
* POWER    *     40 e *                                +
*
*
***********************************************
* Starting Signal Variable Section of Model      *
***********************************************
```

```
*
*         idsv          isvn          ilcn          icn1          icn2
             1             0             0             0             0
*n: Collapsed Water Height
*
*         idsv          isvn          ilcn          icn1          icn2
             2            20            30             1            17
************************************************
* Finished Signal Variable Section of Model      *
************************************************
*
*
*
*
*d: Inlet Boundary Condition
*d: Inlet Flow and Temperature for a single assembly
*******   type           num        userid                component name
fill                      10             0       Inlet Boundary Condition
*         jun1          ifty          ioff
             10             2             0
*        twtold          rfmx        concin          felv
              0.0       1.0E20           0.0           0.0
*          dxin          volin         alpin          vlin          tlin
         0.261257   6.426295E-3           0.0           0.0         350.0
*           pin           pain        flowin          vvin          tvin
       1.01329E5            0.0           0.0           0.0         380.0
*
*
*d: Outlet Boundary Condition
*d: Constant Pressure BC
*******   type           num        userid                component name
break                     20             0      Outlet Boundary Condition
*         jun1          ibty          isat          ioff      adjpress
             20             0             0             0             0
*          dxin         volin         alpin          tin           pin
         0.261257   6.426295E-3           1.0         380.0     1.01329E5
*          pain        concin          rbmx          poff          belv
              0.0           0.0       1.0E20           0.0           0.0
*
*
*******   type           num        userid                component name
chan                      30             0                       unnamed
*         ncell         nodes          jun1          jun2          epsw
             17             2            10            20        1.0E-5
*        nsides
              2
* Water Rod inlet junction
*          nclk         junlk        ncmpto        nclkto        nlevto
              3          3001             0             0             0
*         theta
             90.0
* Water Rod outlet junction
*          nclk         junlk        ncmpto        nclkto        nlevto
             15          3002             0             0             0
*         theta
             90.0
*          ichf         iconc        iaxcnd        liqlev         nhcom
              2             0             0             0             0
*         width            th         houtl         houtv         toutl
         0.53624       1.91E-3           0.0           0.0         350.0
*         toutv       advbwrf       quadsym      numwrods       nvfrays
         350.0             1             0             1             0
*          ngrp        nchans        nodesr          nrow          ncrz
              3             1             9             9            13
```

```
*        icrnk         icrlh         nmwrx          nfci         nfcil
             2             2             1             0             0
*         fmon       reflood         nzmax        nzmaxw        ibeam
             0             0           100            76             0
*        dznht        dznhtw       dtxht1       dtxht2
          0.01           0.1           2.0         10.0
*        hgapo         pdrat         pldr        fucrac        norad
        4600.0        1.2973           0.0           1.0             0
*       emcif1        emcif2       emcif3        noani
          0.67           0.0           0.0           0
*       emcof1        emcof2       emcof3
          0.67           0.0           0.0
* dx    *    0.0775208   0.2362835   0.2362835    0.254254s
* dx    *     0.254254    0.255524    0.255524   0.2561082s
* dx    *    0.2561082   0.2561082   0.2561082   0.2566035s
* dx    *    0.2566035   0.2554097   0.2554097    0.227711s
* dx    *     0.227711e
* vol   *    7.5893E-4   2.3132E-3   2.3132E-3   2.4891E-3s
* vol   *    2.4891E-3   2.5016E-3   2.5016E-3   2.5073E-3s
* vol   *    2.5073E-3   2.5073E-3   2.5073E-3     2.72E-3s
* vol   *      2.72E-3   2.7073E-3   2.7073E-3   2.4137E-3s
* vol   *    2.4137E-3e
* fa    *      9.79E-3     9.79E-3     9.79E-3     9.79E-3s
* fa    *      9.79E-3     9.79E-3     9.79E-3     9.79E-3s
* fa    *      9.79E-3     9.79E-3     9.79E-3      0.0106s
* fa    *       0.0106      0.0106      0.0106      0.0106s
* fa    *       0.0106      0.0106e
* kfac  *          0.1         0.5         0.0         0.5s
* kfac  *          0.0         0.5         0.0         0.5s
* kfac  *          0.0         0.5         0.0         0.5s
* kfac  *          0.0         0.5         0.0         0.5s
* kfac  *          0.0         0.5e
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0         1.0         1.0s
* grav  *          1.0         1.0e
* hd    *       0.0119      0.0119      0.0119      0.0119s
* hd    *       0.0119      0.0119      0.0119      0.0119s
* hd    *       0.0119      0.0119      0.0119      0.0141s
* hd    *       0.0141      0.0141      0.0141      0.0141s
* hd    *       0.0141      0.0141e
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1           1           1s
* nff   *            1           1e
* alp   *          0.0         0.0         0.0         0.0s
* alp   *          0.0         0.0         0.0         0.0s
* alp   *          0.0         0.0         0.0         0.0s
* alp   *          0.0         0.0         0.0         0.0s
* alp   *          0.0e
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0         0.0         0.0s
* vl    *          0.0         0.0e
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0         0.0         0.0s
* vv    *          0.0         0.0e
* tl    *        300.0       300.0       300.0       300.0s
* tl    *        300.0       300.0       300.0       300.0s
```

```
* tl    *       300.0       300.0       300.0       300.0s
* tl    *       300.0       300.0       300.0       300.0s
* tl    *       300.0e
* tv    *       300.0       300.0       300.0       300.0s
* tv    *       300.0       300.0       300.0       300.0s
* tv    *       300.0       300.0       300.0       300.0s
* tv    *       300.0       300.0       300.0       300.0s
* tv    *       300.0e
* p     *  1.013529E5  1.013529E5  1.013529E5  1.013529E5s
* p     *  1.013529E5  1.013529E5  1.013529E5  1.013529E5s
* p     *  1.013529E5  1.013529E5  1.013529E5  1.013529E5s
* p     *  1.013529E5  1.013529E5  1.013529E5  1.013529E5s
* p     *  1.013529E5e
* pa    *         0.0         0.0         0.0         0.0s
* pa    *         0.0         0.0         0.0         0.0s
* pa    *         0.0         0.0         0.0         0.0s
* pa    *         0.0         0.0         0.0         0.0s
* pa    *         0.0e
*  qppp * f 0.0e
* mat   *         2 e
* tw    *      350.0       350.0       350.0       350.0       350.0s
* tw    *      350.0       350.0       350.0       350.0       350.0s
* tw    *      350.0       350.0       350.0       350.0       350.0s
* tw    *      350.0       350.0       350.0       350.0       350.0s
* tw    *      350.0       350.0       350.0       350.0       350.0s
* tw    *      350.0       350.0       350.0       350.0       350.0s
* tw    *      350.0       350.0       350.0       350.0e
*  rdx  *       66.0         8.0         2.0e
* radrd *        0.0   6.604E-4   1.3208E-3     2.54E-3    3.048E-3s
* radrd *   3.556E-3  4.8388E-3   5.1944E-3     5.55E-3e
* matrd *         5           5           4           4 s
* matrd *         4           4           2           2 e
*  nfax *         0           0           0           0s
*  nfax *         0           0           0           0s
*  nfax *         0           0           0           0s
*  nfax *         0e
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
*  rftn *      300.0       300.0       300.0       300.0s
```

```
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0e
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *       300.0       300.0       300.0       300.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0         0.0         0.0         0.0s
*  rftn *         0.0e
* rdpwr *         1.0         1.0         0.0         0.0         0.0s
* rdpwr *         0.0         0.0         0.0         0.0e
* cpowr *         1.0         1.0e
* radpw *  0.95791667  0.95791667  0.95791667  0.95791667  0.95791667s
* radpw *  0.95791667  0.95791667  0.95791667  0.95791667  0.95791667s
* radpw *  0.95791667  0.95791667  0.95791667e
* fpuo2 *         0.0         0.0e
*   ftd *        0.95        0.95e
*  gmix * f       0.0e
* pgapt *         0.0         0.0e
*  burn *       3.0E4       3.0E4       3.0E4       3.0E4s
*  burn *       3.0E4       3.0E4       3.0E4       3.0E4s
*  burn *       3.0E4       3.0E4       3.0E4       3.0E4s
*  burn *       3.0E4e
*  burn *       3.0E4       3.0E4       3.0E4       3.0E4s
*  burn *       3.0E4       3.0E4       3.0E4       3.0E4s
*  burn *       3.0E4       3.0E4       3.0E4       3.0E4s
*  burn *       3.0E4e
* mrod *          1           1           1           1           1s
* mrod *          1           1           1           1           1s
* mrod *          2           1           1           2           1s
* mrod *          1           2           1           1           1s
* mrod *          1           1           1           1           1s
* mrod *          1           1           1           1           1s
* mrod *          1           3           3           1           1s
* mrod *          1           1           2           1           3s
* mrod *          3           3           1           2           1s
* mrod *          1           1           1           3           3s
* mrod *          1           1           1           1           1s
* mrod *          1           1           1           1           1s
* mrod *          1           1           1           1           2s
* mrod *          1           1           2           1           1s
```

```
* mrod *           2           1           1           1           1s
* mrod *           1           1           1           1           1s
* mrod *           1          4e
*    partial length rods
*             i             j         levrod
              2             2             10
              5             2             10
              8             2             10
              2             5             10
              8             5             10
              2             8             10
              5             8             10
              8             8             10
             -1
*
*     water rod locations *
*             i             j           flag          xloc          yloc
              5             4              1       0.07722      -0.05684
              6             4              1           0.0           0.0
              5             5              1           0.0           0.0
              6             5              1           0.0           0.0
              4             5              1       0.05684      -0.07722
              4             6              1           0.0           0.0
              5             6              1           0.0           0.0
-1
*     water rod data sets
*
*        igeom       wrnodes
              1             4
*      wrinlet      wroutlet           dia         sidea         sideb
              3            15       0.02489           0.0           0.0
*           th       rcorner      flowarea      flwareai      flwareao
         7.6E-4           0.0           0.0           0.0           0.0
*           hd          hdri          hdro      thrmdiai      thrmdiao
            0.0           0.0           0.0           0.0           0.0
*     wrflossi      wrflosso      wrrlossi      wrrlosso
      0.1404795    0.13868901     0.1404795    0.13868901
*  matwr  * f              2 e
*    tw   *       350.0       350.0       350.0       350.0       350.0s
*    tw   *       350.0       350.0       350.0       350.0       350.0s
*    tw   *       350.0       350.0       350.0       350.0       350.0s
*    tw   *       350.0       350.0       350.0       350.0       350.0s
*    tw   *       350.0       350.0       350.0       350.0       350.0s
*    tw   *       350.0       350.0       350.0       350.0       350.0s
*    tw   *       350.0       350.0       350.0       350.0       350.0s
*    tw   *       350.0       350.0       350.0       350.0       350.0s
*    tw   *       350.0       350.0       350.0       350.0       350.0s
*    tw   *       350.0       350.0       350.0       350.0       350.0s
*    tw   *       350.0       350.0e
*
*
****************************************
*     Starting Power Components         *
****************************************
*
*******   type           num        userid               component name
power                     40             0                       unnamed
*       numpwr       chanpow
              1             1
* htnum *          30 e
*       irpwty          ndgx          ndhx          nrts         nhist
              5             0             0           100             0
*       izpwtr        izpwsv        nzpwtb        nzpwsv        nzpwrf
              0             1             1             0             0
```

```
*       ipwrad        ipwdep      promheat      decaheat      wtbypass
             0             0           0.0           0.0           0.0
*        nzpwz         nzpwi        nfbpwt         nrpwr         nrpwi
            25             0             0             1             0
*        react         tneut         rpwoff        rrpwmx        rpwscl
           0.0           0.0           0.0        1.0E20           1.0
*       rpowri         zpwin         zpwoff        rzpwmx
         2.18E4           0.0       -1.0E19        1.0E20
*       extsou          pldr          pdrat        fucrac
           0.0           0.0           1.0           1.0
* zpwzt *         0.0  0.16666667  0.33333334  0.50000001  0.66666668s
* zpwzt *  0.83333335         1.0   1.1666667   1.3333334         1.5s
* zpwzt *   1.6666667   1.8333334         2.0   2.1666667   2.3333334s
* zpwzt *         2.5   2.6666667   2.8333334   3.0000001   3.1666667s
* zpwzt *   3.3333334   3.5000001   3.6666667   3.8333334   4.0000001e
* zpwtb1*         0.0s
* zpwtb1*         1.0         1.0         1.0         1.0         1.0s
* zpwtb1*         1.0         1.0         1.0         1.0         1.0s
* zpwtb1*         1.0         1.0         1.0         1.0         1.0s
* zpwtb1*         1.0         1.0         1.0         1.0         1.0s
* zpwtb1*         1.0         1.0         1.0         1.0         1.0e
****************************************
*     Finished Power Components         *
****************************************
*
*
*
end
*
*****************
* Timestep Data *
*****************
*        dtmin         dtmax          tend         rtwfp
        1.0E-6        1.0E-3           1.0          10.0
*        edint         gfint        dmpint        sedint
         100.0           1.0         100.0           1.0
*
*        dtmin         dtmax          tend         rtwfp
        1.0E-6          0.01          10.0          10.0
*        edint         gfint        dmpint        sedint
         100.0           1.0         100.0           1.0
*
*        dtmin         dtmax          tend         rtwfp
        1.0E-6           0.1       1.0E10          10.0
*        edint         gfint        dmpint        sedint
         100.0           1.0         100.0           1.0
*
*      endflag
          -1.0
```