**Response to Request for Additional Information – ANP-10285P**
**"U.S. EPR Fuel Assembly Mechanical Design Topical Report" (TAC No. MD7040)**

***RAI-21.*** *The following questions address the methodology for determining whether the EPR design meets the SAFDL for preventing excess internal rod pressure.*

a. *Please provide the FQ and FΔH and the average core power level for the fuel in the EPR. How are FQ and FΔH related to the bounding power history and licensing analyses that demonstrate SAFDLs are met at these rod power limits?*
b. *The bounding power history is provided in Figure 5-5 of the topical, how is the uncertainty in measured rod powers accounted for in the analyses using this bounding power history?*
c. *Please provide the axial power shapes used for the example rod pressure analyses including AOOs (Condition 1 and 2 events) such that a confirmatory analysis can be performed with the NRC fuel performance code, FRAPCON-3.3. Please identify those transients that are bounding for the Condition 1 and 2 events in terms of fission gas release and rod pressure. Please justify the length of time for the limiting Condition 1 transient for the EPR (including xenon transients) in terms of fission gas release and rod pressure.*
d. *Section 5.1.8 of the topical report states "On a cycle-specific basis, if peak pin powers violate the envelope resulting in predicted pressure greater than the licensed limit, acceptable pin pressure results can be demonstrated by using fuel rod-specific power histories and fuel assembly as-built manufacturing data." How are the peak rod specific histories chosen to assure that the peak rod pressures are determined for the fuel batch? How are the uncertainties in rod specific power histories included in these analyses? A plant may deviate from planned operation, how is this considered in cycle-specific analyses? The as-built manufacturing data for a particular fuel batch has a distribution about a mean, how is this uncertainty included in these analyses?*

**Response 21:**

a. The values for $F_{\Delta H}$ and $F_Q$ are provided in the U.S. EPR Final Safety Analysis Report (FSAR) Tier 2 Table 4.3-1 as shown below:

Technical Specification (TS) limit $F_{\Delta H}$ = 1.7 at 100% power

With a core average linear heating rate of 5.08 kW/ft, this equates to a rod linear heat generation rate (LHGR) of 1.7 x 5.08 kWth/ft = 8.64 kWth/ft (283.3 W/cm)

TS limit $F_Q$ = 2.6

This equates to a local LHGR of 2.6 x 5.08 kWth/ft = 13.21 kW/ft (433.3 W/cm)

The $F_{\Delta H}$ and $F_Q$ limits are used in conjunction with the potential transient power levels in the core to induce the Condition I and II Anticipated Operational Occurrence (AOO) events introduced at intervals in the depletion simulations. **[**

**]** This approach is consistent with the methods in Chapter 12 of BAW-10231PA, Revision 1 (Topical Report (TR) ANP-10285P Reference 17). Geometry information for the fuel rod is provided in TR Tables 3-2 through 3-12.

b. Section 12.1 in TR Reference 17 describes the method for performing the rod internal pressure evaluation. **[** **]** power histories (e.g., TR Figure 5-5) are used in conjunction with consideration for computer code and manufacturing uncertainties. **[**

**]** The methodology of TR Reference 17 also accounts **[**

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c. Following the methods contained in TR Reference 17, the axial power shapes for the power history are taken from the neutronics depletion studies. The specific axial shapes and fuel rod $F_{\Delta H}$ power history used are provided in Table RAI 21-1. Figure RAI 21-1 graphically shows the axial shapes. (Note: the RAI response tables are provided in Attachment B and the RAI response figures are provided in Attachment C). The Condition I and II transient shapes **[**

**]** are taken from the set of shapes generated by neutronics that are induced to simulate a wide range of possible core power distribution conditions. The Condition I and II transients are discussed in Section 12.1.1 in TR Reference 17. They account for plant

maneuvers and transients that cause perturbations to the axial power distribution in the core and therefore cause the core to temporarily operate closer to the limits of normal operation. Following the approach of the TR Reference 17, **[** **]** The LHGR used for each event is determined to cover the possible core power increases for AOO's.

The transient axial shapes were inserted into the fuel rod depletion power history at **[** **]** with the appropriate ramp of the LHGR, following procedures of the TR Reference 17. The duration of the ramp is also described in the TR Reference 17. The fuel rod average $F_{\Delta H}$ values used for each of the ramps in this analysis were equivalent to power level increases of **[** **]** from the LHGR values prior to the transient ramp.

The values presented in Table RAI 21-2 are for the $UO_2$ fuel rod with the highest bounding pressure. The $UO_2$ fuel rod was found to bound the gadolinia loaded fuel rods. The values in the table that are identified in bold italics are the Condition I and II transient ramps at **[**

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Other information needed to perform a confirmatory analysis includes fuel geometry and system boundary conditions. Geometry information for the fuel rod is given the TR Table 3-2 through TR Table 3-12. The fuel rod average LHGR is given in the response to part a of RAI-21 (5.08 kWth/ft). For the plant system boundary conditions, the following information is from the FSAR Tier 2 Table 4.4-1:

- Core Power = 4590 MWth
- Reactor Coolant System (RCS) Pressure = 15.51 MPa (2250 psia)
- Core Average Mass Flux = 3797.4 kg/s-m$^2$ (2.8 Mlb/h-ft$^2$)
- Coolant Inlet Temperature at 100% power = 295 $^{o}$C = 563.4 $^{o}$F
- Fraction of Heat Generated in the Fuel Rod = 0.974

d. As described in the response to part a of RAI-21, the peak rod histories are chosen from the neutronics cycle depletions for the assembly and fuel rod power history. **[**

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] This is consistent with the approach in TR Section 6.0.

e. [

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The consideration for the impacts of the as-built manufacturing data for a particular fuel batch having a distribution about a mean is performed with the bounding pressure calculation as described in Section 12.1 of TR Reference 17. In addition to the computer code uncertainties for fission gas release, various manufacturing aspects that impact fission gas release are considered,

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] In the TR Figure 5-7, the [

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***RAI-22.*** *The following questions address the methodology used for determining whether the EPR design meets the SAFDL for preventing fuel melting and excessive cladding strain. Please provide the axial power shapes used to determine the fuel melting limit as a function of burnup for both UO2 and UO2-Gd2O3 rods (at the maximum limit for Gd2O3 additions) and any other information needed to perform a confirmatory calculation with the NRC fuel performance code. Please provide the results of the cladding strain analysis as a function of burnup including axial power shapes and the necessary information needed to perform a confirmatory calculation with the NRC fuel performance code.*

**Response 22:**

The fuel centerline melt (FCM) and 1% clad strain (1%CS) evaluations are performed as outlined in Sections 12.3 and 12.4 of TR Reference 17. [

] The FCM limit is determined in a separate calculation from the 1%CS limit with the approaches described TR Reference 17.

Since the FCM and 1%CS are both affected by the fuel pellet temperature, the fuel type with the lowest thermal conductivity will typically have the lowest LHGR limit. This is shown in TR Figure 5-8, where increasing levels of gadolinia loading result in decreasing LHGR limits. [

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To perform a confirmatory analysis for the $UO_2$ rod, the same power history (Table RAI 21-2) as used in the rod internal pressure may be used, but without the Condition I and II transient ramps. Those transient steps were at steps [

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and are identified in bold italics in Table RAI 21-2.

To perform a confirmatory analysis for the type of fuel with gadolinia loading, the power history information for a 8 weight percent (w/o) gadolinia fuel rod is provided in Table RAI 22-1. This information is in the same format as the $UO_2$ fuel rod. [

] The elevations and normalized power shape are provided in given in Table RAI 22-2 and Figure RAI 22-1.

The LHGR limits determined for the $UO_2$ and 8 w/o gadolinia loaded fuel rod for the FCM and the 1%CS analyses are contained in Tables RAI 22-3 through RAI 22-6. Figure RAI 22-2 depicts the data for the FCM and 1%CS LHGR limits in the four tables as a function of fuel rod average burnup. For cycle burnup independent fuel LHGR limits, a plant limiting bundle exposure (PLBE) was determined at which the limiting LHGR is determined and applied for all burnup points. Several fuel depletion cycles for the U.S. EPR were considered and the highest PLBE was [ ] GWD/MTU, which provides the lowest FCM and 1%CS LHGR limits. [

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***RAI-23.*** *The SER providing approval of M5 cladding required that additional data on cladding oxide thickness, assembly length and bow, rod diameter (M5 creep data), rod length (growth data), guide tube oxide thickness and rod extraction measurements" be collected from LTAs. The SER also noted that the vendor "committed to obtain cladding strain, oxidation, hydride, rod bow and axial growth (including shoulder gap closure) data up to the current approved rod-average burnup levels." Please provide this data along with comparison to the respective models for M5.*

**Response 23:**

BAW-10227PA, Revision 1 (TR Reference 7), BAW-10186PA, Revision 2 (TR Reference 10), and BAW-10147PA, Revision 1 (TR Reference 15) require acquisition of additional post-irradiation examination (PIE) data, including cladding oxide, rod and assembly growth, shoulder gap, rod bow, control rod drop time and cladding wear inspections. The inspections completed since the submittal of TR References 7, 10, and 15 are summarized in Table RAI 23-1. Table RAI 23-2 provides a list of additional inspections that are planned to occur in the remainder of 2008.

U.S. PWR M5™ fuel rod cladding oxide measurements, M5 fuel rod axial growth measurements, M5 fuel assembly axial growth measurements, M5 assembly (fuel rod cladding and guide tubes) shoulder gap closure measurements, and rod bow are illustrated in Figures RAI 23-1 through RAI 23-8, and Figures RAI 24-1 and RAI 24-2 (see response to RAI 24). These exams encompass fuel exposures up to and exceeding [for some lead test assemblies (LTAs)] the current generically approved fuel burnup levels. In most cases, the fuel rod data is plotted against the average assembly burnup or fluence, rather than the burnup or fluence of the measured fuel rod. Control rod drop time measurements are validated at each cycle. Cladding wear inspections are qualitative in nature and have been completed at several reactors. An example of a non-failed fuel rod cladding wear inspection is provided in Figure RAI-9. Hydride measurements have been completed on high burnup lead test assemblies **[ ]** and on two examples of M5 guide tubes at varying fluences **[ ]** and the hydrides were found to be exceptionally low (see response to RAI-26).

With the exception of the **[ ]** fuel assembly axial growth measurements (see Figures RAI 23-3 and RAI 23-5), the data reported is consistent with the limits established in TR References 7 and 10[1]. Per TR References 7 and 10, AREVA updates the empirical models whenever new data is available, as illustrated for fuel assembly growth in Figures RAI 23-4, RAI 23-5 and RAI 23-6 and fuel rod growth in Figure RAI 23-2. Thus, acceptable fuel performance with respect to shoulder gap and core interface gap is provided.

***RAI-24.*** *Please identify the fuel assembly designs for the rod bow data presented in the submittal. From this figure the mean of the three M5 fuel rods from which rod bow measurements were obtained appear to be different from the mean of the Zr-4 rod bow data. Please explain why the mean of the M5 data appears to be different than that observed in the Zr-4 rods. Also, please provide rod bow results from any additional M5 rods collected since the submittal.*

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[1] The limits and empirical models are generally based on a 95/95 probability and confidence level, and it is expected that 5% of the data fall outside of the limits.

**Response 24:**

The data presented in TR Figure 5-2 contains rod bow measurements performed from 1974 to 2005. The initial database presented in BAW-10147PA, Revision 1 (TR Reference 15) contained rod bow data measured on early Mark-B designs with Inconel grids (Mark-B and Mark-C designs). The rod-to-rod (FR-FR) standard deviation from **[ ]** Mark-B assemblies was used to develop the best estimate and 95% Tolerance Limit, or 95/95 one-sided tolerance limit, design curves. The Mark-C data points were not included in the rod bow correlation.

The fuel rod bow database was extended in TR Reference 10 to include data from the Mark-B, Mark-BEB, Mark-B (Gadolinia), and Mark-BW designs. The remainder of the data in TR Figure 5-2 was collected from the Mark-B10, Mark-B11, Mark-B12, Mark-BW, Alliance, and Advanced Mark-BW designs.

Water channel gap data from **[ ]** was presented in TR Figure 5-2. **[ ]**
The TR Reference 10 and TR Reference 15 licensed methodology used to evaluate fuel rod bowing is based upon the observed fuel-rod-to-fuel-rod (FR-FR) water channel gap standard deviation of the fuel design. The data sets used in TR Figure 5-2 included some fuel-rod-to-guide-tube (GT-FR) water channel gap data. The approach was conservative (**[ ]**), but the mixture of data types is not consistent with method of TR Reference 15. TR Figure RAI 24-1 plots the FR-FR standard deviations collected and indicates the assemblies with M5 fuel rods. This figure represents AREVA's available and evaluated FR-FR water channel data. TR Figure 5-2 will be replaced with Figure RAI 24-1 (see Attachment D) and is consistent with the FR-FR data used in the development of TR. Additionally, the GT-FR water channel data is presented in Figure RAI 24-2. This data set was not used to develop the best estimate or 95% tolerance curve, but is presented for information purposes.

Additional water channel measurements have been collected for M5 fuel rods since the creation of TR Figure 5-2 from the Mark-BW, Advanced Mark-BW, and Alliance LTA designs, as shown in Figures RAI 24-1 and RAI 24-2. The new Mark-BW data points are at or below the best estimate line. The new Advanced Mark-BW data points are at or above the best estimate line. Six of the Advanced Mark-BW assemblies selected for measurement had observed rod bow and are above the best estimate line. The new Alliance data points are above and below the best estimate curve.

Review of the water channel database indicates that the trend versus burnup remains very close to the original best estimate line predicted in TR Reference 15. The M5 FR-FR data indicates a continuation of the trend at higher burnups and also remains consistent at lower burnups. Of the water channel data obtained on M5 fuel to date, the Advanced Mark-BW fuel has the highest standard deviations relative to the best

estimate curve. The remaining M5 fuel rod data points are consistent with the Zircaloy-4 database and TR Reference 15.

The additional Advanced Mark-BW data points were collected for second cycle assemblies with assembly burnups between **[ ]**. The measurements were taken in response to visual observations of apparent FR-FR water channel gap closure and near closure in one batch of fuel assemblies. Additional information on the fuel rod bow observations was provided to the NRC in AREVA NP letter NRC:07:077[2]. The measurements indicated in Figure RAI 24-1 indicate the Advanced Mark-BW is demonstrating elevated scatter but the isolated occurrence of closure, or near closure, of the gap does not indicate that a new population of water channel data has been identified. The data obtained to date is within the 95% tolerance limit and its inclusion in the rod bow database would not create a significant change in any best estimate prediction or accompanying 95% tolerance limit. Data collected to date indicates that fuel rod bow is in compliance with applicable licensing bases as stated in TR Reference 10 and TR Reference 15.

***RAI-25.*** *The following questions are related to fuel assembly (M5 guide tube growth).*

a. *Please provide the data (including calculated stress versus burnup and fluence of M5 guide tubes for each datum) used as the basis of the empirical correlations used for determining the upper core plate to upper fuel assembly nozzle gap along with the calculated guide tube stresses as a function of burnup/fluence for the EPR fuel assemblies with M5 guide tubes. Please provide the data for determining this same gap for Mark-BW and Mark-B12 fuel designs with M5 guide tubes along with calculated stresses versus burnup/fluence. How do the predicted stresses for each datum compare to those for the EPR predicted stresses versus burnup? Discuss how prototypical each design and associated data is to the proposed EPR design. Please provide the as-fabricated fuel assembly to upper core plate gaps and their predicted gaps at end-of-life (EOL) equivalent burnups for EPR, Mark BW and Mark B designs with M5 guide tubes?*
b. *Please provide a list of those current and future plants and assembly designs where guide tube measurements are planned in the future that are applicable to EPR and an explanation why they are applicable to EPR. Please discuss whether the extra fuel assembly length in EPR will result in additional growth compared to an equivalent 12 foot assembly.*

**Response 25:**

a. **[**

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[2] Letter, Ronnie L. Gardner (AREVA NP Inc.) to Document Control Desk (NRC), "Atypical Fuel Rod Bow Observed at North Anna Unit 1," NRC:07:077, December 20, 2007

***RAI-26.*** *Please provide data for M5 grid growth and corrosion (including hydrogen pickup) compared to Zr-4 grid data at equivalent burnup/fluence.*

**Response 26:**

Grid Growth

Figure RAI 26-1 provides empirical data on spacer grid growth for M5 and Zircaloy-4 spacer grids for AREVA NP fuel both in the U.S. and in European reactors. Burnup ranges are from approximately **[ ]** GWd/t to approximately **[ ]** for M5 data. The M5 spacer grid growth is approximately **[ ]** of the zircaloy-4 spacer grid growth.

Grid Corrosion (including hydrogen pickup)

Figure RAI 26-2 provides M5 grid corrosion data as a function of burnup. Included in the data are poolside and metallographic measurements. The maximum oxide thickness measured is **[ ]** µm. The hydrogen content has been measured on two different M5 spacer grids from the same fuel assembly irradiated for **[ ]** annual cycles achieving a burnup of **[ ]** GWd/tU. These two grids are the shaded triangles from Figure RAI 26-2.

At the hottest span (highest axial elevation in the fuel assembly); the equivalent hydrogen content is approximately **[ ]**. For these two grids the oxide thickness is observed to be approximately **[ ]** and **[ ]** µm from near the bottom of the assembly to near the top. This difference is due to the axial temperature gradient in the fuel assemblies.

Figure RAI 26-3 provides poolside measurements of zircaloy-4 grid corrosion as a function of burnup for comparison. The uppermost intermediate grid, which exhibits the highest corrosion is shown in this figure. The maximum zircaloy-4 grid oxide of **[ ]** µm at **[ ]** GWd/mtU is shown to be approximately **[ ]** times greater than that measured for M5 spacer grids. Metallographic measurements of zircaloy 4 spacer grids have been made after **[ ]** GWd/mtU burnup. Maximum oxide and hydrogen measured were **[ ]** µm and **[ ]** ppm.

Spacer grids experience two-sided corrosion in core. For comparison, a plot of hydrogen content versus oxide thickness of the other fuel assembly structural component experiencing two-sided oxidation, namely the guide tubes, is shown in Figure RAI 26-4. Based on the relationship between hydrogen content and oxide thickness, the hydrogen content of the guide tube is generally similar to that of the spacer grid at comparable oxide thickness.

The difference in the hydrogen performance of M5 and Zr-4 components is illustrated in the plots of hydrogen vs. burnup and hydrogen vs. oxide thickness for fuel rod cladding presented below in Figure RAI 26-5 and Figure RAI 26-6.

Cladding experiences one-side corrosion from the metal/water reaction in primary coolant and so the maximum hydrogen content is approximately **[ ]** of what is present in the two-side corrosion spacer grids and guide tubes. However, the large difference in hydrogen pickup between the alloys is readily apparent in these data.

***RAI-27.*** *Please provide the distribution (numbers) of assembly's versus burnup with HMP end grids and have there been any fretting wear failures in designs with HMP (inconel) grids?*

**Response 27:**

There have been no spacer grid-to-fuel rod fretting failures in high thermal performance (HTP) assemblies which utilized a high mechanical performance (HMP) alloy-718 (Inconel) end grid. Figure RAI 27-1 shows the distribution of HTP assemblies with HMP grids versus burnup. The information in this figure is based on AREVA operational fuel databases and from radiochemistry and core follow data submitted to AREVA from customers.

***RAI-28.*** *Please provide the irradiated M5 strain data that confirms that the EPR 1% (elastic plus plastic) limit will be met at the maximum expected hydrogen level for EPR and at the upper limit for hydrogen set for AREVA fuel designs. If irradiated M5 strain data are not available at the upper limit, how can AREVA be assured that the 1% limit can be met at this hydrogen level?*

**Response 28:**

Total elongation data for irradiated M5 fuel rod cladding at room temperature and elevated temperature is presented in Table RAI 28-1. The total elongation (elastic + plastic) data is based on axial tensile tests performed at 20 ºC, 25 ºC, and 350ºC on fuel rod cladding irradiated in PWRs.

The hydrogen content of the M5 cladding tested was "typical" for the burnup (fluence) achieved (i.e., it was in the range shown in Figure RAI 28-1). From the plot of hydrogen content versus burnup in Figure RAI 28-1, the hydrogen content for M5 fuel rod cladding is much less than that of Zr-4 (and other zirconium alloys) at high burnup. At the current burnup limit of 62 GWd/tU, the hydrogen content of Zr-4 cladding is approaching the 700 ppm limit for cladding while in M5 it is less than 100 ppm. The photomicrograph in Figure RAI 28-1 shows circumferential hydride in M5 cladding irradiated to 70 GWd/tU and having total hydrogen content of 70 ppm. This is the typical and expected hydrogen performance of M5 irradiated in a PWR.

The data in Figure RAI 28-1 also shows that the evolution of hydrogen with burnup for M5 is linear and that the maximum expected hydrogen content is reached at relatively low burnup.

Therefore, M5 cladding has been tested at EOL burnups with hydrogen content typical for the alloy and has been found to be within the 1% strain criterion. Therefore, the 1% strain limit will be met at current licensed PWR burnup and at potentially higher future burnups.

***RAI-29.*** *Please provide example small and large break LOCA initialization results (time zero for transient) from the approved fuel performance code such as fuel stored energy, gap conductance and rod pressure. This should include the input for the fuel performance code and the output results such that a confirmatory analysis can be performed with the NRC fuel performance code. The output results provided should include those parameters used to initialize the LOCA such as peak node (identify node) stored energy, gap conductance, rod pressure, etc. If the input at time zero are estimated by the LOCA system code from a fuel performance code result the methodology used by the LOCA code to simulate the fuel performance code result should be described along with the initialization results such as stored energy, gap conductance and rod pressure. What methodology is used to determine the limiting initial conditions for small and large break LOCA because these results change with burnup? The following input information is needed to perform confirmatory analyses:*

*a.* *<u>Rod Size</u>*
*Outer diameter, Inner diameter, Pellet diameter, Stack length, Plenum length*

*b.* *<u>Spring Dimensions</u>*
*Spring outer diameter, Spring wire diameter, Number of spring turns*

*c.* *<u>Pellet Shape</u>*
*Pellet height, Central hole radius, Dish radius, Dish depth*

*d.* *<u>Pellet Isotopics</u>*
*Fuel U-235 enrichment, O/M ratio, Gadolinia content*

*e.* *<u>Pellet Fabrication</u>*
*Pellet density, Pellet surface roughness, Expected density increase (max densification)*

*f.* *<u>Cladding Fabrication</u>*
*Cladding type, Cladding cold work, Cladding surface roughness*

*g.* *<u>Rod Fill Conditions</u>*
*Fill gas pressure, Fill gas*

*h.* *Reactor Conditions*
*Type of plant, rod pitch, coolant pressure, coolant inlet temperature, coolant mass flux*

*i.* *Power History*
*Time, Linear heat generation rate (preferably rod average), Index for axial power profile shape, Axial power profiles*

**Response 29:**

Small-Break Loss-of-Coolant Accident (SBLOCA) Initialization Results

In the U.S. EPR SBLOCA analysis, the initial fuel rod conditions for the system analysis are obtained from RODEX2-2A where the fuel exposure is extended to the desired burnup, usually EOC conditions (Reference RAI 29-1, Section 4.1). The gap conditions (i.e., gap dimensions, gas composition, and gas inventory) used to initialize S-RELAP5 are taken at EOC. For the SBLOCA event, the peak cladding temperature (PCT) is expected to occur near EOC because of the top-skewed axial power shape which results in a longer hot spot uncovery period, higher fuel internal pressure and higher actinide decay heat at this fuel exposure point. The top peak power shape, which occurs at EOC, also leads to less level swelling and liquid entrainment at the hot spot location. The reactor trips and the PCT is predicted well into the transient. At the time of the PCT the initial stored energy has been dissipated; therefore, it does not have any considerable effect on the PCT. The impact of initial stored energy (maximum near beginning-of-cycle (BOC) exposures) on SBLOCA analysis is negligible and BOC cases were not considered.

The SBLOCA methodology uses a power history in the RODEX2-2A calculation that is obtained from neutronics calculations for normal operation and is the power history that produces the highest EOC gas pressure as determined by the mechanical group. The U.S. EPR currently uses COPERNIC instead of RODEX2-2A to determine fuel properties. A sensitivity study was performed with the U.S. EPR SBLOCA model which demonstrated that the PCT is not sensitive to the power history chosen (Reference RAI 29-1, Section 2.1). Therefore, a representative power history is used in RODEX2-2A and fuel rod conditions that represent a bounding high hot rod burnup at EOC are used in the S-RELAP5 calculation. This approach is consistent with AREVA's response to RAI 15 for ANP-10263P which states, "The actual power history used in the RODEX2-2A code to predict fuel rod conditions at EOC does not have a significant effect on the PCT" (Reference RAI 29-3).

The RODEX2-2A input for the four S-RELAP5 core regions (i.e., hot rod, hot assembly, high powered region, and low-powered region) is consolidated so that only one RODEX2-2A computer run is required.

The input to RODEX2-2A is presented in the enclosed CD and is titled "INPUT_RODEX2A." The input also includes the power histories and LHGR for all four rods (representing the four regions) up to the burnup of interest. The axial power shapes for the four rods used by RELAP5 to calculate the temperatures are also provided in the enclosed CD in a spreadsheet file titled RAI-29_SBLOCA_ powershapes.xls.

For the four-core regions (i.e., hot rod, hot assembly, inner core region, and outer core region), the same end time is used at which the gap conditions are taken for input to the S-RELAP5 calculation. Using the same time (i.e., the time corresponding to hot rod EOC maximum exposure for the power history used) for the four regions is acceptable for several reasons. First, the fuel is assumed to be fresh, when in actuality the fuel in the "average" core is already burned and would have lower stored energy. Second, once the gap conductance gets in the range of thousands of Btu/hr/ft$^2$/$^o$F, it is no longer the limiting thermal resistance and thus has a minor effect on stored energy and PCT. Third, stored energy is a minor effect for SBLOCA, since the initial stored energy is released much earlier in the transient than PCT occurs. Fourth, only the hot rod gap conditions have significant impact on the SBLOCA results; the gap conditions in the other three core regions have a negligible effect.

The last interval directly following the last power history input is a very short period of time (e.g., 0.01 hr) with a "zero" power input of 0.01 kW/ft, from which cold gap conditions are obtained to initialize the S-RELAP5 model. The power profile for this interval will be the same as that used for the previous interval (i.e., the final EOC burnup interval).

The average LHGR input for the hot rod and the hot assembly in the power history input is multiplied by the fraction of energy generated in the fuel. The average LHGR input for the four-core regions is conservatively multiplied by 1.04.

<u>S-RELAP5/RODEX2-2A Fuel Model</u>

The RODEX2-2A results at the desired burnup are transferred to S-RELAP5 via a binary file (rodex2d) containing fuel temperature and gap condition data for fuel gap initialization purposes. A steady-state calculation using S-RELAP5 is performed that initializes the system model to plant operating conditions at the burnup of interest utilizing the rodex2d binary file. The binary file is not needed for transient system calculations.

A detailed fuel model, based on the models incorporated in the RODEX2-2A code (References RAI 29-2 and RAI 29-4), has been incorporated into S-RELAP5. The RODEX2-2A models in S-RELAP5 are identical to those in the RODEX2-2A code except for the following:

- A clad ballooning and rupture strain model was added to calculate cladding deformations which can occur with elevated cladding temperatures when the internal rod pressure exceeds the coolant channel pressure.

- The RODEX2-2A quasi-steady-state temperature solution algorithm was replaced by the S-RELAP5 transient temperature solution algorithm. The S-RELAP5 algorithm accounts for the thermal capacitance of the fuel.

- The oxidation thickness for metal water reaction computation is set to zero at the start of SBLOCA.

The S-RELAP5/RODEX2-2A model does not calculate the burnup response of the fuel. Instead, fuel conditions at the burnup of interest (gas release, pellet densification and swell, pellet creep, and cladding creep) are obtained by S-RELAP5 from the binary data file from RODEX2-2A describing fuel at zero power, establishing the initial state of the fuel prior to the transient. A steady-state S-RELAP5 calculation is required to establish the fuel state at power. Table RAI 29-1 identifies the key variables read by S-RELAP5 from the rodex2d file in alphabetical order.

The RODEX2-2A thermal-mechanical model with the addition of heat capacity and ballooning is used to determine the fuel thermal properties (conductivity and capacity) needed for solving S-RELAP5 conduction equations.

The fuel rod components modeled are the active fuel column, the gap region, the cladding, the upper and lower fuel rod plenums, and the fill gas plus released fission gases present in the void volume. The fuel rod is subdivided into axial and radial sub regions.

At each time step, the fuel rod temperatures of the previous time-step from the S-RELAP5 solution algorithm are used by the RODEX2-2A model to evaluate the heat capacity and thermal conductivity for each axial/radial region. The heat capacity and thermal conductivity are then used by the S-RELAP5 conduction solution algorithm to compute fuel rod temperatures at radial boundaries and mid-elevations for each fuel region, which are then used by the RODEX2-2A models. Since temperatures, pressures, etc. do not change substantially from one time step to the next, the time steps used by S-RELAP5 are sufficiently small to assure convergence in computing S-RELAP5 temperatures and RODEX2-2A thermal properties without requiring an iterative solution algorithm.

The RODEX2-2A model also computes temperatures in the upper and lower fuel rod plenum regions, and the internal rod pressure. The internal rod pressure, the external coolant channel pressures, and the cladding temperatures are used to compute the clad ballooning and/or rupture strains, which in turn are used to calculate the gap width and gap conductance.

Reference RAI 29-5, Section 12, provided details of the RODEX2-2A/RELAP5 coupling.

Material Properties

The elastic modulus and the thermal expansion coefficient for the pellet and cladding are required to compute the deformation in the pellet and cladding. The material properties for the M5 clad where implemented in RODEX2-2A and are described in Reference RAI 29-5, Section 7, and TR Reference 8.

In addition to the model described, the RODEX2-2A/S-RELAP5 has a model for clad radial ballooning and rupture deformation, clad rupture and channel flow area and flow evaluation after rupture. These models did not participate in the steady state calculation.

The RODEX2-2A models were approved by the NRC for Appendix K type calculations (Reference RAI 29-5, Section 12.0). The coupling of S-RELAP with RODEX2-2A was also approved for Appendix K type calculations (Reference RAI 29-5, Section 12.0). The parameters passed by RODEX2-2A to the S-RELAP5 input and used for SBLOCA analysis are listed in Attachment E. The initialized S-RELAP5 conditions are presented in Attachment F. The inputs requested in items (a) through (i) are presented in Attachment G.

The enclosed CD contains the following data for SBLOCA:
- INPUT_RODEX2A.txt
- RAI-29_SBLOCA_powershapes.xls

Realistic Large-Break Loss-of-Coolant Accident (RLBLOCA) Initialization Results

In the U.S. EPR RLBLOCA analysis, the initial fuel rod conditions for system analysis are obtained from RODEX3A computer code (Reference RAI 29-6, Section 3.0). In contrast to the SBLOCA, which assumes conservative fuel rod models consistent with Appendix K requirements (i.e., **[**

**]**

[ ]

The data produced by this method is used primarily to develop input for the RODEX3A code. [ ]

The RODEX3A input for the five S-RELAP5 core regions (i.e., hot rod, hot assembly, surrounding region, average region, and cold outer region) is consolidated so that only one RODEX3A computer run is required for each case in the 59-case RLBLOCA analysis. The gadolinia rods are treated as hot rods, the same as the UO2 rod.

The input to RODEX3A for Case 44 is attached in the enclosed CD and is titled "rodex3a.input." Case 44 is the maximum PCT case calculated for the equilibrium fuel cycle (U.S. EPR FSAR Tier 2 Section 15.6.5.1.3). The input also includes the power histories and LHGR for all five regions up to the burnup of interest. The axial power shapes for each region used by S-RELAP5 to calculate the temperatures are attached in the enclosed CD in a spreadsheet file titled RAI-29_RLBLOCA_powershapes.xls.

The S-RELAP5/RODEX3A model does not calculate the burnup response of the fuel. Instead, fuel conditions at the burnup of interest are obtained by S-RELAP5 from the binary data file from RODEX3A, rodex3d, describing fuel at zero power, establishing the initial state of the fuel prior to the transient (Reference RAI 29-8, Section 3.4.9.3). Table RAI 29-2 identifies the key variables read by S-RELAP5 from the rodex3d file in alphabetical order.

A steady-state S-RELAP5 calculation is required to establish the fuel state at power. During steady-state initialization, S-RELAP5 processes only this rodex3d file and the steady-state plant model input (Reference RAI 29-7, Section 5.2.2). The rodex3d file is not needed for transient system calculations.

A detailed fuel model, based on the models incorporated in the RODEX3A code has been incorporated in S-RELAP5. The S-RELAP5/RODEX3A models are identical to those in the RODEX3A code except for the following:

- The cladding thermal property routine was changed to compute properties at the higher temperatures possible in a transient.

- The RODEX3A quasi-steady-state temperature solution algorithm was replaced by the S-RELAP5 transient temperature solution algorithm. The S-RELAP5 algorithm accounts for the thermal capacitance of the fuel.
- The oxidation thickness for metal water reaction computation is set to zero at the start of RLBLOCA (Reference RAI 29-9, responses to RAIs 28c and 28d; the response to RAI 28a addresses cladding swelling and rupture not being considered for RLBLOCA).

The fuel rod components modeled are the active fuel column, the gap region, the cladding, the upper and lower plenum volumes, and the fill gas plus released fission gases present in the void volume. The fuel rod is subdivided into axial and radial subregions.

The S-RELAP5/RODEX3A models compute the heat capacity and thermal conductivity for each axial and radial region, which S-RELAP5 uses in its temperature solution algorithm. The S-RELAP5/RODEX3A models also compute temperatures in the upper and lower fuel plenum regions and the internal rod pressure.

Since parameters such as temperatures and pressures do not change rapidly from one time step to the next, the time steps used by S-RELAP5 are sufficiently small to achieve convergence in computing S-RELAP5 temperatures and RODEX3A thermal properties without requiring an iterative solution algorithm.

The parameters passed by RODEX3A to S-RELAP5 for Case 44 are listed in Attachment H and the initialized S-RELAP5 conditions are presented in Attachment I. Attachments H and I only contain information for the hot rod. Similar information for the hot rod and for all other core regions is contained in enclosed CD (files Complete_Attachment_H.doc and Complete_Attachment_I.doc).

The inputs requested in items (a) through (j) are presented in Attachment G.

The enclosed CD contains the following data for RLBLOCA:
- rodex3a_input
- RAI-29_RLBLOCA_powershapes.xls
- Complete_Attachment_H.doc
- Complete_Attachment_I.doc

References:

RAI 29-1. ANP-10263(P)(A), Revision 0, “Codes and Methods Applicability Report for the U.S. EPR,” August 2007.

RAI 29-2. XN-NF-81-58(P) (A), Supplements 1 and 2, Revision 2, “RODEX2 Fuel Thermal-Mechanical Response Evaluation Model,” Exxon Nuclear Company, March 1984.

RAI 29-3. Letter, Ronnie L. Gardner (AREVA NP Inc.) to Document Control Desk (NRC), "Response to an RAI on the Topical Report ANP-10263P ‘Codes and Methods Applicability Report for the U.S. EPR’," NRC:07:012, March 28, 2007.

RAI 29-4. ANF-81-58(P)(A), Revision 2, Supplements 3 and 4, “RODEX2 Fuel Thermal-Mechanical Response Evaluation Model,” Advanced Nuclear Fuels Corporation, June 1990.

RAI 29-5. EMF-2100(P), Revision 3, “S-RELAP5 Models and Correlations Code Manual,” Siemens Power Corporation, January 2001.

RAI 29-6. ANP-10278(P), Revision 0, “U.S. EPR Realistic Large Break Loss of Coolant Accident Topical Report,” March 2007.

RAI 29-7. EMF-2103(P)(A), Revision 0, “Realistic Large Break LOCA Methodology for Pressurized Water Reactors,” April 2003.

RAI 29-8. EMF-2101(P), Revision 3, “S-RELAP5 Programmers Guide,” May 2004.

RAI 29-9. Letter, James F. Mallay (Framatome ANP Inc.) to Document Control Desk (NRC), “Responses to a Request for Additional Information on EMF-2103(P) Revision 0, ‘Realistic Large Break LOCA Methodology for Pressurized Water Reactors’,” NRC:02:062, December 20, 2002.

***RAI-30.*** *Were rods included or excluded from the grids for the impact and static load tests? If the rods were present were the springs relaxed to simulate EOL conditions? Section 5.1.1.5 notes that a 95/95 one sided confidence of the mean elastic limit from the tests was used to verify that the grids remain within the elastic range; however, most licensing analyses require a 95/95 one sided confidence of the data and not a 95/95 of the mean. Please discuss this discrepancy.*

**Response 30:**

Simulated rods in the form of cladding tube segments were included in the grids during the impact and static load tests. Grid testing was performed on both BOL and simulated EOL conditions, using cladding segments. Grid strength limits for BOL conditions were used in the structural evaluation of the U.S. EPR fuel assembly; as noted in TR Section 5.1.1.5:

> "The grid evaluation for dynamic impact was performed against the strength criterion defined in the recently revised Standard Review Plan (Reference 1). The standard review plan indicates that the grid strength can be evaluated at BOL conditions and that this is also appropriate for irradiated conditions. The methodology used to evaluate the grids in the horizontal faulted analysis in section 5.3.4.1, per reference 14 (ANP-10285P), is in compliance with the Standard Review Plan (Reference 1)."

TR Section 5.1.1.5 does state that "a 95/95 one sided confidence of the mean elastic limit from the tests was used to verify that the grids remain within the elastic range." This wording is consistent with the method used in the data reduction and is consistent with the method in Standard Review Plan (SRP) Section 4.2, Appendix A (Section III, Determination of Strength, Part 1, Grids) as follows:

> "Therefore, average values are appropriate, and the allowable crushing load P(crit) should be the 95-percent confidence level on the true mean as taken from the distribution of measurements on unirradiated production grids at (or corrected to) operating temperature."

Thus, AREVA NP believes that there is no discrepancy or deviation from the approved methodology or the SRP.

# Attachment B

# RAI Response Tables

Table RAI 21-1: Axial Power Shapes used for Condition I and II Transients at each EOC

Table RAI 21-2: Power History Information for $UO_2$ Fuel Rod

Table RAI 21-2: Power History Information for $UO_2$ Fuel Rod

Table RAI 21-2: Power History Information for $UO_2$ Fuel Rod

Table RAI 21-2: Power History Information for $UO_2$ Fuel Rod

Table RAI 21-2: Power History Information for $UO_2$ Fuel Rod

Table RAI 21-2: Power History Information for $UO_2$ Fuel Rod

Table RAI 21-2: Power History Information for $UO_2$ Fuel Rod

Table RAI 21-2: Power History Information for $UO_2$ Fuel Rod

Table RAI 21-2: Power History Information for $UO_2$ Fuel Rod

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Table RAI 21-2: Power History Information for $UO_2$ Fuel Rod

Table RAI 21-2: Power History Information for $UO_2$ Fuel Rod

Table RAI 21-2: Power History Information for $UO_2$ Fuel Rod

Table RAI 21-2: Power History Information for $UO_2$ Fuel Rod

Table RAI 22-1: Power History Information for 8 w/o Gadolinia $UO_2$:$Gd_2O_3$ Fuel Rod

Table RAI 22-1: Power History Information for 8 w/o Gadolinia $UO_2$:$Gd_2O_3$ Fuel Rod

Table RAI 22-1: Power History Information for 8 w/o Gadolinia $UO_2$:$Gd_2O_3$ Fuel Rod

Table RAI 22-1: Power History Information for 8 w/o Gadolinia $UO_2$:$Gd_2O_3$ Fuel Rod

Table RAI 22-1: Power History Information for 8 w/o Gadolinia $UO_2$:$Gd_2O_3$ Fuel Rod

Table RAI 22-1: Power History Information for 8 w/o Gadolinia $UO_2$:$Gd_2O_3$ Fuel Rod

Table RAI 22-1: Power History Information for 8 w/o Gadolinia $UO_2$:$Gd_2O_3$ Fuel Rod

Table RAI 22-1: Power History Information for 8 w/o Gadolinia $UO_2$:$Gd_2O_3$ Fuel Rod

Table RAI 22-1: Power History Information for 8 w/o Gadolinia $UO_2$:$Gd_2O_3$ Fuel Rod

Table RAI 22-1: Power History Information for 8 w/o Gadolinia $UO_2$:$Gd_2O_3$ Fuel Rod

Table RAI 22-1: Power History Information for 8 w/o Gadolinia $UO_2$:$Gd_2O_3$ Fuel Rod

Table RAI 22-1: Power History Information for 8 w/o Gadolinia $UO_2$:$Gd_2O_3$ Fuel Rod

Table RAI 22-1: Power History Information for 8 w/o Gadolinia $UO_2$:$Gd_2O_3$ Fuel Rod

Table RAI 22-2: Normalized Axial Power Shape used in Determining the FCM and 1%CS LHGR Limits

Table RAI 22-3: Fuel Centerline Melt LHGR Limits for $UO_2$ Fuel Rods

Table RAI 22-4: 1% Clad Strain LHGR Limits for $UO_2$ Fuel Rods

Table RAI 22-5: Fuel Centerline Melt LHGR Limits for 8 w/o Gadolinia Fuel Rods

Table RAI 22-6: 1% Clad Strain LHGR Limits for 8 w/o Gadolinia Fuel Rods

Table RAI 23-1: U.S. M5 Fuel Examinations Completed since 2003

Table RAI 23-2: Other U.S.M5 Fuel Examinations Planned for Completion by the end of 2008

Table RAI 25-1: MOGADOR Geometrical Input Data

* Not a direct input – provided for comparison

Table RAI 25-2: MOGADOR Input Data - Thermal Hydraulic Input Data Pressure Loss Coefficients

[ ]

* Combined ISG and MSMG

Table RAI 25-3: MOGADOR Input Data - Temperature and Flow Rate

[ ]

Table RAI 25-4: MOGADOR Input Data – Spacer Grid Spring

* Not a direct input – provided for information

Table RAI 25-5; MOGADOR Input Data – Holddown Spring Parameters

Table RAI 25-6: Comparison of BOL and EOL Core Plate Gap Margin

| Design | Minimum BOL Gap margin (inches) | Minimum EOL Gap margin at 65 GWd/mtU (inches) |
|---|---|---|
| U.S. EPR | [ ] | [ ] |
| Mark-BW | [ ] | [ ] |
| Mark-B12 | [ ] | [ ]<br>[<br>] |

Table RAI 28-1: Total Elongation Data for Irradiated M5 Fuel Rod Cladding at Room Temperature and Elevated Temperature

# Table RAI 29-1: RODEX2-2A Variable List Read by S-RELAP5

| Variable | Description |
|---|---|
| Axlngx | Axial Node Lengths (in) |
| cfrrcx | Cladding Radial-Radial Flexibility |
| compx | (Pu,Gd)O2 Weight Fraction |
| dapdsx | Axial Densification + Swelling Strains in Pellet (in/in) |
| drgapx | Radial Displacement Due to Clad Creep - Pellet Creep - Pellet Densification - Pellet Swelling (in) |
| drphlx | Radial Increment Due to Creep Into Hole (in) |
| dshvol | Dish Volume as Fraction of Fuel Volume |
| fgprex | Internal Rod Gas Pressure (psia) |
| fudblk | Not Used in S-RELAP5 |
| fudenx | Fuel Density Fraction at Fabrication |
| gasmol | Gas Mole Fraction |
| gasmwt | Gas Molecular Weight |
| gastom | Total Moles of Gas Internal to Fuel Rod |
| hgapx | Gap Conductance (w/m2*k) |
| icccgx | S-RELAP5 Geometry Index to Which Data Applies |
| iddate | Part of RODEX2-2A Header |
| idtime | Part of RODEX2-2A Header |
| idsgas | Gas ID Number |
| idvers | Part of RODEX2-2A Header |
| lblk | Flag to Read in Additional Variables |
| matcx | Index Defining Cladding Material |
| matpx | Index Defining Pellet Material |
| narpx | Total Number of Axial Regions |
| nden | Index of Ring with Bridging Radius |
| nrdix | Number of Radial Regions in Pellet Dish |
| nrodsx | Number of Rods on File |
| pcrex | Radial Elastic Deflection Coefficient for Coolant Pressure |
| pgrex | Radial Elastic Deflection Coefficient for Gas Pressure |
| poshx | Fuel Pellet Void Fraction |
| poisc | Not used by S-RELAP5 |
| poisfx | Poisson's Ratio Fuel |
| powfrc | Power Fraction |
| rbrdg | Bridge Radius |
| rgix | Radial Grid Locations |
| ricx/riblk | Clad Inner Radius (in) |
| ripx/riblk | Pellet Inner Radius (in) |
| rmeanx | Pellet + Clad Surface Roughness (in) |
| rocx/roblk | Clad Outer Radius (in) |
| ropx/roblk | Pellet Outer Radius (in) |
| swmden | Fraction of Theoretical Density Accommodating Fuel Swelling |
| vdshsx | Current Region Dish Volume (in3) |
| zact | Total Active Core Axial Length (in) |
| zcrgwx | Change in Cladding Length Due to Creep + Anisotropic Axial Growth of Cladding (in) |
| zplxnl | Fabricated Lower Plenum Length (in) |
| zplxnu | Fabricated Upper Plenum Length (in) |

# Table RAI 29-2: RODEX3A Variable List Read by S-RELAP5

| Variable | Description |
|---|---|
| axlng | Axial Node Lengths (in) |
| cfrrc | Cladding Radial-Radial Flexibility |
| cfrzc | Cladding Radial-Axial Flexibility |
| cfzzc | Cladding Axial-Axial Flexibility |
| crdflm | Crud Film Heat Transfer Coefficient |
| comp | $(Pu,Gd)O_2$ Weight Fraction |
| day | Part of RODEX3D Header |
| daccg | Axial Creep + Growth Strains in Clad (in/in) |
| dapds | Axial Densification + Swelling Strains in Pellet (in/in) |
| dpcr | Pellet Segment Displacement Due to Solid Swelling (in) |
| drgap | Radial Displacement Due to Clad Creep - Pellet Creep - Pellet Densification - Pellet Swelling (in) |
| drphl | Radial Increment Due to Creep Into Hole (in) |
| dshvol | Dish Volume as Fraction of Fuel Volume |
| ezatl | Fuel/Cladding Axial Relative Slip |
| fgpres | Internal Rod Gas Pressure (psia) |
| frzt | Flexibility Radial Direction-Axial Force (in/lb) |
| fudens | Fuel Density Fraction at Fabrication |
| fzzt | Flexibility Axial Direction-Axial Force (in/lb) |
| gascof | Coefficient Used to Compute Gas |
| gastot | Total Moles of Gas Internal to Fuel Rod |
| hgap | Gap Conductance ($w/m^2*k$) |
| igmtry | S-RELAP5 Geometry Index to Which Data Applies |
| irod | Number of Rods on File |
| lock | Locking Index (0:Slip, 1:Locked, 2:Trapped Stack) |
| matc | Index Defining Cladding Material |
| matpm | Index Defining Fuel Pellet |
| narp | Total Number of Axial Regions |
| nrbp | Number of Radial Boundaries in Pellet |
| nrbt | Number of Radial Boundaries Total |
| nrdi | Number Radial Regions in Pellet Dish |
| nrrp | Number of Radial Regions in Pellet |
| nrrt | Number of Radial Regions Total and/or Clad Inner Surface Radial Boundary Number |
| pcae | Axial Elastic Deflection Coefficient for Coolant Pressure |
| pclmt1 | Constant for Setting Upper Contact Pressure Limit (psia) |
| pclmt2 | Constant for Setting Upper Contact Pressure Limit (psia/F) |
| pcre | Axial Elastic Deflection Coefficient for Coolant Pressure |
| pgae | Axial Elastic Deflection Coefficient for Gas Pressure |
| pgre | Radial Elastic Deflection Coefficient for Gas Pressure |
| poisf | Poissons Ratio Fuel |
| qf | Normalized Axial LHGR Distribution |
| rffp | Additional Roughness Due to Fission Products (in) |
| ric | Clad Inner Radius (in) |
| rip | Pellet Inner Radius (in) |
| rmean | Pellet + Clad Surface Roughness (in) |

| Variable | Description |
|---|---|
| roc | Clad Outer Radius (in) |
| rop | Pellet Outer Radius (in) |
| rr | Gas Constant |
| swmden | Fraction of Theoretical Density Accommodating Fuel Swelling |
| taulp | Time Constant for Response of Lower Fuel Rod Plenum Temperature to Coolant Temperature |
| tauup | Time Constant for Response of Upper Fuel Rod Plenum Temperature to Coolant Temperature |
| timx | Part of RODEX3D Header |
| tplnlo | Rod Lower Plenum Temperature (F) |
| tplnuo | Rod Upper Plenum Temperature (F) |
| trefx | Reference Temperature (F) |
| vdez | Fuel/Cladding Axial Interaction |
| vdshc | Current Region Dish Volume ($in^3$) |
| voidfc | Void Fraction for Thermal Conductivity and Apparent Gaseous Swelling ($in^3$) |
| xcor | Thickness of Clad Outer zro2 Layer (in) |
| xotm | Oxygen to Metal Ratio Minus 20 |
| zcrgw | Change in Cladding Length Due to Creep + Anisotropic Axial Growth of Cladding (in) |
| zplenl | Fabricated Lower Plenum Length (in) |
| zplenu | Fabricated Upper Plenum Length (in) |
| zpst | Fuel-Cladding Axial Interaction Force (lbs) |

# Attachment C

# RAI Response Figures

Figure RAI 21-1: Axial Power Shapes used for Condition I and II Transients at each EOC

Figure RAI 22-1: Normalized Axial Power Shape used in Determining the FCM and 1%CS LHGR Limits

Figure RAI 22-2: FCM and 1%CS LHGR limits for the $UO_2$ and 8 w/o Gadolinia Fuel Rods

Figure RAI 23-1: M5 Fuel Rod Cladding Oxide Measurements

Figure RAI 23-2: M5 Fuel Rod Growth Rate Measurements

Figure RAI 23-3: M5 Fuel Assembly Growth Rate Measurements with Initial BAW-10227PA, Revision 1 Growth Model

[ ]

Figure RAI 23-4: Measurements of Batch Mark-BW Fuel and Updated Assembly Growth Model

[ ]

Figure RAI 23-5: Measurements of Batch Mark-B11A/B12 Fuel and Updated Assembly Growth Model

[ ]

Figure RAI 23-6: Measurements of Batch Mark-B-HTP and Updated Assembly Growth Model

Figure RAI 23-7: M5 Shoulder Gap Closure Measurements

Figure RAI 23-8: U.S. Poolside Fuel Rod Diameter Measurements, Differential from Design Nominal Diameter

[ ]

Figure RAI 23-9: Grid-to-rod Interface Marks Recorded for a Typical Mark-BW Assembly at a Burnup of **[ ]**

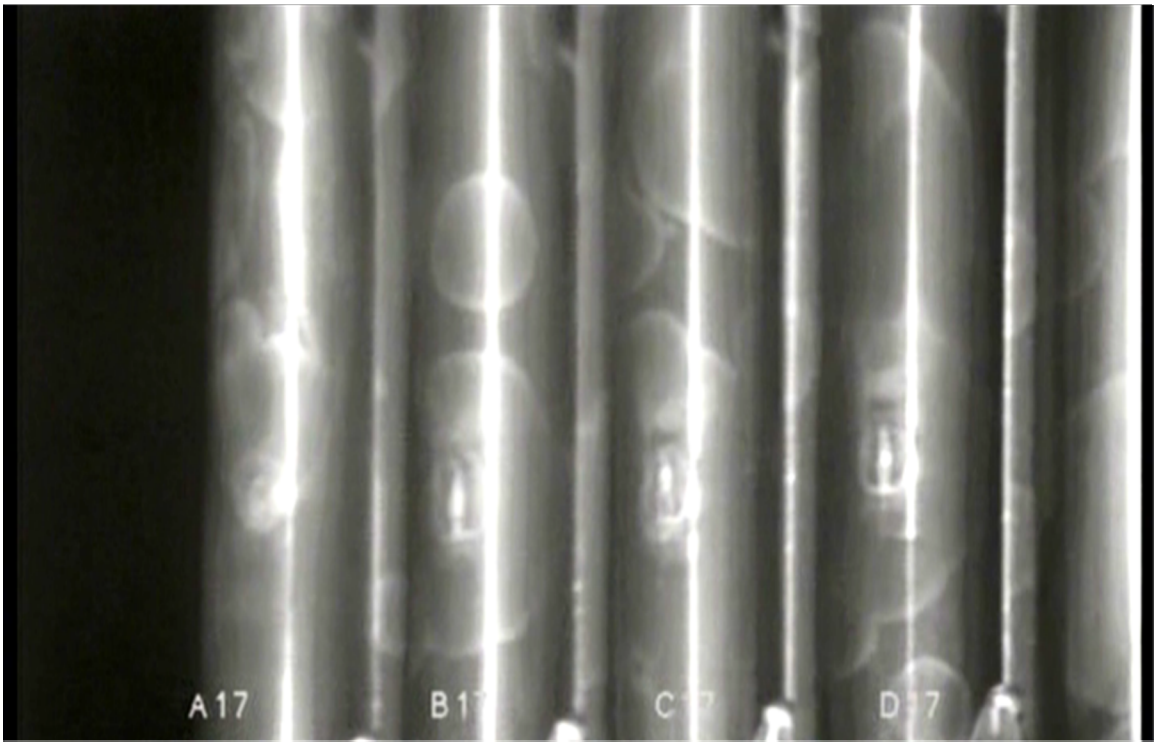

Figure RAI 24-1: Fuel Rod to Fuel Rod Standard Deviation versus Burnup

70

Figure RAI 24-2: Guide Tube to Fuel Rod Standard Deviation versus Burnup

Figure 25-1: Mark-BW Fuel Assembly Growth Analytical vs Empirical

Figure 25-2: Mark-BW Fuel Assembly Nominal Calculated Growth vs Average Guide Tube Stress

Figure 25-3: Fuel Assembly Fast Fluence to Burnup Relationship

Figure RAI 25-4: Mark-BW Fuel Design Growth Comparison

Figure RAI 25-5: Mark-BW Fuel Design Average Guide Tube Stress Comparison

Figure RAI 25-6: Mark-B12 Fuel Assembly Growth Analytical vs Empirical

Figure RAI 25-7: Mark-B12 Fuel Assembly Growth Analytical vs Empirical - All Mark-B Data

Figure RAI 25-8 : Mark-B12 Fuel Assembly Nominal Calculated Growth vs Average Guide Tube Stress

Figure RAI 25-9: Mark-B11A Fuel Assembly Growth Analytical vs Empirical (Nominal)

Figure RAI 25-10: U.S. EPR Fuel Assembly Growth – Calculated

Figure RAI 25-11: U.S. EPR Fuel Assembly Growth Design Limits

Figure RAI 25-12: U.S. EPR Fuel Assembly Nominal Calculated Growth vs Average Guide Tube Stress

[ ]

Figure RAI 25-13: Comparison of Calculated Fuel Assembly Growth

Figure RAI 25-14: Comparison of Calculated Average Guide Tube Stress

Figure RAI 26-1: Grid Growth Data for M5 and Zircaloy-4 Spacer Grids

Figure RAI 26-2: Oxide Thickness vs. Burnup for M5 PWR Fuel Assembly Spacer Grids

Figure RAI 26-3: Zr-4 Spacer Grid Average Oxide Thickness vs. Burnup

Figure RAI 26-4: Oxide Thickness vs. Hydrogen Content for M5 PWR Fuel Assembly Guide Tube

Figure RAI 26-5: Hydrogen Content vs. Burnup for M5 PWR Fuel Assembly Fuel Rod

Figure RAI 26-6: Hydrogen Content vs. Oxide Thickness for M5 PWR Fuel Assembly Fuel Rods

Figure RAI 27-1: Distribution of HTP Assemblies with HMP Grids vs. Burnup

[ ]

Figure RAI 28-1: Circumferential Hydride in M5 Cladding Irradiated to 70 Gwd/tU and Having Total Hydrogen Content of [ ]

# Attachment D

# Topical Report Marked-up Pages

### 5.1.6 Fuel Rod Bow

Fuel rod bowing is evaluated with respect to the mechanical and thermal-hydraulic performance of the fuel assembly. Although there is no specific design mechanical criterion for fuel rod bow, the design follows the rod bow limits as established in Reference ~~10~~15.

The current post-irradiation examination (PIE) database of fuel rod bow performance, measured as the standard deviation (i.e., mils) of the~~ minimum of~~ water channel (i.e., gap space between adjacent fuel rods), is provided in Figure 5-2. Assembly features such as M5™ cladding are segregated for convenience.

**Figure 5-2 Worst Case Water Channel Closure versus Burnup**

Because there is no U.S. fuel rod bow data specific for fuel assemblies with HTP grids, AREVA has performed a comparative evaluation of the U.S. EPR fuel assembly with respect to existing fuel designs in order to predict future performance relative to current bowing data. Key factors such as slip load, rod dimensions, span lengths, rod growth, and physics were evaluated.

The design slip load of the U.S. EPR HMP upper end grid is less than any other approved 17x17 designs. Because the upper end grid slip is 44% lower than the lower end grid the slip of the upper end grid governs the performance of the assembly with regard to rod bow. Intermediate M5™ grid slip loads were not considered to be a factor because they will relax early in the first cycle of operation. The high degree of fuel rod rotational fixity afforded by HTP and HMP grid line contacts significantly improves any adverse tendency for rod bow.

The influence of span length between spacer grids on rod performance is not an adverse factor because the average span lengths for the U.S. EPR design are shorter than that for 12 ft MK-BW designs for which PIE data is available. Likewise, the magnitude of flux applied to the U.S. EPR fuel rods is consistent with other core designs for which PIE data is available.

The lower growth characteristics of the M5™ advanced material that is used on the U.S. EPR can be expected to result in fuel rod bow behavior that is no more severe than the Zircaloy-4 clad fuel. The growth of M5™ for equivalent burnups across the entire range of the database has been demonstrated by irradiation experience to be consistently lower than Zircaloy-4 for each fuel design type, both in the U.S. and in Europe.

In consideration of the PIE data and the comparative design feature evaluations, AREVA has concluded that rod bow performance is similar to that of other AREVA NP designs and that the rod bow correlations from ~~Reference 10 and~~ Reference15, previously approved by the NRC, are applicable to the U.S. EPR fuel assembly design including consideration of extended burnup conditions.

# SBLOCA Analysis: Parameters Passed by RODEX2-2A to S-RELAP5 Input

```
1     ----  EDIT OF RODEX2 MODEL INPUT  -----
0 INPUT FILE, rodex2d, was created on 02/12/07 AT 13:37:41 WITH RDX2LSE VERSION: uapr02
0 -----------  S-RELAP5/RODEX2 FUEL MODEL INPUT FOR ROD #    1   ------------
    HEAT STRUCTURE-GEOMETRY ID NUMBER:    201
    CLAD MATERIAL TYPE:   1151
    FUEL PELLET MATERIAL TYPE:    111
    TOTAL NUMBER OF AXIAL REGIONS:     38
    NUMBER OF RADIAL REGIONS IN PELLET:      8    NUMBER OF RADIAL REGIONS IN PELLET DISH:      6
    CLAD INNER RADIUS (IN):     0.16455
    CLAD OUTER RADIUS (IN):     0.18700
    PELLET + CLAD SURFACE ROUGHNESS (IN):     9.50000E-05
    FABRICATED LOWER PLENUM LENGTH (IN):      1.8810
    FABRICATED UPPER PLENUM LENGTH (IN):      6.7010
    TOTAL ACTIVE CORE AXIAL LENGTH (IN):      165.35
    FUEL DENSITY FRACTION AT FABRICATION:     0.96000
    GD2O3 WEIGHT FRACTION:      0.0000
    CHANGE IN CLADDING LENGTH DUE TO CREEP + ANISOTROPIC AXIAL GROWTH OF CLADDING (IN):     0.73847
    INTERNAL ROD GAS PRESSURE (PSIA):      683.31
    TOTAL MOLES OF GAS INTERNAL TO FUEL ROD (GMMOLES):     2.08320E-02
           FUEL GAS MOLE FRACTION
    HELIUM         NITROGEN       KRYPTON        XENON
        0.95136        9.60971E-03    5.16193E-03    3.38667E-02
    LA     = AXIAL NODE NUMBER
    NDEN   = RADIAL NODE NUMBER OF FIRST FUEL REGION WITH CRACKING
    AXLNG  = AXIAL NODE LENGTHS (IN)
    RIP    = PELLET INNER RADIUS (IN)
    ROP    = PELLET OUTER RADIUS (IN)
    DRGAP  = RADIAL DISPLACEMENT DUE TO CLAD CREEP - PELLET CREEP - PELLET DENSIFICATION - PELLET SWELLING (IN)
    DRPC   = PELLET RADIAL DISPLACEMENT DUE TO CREEP AND CRACKING (IN)
    DRPHL  = RADIAL INCREMENT DUE TO CREEP INTO HOLE (IN)
    DAPDS  = AXIAL INCREMENT DUE TO DENSIFICATION AND SWELLING IN PELLET (IN)
    RBRDG  = BRIDGE RADIUS (IN)
    VDSHC  =  CURRENT REGION DISH VOLUME (IN3)
```

| LA | NDEN | AXLNG | RIP | ROP | DRGAP | DRPC | DRPHL | DAPDS | RBRDG | VDSHC |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3.35 | 0.00 | 0.161 | -3.691E-03 | 2.655E-03 | 0.00 | -2.601E-02 | 1.812E-02 | 5.558E-03 |
| 2 | 2 | 6.00 | 0.00 | 0.161 | -3.695E-03 | 2.655E-03 | 0.00 | -2.600E-02 | 1.812E-02 | 5.558E-03 |
| 3 | 2 | 6.00 | 0.00 | 0.161 | -3.840E-03 | 2.579E-03 | 0.00 | -2.211E-02 | 1.858E-02 | 5.251E-03 |
| 4 | 2 | 6.00 | 0.00 | 0.161 | -4.237E-03 | 2.367E-03 | 0.00 | -1.120E-02 | 1.985E-02 | 4.391E-03 |
| 5 | 2 | 6.00 | 0.00 | 0.161 | -4.263E-03 | 2.362E-03 | 0.00 | -1.120E-02 | 1.988E-02 | 4.393E-03 |
| 6 | 2 | 6.00 | 0.00 | 0.161 | -4.454E-03 | 2.264E-03 | 0.00 | -8.249E-03 | 2.057E-02 | 4.717E-03 |
| 7 | 2 | 6.00 | 0.00 | 0.161 | -4.493E-03 | 2.253E-03 | 0.00 | -8.169E-03 | 2.063E-02 | 4.743E-03 |
| 8 | 2 | 6.00 | 0.00 | 0.161 | -4.506E-03 | 2.182E-03 | 0.00 | -7.254E-03 | 2.154E-02 | 4.632E-03 |
| 9 | 2 | 6.00 | 0.00 | 0.161 | -4.492E-03 | 2.115E-03 | 0.00 | -6.837E-03 | 2.220E-02 | 4.587E-03 |
| 10 | 2 | 6.00 | 0.00 | 0.161 | -4.433E-03 | 2.024E-03 | 0.00 | -6.718E-03 | 2.329E-02 | 4.486E-03 |
| 11 | 2 | 6.00 | 0.00 | 0.161 | -4.340E-03 | 1.898E-03 | 0.00 | -6.484E-03 | 2.499E-02 | 4.305E-03 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 2 | 6.00 | 0.00 | 0.161 | -4.269E-03 | 1.811E-03 | 0.00 | -6.590E-03 | 2.572E-02 | 4.325E-03 |
| 13 | 2 | 6.00 | 0.00 | 0.161 | -4.200E-03 | 1.723E-03 | 0.00 | -6.846E-03 | 2.683E-02 | 4.295E-03 |
| 14 | 2 | 6.00 | 0.00 | 0.161 | -4.091E-03 | 1.604E-03 | 0.00 | -6.981E-03 | 2.804E-02 | 4.325E-03 |
| 15 | 2 | 6.00 | 0.00 | 0.161 | -4.096E-03 | 1.601E-03 | 0.00 | -7.596E-03 | 2.708E-02 | 4.536E-03 |
| 16 | 2 | 6.00 | 0.00 | 0.161 | -4.047E-03 | 1.547E-03 | 0.00 | -7.886E-03 | 2.728E-02 | 4.623E-03 |
| 17 | 2 | 6.00 | 0.00 | 0.161 | -4.056E-03 | 1.562E-03 | 0.00 | -8.444E-03 | 2.655E-02 | 4.813E-03 |
| 18 | 2 | 6.00 | 0.00 | 0.161 | -4.094E-03 | 1.608E-03 | 0.00 | -8.973E-03 | 2.548E-02 | 4.999E-03 |
| 19 | 2 | 3.00 | 0.00 | 0.161 | -4.085E-03 | 1.599E-03 | 0.00 | -8.985E-03 | 2.556E-02 | 4.999E-03 |
| 20 | 2 | 3.00 | 0.00 | 0.161 | -4.130E-03 | 1.654E-03 | 0.00 | -9.496E-03 | 2.493E-02 | 5.088E-03 |
| 21 | 2 | 3.00 | 0.00 | 0.161 | -4.207E-03 | 1.748E-03 | 0.00 | -1.035E-02 | 2.387E-02 | 5.236E-03 |
| 22 | 2 | 3.00 | 0.00 | 0.161 | -4.207E-03 | 1.748E-03 | 0.00 | -1.035E-02 | 2.387E-02 | 5.236E-03 |
| 23 | 2 | 3.00 | 0.00 | 0.161 | -4.207E-03 | 1.748E-03 | 0.00 | -1.035E-02 | 2.387E-02 | 5.236E-03 |
| 24 | 2 | 3.00 | 0.00 | 0.161 | -4.207E-03 | 1.748E-03 | 0.00 | -1.035E-02 | 2.387E-02 | 5.236E-03 |
| 25 | 2 | 3.00 | 0.00 | 0.161 | -4.337E-03 | 1.926E-03 | 0.00 | -1.142E-02 | 2.251E-02 | 4.978E-03 |
| 26 | 2 | 3.00 | 0.00 | 0.161 | -4.373E-03 | 1.977E-03 | 0.00 | -1.173E-02 | 2.213E-02 | 4.905E-03 |
| 27 | 2 | 3.00 | 0.00 | 0.161 | -4.373E-03 | 1.977E-03 | 0.00 | -1.173E-02 | 2.213E-02 | 4.905E-03 |
| 28 | 2 | 3.00 | 0.00 | 0.161 | -4.373E-03 | 1.977E-03 | 0.00 | -1.173E-02 | 2.213E-02 | 4.905E-03 |
| 29 | 2 | 3.00 | 0.00 | 0.161 | -4.410E-03 | 2.049E-03 | 0.00 | -1.263E-02 | 2.168E-02 | 4.917E-03 |
| 30 | 2 | 3.00 | 0.00 | 0.161 | -4.570E-03 | 2.362E-03 | 0.00 | -1.655E-02 | 1.971E-02 | 4.968E-03 |
| 31 | 2 | 3.00 | 0.00 | 0.161 | -4.570E-03 | 2.362E-03 | 0.00 | -1.655E-02 | 1.971E-02 | 4.968E-03 |
| 32 | 2 | 3.00 | 0.00 | 0.161 | -4.570E-03 | 2.362E-03 | 0.00 | -1.655E-02 | 1.971E-02 | 4.968E-03 |
| 33 | 2 | 3.00 | 0.00 | 0.161 | -4.570E-03 | 2.362E-03 | 0.00 | -1.655E-02 | 1.971E-02 | 4.968E-03 |
| 34 | 2 | 3.00 | 0.00 | 0.161 | -4.168E-03 | 2.540E-03 | 0.00 | -2.640E-02 | 1.875E-02 | 5.359E-03 |
| 35 | 2 | 3.00 | 0.00 | 0.161 | -3.892E-03 | 2.662E-03 | 0.00 | -3.317E-02 | 1.809E-02 | 5.628E-03 |
| 36 | 2 | 3.00 | 0.00 | 0.161 | -3.892E-03 | 2.662E-03 | 0.00 | -3.317E-02 | 1.809E-02 | 5.628E-03 |
| 37 | 2 | 3.00 | 0.00 | 0.161 | -3.892E-03 | 2.662E-03 | 0.00 | -3.317E-02 | 1.809E-02 | 5.628E-03 |
| 38 | 2 | 3.00 | 0.00 | 0.161 | -3.892E-03 | 2.662E-03 | 0.00 | -3.317E-02 | 1.809E-02 | 5.628E-03 |

FIRST TWO AXIAL LEVEL RADIAL GRID LOCATION (IN)

| LA | RGI VALUES | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.000 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 0.1043 | 0.1328 |
| | 0.1613 | | | | | | | |
| 2 | 0.000 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 0.1043 | 0.1328 |
| | 0.1613 | | | | | | | |

RADIAL POROSITY DISTRIBUTION

| LA | POROSITY VALUES | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 2.6255E-02 | 2.5835E-02 | 2.5088E-02 | 2.4166E-02 | 2.3244E-02 | 2.2482E-02 | 2.1858E-02 | 2.1800E-02 |
| 2 | 2.6280E-02 | 2.5858E-02 | 2.5108E-02 | 2.4182E-02 | 2.3256E-02 | 2.2490E-02 | 2.1862E-02 | 2.1800E-02 |
| 3 | 3.2496E-02 | 3.1657E-02 | 3.0182E-02 | 2.8377E-02 | 2.6598E-02 | 2.5153E-02 | 2.3978E-02 | 2.3740E-02 |
| 4 | 4.9865E-02 | 4.7862E-02 | 4.4360E-02 | 4.0102E-02 | 3.5942E-02 | 3.2606E-02 | 2.9911E-02 | 2.9188E-02 |
| 5 | 4.9837E-02 | 4.7846E-02 | 4.4347E-02 | 4.0094E-02 | 3.5939E-02 | 3.2606E-02 | 2.9912E-02 | 2.9189E-02 |
| 6 | 5.0990E-02 | 4.9051E-02 | 4.5631E-02 | 4.1454E-02 | 3.7364E-02 | 3.4060E-02 | 3.1429E-02 | 3.0744E-02 |
| 7 | 5.0873E-02 | 4.8950E-02 | 4.5554E-02 | 4.1406E-02 | 3.7350E-02 | 3.4077E-02 | 3.1473E-02 | 3.0799E-02 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 8 | 5.2986E-02 | 5.0953E-02 | 4.7353E-02 | 4.2938E-02 | 3.8540E-02 | 3.4892E-02 | 3.1854E-02 | 3.0893E-02 |
| 9 | 5.3920E-02 | 5.1841E-02 | 4.8163E-02 | 4.3633E-02 | 3.9078E-02 | 3.5262E-02 | 3.2028E-02 | 3.0935E-02 |
| 10 | 5.5254E-02 | 5.3068E-02 | 4.9187E-02 | 4.4385E-02 | 3.9533E-02 | 3.5495E-02 | 3.2063E-02 | 3.0878E-02 |
| 11 | 5.7623E-02 | 5.5248E-02 | 5.0998E-02 | 4.5714E-02 | 4.0324E-02 | 3.5912E-02 | 3.2136E-02 | 3.0786E-02 |
| 12 | 5.7403E-02 | 5.5041E-02 | 5.0815E-02 | 4.5557E-02 | 4.0098E-02 | 3.5799E-02 | 3.2091E-02 | 3.0766E-02 |
| 13 | 5.7746E-02 | 5.5333E-02 | 5.1015E-02 | 4.5659E-02 | 3.9955E-02 | 3.5681E-02 | 3.1957E-02 | 3.0621E-02 |
| 14 | 5.7404E-02 | 5.5014E-02 | 5.0738E-02 | 4.5435E-02 | 3.9522E-02 | 3.5489E-02 | 3.1902E-02 | 3.0611E-02 |
| 15 | 5.4774E-02 | 5.2589E-02 | 4.8678E-02 | 4.3844E-02 | 3.8425E-02 | 3.4837E-02 | 3.1634E-02 | 3.0507E-02 |
| 16 | 5.3721E-02 | 5.1611E-02 | 4.7841E-02 | 4.3190E-02 | 3.7849E-02 | 3.4517E-02 | 3.1511E-02 | 3.0468E-02 |
| 17 | 5.1033E-02 | 4.9153E-02 | 4.5799E-02 | 4.1662E-02 | 3.6879E-02 | 3.3926E-02 | 3.1271E-02 | 3.0388E-02 |
| 18 | 4.8346E-02 | 4.6701E-02 | 4.3770E-02 | 4.0151E-02 | 3.5997E-02 | 3.3374E-02 | 3.1043E-02 | 3.0308E-02 |
| 19 | 4.8333E-02 | 4.6688E-02 | 4.3758E-02 | 4.0142E-02 | 3.5966E-02 | 3.3361E-02 | 3.1038E-02 | 3.0306E-02 |
| 20 | 4.6851E-02 | 4.5295E-02 | 4.2536E-02 | 3.9154E-02 | 3.5347E-02 | 3.2916E-02 | 3.0816E-02 | 3.0218E-02 |
| 21 | 4.4357E-02 | 4.2951E-02 | 4.0478E-02 | 3.7492E-02 | 3.4306E-02 | 3.2168E-02 | 3.0441E-02 | 3.0070E-02 |
| 22 | 4.4357E-02 | 4.2951E-02 | 4.0478E-02 | 3.7492E-02 | 3.4306E-02 | 3.2168E-02 | 3.0441E-02 | 3.0070E-02 |
| 23 | 4.4357E-02 | 4.2951E-02 | 4.0478E-02 | 3.7492E-02 | 3.4306E-02 | 3.2168E-02 | 3.0441E-02 | 3.0070E-02 |
| 24 | 4.4357E-02 | 4.2951E-02 | 4.0478E-02 | 3.7492E-02 | 3.4306E-02 | 3.2168E-02 | 3.0441E-02 | 3.0070E-02 |
| 25 | 4.4688E-02 | 4.3172E-02 | 4.0510E-02 | 3.7301E-02 | 3.4083E-02 | 3.1727E-02 | 2.9912E-02 | 2.9593E-02 |
| 26 | 4.4781E-02 | 4.3234E-02 | 4.0519E-02 | 3.7247E-02 | 3.4019E-02 | 3.1602E-02 | 2.9763E-02 | 2.9459E-02 |
| 27 | 4.4781E-02 | 4.3234E-02 | 4.0519E-02 | 3.7247E-02 | 3.4019E-02 | 3.1602E-02 | 2.9763E-02 | 2.9459E-02 |
| 28 | 4.4781E-02 | 4.3234E-02 | 4.0519E-02 | 3.7247E-02 | 3.4019E-02 | 3.1602E-02 | 2.9763E-02 | 2.9459E-02 |
| 29 | 4.3780E-02 | 4.2289E-02 | 3.9674E-02 | 3.6520E-02 | 3.3418E-02 | 3.1074E-02 | 2.9288E-02 | 2.8990E-02 |
| 30 | 3.9405E-02 | 3.8162E-02 | 3.5981E-02 | 3.3345E-02 | 3.0794E-02 | 2.8769E-02 | 2.7213E-02 | 2.6942E-02 |
| 31 | 3.9405E-02 | 3.8162E-02 | 3.5981E-02 | 3.3345E-02 | 3.0794E-02 | 2.8769E-02 | 2.7213E-02 | 2.6942E-02 |
| 32 | 3.9405E-02 | 3.8162E-02 | 3.5981E-02 | 3.3345E-02 | 3.0794E-02 | 2.8769E-02 | 2.7213E-02 | 2.6942E-02 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 33 | 3.9405E-02 | 3.8162E-02 | 3.5981E-02 | 3.3345E-02 | 3.0794E-02 | 2.8769E-02 | 2.7213E-02 | 2.6942E-02 |
| 34 | 2.7662E-02 | 2.7156E-02 | 2.6269E-02 | 2.5197E-02 | 2.4159E-02 | 2.3335E-02 | 2.2702E-02 | 2.2592E-02 |
| 35 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 |
| 36 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 |
| 37 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 |
| 38 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 |

| AXIAL NODE NO. | OUTER CLAD OXIDE THICKNESS (IN) | LEFT-SIDE DIRECT HEATING FRACTION | RIGHT-SIDE DIRECT HEATING FRACTION |
|---|---|---|---|
| 1 | 3.94000E-05 | 0.0000 | 0.0000 |
| 2 | 3.94000E-05 | 0.0000 | 0.0000 |
| 3 | 3.94000E-05 | 0.0000 | 0.0000 |
| 4 | 3.94000E-05 | 0.0000 | 0.0000 |
| 5 | 3.94000E-05 | 0.0000 | 0.0000 |
| 6 | 3.94000E-05 | 0.0000 | 0.0000 |
| 7 | 3.94000E-05 | 0.0000 | 0.0000 |
| 8 | 3.94000E-05 | 0.0000 | 0.0000 |
| 9 | 3.94000E-05 | 0.0000 | 0.0000 |
| 10 | 3.94000E-05 | 0.0000 | 0.0000 |
| 11 | 3.94000E-05 | 0.0000 | 0.0000 |
| 12 | 3.94000E-05 | 0.0000 | 0.0000 |
| 13 | 3.94000E-05 | 0.0000 | 0.0000 |
| 14 | 3.94000E-05 | 0.0000 | 0.0000 |
| 15 | 3.94000E-05 | 0.0000 | 0.0000 |
| 16 | 3.94000E-05 | 0.0000 | 0.0000 |
| 17 | 3.94000E-05 | 0.0000 | 0.0000 |
| 18 | 3.94000E-05 | 0.0000 | 0.0000 |
| 19 | 3.94000E-05 | 0.0000 | 0.0000 |
| 20 | 3.94000E-05 | 0.0000 | 0.0000 |
| 21 | 3.94000E-05 | 0.0000 | 0.0000 |
| 22 | 3.94000E-05 | 0.0000 | 0.0000 |
| 23 | 3.94000E-05 | 0.0000 | 0.0000 |
| 24 | 3.94000E-05 | 0.0000 | 0.0000 |
| 25 | 3.94000E-05 | 0.0000 | 0.0000 |
| 26 | 3.94000E-05 | 0.0000 | 0.0000 |
| 27 | 3.94000E-05 | 0.0000 | 0.0000 |
| 28 | 3.94000E-05 | 0.0000 | 0.0000 |
| 29 | 3.94000E-05 | 0.0000 | 0.0000 |
| 30 | 3.94000E-05 | 0.0000 | 0.0000 |
| 31 | 3.94000E-05 | 0.0000 | 0.0000 |
| 32 | 3.94000E-05 | 0.0000 | 0.0000 |
| 33 | 3.94000E-05 | 0.0000 | 0.0000 |
| 34 | 3.94000E-05 | 0.0000 | 0.0000 |
| 35 | 3.94000E-05 | 0.0000 | 0.0000 |

| | | | |
|---|---|---|---|
| 36 | 3.94000E-05 | 0.0000 | 0.0000 |
| 37 | 3.94000E-05 | 0.0000 | 0.0000 |
| 38 | 3.94000E-05 | 0.0000 | 0.0000 |

MESH POINT TEMPERATURES

LA TEMPERATURE VALUES (F)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 563.9 | 563.9 | 563.9 | 563.8 | 563.8 | 563.7 | 563.6 | 563.4 |
| | 563.2 | 562.7 | 562.6 | 562.6 | | | | |
| 2 | 563.9 | 563.9 | 563.9 | 563.8 | 563.8 | 563.7 | 563.6 | 563.4 |
| | 563.2 | 562.7 | 562.6 | 562.6 | | | | |
| 3 | 563.9 | 563.9 | 563.9 | 563.9 | 563.8 | 563.7 | 563.6 | 563.4 |
| | 563.2 | 562.7 | 562.7 | 562.6 | | | | |
| 4 | 564.0 | 564.0 | 564.0 | 563.9 | 563.9 | 563.8 | 563.7 | 563.4 |
| | 563.1 | 562.7 | 562.7 | 562.6 | | | | |
| 5 | 564.0 | 564.0 | 564.0 | 563.9 | 563.9 | 563.8 | 563.6 | 563.4 |
| | 563.1 | 562.7 | 562.7 | 562.6 | | | | |
| 6 | 563.9 | 563.9 | 563.8 | 563.8 | 563.7 | 563.6 | 563.5 | 563.3 |
| | 563.0 | 562.7 | 562.7 | 562.6 | | | | |
| 7 | 563.9 | 563.9 | 563.8 | 563.8 | 563.7 | 563.6 | 563.5 | 563.3 |
| | 563.0 | 562.7 | 562.7 | 562.7 | | | | |
| 8 | 563.8 | 563.8 | 563.8 | 563.7 | 563.6 | 563.6 | 563.4 | 563.2 |
| | 562.9 | 562.7 | 562.7 | 562.7 | | | | |
| 9 | 563.8 | 563.8 | 563.7 | 563.7 | 563.6 | 563.5 | 563.4 | 563.2 |
| | 562.9 | 562.7 | 562.7 | 562.7 | | | | |
| 10 | 563.8 | 563.7 | 563.7 | 563.7 | 563.6 | 563.5 | 563.4 | 563.2 |
| | 562.9 | 562.7 | 562.7 | 562.7 | | | | |
| 11 | 563.7 | 563.7 | 563.7 | 563.6 | 563.6 | 563.5 | 563.4 | 563.2 |
| | 562.9 | 562.7 | 562.7 | 562.7 | | | | |
| 12 | 563.7 | 563.7 | 563.7 | 563.6 | 563.6 | 563.5 | 563.4 | 563.2 |
| | 562.9 | 562.7 | 562.7 | 562.7 | | | | |
| 13 | 563.7 | 563.7 | 563.7 | 563.6 | 563.6 | 563.5 | 563.4 | 563.2 |
| | 562.9 | 562.7 | 562.7 | 562.7 | | | | |
| 14 | 563.7 | 563.7 | 563.7 | 563.6 | 563.6 | 563.5 | 563.4 | 563.2 |
| | 562.9 | 562.8 | 562.7 | 562.7 | | | | |
| 15 | 563.7 | 563.7 | 563.7 | 563.6 | 563.6 | 563.5 | 563.4 | 563.2 |
| | 562.9 | 562.8 | 562.7 | 562.7 | | | | |
| 16 | 563.7 | 563.7 | 563.7 | 563.6 | 563.6 | 563.5 | 563.4 | 563.2 |
| | 562.9 | 562.8 | 562.7 | 562.7 | | | | |
| 17 | 563.7 | 563.7 | 563.7 | 563.6 | 563.6 | 563.5 | 563.4 | 563.2 |
| | 562.9 | 562.8 | 562.7 | 562.7 | | | | |
| 18 | 563.7 | 563.7 | 563.7 | 563.7 | 563.6 | 563.5 | 563.4 | 563.2 |
| | 562.9 | 562.8 | 562.7 | 562.7 | | | | |
| 19 | 563.7 | 563.7 | 563.7 | 563.7 | 563.6 | 563.5 | 563.4 | 563.2 |
| | 562.9 | 562.8 | 562.7 | 562.7 | | | | |
| 20 | 563.8 | 563.7 | 563.7 | 563.7 | 563.6 | 563.5 | 563.4 | 563.2 |
| | 562.9 | 562.8 | 562.7 | 562.7 | | | | |
| 21 | 563.8 | 563.8 | 563.7 | 563.7 | 563.6 | 563.5 | 563.4 | 563.2 |
| | 563.0 | 562.8 | 562.8 | 562.7 | | | | |
| 22 | 563.8 | 563.8 | 563.7 | 563.7 | 563.6 | 563.5 | 563.4 | 563.2 |
| | 563.0 | 562.8 | 562.8 | 562.7 | | | | |

```
    23   563.8       563.8       563.7       563.7       563.6       563.5       563.4       563.2
         563.0       562.8       562.8       562.7
    24   563.8       563.8       563.7       563.7       563.6       563.5       563.4       563.2
         563.0       562.8       562.8       562.7
    25   563.8       563.8       563.8       563.8       563.7       563.6       563.5       563.3
         563.0       562.8       562.8       562.7
    26   563.9       563.9       563.8       563.8       563.7       563.6       563.5       563.3
         563.0       562.8       562.8       562.7
    27   563.9       563.9       563.8       563.8       563.7       563.6       563.5       563.3
         563.0       562.8       562.8       562.7
    28   563.9       563.9       563.8       563.8       563.7       563.6       563.5       563.3
         563.0       562.8       562.8       562.7
    29   563.9       563.9       563.8       563.8       563.7       563.6       563.5       563.3
         563.0       562.8       562.8       562.7
    30   564.0       563.9       563.9       563.9       563.8       563.7       563.6       563.4
         563.1       562.8       562.8       562.7
    31   564.0       563.9       563.9       563.9       563.8       563.7       563.6       563.4
         563.1       562.8       562.8       562.7
    32   564.0       563.9       563.9       563.9       563.8       563.7       563.6       563.4
         563.1       562.8       562.8       562.8
    33   564.0       563.9       563.9       563.9       563.8       563.7       563.6       563.4
         563.1       562.8       562.8       562.8
    34   563.8       563.8       563.8       563.7       563.7       563.6       563.5       563.3
         563.1       562.8       562.8       562.7
    35   563.7       563.7       563.6       563.6       563.6       563.5       563.4       563.3
         563.1       562.8       562.8       562.7
    36   563.7       563.7       563.6       563.6       563.6       563.5       563.4       563.3
         563.1       562.8       562.8       562.7
    37   563.7       563.7       563.6       563.6       563.6       563.5       563.4       563.3
         563.1       562.8       562.8       562.7
    38   563.7       563.7       563.6       563.6       563.6       563.5       563.4       563.3
         563.1       562.8       562.8       562.7
        RADIAL POWER SOURCE DISTRIBUTION
   0.9614      0.9631      0.9664      0.9715      0.9785      0.9876       1.003       1.028

0 -----------  S-RELAP5/RODEX2 FUEL MODEL INPUT FOR ROD #    2   ------------
    HEAT STRUCTURE-GEOMETRY ID NUMBER:    202
    CLAD MATERIAL TYPE:   1151
    FUEL PELLET MATERIAL TYPE:    111
    TOTAL NUMBER OF AXIAL REGIONS:     28
    NUMBER OF RADIAL REGIONS IN PELLET:      8    NUMBER OF RADIAL REGIONS IN PELLET DISH:      6
    CLAD INNER RADIUS (IN):     0.16455
    CLAD OUTER RADIUS (IN):     0.18700
    PELLET + CLAD SURFACE ROUGHNESS (IN):     9.50000E-05
    FABRICATED LOWER PLENUM LENGTH (IN):      1.8810
    FABRICATED UPPER PLENUM LENGTH (IN):      6.7010
    TOTAL ACTIVE CORE AXIAL LENGTH (IN):      165.35
    FUEL DENSITY FRACTION AT FABRICATION:     0.96000
    GD2O3 WEIGHT FRACTION:      0.0000
    CHANGE IN CLADDING LENGTH DUE TO CREEP + ANISOTROPIC AXIAL GROWTH OF CLADDING (IN):     0.77096
```

INTERNAL ROD GAS PRESSURE (PSIA): 636.62
TOTAL MOLES OF GAS INTERNAL TO FUEL ROD (GMMOLES): 2.04025E-02
FUEL GAS MOLE FRACTION

| HELIUM | NITROGEN | KRYPTON | XENON |
|---|---|---|---|
| 0.97139 | 9.81202E-03 | 2.48623E-03 | 1.63118E-02 |

| LA | NDEN | AXLNG | RIP | ROP | DRGAP | DRPC | DRPHL | DAPDS | RBRDG | VDSHC |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3.35 | 0.00 | 0.161 | -3.661E-03 | 2.675E-03 | 0.00 | -2.826E-02 | 1.802E-02 | 5.623E-03 |
| 2 | 2 | 6.00 | 0.00 | 0.161 | -3.664E-03 | 2.675E-03 | 0.00 | -2.826E-02 | 1.802E-02 | 5.622E-03 |
| 3 | 2 | 6.00 | 0.00 | 0.161 | -3.814E-03 | 2.613E-03 | 0.00 | -2.475E-02 | 1.837E-02 | 5.400E-03 |
| 4 | 2 | 6.00 | 0.00 | 0.161 | -4.224E-03 | 2.440E-03 | 0.00 | -1.491E-02 | 1.934E-02 | 4.776E-03 |
| 5 | 2 | 6.00 | 0.00 | 0.161 | -4.246E-03 | 2.436E-03 | 0.00 | -1.489E-02 | 1.937E-02 | 4.772E-03 |
| 6 | 2 | 6.00 | 0.00 | 0.161 | -4.407E-03 | 2.365E-03 | 0.00 | -1.228E-02 | 1.977E-02 | 4.970E-03 |
| 7 | 2 | 6.00 | 0.00 | 0.161 | -4.439E-03 | 2.356E-03 | 0.00 | -1.219E-02 | 1.982E-02 | 4.981E-03 |
| 8 | 2 | 6.00 | 0.00 | 0.161 | -4.494E-03 | 2.336E-03 | 0.00 | -1.177E-02 | 1.998E-02 | 5.020E-03 |
| 9 | 2 | 6.00 | 0.00 | 0.161 | -4.537E-03 | 2.323E-03 | 0.00 | -1.158E-02 | 2.009E-02 | 5.044E-03 |
| 10 | 2 | 6.00 | 0.00 | 0.161 | -4.569E-03 | 2.311E-03 | 0.00 | -1.153E-02 | 2.021E-02 | 4.995E-03 |
| 11 | 2 | 6.00 | 0.00 | 0.161 | -4.603E-03 | 2.297E-03 | 0.00 | -1.142E-02 | 2.038E-02 | 4.907E-03 |
| 12 | 2 | 6.00 | 0.00 | 0.161 | -4.634E-03 | 2.290E-03 | 0.00 | -1.147E-02 | 2.043E-02 | 4.916E-03 |
| 13 | 2 | 6.00 | 0.00 | 0.161 | -4.661E-03 | 2.283E-03 | 0.00 | -1.166E-02 | 2.050E-02 | 4.920E-03 |
| 14 | 2 | 6.00 | 0.00 | 0.161 | -4.669E-03 | 2.254E-03 | 0.00 | -1.172E-02 | 2.066E-02 | 4.935E-03 |
| 15 | 2 | 6.00 | 0.00 | 0.161 | -4.679E-03 | 2.247E-03 | 0.00 | -1.218E-02 | 2.060E-02 | 5.052E-03 |
| 16 | 2 | 6.00 | 0.00 | 0.161 | -4.657E-03 | 2.205E-03 | 0.00 | -1.235E-02 | 2.083E-02 | 5.095E-03 |
| 17 | 2 | 6.00 | 0.00 | 0.161 | -4.640E-03 | 2.178E-03 | 0.00 | -1.277E-02 | 2.093E-02 | 5.205E-03 |
| 18 | 2 | 6.00 | 0.00 | 0.161 | -4.621E-03 | 2.155E-03 | 0.00 | -1.323E-02 | 2.101E-02 | 5.324E-03 |
| 19 | 2 | 6.00 | 0.00 | 0.161 | -4.596E-03 | 2.127E-03 | 0.00 | -1.346E-02 | 2.117E-02 | 5.334E-03 |
| 20 | 2 | 6.00 | 0.00 | 0.161 | -4.621E-03 | 2.174E-03 | 0.00 | -1.418E-02 | 2.084E-02 | 5.313E-03 |
| 21 | 2 | 6.00 | 0.00 | 0.161 | -4.601E-03 | 2.150E-03 | 0.00 | -1.423E-02 | 2.098E-02 | 5.322E-03 |
| 22 | 2 | 6.00 | 0.00 | 0.161 | -4.633E-03 | 2.233E-03 | 0.00 | -1.512E-02 | 2.047E-02 | 5.129E-03 |
| 23 | 2 | 6.00 | 0.00 | 0.161 | -4.636E-03 | 2.244E-03 | 0.00 | -1.523E-02 | 2.041E-02 | 5.105E-03 |
| 24 | 2 | 6.00 | 0.00 | 0.161 | -4.604E-03 | 2.343E-03 | 0.00 | -1.784E-02 | 1.983E-02 | 5.170E-03 |
| 25 | 2 | 6.00 | 0.00 | 0.161 | -4.581E-03 | 2.412E-03 | 0.00 | -1.964E-02 | 1.943E-02 | 5.215E-03 |
| 26 | 2 | 6.00 | 0.00 | 0.161 | -4.380E-03 | 2.490E-03 | 0.00 | -2.403E-02 | 1.901E-02 | 5.338E-03 |
| 27 | 2 | 6.00 | 0.00 | 0.161 | -3.904E-03 | 2.676E-03 | 0.00 | -3.445E-02 | 1.801E-02 | 5.628E-03 |
| 28 | 2 | 6.00 | 0.00 | 0.161 | -3.905E-03 | 2.676E-03 | 0.00 | -3.445E-02 | 1.801E-02 | 5.628E-03 |

FIRST TWO AXIAL LEVEL RADIAL GRID LOCATION (IN)

| LA | RGI VALUES | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.000 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 0.1043 | 0.1328 |
| | 0.1613 | | | | | | | |
| 2 | 0.000 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 0.1043 | 0.1328 |
| | 0.1613 | | | | | | | |

RADIAL POROSITY DISTRIBUTION

| LA | POROSITY VALUES | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 2.3504E-02 | 2.3210E-02 | 2.2690E-02 | 2.2051E-02 | 2.1419E-02 | 2.0908E-02 | 2.0516E-02 | 2.0557E-02 |
| 2 | 2.3525E-02 | 2.3230E-02 | 2.2707E-02 | 2.2064E-02 | 2.1429E-02 | 2.0915E-02 | 2.0519E-02 | 2.0557E-02 |
| 3 | 2.8709E-02 | 2.8093E-02 | 2.7004E-02 | 2.5681E-02 | 2.4383E-02 | 2.3328E-02 | 2.2485E-02 | 2.2369E-02 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4 | 4.3200E-02 | 4.1688E-02 | 3.9021E-02 | 3.5796E-02 | 3.2647E-02 | 3.0085E-02 | 2.7999E-02 | 2.7457E-02 |
| 5 | 4.3248E-02 | 4.1734E-02 | 3.9063E-02 | 3.5832E-02 | 3.2673E-02 | 3.0103E-02 | 2.8007E-02 | 2.7459E-02 |
| 6 | 4.4343E-02 | 4.2883E-02 | 4.0301E-02 | 3.7141E-02 | 3.4025E-02 | 3.1480E-02 | 2.9388E-02 | 2.8843E-02 |
| 7 | 4.4346E-02 | 4.2890E-02 | 4.0318E-02 | 3.7167E-02 | 3.4062E-02 | 3.1523E-02 | 2.9436E-02 | 2.8893E-02 |
| 8 | 4.5005E-02 | 4.3540E-02 | 4.0938E-02 | 3.7720E-02 | 3.4504E-02 | 3.1839E-02 | 2.9608E-02 | 2.8948E-02 |
| 9 | 4.5278E-02 | 4.3812E-02 | 4.1202E-02 | 3.7959E-02 | 3.4698E-02 | 3.1981E-02 | 2.9689E-02 | 2.8974E-02 |
| 10 | 4.6072E-02 | 4.4539E-02 | 4.1806E-02 | 3.8404E-02 | 3.4979E-02 | 3.2117E-02 | 2.9696E-02 | 2.8918E-02 |
| 11 | 4.7463E-02 | 4.5814E-02 | 4.2864E-02 | 3.9187E-02 | 3.5475E-02 | 3.2359E-02 | 2.9713E-02 | 2.8824E-02 |
| 12 | 4.7340E-02 | 4.5699E-02 | 4.2763E-02 | 3.9105E-02 | 3.5415E-02 | 3.2319E-02 | 2.9693E-02 | 2.8812E-02 |
| 13 | 4.7296E-02 | 4.5645E-02 | 4.2695E-02 | 3.9027E-02 | 3.5338E-02 | 3.2240E-02 | 2.9583E-02 | 2.8677E-02 |
| 14 | 4.7120E-02 | 4.5482E-02 | 4.2552E-02 | 3.8912E-02 | 3.5257E-02 | 3.2187E-02 | 2.9559E-02 | 2.8671E-02 |
| 15 | 4.5429E-02 | 4.3924E-02 | 4.1232E-02 | 3.7893E-02 | 3.4548E-02 | 3.1742E-02 | 2.9352E-02 | 2.8578E-02 |
| 16 | 4.4826E-02 | 4.3364E-02 | 4.0755E-02 | 3.7524E-02 | 3.4289E-02 | 3.1579E-02 | 2.9276E-02 | 2.8548E-02 |
| 17 | 4.3142E-02 | 4.1814E-02 | 3.9447E-02 | 3.6518E-02 | 3.3591E-02 | 3.1151E-02 | 2.9095E-02 | 2.8484E-02 |
| 18 | 4.1314E-02 | 4.0134E-02 | 3.8028E-02 | 3.5425E-02 | 3.2834E-02 | 3.0684E-02 | 2.8897E-02 | 2.8415E-02 |
| 19 | 4.0770E-02 | 3.9619E-02 | 3.7571E-02 | 3.5049E-02 | 3.2549E-02 | 3.0487E-02 | 2.8795E-02 | 2.8372E-02 |
| 20 | 3.9294E-02 | 3.8213E-02 | 3.6304E-02 | 3.3989E-02 | 3.1726E-02 | 2.9910E-02 | 2.8473E-02 | 2.8211E-02 |
| 21 | 3.9154E-02 | 3.8083E-02 | 3.6192E-02 | 3.3899E-02 | 3.1660E-02 | 2.9866E-02 | 2.8453E-02 | 2.8206E-02 |
| 22 | 3.9579E-02 | 3.8396E-02 | 3.6323E-02 | 3.3816E-02 | 3.1394E-02 | 2.9474E-02 | 2.7988E-02 | 2.7747E-02 |
| 23 | 3.9632E-02 | 3.8435E-02 | 3.6339E-02 | 3.3805E-02 | 3.1361E-02 | 2.9426E-02 | 2.7931E-02 | 2.7690E-02 |
| 24 | 3.6777E-02 | 3.5736E-02 | 3.3905E-02 | 3.1691E-02 | 2.9544E-02 | 2.7833E-02 | 2.6510E-02 | 2.6307E-02 |
| 25 | 3.4820E-02 | 3.3884E-02 | 3.2236E-02 | 3.0241E-02 | 2.8297E-02 | 2.6741E-02 | 2.5535E-02 | 2.5359E-02 |
| 26 | 3.0308E-02 | 2.9650E-02 | 2.8491E-02 | 2.7087E-02 | 2.5720E-02 | 2.4626E-02 | 2.3777E-02 | 2.3653E-02 |
| 27 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 |
| 28 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 |

| AXIAL NODE NO. | OUTER CLAD OXIDE THICKNESS (IN) | LEFT-SIDE DIRECT HEATING FRACTION | RIGHT-SIDE DIRECT HEATING FRACTION |
|---|---|---|---|
| 1 | 3.94000E-05 | 0.0000 | 0.0000 |
| 2 | 3.94000E-05 | 0.0000 | 0.0000 |
| 3 | 3.94000E-05 | 0.0000 | 0.0000 |
| 4 | 3.94000E-05 | 0.0000 | 0.0000 |
| 5 | 3.94000E-05 | 0.0000 | 0.0000 |
| 6 | 3.94000E-05 | 0.0000 | 0.0000 |
| 7 | 3.94000E-05 | 0.0000 | 0.0000 |
| 8 | 3.94000E-05 | 0.0000 | 0.0000 |
| 9 | 3.94000E-05 | 0.0000 | 0.0000 |
| 10 | 3.94000E-05 | 0.0000 | 0.0000 |
| 11 | 3.94000E-05 | 0.0000 | 0.0000 |
| 12 | 3.94000E-05 | 0.0000 | 0.0000 |
| 13 | 3.94000E-05 | 0.0000 | 0.0000 |
| 14 | 3.94000E-05 | 0.0000 | 0.0000 |
| 15 | 3.94000E-05 | 0.0000 | 0.0000 |
| 16 | 3.94000E-05 | 0.0000 | 0.0000 |
| 17 | 3.94000E-05 | 0.0000 | 0.0000 |
| 18 | 3.94000E-05 | 0.0000 | 0.0000 |
| 19 | 3.94000E-05 | 0.0000 | 0.0000 |
| 20 | 3.94000E-05 | 0.0000 | 0.0000 |
| 21 | 3.94000E-05 | 0.0000 | 0.0000 |
| 22 | 3.94000E-05 | 0.0000 | 0.0000 |
| 23 | 3.94000E-05 | 0.0000 | 0.0000 |
| 24 | 3.94000E-05 | 0.0000 | 0.0000 |
| 25 | 3.94000E-05 | 0.0000 | 0.0000 |
| 26 | 3.94000E-05 | 0.0000 | 0.0000 |
| 27 | 3.94000E-05 | 0.0000 | 0.0000 |
| 28 | 3.94000E-05 | 0.0000 | 0.0000 |

MESH POINT TEMPERATURES

| LA | TEMPERATURE VALUES (F) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 563.9 | 563.9 | 563.8 | 563.8 | 563.7 | 563.7 | 563.6 | 563.4 |
| | 563.2 | 562.7 | 562.6 | 562.6 | | | | |
| 2 | 563.9 | 563.9 | 563.8 | 563.8 | 563.7 | 563.7 | 563.6 | 563.4 |
| | 563.2 | 562.7 | 562.6 | 562.6 | | | | |
| 3 | 563.9 | 563.9 | 563.9 | 563.8 | 563.8 | 563.7 | 563.6 | 563.4 |
| | 563.2 | 562.7 | 562.7 | 562.6 | | | | |
| 4 | 564.0 | 564.0 | 564.0 | 563.9 | 563.9 | 563.8 | 563.7 | 563.4 |
| | 563.1 | 562.7 | 562.7 | 562.6 | | | | |
| 5 | 564.0 | 564.0 | 564.0 | 563.9 | 563.9 | 563.8 | 563.7 | 563.4 |
| | 563.1 | 562.7 | 562.7 | 562.6 | | | | |
| 6 | 563.9 | 563.9 | 563.9 | 563.8 | 563.7 | 563.6 | 563.5 | 563.3 |
| | 563.0 | 562.7 | 562.7 | 562.6 | | | | |
| 7 | 563.9 | 563.9 | 563.9 | 563.8 | 563.7 | 563.6 | 563.5 | 563.3 |
| | 563.0 | 562.7 | 562.7 | 562.7 | | | | |
| 8 | 563.8 | 563.8 | 563.8 | 563.7 | 563.7 | 563.6 | 563.5 | 563.3 |
| | 563.0 | 562.7 | 562.7 | 562.7 | | | | |
| 9 | 563.8 | 563.8 | 563.8 | 563.7 | 563.6 | 563.6 | 563.4 | 563.2 |

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         563.0       562.7       562.7       562.7
    10   563.8       563.8       563.7       563.7       563.6       563.5       563.4       563.2
         563.0       562.7       562.7       562.7
    11   563.8       563.7       563.7       563.7       563.6       563.5       563.4       563.2
         562.9       562.7       562.7       562.7
    12   563.7       563.7       563.7       563.7       563.6       563.5       563.4       563.2
         562.9       562.7       562.7       562.7
    13   563.7       563.7       563.7       563.6       563.6       563.5       563.4       563.2
         562.9       562.7       562.7       562.7
    14   563.7       563.7       563.7       563.6       563.6       563.5       563.4       563.2
         562.9       562.8       562.7       562.7
    15   563.7       563.7       563.7       563.6       563.6       563.5       563.4       563.2
         562.9       562.8       562.7       562.7
    16   563.7       563.7       563.7       563.6       563.6       563.5       563.4       563.2
         562.9       562.8       562.7       562.7
    17   563.7       563.7       563.7       563.6       563.6       563.5       563.4       563.2
         562.9       562.8       562.7       562.7
    18   563.7       563.7       563.7       563.6       563.6       563.5       563.4       563.2
         562.9       562.8       562.7       562.7
    19   563.7       563.7       563.7       563.7       563.6       563.5       563.4       563.2
         562.9       562.8       562.7       562.7
    20   563.8       563.8       563.7       563.7       563.6       563.5       563.4       563.2
         563.0       562.8       562.8       562.7
    21   563.8       563.8       563.7       563.7       563.6       563.5       563.4       563.2
         563.0       562.8       562.8       562.7
    22   563.8       563.8       563.8       563.8       563.7       563.6       563.5       563.3
         563.0       562.8       562.8       562.7
    23   563.9       563.8       563.8       563.8       563.7       563.6       563.5       563.3
         563.0       562.8       562.8       562.7
    24   563.9       563.9       563.9       563.8       563.7       563.7       563.5       563.3
         563.0       562.8       562.8       562.7
    25   563.9       563.9       563.9       563.9       563.8       563.7       563.6       563.4
         563.1       562.8       562.8       562.8
    26   563.9       563.8       563.8       563.8       563.7       563.6       563.5       563.3
         563.1       562.8       562.8       562.8
    27   563.6       563.6       563.6       563.6       563.5       563.5       563.4       563.3
         563.1       562.8       562.8       562.7
    28   563.6       563.6       563.6       563.6       563.5       563.5       563.4       563.3
         563.1       562.8       562.8       562.7
        RADIAL POWER SOURCE DISTRIBUTION
   0.9614      0.9631      0.9664      0.9715      0.9785      0.9876       1.003       1.028

0 -----------  S-RELAP5/RODEX2 FUEL MODEL INPUT FOR ROD #    3   ------------
    HEAT STRUCTURE-GEOMETRY ID NUMBER:    203
    CLAD MATERIAL TYPE:   1151
    FUEL PELLET MATERIAL TYPE:    111
    TOTAL NUMBER OF AXIAL REGIONS:     28
    NUMBER OF RADIAL REGIONS IN PELLET:      8    NUMBER OF RADIAL REGIONS IN PELLET DISH:      6
    CLAD INNER RADIUS (IN):     0.16455
    CLAD OUTER RADIUS (IN):     0.18700
```

PELLET + CLAD SURFACE ROUGHNESS (IN): 9.50000E-05
FABRICATED LOWER PLENUM LENGTH (IN): 1.8810
FABRICATED UPPER PLENUM LENGTH (IN): 6.7010
TOTAL ACTIVE CORE AXIAL LENGTH (IN): 165.35
FUEL DENSITY FRACTION AT FABRICATION: 0.96000
GD2O3 WEIGHT FRACTION: 0.0000
CHANGE IN CLADDING LENGTH DUE TO CREEP + ANISOTROPIC AXIAL GROWTH OF CLADDING (IN): 0.78845
INTERNAL ROD GAS PRESSURE (PSIA): 617.80
TOTAL MOLES OF GAS INTERNAL TO FUEL ROD (GMMOLES): 2.01795E-02

FUEL GAS MOLE FRACTION

| HELIUM | NITROGEN | KRYPTON | XENON |
|---|---|---|---|
| 0.98212 | 9.92045E-03 | 1.05210E-03 | 6.90267E-03 |

| LA | NDEN | AXLNG | RIP | ROP | DRGAP | DRPC | DRPHL | DAPDS | RBRDG | VDSHC |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3.35 | 0.00 | 0.161 | -3.592E-03 | 2.693E-03 | 0.00 | -3.070E-02 | 1.792E-02 | 5.625E-03 |
| 2 | 2 | 6.00 | 0.00 | 0.161 | -3.595E-03 | 2.693E-03 | 0.00 | -3.070E-02 | 1.792E-02 | 5.625E-03 |
| 3 | 2 | 6.00 | 0.00 | 0.161 | -3.752E-03 | 2.640E-03 | 0.00 | -2.739E-02 | 1.821E-02 | 5.518E-03 |
| 4 | 2 | 6.00 | 0.00 | 0.161 | -4.186E-03 | 2.492E-03 | 0.00 | -1.809E-02 | 1.901E-02 | 5.219E-03 |
| 5 | 2 | 6.00 | 0.00 | 0.161 | -4.205E-03 | 2.489E-03 | 0.00 | -1.807E-02 | 1.903E-02 | 5.215E-03 |
| 6 | 2 | 6.00 | 0.00 | 0.161 | -4.375E-03 | 2.422E-03 | 0.00 | -1.546E-02 | 1.940E-02 | 5.437E-03 |
| 7 | 2 | 6.00 | 0.00 | 0.161 | -4.405E-03 | 2.414E-03 | 0.00 | -1.537E-02 | 1.944E-02 | 5.445E-03 |
| 8 | 2 | 6.00 | 0.00 | 0.161 | -4.471E-03 | 2.393E-03 | 0.00 | -1.460E-02 | 1.959E-02 | 5.373E-03 |
| 9 | 2 | 6.00 | 0.00 | 0.161 | -4.519E-03 | 2.379E-03 | 0.00 | -1.424E-02 | 1.968E-02 | 5.341E-03 |
| 10 | 2 | 6.00 | 0.00 | 0.161 | -4.552E-03 | 2.369E-03 | 0.00 | -1.411E-02 | 1.977E-02 | 5.271E-03 |
| 11 | 2 | 6.00 | 0.00 | 0.161 | -4.587E-03 | 2.356E-03 | 0.00 | -1.390E-02 | 1.991E-02 | 5.152E-03 |
| 12 | 2 | 6.00 | 0.00 | 0.161 | -4.617E-03 | 2.349E-03 | 0.00 | -1.394E-02 | 1.995E-02 | 5.157E-03 |
| 13 | 2 | 6.00 | 0.00 | 0.161 | -4.645E-03 | 2.342E-03 | 0.00 | -1.410E-02 | 2.000E-02 | 5.134E-03 |
| 14 | 2 | 6.00 | 0.00 | 0.161 | -4.680E-03 | 2.335E-03 | 0.00 | -1.413E-02 | 2.005E-02 | 5.145E-03 |
| 15 | 2 | 6.00 | 0.00 | 0.161 | -4.702E-03 | 2.338E-03 | 0.00 | -1.461E-02 | 1.997E-02 | 5.276E-03 |
| 16 | 2 | 6.00 | 0.00 | 0.161 | -4.731E-03 | 2.332E-03 | 0.00 | -1.477E-02 | 1.999E-02 | 5.322E-03 |
| 17 | 2 | 6.00 | 0.00 | 0.161 | -4.747E-03 | 2.333E-03 | 0.00 | -1.519E-02 | 1.995E-02 | 5.415E-03 |
| 18 | 2 | 6.00 | 0.00 | 0.161 | -4.750E-03 | 2.326E-03 | 0.00 | -1.564E-02 | 1.995E-02 | 5.512E-03 |
| 19 | 2 | 6.00 | 0.00 | 0.161 | -4.752E-03 | 2.310E-03 | 0.00 | -1.588E-02 | 2.003E-02 | 5.527E-03 |
| 20 | 2 | 6.00 | 0.00 | 0.161 | -4.749E-03 | 2.338E-03 | 0.00 | -1.678E-02 | 1.985E-02 | 5.583E-03 |
| 21 | 2 | 6.00 | 0.00 | 0.161 | -4.748E-03 | 2.317E-03 | 0.00 | -1.682E-02 | 1.996E-02 | 5.585E-03 |
| 22 | 2 | 6.00 | 0.00 | 0.161 | -4.723E-03 | 2.361E-03 | 0.00 | -1.789E-02 | 1.970E-02 | 5.436E-03 |
| 23 | 2 | 6.00 | 0.00 | 0.161 | -4.720E-03 | 2.367E-03 | 0.00 | -1.802E-02 | 1.967E-02 | 5.418E-03 |
| 24 | 2 | 6.00 | 0.00 | 0.161 | -4.627E-03 | 2.418E-03 | 0.00 | -2.042E-02 | 1.939E-02 | 5.443E-03 |
| 25 | 2 | 6.00 | 0.00 | 0.161 | -4.563E-03 | 2.453E-03 | 0.00 | -2.206E-02 | 1.919E-02 | 5.460E-03 |
| 26 | 2 | 6.00 | 0.00 | 0.161 | -4.367E-03 | 2.523E-03 | 0.00 | -2.598E-02 | 1.882E-02 | 5.510E-03 |
| 27 | 2 | 6.00 | 0.00 | 0.161 | -3.903E-03 | 2.689E-03 | 0.00 | -3.527E-02 | 1.795E-02 | 5.628E-03 |
| 28 | 2 | 6.00 | 0.00 | 0.161 | -3.908E-03 | 2.688E-03 | 0.00 | -3.527E-02 | 1.795E-02 | 5.628E-03 |

FIRST TWO AXIAL LEVEL RADIAL GRID LOCATION (IN)

| LA | RGI VALUES | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.000 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 0.1043 | 0.1328 |
| | 0.1613 | | | | | | | |
| 2 | 0.000 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 0.1043 | 0.1328 |
| | 0.1613 | | | | | | | |

RADIAL POROSITY DISTRIBUTION

LA POROSITY VALUES

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 2.1532E-02 | 2.1329E-02 | 2.0970E-02 | 2.0536E-02 | 2.0115E-02 | 1.9790E-02 | 1.9608E-02 | 1.9698E-02 |
| 2 | 2.1549E-02 | 2.1344E-02 | 2.0983E-02 | 2.0546E-02 | 2.0123E-02 | 1.9795E-02 | 1.9608E-02 | 1.9698E-02 |
| 3 | 2.5283E-02 | 2.4886E-02 | 2.4187E-02 | 2.3337E-02 | 2.2509E-02 | 2.1855E-02 | 2.1387E-02 | 2.1400E-02 |
| 4 | 3.5720E-02 | 3.4788E-02 | 3.3144E-02 | 3.1143E-02 | 2.9189E-02 | 2.7626E-02 | 2.6388E-02 | 2.6183E-02 |
| 5 | 3.5769E-02 | 3.4834E-02 | 3.3183E-02 | 3.1175E-02 | 2.9211E-02 | 2.7641E-02 | 2.6395E-02 | 2.6184E-02 |
| 6 | 3.7006E-02 | 3.6113E-02 | 3.4528E-02 | 3.2581E-02 | 3.0653E-02 | 2.9073E-02 | 2.7792E-02 | 2.7552E-02 |
| 7 | 3.7046E-02 | 3.6154E-02 | 3.4572E-02 | 3.2629E-02 | 3.0703E-02 | 2.9124E-02 | 2.7843E-02 | 2.7601E-02 |
| 8 | 3.9467E-02 | 3.8409E-02 | 3.6517E-02 | 3.4171E-02 | 3.1815E-02 | 2.9840E-02 | 2.8166E-02 | 2.7697E-02 |
| 9 | 4.0631E-02 | 3.9492E-02 | 3.7451E-02 | 3.4912E-02 | 3.2350E-02 | 3.0186E-02 | 2.8322E-02 | 2.7744E-02 |
| 10 | 4.1647E-02 | 4.0424E-02 | 3.8231E-02 | 3.5497E-02 | 3.2731E-02 | 3.0386E-02 | 2.8359E-02 | 2.7704E-02 |
| 11 | 4.3387E-02 | 4.2021E-02 | 3.9568E-02 | 3.6500E-02 | 3.3384E-02 | 3.0729E-02 | 2.8424E-02 | 2.7635E-02 |
| 12 | 4.3331E-02 | 4.1967E-02 | 3.9518E-02 | 3.6457E-02 | 3.3348E-02 | 3.0701E-02 | 2.8407E-02 | 2.7624E-02 |
| 13 | 4.3638E-02 | 4.2236E-02 | 3.9717E-02 | 3.6570E-02 | 3.3377E-02 | 3.0660E-02 | 2.8312E-02 | 2.7503E-02 |
| 14 | 4.3513E-02 | 4.2119E-02 | 3.9616E-02 | 3.6489E-02 | 3.3318E-02 | 3.0623E-02 | 2.8297E-02 | 2.7501E-02 |
| 15 | 4.1721E-02 | 4.0462E-02 | 3.8205E-02 | 3.5394E-02 | 3.2556E-02 | 3.0153E-02 | 2.8083E-02 | 2.7405E-02 |
| 16 | 4.1120E-02 | 3.9906E-02 | 3.7730E-02 | 3.5024E-02 | 3.2298E-02 | 2.9993E-02 | 2.8011E-02 | 2.7376E-02 |
| 17 | 3.9395E-02 | 3.8320E-02 | 3.6396E-02 | 3.4006E-02 | 3.1598E-02 | 2.9566E-02 | 2.7825E-02 | 2.7304E-02 |
| 18 | 3.7566E-02 | 3.6638E-02 | 3.4982E-02 | 3.2928E-02 | 3.0857E-02 | 2.9113E-02 | 2.7627E-02 | 2.7226E-02 |
| 19 | 3.6850E-02 | 3.5973E-02 | 3.4411E-02 | 3.2476E-02 | 3.0529E-02 | 2.8899E-02 | 2.7522E-02 | 2.7180E-02 |
| 20 | 3.4093E-02 | 3.3414E-02 | 3.2211E-02 | 3.0733E-02 | 2.9269E-02 | 2.8076E-02 | 2.7118E-02 | 2.6994E-02 |
| 21 | 3.3979E-02 | 3.3309E-02 | 3.2119E-02 | 3.0659E-02 | 2.9214E-02 | 2.8038E-02 | 2.7099E-02 | 2.6988E-02 |
| 22 | 3.3697E-02 | 3.2975E-02 | 3.1703E-02 | 3.0155E-02 | 2.8652E-02 | 2.7459E-02 | 2.6552E-02 | 2.6509E-02 |
| 23 | 3.3662E-02 | 3.2934E-02 | 3.1651E-02 | 3.0093E-02 | 2.8582E-02 | 2.7388E-02 | 2.6484E-02 | 2.6450E-02 |
| 24 | 3.1529E-02 | 3.0882E-02 | 2.9742E-02 | 2.8358E-02 | 2.7015E-02 | 2.5951E-02 | 2.5147E-02 | 2.5132E-02 |
| 25 | 3.0066E-02 | 2.9474E-02 | 2.8433E-02 | 2.7168E-02 | 2.5941E-02 | 2.4966E-02 | 2.4231E-02 | 2.4227E-02 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 26 | 2.6964E-02 | 2.6548E-02 | 2.5816E-02 | 2.4926E-02 | 2.4062E-02 | 2.3377E-02 | 2.2860E-02 | 2.2857E-02 |
| 27 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 |
| 28 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 |

| AXIAL NODE NO. | OUTER CLAD OXIDE THICKNESS (IN) | LEFT-SIDE DIRECT HEATING FRACTION | RIGHT-SIDE DIRECT HEATING FRACTION |
|---|---|---|---|
| 1 | 3.94000E-05 | 0.0000 | 0.0000 |
| 2 | 3.94000E-05 | 0.0000 | 0.0000 |
| 3 | 3.94000E-05 | 0.0000 | 0.0000 |
| 4 | 3.94000E-05 | 0.0000 | 0.0000 |
| 5 | 3.94000E-05 | 0.0000 | 0.0000 |
| 6 | 3.94000E-05 | 0.0000 | 0.0000 |
| 7 | 3.94000E-05 | 0.0000 | 0.0000 |
| 8 | 3.94000E-05 | 0.0000 | 0.0000 |
| 9 | 3.94000E-05 | 0.0000 | 0.0000 |
| 10 | 3.94000E-05 | 0.0000 | 0.0000 |
| 11 | 3.94000E-05 | 0.0000 | 0.0000 |
| 12 | 3.94000E-05 | 0.0000 | 0.0000 |
| 13 | 3.94000E-05 | 0.0000 | 0.0000 |
| 14 | 3.94000E-05 | 0.0000 | 0.0000 |
| 15 | 3.94000E-05 | 0.0000 | 0.0000 |
| 16 | 3.94000E-05 | 0.0000 | 0.0000 |
| 17 | 3.94000E-05 | 0.0000 | 0.0000 |
| 18 | 3.94000E-05 | 0.0000 | 0.0000 |
| 19 | 3.94000E-05 | 0.0000 | 0.0000 |
| 20 | 3.94000E-05 | 0.0000 | 0.0000 |
| 21 | 3.94000E-05 | 0.0000 | 0.0000 |
| 22 | 3.94000E-05 | 0.0000 | 0.0000 |
| 23 | 3.94000E-05 | 0.0000 | 0.0000 |
| 24 | 3.94000E-05 | 0.0000 | 0.0000 |
| 25 | 3.94000E-05 | 0.0000 | 0.0000 |
| 26 | 3.94000E-05 | 0.0000 | 0.0000 |
| 27 | 3.94000E-05 | 0.0000 | 0.0000 |
| 28 | 3.94000E-05 | 0.0000 | 0.0000 |

MESH POINT TEMPERATURES

| LA | TEMPERATURE VALUES (F) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 563.9 | 563.9 | 563.8 | 563.8 | 563.7 | 563.7 | 563.6 | 563.4 |
| | 563.2 | 562.7 | 562.6 | 562.6 | | | | |
| 2 | 563.9 | 563.9 | 563.8 | 563.8 | 563.7 | 563.7 | 563.6 | 563.4 |
| | 563.2 | 562.7 | 562.6 | 562.6 | | | | |
| 3 | 563.9 | 563.9 | 563.9 | 563.8 | 563.8 | 563.7 | 563.6 | 563.4 |
| | 563.2 | 562.7 | 562.7 | 562.6 | | | | |
| 4 | 564.1 | 564.0 | 564.0 | 564.0 | 563.9 | 563.8 | 563.7 | 563.4 |
| | 563.1 | 562.7 | 562.7 | 562.6 | | | | |
| 5 | 564.1 | 564.0 | 564.0 | 564.0 | 563.9 | 563.8 | 563.7 | 563.4 |
| | 563.1 | 562.7 | 562.7 | 562.6 | | | | |

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     6   563.9       563.9       563.9       563.8       563.7       563.7       563.5       563.3
         563.0       562.7       562.7       562.6
     7   563.9       563.9       563.9       563.8       563.7       563.7       563.5       563.3
         563.0       562.7       562.7       562.7
     8   563.8       563.8       563.8       563.8       563.7       563.6       563.5       563.3
         563.0       562.7       562.7       562.7
     9   563.8       563.8       563.8       563.7       563.7       563.6       563.5       563.2
         563.0       562.7       562.7       562.7
    10   563.8       563.8       563.8       563.7       563.6       563.6       563.4       563.2
         563.0       562.7       562.7       562.7
    11   563.8       563.8       563.7       563.7       563.6       563.5       563.4       563.2
         563.0       562.7       562.7       562.7
    12   563.8       563.7       563.7       563.7       563.6       563.5       563.4       563.2
         562.9       562.7       562.7       562.7
    13   563.7       563.7       563.7       563.7       563.6       563.5       563.4       563.2
         562.9       562.7       562.7       562.7
    14   563.7       563.7       563.7       563.7       563.6       563.5       563.4       563.2
         562.9       562.8       562.7       562.7
    15   563.7       563.7       563.7       563.6       563.6       563.5       563.4       563.2
         562.9       562.8       562.7       562.7
    16   563.7       563.7       563.7       563.6       563.6       563.5       563.4       563.2
         562.9       562.8       562.7       562.7
    17   563.7       563.7       563.7       563.6       563.6       563.5       563.4       563.2
         562.9       562.8       562.7       562.7
    18   563.7       563.7       563.7       563.7       563.6       563.5       563.4       563.2
         562.9       562.8       562.7       562.7
    19   563.7       563.7       563.7       563.7       563.6       563.5       563.4       563.2
         562.9       562.8       562.7       562.7
    20   563.8       563.8       563.7       563.7       563.6       563.5       563.4       563.2
         563.0       562.8       562.8       562.7
    21   563.8       563.8       563.7       563.7       563.6       563.5       563.4       563.2
         563.0       562.8       562.8       562.7
    22   563.8       563.8       563.8       563.8       563.7       563.6       563.5       563.3
         563.0       562.8       562.8       562.7
    23   563.9       563.8       563.8       563.8       563.7       563.6       563.5       563.3
         563.0       562.8       562.8       562.7
    24   563.9       563.9       563.9       563.8       563.8       563.7       563.6       563.3
         563.1       562.8       562.8       562.7
    25   564.0       563.9       563.9       563.9       563.8       563.7       563.6       563.4
         563.1       562.8       562.8       562.8
    26   563.9       563.9       563.8       563.8       563.7       563.6       563.5       563.3
         563.1       562.8       562.8       562.8
    27   563.6       563.6       563.6       563.6       563.5       563.5       563.4       563.3
         563.1       562.8       562.8       562.7
    28   563.6       563.6       563.6       563.6       563.5       563.5       563.4       563.3
         563.1       562.8       562.8       562.7
        RADIAL POWER SOURCE DISTRIBUTION
  0.9614      0.9631      0.9664      0.9715      0.9785      0.9876       1.003       1.028

0 -----------  S-RELAP5/RODEX2 FUEL MODEL INPUT FOR ROD #    4   ------------
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HEAT STRUCTURE-GEOMETRY ID NUMBER: 204
CLAD MATERIAL TYPE: 1151
FUEL PELLET MATERIAL TYPE: 111
TOTAL NUMBER OF AXIAL REGIONS: 28
NUMBER OF RADIAL REGIONS IN PELLET: 8 NUMBER OF RADIAL REGIONS IN PELLET DISH: 6
CLAD INNER RADIUS (IN): 0.16455
CLAD OUTER RADIUS (IN): 0.18700
PELLET + CLAD SURFACE ROUGHNESS (IN): 9.50000E-05
FABRICATED LOWER PLENUM LENGTH (IN): 1.8810
FABRICATED UPPER PLENUM LENGTH (IN): 6.7010
TOTAL ACTIVE CORE AXIAL LENGTH (IN): 165.35
FUEL DENSITY FRACTION AT FABRICATION: 0.96000
GD2O3 WEIGHT FRACTION: 0.0000
CHANGE IN CLADDING LENGTH DUE TO CREEP + ANISOTROPIC AXIAL GROWTH OF CLADDING (IN): 0.81832
INTERNAL ROD GAS PRESSURE (PSIA): 594.79
TOTAL MOLES OF GAS INTERNAL TO FUEL ROD (GMMOLES): 2.00469E-02
FUEL GAS MOLE FRACTION

| HELIUM | NITROGEN | KRYPTON | XENON |
|---|---|---|---|
| 0.98862 | 9.98604E-03 | 1.84653E-04 | 1.21148E-03 |

| LA | NDEN | AXLNG | RIP | ROP | DRGAP | DRPC | DRPHL | DAPDS | RBRDG | VDSHC |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3.35 | 0.00 | 0.161 | -3.540E-03 | 2.724E-03 | 0.00 | -3.400E-02 | 1.776E-02 | 5.628E-03 |
| 2 | 2 | 6.00 | 0.00 | 0.161 | -3.541E-03 | 2.724E-03 | 0.00 | -3.400E-02 | 1.776E-02 | 5.628E-03 |
| 3 | 2 | 6.00 | 0.00 | 0.161 | -3.690E-03 | 2.689E-03 | 0.00 | -3.158E-02 | 1.795E-02 | 5.624E-03 |
| 4 | 2 | 6.00 | 0.00 | 0.161 | -4.106E-03 | 2.591E-03 | 0.00 | -2.478E-02 | 1.847E-02 | 5.612E-03 |
| 5 | 2 | 6.00 | 0.00 | 0.161 | -4.116E-03 | 2.589E-03 | 0.00 | -2.476E-02 | 1.847E-02 | 5.611E-03 |
| 6 | 2 | 6.00 | 0.00 | 0.161 | -4.215E-03 | 2.552E-03 | 0.00 | -2.283E-02 | 1.867E-02 | 5.627E-03 |
| 7 | 2 | 6.00 | 0.00 | 0.161 | -4.234E-03 | 2.548E-03 | 0.00 | -2.275E-02 | 1.869E-02 | 5.628E-03 |
| 8 | 2 | 6.00 | 0.00 | 0.161 | -4.277E-03 | 2.541E-03 | 0.00 | -2.240E-02 | 1.874E-02 | 5.628E-03 |
| 9 | 2 | 6.00 | 0.00 | 0.161 | -4.308E-03 | 2.535E-03 | 0.00 | -2.222E-02 | 1.877E-02 | 5.628E-03 |
| 10 | 2 | 6.00 | 0.00 | 0.161 | -4.339E-03 | 2.530E-03 | 0.00 | -2.216E-02 | 1.879E-02 | 5.628E-03 |
| 11 | 2 | 6.00 | 0.00 | 0.161 | -4.379E-03 | 2.524E-03 | 0.00 | -2.208E-02 | 1.882E-02 | 5.627E-03 |
| 12 | 2 | 6.00 | 0.00 | 0.161 | -4.402E-03 | 2.520E-03 | 0.00 | -2.209E-02 | 1.885E-02 | 5.627E-03 |
| 13 | 2 | 6.00 | 0.00 | 0.161 | -4.425E-03 | 2.517E-03 | 0.00 | -2.220E-02 | 1.886E-02 | 5.628E-03 |
| 14 | 2 | 6.00 | 0.00 | 0.161 | -4.452E-03 | 2.512E-03 | 0.00 | -2.221E-02 | 1.889E-02 | 5.628E-03 |
| 15 | 2 | 6.00 | 0.00 | 0.161 | -4.451E-03 | 2.512E-03 | 0.00 | -2.249E-02 | 1.888E-02 | 5.628E-03 |
| 16 | 2 | 6.00 | 0.00 | 0.161 | -4.468E-03 | 2.509E-03 | 0.00 | -2.257E-02 | 1.890E-02 | 5.628E-03 |
| 17 | 2 | 6.00 | 0.00 | 0.161 | -4.468E-03 | 2.509E-03 | 0.00 | -2.283E-02 | 1.890E-02 | 5.628E-03 |
| 18 | 2 | 6.00 | 0.00 | 0.161 | -4.467E-03 | 2.508E-03 | 0.00 | -2.311E-02 | 1.890E-02 | 5.628E-03 |
| 19 | 2 | 6.00 | 0.00 | 0.161 | -4.484E-03 | 2.505E-03 | 0.00 | -2.323E-02 | 1.892E-02 | 5.628E-03 |
| 20 | 2 | 6.00 | 0.00 | 0.161 | -4.471E-03 | 2.508E-03 | 0.00 | -2.373E-02 | 1.890E-02 | 5.628E-03 |
| 21 | 2 | 6.00 | 0.00 | 0.161 | -4.502E-03 | 2.502E-03 | 0.00 | -2.374E-02 | 1.893E-02 | 5.628E-03 |
| 22 | 2 | 6.00 | 0.00 | 0.161 | -4.507E-03 | 2.510E-03 | 0.00 | -2.439E-02 | 1.889E-02 | 5.626E-03 |
| 23 | 2 | 6.00 | 0.00 | 0.161 | -4.532E-03 | 2.507E-03 | 0.00 | -2.447E-02 | 1.891E-02 | 5.626E-03 |
| 24 | 2 | 6.00 | 0.00 | 0.161 | -4.451E-03 | 2.541E-03 | 0.00 | -2.632E-02 | 1.872E-02 | 5.627E-03 |
| 25 | 2 | 6.00 | 0.00 | 0.161 | -4.403E-03 | 2.564E-03 | 0.00 | -2.759E-02 | 1.860E-02 | 5.628E-03 |
| 26 | 2 | 6.00 | 0.00 | 0.161 | -4.211E-03 | 2.612E-03 | 0.00 | -3.055E-02 | 1.835E-02 | 5.628E-03 |
| 27 | 2 | 6.00 | 0.00 | 0.161 | -3.722E-03 | 2.732E-03 | 0.00 | -3.757E-02 | 1.772E-02 | 5.628E-03 |
| 28 | 2 | 6.00 | 0.00 | 0.161 | -3.739E-03 | 2.731E-03 | 0.00 | -3.757E-02 | 1.773E-02 | 5.628E-03 |

FIRST TWO AXIAL LEVEL RADIAL GRID LOCATION (IN)

```
LA     RGI VALUES
  1   0.000      1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  0.1043      0.1328
     0.1613
  2   0.000      1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  0.1043      0.1328
     0.1613
     RADIAL POROSITY DISTRIBUTION

LA  POROSITY VALUES
  1  1.9608E-02  1.9608E-02  1.9608E-02  1.9608E-02  1.9608E-02  1.9608E-02  1.9608E-02  1.9608E-02

  2  1.9608E-02  1.9608E-02  1.9608E-02  1.9608E-02  1.9608E-02  1.9608E-02  1.9608E-02  1.9608E-02

  3  2.1364E-02  2.1268E-02  2.1100E-02  2.0893E-02  2.0692E-02  2.0531E-02  2.0411E-02  2.0429E-02

  4  2.6307E-02  2.5941E-02  2.5297E-02  2.4511E-02  2.3741E-02  2.3127E-02  2.2670E-02  2.2737E-02

  5  2.6355E-02  2.5986E-02  2.5336E-02  2.4542E-02  2.3764E-02  2.3142E-02  2.2676E-02  2.2738E-02

  6  2.7369E-02  2.7018E-02  2.6397E-02  2.5632E-02  2.4878E-02  2.4268E-02  2.3806E-02  2.3869E-02

  7  2.7429E-02  2.7077E-02  2.6454E-02  2.5687E-02  2.4929E-02  2.4316E-02  2.3849E-02  2.3909E-02

  8  2.8325E-02  2.7914E-02  2.7181E-02  2.6272E-02  2.5365E-02  2.4614E-02  2.4006E-02  2.3976E-02

  9  2.8773E-02  2.8333E-02  2.7544E-02  2.6565E-02  2.5584E-02  2.4763E-02  2.4085E-02  2.4010E-02

 10  2.9257E-02  2.8777E-02  2.7916E-02  2.6843E-02  2.5762E-02  2.4853E-02  2.4094E-02  2.3975E-02

 11  3.0057E-02  2.9510E-02  2.8529E-02  2.7301E-02  2.6054E-02  2.4999E-02  2.4106E-02  2.3916E-02

 12  3.0058E-02  2.9511E-02  2.8528E-02  2.7298E-02  2.6050E-02  2.4994E-02  2.4100E-02  2.3908E-02

 13  3.0145E-02  2.9586E-02  2.8581E-02  2.7321E-02  2.6039E-02  2.4951E-02  2.4023E-02  2.3808E-02

 14  3.0127E-02  2.9569E-02  2.8565E-02  2.7309E-02  2.6030E-02  2.4945E-02  2.4021E-02  2.3808E-02

 15  2.9332E-02  2.8830E-02  2.7930E-02  2.6806E-02  2.5665E-02  2.4701E-02  2.3886E-02  2.3729E-02

 16  2.9091E-02  2.8606E-02  2.7737E-02  2.6654E-02  2.5555E-02  2.4627E-02  2.3845E-02  2.3706E-02

 17  2.8301E-02  2.7875E-02  2.7112E-02  2.6162E-02  2.5200E-02  2.4394E-02  2.3725E-02  2.3647E-02

 18  2.7458E-02  2.7095E-02  2.6445E-02  2.5636E-02  2.4821E-02  2.4144E-02  2.3597E-02  2.3583E-02

 19  2.7195E-02  2.6847E-02  2.6227E-02  2.5456E-02  2.4684E-02  2.4046E-02  2.3539E-02  2.3549E-02

 20  2.6109E-02  2.5826E-02  2.5326E-02  2.4714E-02  2.4114E-02  2.3636E-02  2.3293E-02  2.3401E-02

 21  2.6083E-02  2.5802E-02  2.5305E-02  2.4698E-02  2.4102E-02  2.3629E-02  2.3290E-02  2.3401E-02
```

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 22 | 2.5988E-02 | 2.5678E-02 | 2.5128E-02 | 2.4458E-02 | 2.3803E-02 | 2.3285E-02 | 2.2913E-02 | 2.3018E-02 |
| 23 | 2.5952E-02 | 2.5639E-02 | 2.5086E-02 | 2.4412E-02 | 2.3755E-02 | 2.3236E-02 | 2.2863E-02 | 2.2970E-02 |
| 24 | 2.4425E-02 | 2.4152E-02 | 2.3671E-02 | 2.3084E-02 | 2.2513E-02 | 2.2064E-02 | 2.1748E-02 | 2.1863E-02 |
| 25 | 2.3373E-02 | 2.3128E-02 | 2.2697E-02 | 2.2171E-02 | 2.1660E-02 | 2.1259E-02 | 2.0982E-02 | 2.1103E-02 |
| 26 | 2.2248E-02 | 2.2076E-02 | 2.1774E-02 | 2.1405E-02 | 2.1047E-02 | 2.0767E-02 | 2.0574E-02 | 2.0659E-02 |
| 27 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 |
| 28 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 | 1.9608E-02 |

| AXIAL NODE NO. | OUTER CLAD OXIDE THICKNESS (IN) | LEFT-SIDE DIRECT HEATING FRACTION | RIGHT-SIDE DIRECT HEATING FRACTION |
|---|---|---|---|
| 1 | 3.94000E-05 | 0.0000 | 0.0000 |
| 2 | 3.94000E-05 | 0.0000 | 0.0000 |
| 3 | 3.94000E-05 | 0.0000 | 0.0000 |
| 4 | 3.94000E-05 | 0.0000 | 0.0000 |
| 5 | 3.94000E-05 | 0.0000 | 0.0000 |
| 6 | 3.94000E-05 | 0.0000 | 0.0000 |
| 7 | 3.94000E-05 | 0.0000 | 0.0000 |
| 8 | 3.94000E-05 | 0.0000 | 0.0000 |
| 9 | 3.94000E-05 | 0.0000 | 0.0000 |
| 10 | 3.94000E-05 | 0.0000 | 0.0000 |
| 11 | 3.94000E-05 | 0.0000 | 0.0000 |
| 12 | 3.94000E-05 | 0.0000 | 0.0000 |
| 13 | 3.94000E-05 | 0.0000 | 0.0000 |
| 14 | 3.94000E-05 | 0.0000 | 0.0000 |
| 15 | 3.94000E-05 | 0.0000 | 0.0000 |
| 16 | 3.94000E-05 | 0.0000 | 0.0000 |
| 17 | 3.94000E-05 | 0.0000 | 0.0000 |
| 18 | 3.94000E-05 | 0.0000 | 0.0000 |
| 19 | 3.94000E-05 | 0.0000 | 0.0000 |
| 20 | 3.94000E-05 | 0.0000 | 0.0000 |
| 21 | 3.94000E-05 | 0.0000 | 0.0000 |
| 22 | 3.94000E-05 | 0.0000 | 0.0000 |
| 23 | 3.94000E-05 | 0.0000 | 0.0000 |
| 24 | 3.94000E-05 | 0.0000 | 0.0000 |
| 25 | 3.94000E-05 | 0.0000 | 0.0000 |
| 26 | 3.94000E-05 | 0.0000 | 0.0000 |
| 27 | 3.94000E-05 | 0.0000 | 0.0000 |
| 28 | 3.94000E-05 | 0.0000 | 0.0000 |

MESH POINT TEMPERATURES

| LA | TEMPERATURE VALUES (F) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 563.9 | 563.9 | 563.8 | 563.8 | 563.8 | 563.7 | 563.6 | 563.4 |
| | 563.2 | 562.7 | 562.6 | 562.6 | | | | |
| 2 | 563.9 | 563.9 | 563.8 | 563.8 | 563.8 | 563.7 | 563.6 | 563.4 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 563.2 | 562.7 | 562.6 | 562.6 | | | | |
| 3 | 563.9 | 563.9 | 563.9 | 563.9 | 563.8 | 563.7 | 563.6 | 563.4 |
| | 563.2 | 562.7 | 562.7 | 562.6 | | | | |
| 4 | 564.1 | 564.1 | 564.0 | 564.0 | 563.9 | 563.8 | 563.7 | 563.5 |
| | 563.2 | 562.7 | 562.7 | 562.6 | | | | |
| 5 | 564.1 | 564.1 | 564.1 | 564.0 | 563.9 | 563.8 | 563.7 | 563.5 |
| | 563.2 | 562.7 | 562.7 | 562.6 | | | | |
| 6 | 564.0 | 564.0 | 563.9 | 563.9 | 563.8 | 563.7 | 563.6 | 563.4 |
| | 563.1 | 562.7 | 562.7 | 562.6 | | | | |
| 7 | 564.0 | 564.0 | 563.9 | 563.9 | 563.8 | 563.7 | 563.6 | 563.4 |
| | 563.1 | 562.7 | 562.7 | 562.7 | | | | |
| 8 | 563.9 | 563.9 | 563.9 | 563.8 | 563.8 | 563.7 | 563.6 | 563.4 |
| | 563.1 | 562.7 | 562.7 | 562.7 | | | | |
| 9 | 563.9 | 563.9 | 563.8 | 563.8 | 563.7 | 563.7 | 563.5 | 563.3 |
| | 563.1 | 562.7 | 562.7 | 562.7 | | | | |
| 10 | 563.9 | 563.9 | 563.8 | 563.8 | 563.7 | 563.6 | 563.5 | 563.3 |
| | 563.1 | 562.7 | 562.7 | 562.7 | | | | |
| 11 | 563.8 | 563.8 | 563.8 | 563.8 | 563.7 | 563.6 | 563.5 | 563.3 |
| | 563.0 | 562.7 | 562.7 | 562.7 | | | | |
| 12 | 563.8 | 563.8 | 563.8 | 563.8 | 563.7 | 563.6 | 563.5 | 563.3 |
| | 563.0 | 562.7 | 562.7 | 562.7 | | | | |
| 13 | 563.8 | 563.8 | 563.8 | 563.7 | 563.7 | 563.6 | 563.5 | 563.3 |
| | 563.0 | 562.7 | 562.7 | 562.7 | | | | |
| 14 | 563.8 | 563.8 | 563.8 | 563.7 | 563.7 | 563.6 | 563.5 | 563.3 |
| | 563.0 | 562.8 | 562.7 | 562.7 | | | | |
| 15 | 563.8 | 563.8 | 563.8 | 563.7 | 563.7 | 563.6 | 563.5 | 563.3 |
| | 563.0 | 562.8 | 562.7 | 562.7 | | | | |
| 16 | 563.8 | 563.8 | 563.8 | 563.7 | 563.7 | 563.6 | 563.5 | 563.3 |
| | 563.0 | 562.8 | 562.7 | 562.7 | | | | |
| 17 | 563.8 | 563.8 | 563.8 | 563.7 | 563.7 | 563.6 | 563.5 | 563.3 |
| | 563.0 | 562.8 | 562.7 | 562.7 | | | | |
| 18 | 563.8 | 563.8 | 563.8 | 563.8 | 563.7 | 563.6 | 563.5 | 563.3 |
| | 563.0 | 562.8 | 562.7 | 562.7 | | | | |
| 19 | 563.8 | 563.8 | 563.8 | 563.8 | 563.7 | 563.6 | 563.5 | 563.3 |
| | 563.1 | 562.8 | 562.7 | 562.7 | | | | |
| 20 | 563.9 | 563.9 | 563.8 | 563.8 | 563.7 | 563.6 | 563.5 | 563.3 |
| | 563.1 | 562.8 | 562.8 | 562.7 | | | | |
| 21 | 563.9 | 563.9 | 563.8 | 563.8 | 563.7 | 563.6 | 563.5 | 563.3 |
| | 563.1 | 562.8 | 562.8 | 562.7 | | | | |
| 22 | 563.9 | 563.9 | 563.9 | 563.8 | 563.8 | 563.7 | 563.6 | 563.4 |
| | 563.1 | 562.8 | 562.8 | 562.7 | | | | |
| 23 | 563.9 | 563.9 | 563.9 | 563.8 | 563.8 | 563.7 | 563.6 | 563.4 |
| | 563.1 | 562.8 | 562.8 | 562.7 | | | | |
| 24 | 564.0 | 564.0 | 563.9 | 563.9 | 563.8 | 563.7 | 563.6 | 563.4 |
| | 563.1 | 562.8 | 562.8 | 562.7 | | | | |
| 25 | 564.0 | 564.0 | 564.0 | 563.9 | 563.9 | 563.8 | 563.7 | 563.4 |
| | 563.2 | 562.8 | 562.8 | 562.8 | | | | |
| 26 | 563.9 | 563.9 | 563.9 | 563.8 | 563.8 | 563.7 | 563.6 | 563.4 |
| | 563.1 | 562.8 | 562.8 | 562.8 | | | | |
| 27 | 563.7 | 563.7 | 563.6 | 563.6 | 563.6 | 563.5 | 563.4 | 563.3 |

```
        563.1       562.8       562.8       562.7
 28     563.7       563.7       563.6       563.6       563.6       563.5       563.4       563.3
        563.1       562.8       562.8       562.7
       RADIAL POWER SOURCE DISTRIBUTION
0.9614      0.9631      0.9664      0.9715      0.9785      0.9876      1.003       1.028
```

# SBLOCA Analysis: Initialized S-RELAP5 Conditions

0 EDIT OF RODEX2 FUEL MODEL

```
RELAP5 ROD NUMBER     =      201
RODEX2 ROD NUMBER     =        1
INTERNAL ROD PRESSURE =    828.30     PSIA
PCT                   =    689.47     F
PCT TIME              =    1.9300     SEC
AXIAL NODE NO.        =       31
```

| AXIAL NODE NO. | TEMPERATURES PELLET INNER (F) | SHOULDER (F) | PELLET OUTER (F) | CLAD INNER (F) | CLAD OUTER (F) | COOLANT (F) | GAP COEFFICIENT (BTU/HR-FT2-F) | LHGR (KW/FT) | PLASTIC STRAIN |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 909.575 | 790.306 | 702.536 | 590.874 | 575.864 | 563.184 | 7.9039E+02 | 2.19817 | 0.00000 |
| 2 | 1249.897 | 985.213 | 801.547 | 617.959 | 589.469 | 565.348 | 9.1525E+02 | 4.18502 | 0.00000 |
| 3 | 1542.502 | 1120.566 | 843.472 | 643.202 | 602.692 | 568.343 | 1.1966E+03 | 5.96897 | 0.00000 |
| 4 | 1507.512 | 1062.093 | 776.973 | 650.321 | 607.627 | 571.456 | 1.9962E+03 | 6.29701 | 0.00000 |
| 5 | 1537.811 | 1074.043 | 778.826 | 655.868 | 611.875 | 574.661 | 2.1204E+03 | 6.49382 | 0.00000 |
| 6 | 1521.333 | 1045.560 | 745.064 | 661.804 | 616.354 | 577.969 | 3.2380E+03 | 6.71478 | 0.00000 |
| 7 | 1564.456 | 1059.833 | 743.955 | 669.058 | 621.518 | 581.428 | 3.7690E+03 | 7.03092 | 0.00000 |
| 8 | 1612.764 | 1071.245 | 737.078 | 677.414 | 627.261 | 585.040 | 4.9974E+03 | 7.42630 | 0.00000 |
| 9 | 1671.483 | 1088.357 | 733.362 | 686.203 | 633.203 | 588.703 | 6.6900E+03 | 7.85802 | 0.00000 |
| 10 | 1745.073 | 1116.343 | 738.532 | 695.069 | 639.276 | 592.560 | 7.6517E+03 | 8.28307 | 0.00000 |
| 11 | 1821.708 | 1147.239 | 747.078 | 703.663 | 645.315 | 596.595 | 8.0216E+03 | 8.67389 | 0.00000 |
| 12 | 1889.598 | 1175.599 | 755.395 | 711.789 | 651.230 | 600.785 | 8.2997E+03 | 9.01412 | 0.00000 |
| 13 | 1943.878 | 1198.389 | 762.503 | 718.967 | 656.731 | 604.962 | 8.5534E+03 | 9.27473 | 0.00000 |
| 14 | 1984.562 | 1215.824 | 768.053 | 724.537 | 661.068 | 609.167 | 8.7348E+03 | 9.46719 | 0.00000 |
| 15 | 2009.836 | 1227.651 | 772.004 | 728.487 | 664.202 | 613.342 | 8.8529E+03 | 9.59522 | 0.00000 |
| 16 | 2026.021 | 1235.427 | 774.995 | 731.511 | 666.769 | 617.459 | 8.9274E+03 | 9.66863 | 0.00000 |
| 17 | 2033.645 | 1240.478 | 777.524 | 733.907 | 668.955 | 621.527 | 8.9329E+03 | 9.70420 | 0.00000 |
| 18 | 2036.591 | 1243.659 | 779.606 | 735.836 | 670.829 | 625.461 | 8.9125E+03 | 9.71595 | 0.00000 |
| 19 | 2040.898 | 1246.363 | 781.369 | 737.626 | 672.590 | 629.381 | 8.9246E+03 | 9.72350 | 0.00000 |
| 20 | 2031.545 | 1243.559 | 781.139 | 737.235 | 672.483 | 629.381 | 8.8527E+03 | 9.68064 | 0.00000 |
| 21 | 2028.151 | 1244.342 | 782.773 | 738.558 | 673.953 | 633.093 | 8.7730E+03 | 9.66124 | 0.00000 |
| 22 | 2060.768 | 1256.388 | 784.644 | 740.140 | 674.371 | 633.093 | 8.8747E+03 | 9.83726 | 0.00000 |
| 23 | 2116.070 | 1277.658 | 789.038 | 744.157 | 676.544 | 637.039 | 9.0524E+03 | 10.11916 | 0.00000 |
| 24 | 2181.185 | 1301.391 | 792.526 | 747.175 | 677.291 | 637.039 | 9.2629E+03 | 10.46293 | 0.00000 |
| 25 | 2264.239 | 1332.967 | 799.139 | 752.204 | 679.599 | 641.155 | 9.3057E+03 | 10.87823 | 0.00000 |
| 26 | 2350.728 | 1364.187 | 803.692 | 755.996 | 680.474 | 641.155 | 9.5296E+03 | 11.32051 | 0.00000 |
| 27 | 2440.383 | 1396.966 | 808.929 | 760.944 | 682.527 | 645.095 | 9.8421E+03 | 11.76266 | 0.00000 |
| 28 | 2523.378 | 1426.432 | 812.643 | 764.424 | 683.281 | 645.095 | 1.0139E+04 | 12.17663 | 0.00000 |
| 29 | 2648.449 | 1472.192 | 819.665 | 770.401 | 685.234 | 648.377 | 1.0425E+04 | 12.79090 | 0.00000 |
| 30 | 2763.960 | 1517.266 | 828.569 | 775.285 | 686.229 | 648.377 | 1.0084E+04 | 13.38286 | 0.00000 |
| 31 | 2768.772 | 1519.392 | 829.288 | 776.032 | 686.868 | 650.848 | 1.0103E+04 | 13.40087 | 0.00000 |
| 32 | 2661.988 | 1481.579 | 825.006 | 771.748 | 686.014 | 650.848 | 9.7089E+03 | 12.87865 | 0.00000 |
| 33 | 2513.104 | 1429.121 | 819.148 | 766.108 | 685.267 | 652.461 | 9.1865E+03 | 12.13580 | 0.00000 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 34 | 2424.152 | 1456.447 | 890.085 | 757.316 | 683.454 | 652.461 | 3.3495E+03 | 11.07623 | 0.00000 |
| 35 | 2285.946 | 1463.424 | 961.245 | 745.823 | 681.187 | 653.366 | 1.8040E+03 | 9.67944 | 0.00000 |
| 36 | 2011.823 | 1359.699 | 948.463 | 732.742 | 678.221 | 653.366 | 1.5172E+03 | 8.15184 | 0.00000 |
| 37 | 1590.905 | 1178.841 | 903.502 | 711.820 | 673.015 | 653.602 | 1.2123E+03 | 5.78764 | 0.00000 |
| 38 | 1140.107 | 950.951 | 814.869 | 686.974 | 665.895 | 653.602 | 9.8402E+02 | 3.13451 | 0.00000 |

RELAP5 ROD NUMBER = 202
RODEX2 ROD NUMBER = 2
INTERNAL ROD PRESSURE = 807.06 PSIA
PCT = 688.96 F
PCT TIME = 1.9300 SEC
AXIAL NODE NO. = 25

| AXIAL NODE NO. | TEMPERATURES PELLET INNER | SHOULDER | PELLET OUTER | CLAD INNER | CLAD OUTER | COOLANT | GAP COEFFICIENT | LHGR | PLASTIC STRAIN |
|---|---|---|---|---|---|---|---|---|---|
| | (F) | (F) | (F) | (F) | (F) | (F) | (BTU/HR-FT2-F) | (KW/FT) | |
| 1 | 903.873 | 785.934 | 698.973 | 590.770 | 575.816 | 563.184 | 8.1256E+02 | 2.18984 | 0.00000 |
| 2 | 1239.923 | 978.501 | 796.681 | 617.760 | 589.378 | 565.348 | 9.3556E+02 | 4.16916 | 0.00000 |
| 3 | 1532.286 | 1115.595 | 840.979 | 642.920 | 602.562 | 568.343 | 1.2054E+03 | 5.94636 | 0.00000 |
| 4 | 1505.433 | 1065.217 | 781.607 | 650.024 | 607.490 | 571.456 | 1.9141E+03 | 6.27316 | 0.00000 |
| 5 | 1537.219 | 1078.529 | 784.653 | 655.562 | 611.734 | 574.661 | 2.0121E+03 | 6.46922 | 0.00000 |
| 6 | 1535.299 | 1061.873 | 760.833 | 661.488 | 616.208 | 577.969 | 2.7035E+03 | 6.68934 | 0.00000 |
| 7 | 1581.925 | 1079.052 | 762.111 | 668.728 | 621.366 | 581.428 | 3.0115E+03 | 7.00429 | 0.00000 |
| 8 | 1633.949 | 1094.434 | 758.502 | 677.066 | 627.101 | 585.040 | 3.6475E+03 | 7.39816 | 0.00000 |
| 9 | 1693.991 | 1113.253 | 756.119 | 685.836 | 633.034 | 588.703 | 4.4720E+03 | 7.82825 | 0.00000 |
| 10 | 1755.555 | 1132.646 | 754.367 | 694.684 | 639.100 | 592.560 | 5.5511E+03 | 8.25169 | 0.00000 |
| 11 | 1810.632 | 1148.191 | 750.822 | 703.261 | 645.131 | 596.595 | 7.2946E+03 | 8.64103 | 0.00000 |
| 12 | 1871.718 | 1171.855 | 755.578 | 711.372 | 651.039 | 600.785 | 8.1561E+03 | 8.97998 | 0.00000 |
| 13 | 1924.344 | 1193.982 | 762.281 | 718.539 | 656.535 | 604.962 | 8.4809E+03 | 9.23959 | 0.00000 |
| 14 | 1963.838 | 1210.611 | 767.288 | 724.170 | 660.938 | 609.167 | 8.7821E+03 | 9.43133 | 0.00000 |
| 15 | 1989.299 | 1222.095 | 771.011 | 728.119 | 664.075 | 613.342 | 8.9477E+03 | 9.55888 | 0.00000 |
| 16 | 2005.190 | 1229.364 | 773.627 | 731.154 | 666.654 | 617.459 | 9.1052E+03 | 9.63200 | 0.00000 |
| 17 | 2013.050 | 1234.006 | 775.832 | 733.559 | 668.850 | 621.527 | 9.1818E+03 | 9.66744 | 0.00000 |
| 18 | 2016.192 | 1236.875 | 777.664 | 735.495 | 670.731 | 625.461 | 9.2156E+03 | 9.67915 | 0.00000 |
| 19 | 2015.706 | 1237.931 | 779.112 | 737.095 | 672.444 | 629.381 | 9.2357E+03 | 9.66532 | 0.00000 |
| 20 | 2025.629 | 1243.419 | 781.582 | 739.018 | 674.075 | 633.093 | 9.1614E+03 | 9.71232 | 0.00000 |
| 21 | 2127.973 | 1282.043 | 788.548 | 745.326 | 676.835 | 637.039 | 9.5232E+03 | 10.25207 | 0.00000 |
| 22 | 2284.845 | 1340.507 | 799.054 | 753.743 | 679.956 | 641.155 | 9.7977E+03 | 11.05733 | 0.00000 |
| 23 | 2457.128 | 1403.050 | 808.422 | 762.305 | 682.823 | 645.095 | 1.0381E+04 | 11.92431 | 0.00000 |
| 24 | 2680.379 | 1486.016 | 822.150 | 772.438 | 685.651 | 648.377 | 1.0529E+04 | 13.03731 | 0.00000 |
| 25 | 2690.526 | 1492.331 | 825.520 | 773.484 | 686.362 | 650.848 | 1.0100E+04 | 13.08999 | 0.00000 |
| 26 | 2415.484 | 1410.890 | 833.986 | 761.360 | 684.296 | 652.461 | 6.3918E+03 | 11.56206 | 0.00000 |
| 27 | 2129.351 | 1399.964 | 947.640 | 739.028 | 679.670 | 653.366 | 1.7094E+03 | 8.88187 | 0.00000 |
| 28 | 1348.925 | 1057.886 | 856.229 | 699.477 | 669.636 | 653.602 | 1.1383E+03 | 4.44418 | 0.00000 |

RELAP5 ROD NUMBER = 203
RODEX2 ROD NUMBER = 3
INTERNAL ROD PRESSURE = 742.18 PSIA
PCT = 673.10 F
PCT TIME = 1.9150 SEC
AXIAL NODE NO. = 25

| AXIAL NODE NO. | TEMPERATURES PELLET INNER | SHOULDER | PELLET OUTER | CLAD INNER | CLAD OUTER | COOLANT | GAP COEFFICIENT | LHGR | PLASTIC STRAIN |
|---|---|---|---|---|---|---|---|---|---|
| | (F) | (F) | (F) | (F) | (F) | (F) | (BTU/HR-FT2-F) | (KW/FT) | |
| 1 | 798.660 | 720.798 | 662.156 | 582.314 | 571.836 | 562.994 | 7.7086E+02 | 1.53295 | 0.00000 |
| 2 | 1026.252 | 859.871 | 739.681 | 601.239 | 581.333 | 564.512 | 8.4641E+02 | 2.91852 | 0.00000 |
| 3 | 1221.530 | 962.252 | 782.114 | 618.950 | 590.618 | 566.655 | 1.0243E+03 | 4.16260 | 0.00000 |
| 4 | 1201.964 | 928.190 | 740.699 | 623.941 | 594.071 | 568.834 | 1.5101E+03 | 4.39137 | 0.00000 |
| 5 | 1223.652 | 938.854 | 744.611 | 627.844 | 597.057 | 571.076 | 1.5571E+03 | 4.52862 | 0.00000 |
| 6 | 1221.956 | 927.658 | 728.011 | 632.016 | 600.200 | 573.388 | 1.9585E+03 | 4.68271 | 0.00000 |
| 7 | 1253.527 | 941.616 | 731.403 | 637.106 | 603.815 | 575.804 | 2.0877E+03 | 4.90318 | 0.00000 |
| 8 | 1287.301 | 953.041 | 730.216 | 643.001 | 607.867 | 578.351 | 2.3841E+03 | 5.17890 | 0.00000 |
| 9 | 1327.360 | 968.185 | 731.185 | 649.340 | 612.196 | 581.040 | 2.6882E+03 | 5.47997 | 0.00000 |
| 10 | 1369.167 | 984.626 | 733.378 | 655.745 | 616.627 | 583.870 | 2.9874E+03 | 5.77639 | 0.00000 |
| 11 | 1406.437 | 998.020 | 733.820 | 661.815 | 620.887 | 586.701 | 3.3729E+03 | 6.04894 | 0.00000 |
| 12 | 1439.223 | 1010.215 | 734.587 | 667.511 | 625.013 | 589.615 | 3.7628E+03 | 6.28621 | 0.00000 |
| 13 | 1464.085 | 1019.070 | 734.773 | 672.587 | 628.894 | 592.607 | 4.1760E+03 | 6.46795 | 0.00000 |
| 14 | 1479.991 | 1023.641 | 733.205 | 677.146 | 632.579 | 595.675 | 4.7286E+03 | 6.60216 | 0.00000 |
| 15 | 1492.680 | 1029.114 | 734.265 | 681.183 | 636.042 | 598.778 | 5.0612E+03 | 6.69145 | 0.00000 |
| 16 | 1497.316 | 1029.939 | 732.923 | 684.807 | 639.349 | 601.897 | 5.6264E+03 | 6.74264 | 0.00000 |
| 17 | 1500.917 | 1032.061 | 733.764 | 687.978 | 642.377 | 604.893 | 5.9344E+03 | 6.76744 | 0.00000 |
| 18 | 1503.030 | 1034.067 | 735.179 | 690.918 | 645.286 | 607.865 | 6.1463E+03 | 6.77565 | 0.00000 |
| 19 | 1501.622 | 1033.888 | 735.462 | 693.631 | 648.087 | 610.825 | 6.4941E+03 | 6.76596 | 0.00000 |
| 20 | 1514.341 | 1043.373 | 742.187 | 696.744 | 651.003 | 613.695 | 6.0071E+03 | 6.79887 | 0.00000 |
| 21 | 1570.247 | 1064.440 | 744.342 | 704.183 | 655.955 | 616.731 | 7.1750E+03 | 7.17670 | 0.00000 |
| 22 | 1671.771 | 1109.101 | 758.242 | 713.082 | 661.133 | 620.001 | 6.8817E+03 | 7.74041 | 0.00000 |
| 23 | 1768.732 | 1145.094 | 762.431 | 721.312 | 665.356 | 623.376 | 8.1507E+03 | 8.34731 | 0.00000 |
| 24 | 1922.015 | 1212.548 | 784.654 | 730.653 | 669.552 | 627.045 | 6.7855E+03 | 9.12644 | 0.00000 |
| 25 | 1953.635 | 1235.544 | 801.855 | 732.602 | 671.275 | 630.633 | 5.3124E+03 | 9.16331 | 0.00000 |
| 26 | 1844.427 | 1226.210 | 840.739 | 723.994 | 669.774 | 633.658 | 2.7835E+03 | 8.09372 | 0.00000 |
| 27 | 1638.608 | 1190.407 | 894.482 | 707.122 | 665.386 | 635.935 | 1.3324E+03 | 6.21753 | 0.00000 |
| 28 | 1111.316 | 926.347 | 793.217 | 674.216 | 653.248 | 636.999 | 1.0496E+03 | 3.11103 | 0.00000 |

RELAP5 ROD NUMBER = 204
RODEX2 ROD NUMBER = 4
INTERNAL ROD PRESSURE = 698.99 PSIA
PCT = 660.28 F
PCT TIME = 6.2350 SEC
AXIAL NODE NO. = 25

| AXIAL NODE NO. | TEMPERATURES PELLET INNER | SHOULDER | PELLET OUTER | CLAD INNER | CLAD OUTER | COOLANT | GAP COEFFICIENT | LHGR | PLASTIC STRAIN |
|---|---|---|---|---|---|---|---|---|---|
| | (F) | (F) | (F) | (F) | (F) | (F) | (BTU/HR-FT2-F) | (KW/FT) | |
| 1 | 751.029 | 690.561 | 644.517 | 578.342 | 569.968 | 562.905 | 7.4298E+02 | 1.22458 | 0.00000 |
| 2 | 930.768 | 804.006 | 710.668 | 593.472 | 577.557 | 564.120 | 7.9872E+02 | 2.33143 | 0.00000 |
| 3 | 1085.061 | 890.353 | 751.312 | 607.649 | 584.987 | 565.844 | 9.2932E+02 | 3.32525 | 0.00000 |
| 4 | 1073.678 | 868.775 | 723.727 | 611.666 | 587.770 | 567.605 | 1.2569E+03 | 3.50800 | 0.00000 |
| 5 | 1091.618 | 878.611 | 728.325 | 614.790 | 590.157 | 569.396 | 1.2793E+03 | 3.61764 | 0.00000 |
| 6 | 1100.678 | 879.307 | 723.736 | 618.134 | 592.676 | 571.243 | 1.4222E+03 | 3.74073 | 0.00000 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7 | 1127.666 | 893.165 | 729.233 | 622.213 | 595.570 | 573.173 | 1.4695E+03 | 3.91685 | 0.00000 |
| 8 | 1158.736 | 907.634 | 733.408 | 626.934 | 598.810 | 575.205 | 1.5600E+03 | 4.13711 | 0.00000 |
| 9 | 1194.150 | 924.497 | 738.813 | 632.010 | 602.271 | 577.351 | 1.6456E+03 | 4.37762 | 0.00000 |
| 10 | 1229.164 | 940.857 | 743.816 | 637.139 | 605.814 | 579.608 | 1.7367E+03 | 4.61441 | 0.00000 |
| 11 | 1260.065 | 954.374 | 746.973 | 642.121 | 609.341 | 581.966 | 1.8503E+03 | 4.83213 | 0.00000 |
| 12 | 1288.584 | 967.467 | 750.802 | 646.825 | 612.782 | 584.407 | 1.9391E+03 | 5.02167 | 0.00000 |
| 13 | 1310.228 | 977.171 | 753.436 | 650.895 | 615.888 | 586.790 | 2.0231E+03 | 5.16685 | 0.00000 |
| 14 | 1325.191 | 983.407 | 754.519 | 654.552 | 618.838 | 589.237 | 2.1182E+03 | 5.27407 | 0.00000 |
| 15 | 1338.992 | 991.031 | 758.284 | 657.788 | 621.610 | 591.711 | 2.1356E+03 | 5.34540 | 0.00000 |
| 16 | 1345.118 | 993.813 | 759.048 | 660.660 | 624.222 | 594.197 | 2.1980E+03 | 5.38629 | 0.00000 |
| 17 | 1350.719 | 997.607 | 761.563 | 663.274 | 626.718 | 596.685 | 2.2083E+03 | 5.40611 | 0.00000 |
| 18 | 1354.477 | 1000.671 | 763.987 | 665.722 | 629.136 | 599.169 | 2.2115E+03 | 5.41266 | 0.00000 |
| 19 | 1353.175 | 1000.152 | 763.874 | 668.013 | 631.495 | 601.641 | 2.2638E+03 | 5.40492 | 0.00000 |
| 20 | 1361.828 | 1006.268 | 768.178 | 670.637 | 633.957 | 604.034 | 2.2356E+03 | 5.43121 | 0.00000 |
| 21 | 1406.018 | 1024.918 | 771.906 | 676.730 | 638.046 | 606.551 | 2.4185E+03 | 5.73304 | 0.00000 |
| 22 | 1479.366 | 1058.058 | 781.876 | 684.800 | 643.126 | 609.261 | 2.5574E+03 | 6.18335 | 0.00000 |
| 23 | 1554.069 | 1088.731 | 787.743 | 693.422 | 648.537 | 612.144 | 2.8384E+03 | 6.66817 | 0.00000 |
| 24 | 1677.359 | 1149.227 | 812.739 | 703.815 | 654.815 | 615.202 | 2.6873E+03 | 7.29056 | 0.00000 |
| 25 | 1698.397 | 1164.955 | 824.944 | 706.998 | 657.828 | 618.262 | 2.4918E+03 | 7.32002 | 0.00000 |
| 26 | 1602.385 | 1143.271 | 843.334 | 699.235 | 655.765 | 620.921 | 1.8015E+03 | 6.46559 | 0.00000 |
| 27 | 1431.859 | 1096.948 | 868.257 | 683.005 | 649.544 | 622.868 | 1.0765E+03 | 4.96681 | 0.00000 |
| 28 | 1007.590 | 866.607 | 763.244 | 653.939 | 637.135 | 623.805 | 9.1287E+02 | 2.48522 | 0.00000 |

## Requested Input for Assessment Case

| | | |
|---|---|---|
| **Rod Size** | | |
| Pellet inner diameter (in) | 0 | |
| Pellet outer diameter (in), POD | 0.3225 | |
| Outer cladding diameter (in) | 0.374 | |
| Inner cladding diameter (in) | 0.3291 | |
| Stack length (in) | 165.354 | |
| Effective lower plenum length (in) | 1.881 | |
| Effective upper plenum length (in) | 6.701 | |
| **Spring Dimensions** | | |
| Upper plenum spring outer diameter (in) | 0.31 | |
| Upper plenum spring wire diameter (in) | 0.062 | |
| Number of effective coils (not used in RODEX) | 40 | |
| Total number of coils (not used in RODEX) | 46 | |
| **Pellet Shape** | Solid pellet Urania | |
| Pellet height (in), H | 0.531 | |
| Central hole radius | No central hole | |
| Dish radius (in), DSHRAD | 0.1045 | |
| Dish depth (in) (not used in RODEX input) | Min Value=0.012 (SBLOCA) | (1/4*POD^2*H*DSHVOL)/(DSHRAD^2) |
| | Min Value=0.018 (RLBLOCA) | |
| Dish volume as a fraction of pellet volume, DSHVOL | 0.010 (used in RODEX2-2A | |
| | 0.015 (used in RODEX3A) | |

## Requested Input for Assessment Case

| **Pellet Isotopics** | Fuel U-235 enrichment (wt%) | O/M ratio | Gadolinia Content (wt%) |
|---|---|---|---|
| ***SBLOCA*** | 3% | 2 | (assumed no Gad for SBLOCA) |
| ***RLBLOCA*** | | | |
| Hot UO2 Rod | 4.8% | 2 | 0.000% |
| Hot Assembly | | | |
| Hot Ring | | | |
| Average Ring | | | |
| Low-Powered Outer Ring | | | |
| Hot Gd2 Rod | 4.080% | | 2.000% |
| Hot Gd4 Rod | 4.560% | | 4.000% |
| Hot Gd8 Rod | 3.360% | | 8.000% |

| **Pellet Fabrication** | |
|---|---|
| Initial pellet density (fraction of theoretical) | 96% |
| Pellet surface Roughness (in) | 6.3 E-5 |
| Expected Density increase | 2% |
| **Cladding Fabrication** | |
| Cladding Type | M5 alloy |
| Cladding cold work | annealed recrystalized |
| Cladding Surface Roughness (in) | 4.33E-05 |
| **Rod Fill Conditions** | |
| Fill Gas Pressure (psia) | 290 +14.7 = 304.7 psia |
| Fill Gas Composition | Helium Mole Fraction=0.99 |
| | Nitrogen Mole Fraction=0.01 |
| | Argon Mole Fraction=0.0 |
| | Hydrogen Mole Fraction =0.0 |

## Requested Input for Assessment Case

| **Reactor Conditions** | ***SBLOCA*** | ***RLBLOCA*** |
|---|---|---|
| Type of Plant | PWR | |
| Rod pitch (in) | 0.496 | |
| Coolant pressure (psia) | 2319.6 (at core inlet), used in RODEX | 2250 |
| Pressurizer pressure (psia) | 2250 | 2250 |
| Coolant inlet temperature ($^{o}$F) | 562.55 | 562.5 |
| Coolant mass flux (lb/hr-ft$^2$) | 2.63E+06 | 2.756666E+06 |
| **Power History** | ***SBLOCA*** | ***RLBLOCA*** |
| Time | Provided in attachment | Cycle Burnup = 10131.12 hrs |
| Index to power shape | User Input in RODEX2/RELAP5 (SBLOCA) | Axial Shape Index = 0.1884 (RLBLOCA) |
| Axial Power Profiles | Provided in attachment | |
| **LHGR (kW/ft)** | | |
| **SBLOCA** | | |
| Hot Rod | 8.7311 | |
| Hot Assembly | 8.6981 | |
| Inner Core | 6.0889 | |
| Outer Core | 4.7375 | |
| **RLBLOCA (Effective Assy LHGR)** | | |
| Hot Rod | 6.9948 | |
| Hot Gd2 Rod | 6.7338 | |
| Hot Gd4 Rod | 6.6816 | |
| Hot Gd8 Rod | 6.264 | |

# RLBLOCA Analysis: Sample of Parameters Passed by RODEX3A to S-RELAP5 Input

```
1___ READING RODEX3 TO RELAP5 DATA TRANSFER CREATED JAN-09-07 AT 03:20:12
 RODEX3 INPUTS FOR ROD   1
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 RODEX3 FUEL ROD DEPENDENT VARIABLES
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          CFRRC  =   1.3101E+00 = CLADDING RADIAL-RADIAL FLEXIBILITY COEFFICIENT
          CFRZC  =  -2.4555E+00 = CLADDING RADIAL-AXIAL FLEXIBILITY COFFICIENT
          CFZZC  =   4.0332E+01 = CLADDING AXIAL-AXIAL FLEXIBILITY COEFFICIENT
          CRDFLM =   1.0000E+06 = CRUD FILM HEAT TRANSFER COEFFICIENT (BTU/HR*F*FT2)
          GASCOF =   4.1774E-01 = COEFFICIENT USED TO COMPUTE GAS THERMAL CONDUCTIVITY AND VISCOSITY
                     4.1755E-01 = COEFFICIENT USED TO COMPUTE GAS THERMAL CONDUCTIVITY AND VISCOSITY
                     4.8516E-01 = COEFFICIENT USED TO COMPUTE GAS THERMAL CONDUCTIVITY AND VISCOSITY
                     4.8520E-01 = COEFFICIENT USED TO COMPUTE GAS THERMAL CONDUCTIVITY AND VISCOSITY
                     3.6161E-05 = COEFFICIENT USED TO COMPUTE GAS THERMAL CONDUCTIVITY AND VISCOSITY
                     1.9917E-05 = COEFFICIENT USED TO COMPUTE GAS THERMAL CONDUCTIVITY AND VISCOSITY
                     1.4405E-07 = COEFFICIENT USED TO COMPUTE GAS THERMAL CONDUCTIVITY AND VISCOSITY
                     2.3855E-06 = COEFFICIENT USED TO COMPUTE GAS THERMAL CONDUCTIVITY AND VISCOSITY
                     6.7451E+00 = COEFFICIENT USED TO COMPUTE GAS THERMAL CONDUCTIVITY AND VISCOSITY
          GASTOT =   2.1814E-02 = TOTAL MOLES OF GAS INTERNAL TO FUEL ROD (GMMOLES)
          IGMTRY =          201 = RELAP5 GEOMETRY INDEX TO WHICH DATA APPLIES
          MATC   =         1151 = INDEX DEFINING CLADING MATERIAL
          NARP   =           52 = TOTAL NUMBER OF AXIAL REGIONS
          NRBP   =           11 = NUMBER OF RADIAL BOUNDARIES IN PELLET
          NRBT   =           13 = NUMBER OF RADIAL BOUNDARIES TOTAL
          NRRP   =           10 = NUMBER OF RADIAL REGIONS IN PELLET
          NRRT   =           12 = NUMBER OF RADIAL REGIONS TOTAL AND/OR CLAD INNER SURFACE RADIAL BOUNDARY NUMBER
          PCAE   =  -1.1520E+00 = AXIAL ELASTIC DEFLECTION COEFFICIENT FOR COOLANT PRESSURE
          PCRE   =  -1.4582E+00 = AXIAL ELASTIC DEFLECTION COEFFICIENT FOR COOLANT PRESSURE
          PGAE   =   8.9200E-01 = AXIAL ELASTIC DEFLECTION COEFFICIENT FOR GAS PRESSURE
          PGRE   =   1.3545E+00 = RADIAL ELASTIC DEFLECTION COEFFICIENT FOR GAS PRESSURE
          RIC    =   1.6455E-01 = CLAD INNER RADIUS (IN)
          RMEAN  =   1.0630E-04 = PELLET + CLAD SURFACE ROUGHNESS (IN)
          ROC    =   1.8700E-01 = CLAD OUTER RADIUS (IN)
          TAULP  =   1.0000E+04 = TIME CONSTANT FOR RESPONSE OF LOWER FUEL ROD PLENUM TEMPERATURE TO COOLANT TEMPERATURE
          TAUUP  =   4.1320E+00 = TIME CONSTANT FOR RESPONSE OF UPPER FUEL ROD PLENUM TEMPERATURE TO COOLANT TEMPERATURE
          TREFX  =   7.0000E+01 = REFERENCE TEMPERATURE (F)
          ZCRGW  =   4.2435E-01 = CHANGE IN CLADDING LENGTH DUE TO CREEP + ANISOTROPIC AXIAL GROWTH OF CLADDING (IN)
          ZPLENL =   1.8810E+00 = FABRICATED LOWER PLENUM LENGTH (IN)
          ZPLENU =   6.7010E+00 = FABRICATED UPPER PLENUM LENGTH (IN)
          FGPRES =   8.7090E+02 = INTERNAL ROD GAS PRESSURE (PSIA)
          TPLNLO =   5.7704E+02 = ROD LOWER PLENUM TEMPERATURE (F) PREVIOUS TIME STEP
          TPLNUO =   6.6567E+02 = ROD UPPER PLENUM TEMPERATURE (F) PREVIOUS TIME STEP
1
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RODEX3 AXIALLY DEPENDENT DATA

```
AXLNG  = AXIAL NODE LENGTHS (IN)
COMP   = GD2O3 WEIGHT FRACTION
DACCG  = AXIAL CREEP + GROWTH STRAINS IN CLAD (IN/IN)
DAPDS  = AXIAL DENSIFICATION + SWELLING STRAINS IN PELLET (IN/IN)
DPCR   = PELLET SURFACE DISPLACEMENT DUE FUEL MIGRATION (IN)
DRGAP  = RADIAL DISPLACEMENT DUE TO CLAD CREEP - PELLET CREEP - PELLET DENSIFICATION - PELLET SWELLING (IN)
DRPHL  = RADIAL INCREMENT DUE TO CREEP INTO HOLE (IN)
DSHVOL = DISH VOLUME AS FRACTION OF FUEL VOLUME
EZATL  = FUEL/CLADDING AXIAL RELATIVE SLIP
FRZT   = FLEXIBILITY RADIAL DIRECTION-AXIAL FORCE (IN/LB)
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| LA | AXLNG | COMP | DACCG | DAPDS | DPCR | DRGAP | DRPHL | DSHVOL | EZATL | FRZT |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.012E+00 | .000E+00 | 1.721E-03 | -5.613E-03 | 6.750E-05 | -1.187E-04 | .000E+00 | 1.500E-02 | -6.147E-03 | -2.176E-02 |
| 2 | 3.012E+00 | .000E+00 | 1.721E-03 | -5.613E-03 | 6.750E-05 | -1.187E-04 | .000E+00 | 1.500E-02 | -6.147E-03 | -2.176E-02 |
| 3 | 3.012E+00 | .000E+00 | 1.720E-03 | -5.613E-03 | 6.750E-05 | -1.217E-04 | .000E+00 | 1.500E-02 | -6.146E-03 | -2.177E-02 |
| 4 | 3.012E+00 | .000E+00 | 1.720E-03 | -5.613E-03 | 6.750E-05 | -1.229E-04 | .000E+00 | 1.500E-02 | -6.145E-03 | -2.177E-02 |
| 5 | 3.012E+00 | .000E+00 | 1.961E-03 | -4.599E-03 | 1.084E-04 | -5.065E-04 | .000E+00 | 1.500E-02 | -4.978E-03 | -2.250E-02 |
| 6 | 3.012E+00 | .000E+00 | 2.288E-03 | -3.225E-03 | 1.638E-04 | -1.026E-03 | .000E+00 | 1.500E-02 | -3.395E-03 | -2.348E-02 |
| 7 | 3.333E+00 | .000E+00 | 2.294E-03 | -3.222E-03 | 1.638E-04 | -1.033E-03 | .000E+00 | 1.500E-02 | -3.400E-03 | -2.349E-02 |
| 8 | 3.333E+00 | .000E+00 | 2.315E-03 | -3.212E-03 | 1.639E-04 | -1.055E-03 | .000E+00 | 1.500E-02 | -3.416E-03 | -2.350E-02 |
| 9 | 3.333E+00 | .000E+00 | 2.339E-03 | -3.097E-03 | 1.688E-04 | -1.094E-03 | .000E+00 | 1.500E-02 | -3.335E-03 | -2.350E-02 |
| 10 | 3.333E+00 | .000E+00 | 2.475E-03 | -2.461E-03 | 1.960E-04 | -1.307E-03 | .000E+00 | 1.500E-02 | -2.889E-03 | -2.351E-02 |
| 11 | 3.333E+00 | .000E+00 | 2.479E-03 | -2.460E-03 | 1.961E-04 | -1.311E-03 | .000E+00 | 1.500E-02 | -2.893E-03 | -2.352E-02 |
| 12 | 3.333E+00 | .000E+00 | 2.519E-03 | -2.449E-03 | 1.961E-04 | -1.349E-03 | .000E+00 | 1.500E-02 | -2.934E-03 | -2.352E-02 |
| 13 | 3.333E+00 | .000E+00 | 2.520E-03 | -2.447E-03 | 1.962E-04 | -1.350E-03 | .000E+00 | 1.500E-02 | -2.935E-03 | -2.352E-02 |
| 14 | 3.333E+00 | .000E+00 | 2.590E-03 | -2.343E-03 | 2.006E-04 | -1.422E-03 | .000E+00 | 1.500E-02 | -3.004E-03 | -2.336E-02 |
| 15 | 3.333E+00 | .000E+00 | 2.590E-03 | -2.343E-03 | 2.006E-04 | -1.422E-03 | .000E+00 | 1.500E-02 | -3.004E-03 | -2.336E-02 |
| 16 | 3.333E+00 | .000E+00 | 2.641E-03 | -2.337E-03 | 2.005E-04 | -1.467E-03 | .000E+00 | 1.500E-02 | -3.062E-03 | -2.336E-02 |
| 17 | 3.333E+00 | .000E+00 | 2.643E-03 | -2.337E-03 | 2.005E-04 | -1.469E-03 | .000E+00 | 1.500E-02 | -3.065E-03 | -2.336E-02 |
| 18 | 3.333E+00 | .000E+00 | 2.686E-03 | -2.415E-03 | 1.969E-04 | -1.507E-03 | .000E+00 | 1.500E-02 | -3.267E-03 | -2.322E-02 |
| 19 | 3.333E+00 | .000E+00 | 2.692E-03 | -2.425E-03 | 1.964E-04 | -1.512E-03 | .000E+00 | 1.500E-02 | -3.293E-03 | -2.320E-02 |
| 20 | 3.333E+00 | .000E+00 | 2.738E-03 | -2.421E-03 | 1.963E-04 | -1.553E-03 | .000E+00 | 1.500E-02 | -3.349E-03 | -2.319E-02 |
| 21 | 3.333E+00 | .000E+00 | 2.749E-03 | -2.421E-03 | 1.962E-04 | -1.562E-03 | .000E+00 | 1.500E-02 | -3.362E-03 | -2.319E-02 |
| 22 | 3.333E+00 | .000E+00 | 2.786E-03 | -2.534E-03 | 1.922E-04 | -1.585E-03 | .000E+00 | 1.500E-02 | -3.537E-03 | -2.313E-02 |
| 23 | 3.333E+00 | .000E+00 | 2.798E-03 | -2.571E-03 | 1.909E-04 | -1.592E-03 | .000E+00 | 1.500E-02 | -3.595E-03 | -2.311E-02 |
| 24 | 3.333E+00 | .000E+00 | 2.842E-03 | -2.571E-03 | 1.908E-04 | -1.630E-03 | .000E+00 | 1.500E-02 | -3.652E-03 | -2.311E-02 |
| 25 | 3.333E+00 | .000E+00 | 2.862E-03 | -2.570E-03 | 1.907E-04 | -1.648E-03 | .000E+00 | 1.500E-02 | -3.678E-03 | -2.310E-02 |
| 26 | 3.333E+00 | .000E+00 | 2.891E-03 | -2.675E-03 | 1.870E-04 | -1.664E-03 | .000E+00 | 1.500E-02 | -3.817E-03 | -2.308E-02 |
| 27 | 3.333E+00 | .000E+00 | 2.910E-03 | -2.740E-03 | 1.847E-04 | -1.674E-03 | .000E+00 | 1.500E-02 | -3.903E-03 | -2.307E-02 |
| 28 | 3.333E+00 | .000E+00 | 2.932E-03 | -2.747E-03 | 1.846E-04 | -1.694E-03 | .000E+00 | 1.500E-02 | -3.939E-03 | -2.307E-02 |
| 29 | 3.333E+00 | .000E+00 | 2.950E-03 | -2.753E-03 | 1.845E-04 | -1.711E-03 | .000E+00 | 1.500E-02 | -3.968E-03 | -2.307E-02 |
| 30 | 3.333E+00 | .000E+00 | 2.941E-03 | -2.823E-03 | 1.820E-04 | -1.690E-03 | .000E+00 | 1.500E-02 | -4.008E-03 | -2.309E-02 |
| 31 | 3.083E+00 | .000E+00 | 2.931E-03 | -2.898E-03 | 1.794E-04 | -1.667E-03 | .000E+00 | 1.500E-02 | -4.052E-03 | -2.312E-02 |
| 32 | 3.083E+00 | .000E+00 | 2.931E-03 | -2.898E-03 | 1.794E-04 | -1.667E-03 | .000E+00 | 1.500E-02 | -4.052E-03 | -2.312E-02 |
| 33 | 3.083E+00 | .000E+00 | 2.931E-03 | -2.898E-03 | 1.794E-04 | -1.667E-03 | .000E+00 | 1.500E-02 | -4.052E-03 | -2.312E-02 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 34 | 3.083E+00 | .000E+00 | 2.929E-03 | -2.907E-03 | 1.790E-04 | -1.663E-03 | .000E+00 | 1.500E-02 | -4.056E-03 | -2.312E-02 |
| 35 | 3.083E+00 | .000E+00 | 2.896E-03 | -3.067E-03 | 1.727E-04 | -1.595E-03 | .000E+00 | 1.500E-02 | -4.133E-03 | -2.319E-02 |
| 36 | 3.083E+00 | .000E+00 | 2.896E-03 | -3.067E-03 | 1.727E-04 | -1.595E-03 | .000E+00 | 1.500E-02 | -4.133E-03 | -2.319E-02 |
| 37 | 3.085E+00 | .000E+00 | 2.896E-03 | -3.067E-03 | 1.727E-04 | -1.595E-03 | .000E+00 | 1.500E-02 | -4.133E-03 | -2.319E-02 |
| 38 | 3.085E+00 | .000E+00 | 2.896E-03 | -3.067E-03 | 1.727E-04 | -1.595E-03 | .000E+00 | 1.500E-02 | -4.133E-03 | -2.319E-02 |
| 39 | 3.085E+00 | .000E+00 | 2.859E-03 | -3.236E-03 | 1.654E-04 | -1.541E-03 | .000E+00 | 1.500E-02 | -4.228E-03 | -2.325E-02 |
| 40 | 3.085E+00 | .000E+00 | 2.832E-03 | -3.355E-03 | 1.603E-04 | -1.502E-03 | .000E+00 | 1.500E-02 | -4.295E-03 | -2.329E-02 |
| 41 | 3.085E+00 | .000E+00 | 2.832E-03 | -3.355E-03 | 1.603E-04 | -1.502E-03 | .000E+00 | 1.500E-02 | -4.295E-03 | -2.329E-02 |
| 42 | 3.085E+00 | .000E+00 | 2.832E-03 | -3.355E-03 | 1.603E-04 | -1.502E-03 | .000E+00 | 1.500E-02 | -4.295E-03 | -2.329E-02 |
| 43 | 3.083E+00 | .000E+00 | 2.811E-03 | -3.449E-03 | 1.568E-04 | -1.473E-03 | .000E+00 | 1.500E-02 | -4.383E-03 | -2.326E-02 |
| 44 | 3.083E+00 | .000E+00 | 2.656E-03 | -4.140E-03 | 1.308E-04 | -1.257E-03 | .000E+00 | 1.500E-02 | -5.030E-03 | -2.300E-02 |
| 45 | 3.083E+00 | .000E+00 | 2.656E-03 | -4.140E-03 | 1.308E-04 | -1.257E-03 | .000E+00 | 1.500E-02 | -5.030E-03 | -2.300E-02 |
| 46 | 3.083E+00 | .000E+00 | 2.656E-03 | -4.140E-03 | 1.308E-04 | -1.257E-03 | .000E+00 | 1.500E-02 | -5.030E-03 | -2.300E-02 |
| 47 | 3.083E+00 | .000E+00 | 2.656E-03 | -4.140E-03 | 1.308E-04 | -1.257E-03 | .000E+00 | 1.500E-02 | -5.030E-03 | -2.300E-02 |
| 48 | 3.083E+00 | .000E+00 | 2.141E-03 | -5.707E-03 | 6.241E-05 | -5.642E-04 | .000E+00 | 1.500E-02 | -6.836E-03 | -2.196E-02 |
| 49 | 2.943E+00 | .000E+00 | 1.864E-03 | -6.548E-03 | 2.565E-05 | -1.919E-04 | .000E+00 | 1.500E-02 | -7.807E-03 | -2.140E-02 |
| 50 | 2.943E+00 | .000E+00 | 1.864E-03 | -6.548E-03 | 2.565E-05 | -1.919E-04 | .000E+00 | 1.500E-02 | -7.807E-03 | -2.140E-02 |
| 51 | 2.943E+00 | .000E+00 | 1.864E-03 | -6.548E-03 | 2.565E-05 | -1.919E-04 | .000E+00 | 1.500E-02 | -7.807E-03 | -2.140E-02 |
| 52 | 2.943E+00 | .000E+00 | 1.864E-03 | -6.548E-03 | 2.565E-05 | -1.919E-04 | .000E+00 | 1.500E-02 | -7.807E-03 | -2.140E-02 |

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RODEX3 AXIALLY DEPENDENT DATA
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FZZT   = FLEXIBILITY AXIAL DIRECTION-AXIAL FORCE (1/LB)
FUDENS = FUEL DENSITY FRACTION AT FABRICATION
HGAP   = GAP CONDUCTANCE (W/M2*K)
LOCK   = LOCKING INDEX (0:SLIP 1:LOCKED 2:TRAPPED STACK)
MATPM  = INDEX DEFINING FUEL PELLET
NRDI   = NUMBER REGIONS IN DISH OF FUEL TYPE
PCLMT1 = USED TO SET CONTACT PRESSURE LIMIT (PSIA)
PCLMT2 = USED TO SET CONTACT PRESSURE LIMIT (PSIA/F)
POISF  = POISSONS RATIO FUEL
QF     = NORMALIZED AXIAL LHGR DISTRIBUTION
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| LA | FZZT | FUDENS | HGAP | LOCK | MATPM | NRDI | PCLMT1 | PCLMT2 | POISF | QF |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.537E-01 | 9.600E-01 | 3.184E+03 | 0 | 111 | 6 | 1.975E+04 | -1.026E+01 | 3.160E-01 | 7.023E-01 |
| 2 | 6.537E-01 | 9.600E-01 | 3.184E+03 | 0 | 111 | 6 | 1.975E+04 | -1.026E+01 | 3.160E-01 | 7.023E-01 |
| 3 | 6.540E-01 | 9.600E-01 | 3.190E+03 | 0 | 111 | 6 | 1.975E+04 | -1.026E+01 | 3.160E-01 | 7.023E-01 |
| 4 | 6.540E-01 | 9.600E-01 | 3.192E+03 | 0 | 111 | 6 | 1.975E+04 | -1.026E+01 | 3.160E-01 | 7.023E-01 |
| 5 | 6.759E-01 | 9.600E-01 | 3.520E+03 | 0 | 111 | 6 | 1.987E+04 | -1.031E+01 | 3.160E-01 | 8.813E-01 |
| 6 | 7.056E-01 | 9.600E-01 | 3.965E+03 | 0 | 111 | 6 | 2.003E+04 | -1.039E+01 | 3.160E-01 | 1.124E+00 |
| 7 | 7.057E-01 | 9.600E-01 | 3.972E+03 | 0 | 111 | 6 | 2.003E+04 | -1.039E+01 | 3.160E-01 | 1.124E+00 |
| 8 | 7.061E-01 | 9.600E-01 | 3.996E+03 | 0 | 111 | 6 | 2.003E+04 | -1.039E+01 | 3.160E-01 | 1.124E+00 |
| 9 | 7.062E-01 | 9.600E-01 | 4.034E+03 | 0 | 111 | 6 | 2.004E+04 | -1.039E+01 | 3.160E-01 | 1.125E+00 |
| 10 | 7.065E-01 | 9.600E-01 | 4.245E+03 | 0 | 111 | 6 | 2.008E+04 | -1.041E+01 | 3.160E-01 | 1.134E+00 |
| 11 | 7.065E-01 | 9.600E-01 | 4.250E+03 | 0 | 111 | 6 | 2.008E+04 | -1.041E+01 | 3.160E-01 | 1.134E+00 |
| 12 | 7.067E-01 | 9.600E-01 | 4.299E+03 | 0 | 111 | 6 | 2.008E+04 | -1.041E+01 | 3.160E-01 | 1.134E+00 |
| 13 | 7.066E-01 | 9.600E-01 | 4.300E+03 | 0 | 111 | 6 | 2.008E+04 | -1.041E+01 | 3.160E-01 | 1.133E+00 |
| 14 | 7.018E-01 | 9.600E-01 | 4.354E+03 | 0 | 111 | 6 | 2.008E+04 | -1.041E+01 | 3.160E-01 | 1.104E+00 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 7.018E-01 | 9.600E-01 | 4.354E+03 | 0 | 111 | 6 | 2.008E+04 | -1.041E+01 | 3.160E-01 | 1.104E+00 |
| 16 | 7.018E-01 | 9.600E-01 | 4.420E+03 | 0 | 111 | 6 | 2.008E+04 | -1.041E+01 | 3.160E-01 | 1.104E+00 |
| 17 | 7.018E-01 | 9.600E-01 | 4.423E+03 | 0 | 111 | 6 | 2.008E+04 | -1.041E+01 | 3.160E-01 | 1.104E+00 |
| 18 | 6.975E-01 | 9.600E-01 | 4.436E+03 | 0 | 111 | 6 | 2.008E+04 | -1.041E+01 | 3.160E-01 | 1.077E+00 |
| 19 | 6.969E-01 | 9.600E-01 | 4.437E+03 | 0 | 111 | 6 | 2.008E+04 | -1.041E+01 | 3.160E-01 | 1.074E+00 |
| 20 | 6.968E-01 | 9.600E-01 | 4.502E+03 | 0 | 111 | 6 | 2.008E+04 | -1.041E+01 | 3.160E-01 | 1.074E+00 |
| 21 | 6.968E-01 | 9.600E-01 | 4.516E+03 | 0 | 111 | 6 | 2.008E+04 | -1.041E+01 | 3.160E-01 | 1.074E+00 |
| 22 | 6.950E-01 | 9.600E-01 | 4.539E+03 | 0 | 111 | 6 | 2.008E+04 | -1.041E+01 | 3.160E-01 | 1.066E+00 |
| 23 | 6.944E-01 | 9.600E-01 | 4.546E+03 | 0 | 111 | 6 | 2.008E+04 | -1.041E+01 | 3.160E-01 | 1.064E+00 |
| 24 | 6.942E-01 | 9.600E-01 | 4.615E+03 | 0 | 111 | 6 | 2.008E+04 | -1.041E+01 | 3.160E-01 | 1.064E+00 |
| 25 | 6.941E-01 | 9.600E-01 | 4.647E+03 | 0 | 111 | 6 | 2.008E+04 | -1.041E+01 | 3.160E-01 | 1.064E+00 |
| 26 | 6.935E-01 | 9.600E-01 | 4.675E+03 | 0 | 111 | 6 | 2.007E+04 | -1.040E+01 | 3.160E-01 | 1.064E+00 |
| 27 | 6.931E-01 | 9.600E-01 | 4.693E+03 | 0 | 111 | 6 | 2.007E+04 | -1.040E+01 | 3.160E-01 | 1.064E+00 |
| 28 | 6.930E-01 | 9.600E-01 | 4.740E+03 | 0 | 111 | 6 | 2.007E+04 | -1.040E+01 | 3.160E-01 | 1.064E+00 |
| 29 | 6.930E-01 | 9.600E-01 | 4.778E+03 | 0 | 111 | 6 | 2.007E+04 | -1.040E+01 | 3.160E-01 | 1.064E+00 |
| 30 | 6.938E-01 | 9.600E-01 | 4.745E+03 | 0 | 111 | 6 | 2.007E+04 | -1.040E+01 | 3.160E-01 | 1.068E+00 |
| 31 | 6.946E-01 | 9.600E-01 | 4.710E+03 | 0 | 111 | 6 | 2.006E+04 | -1.040E+01 | 3.160E-01 | 1.074E+00 |
| 32 | 6.946E-01 | 9.600E-01 | 4.710E+03 | 0 | 111 | 6 | 2.006E+04 | -1.040E+01 | 3.160E-01 | 1.074E+00 |
| 33 | 6.946E-01 | 9.600E-01 | 4.710E+03 | 0 | 111 | 6 | 2.006E+04 | -1.040E+01 | 3.160E-01 | 1.074E+00 |
| 34 | 6.947E-01 | 9.600E-01 | 4.704E+03 | 0 | 111 | 6 | 2.006E+04 | -1.040E+01 | 3.160E-01 | 1.074E+00 |
| 35 | 6.967E-01 | 9.600E-01 | 4.596E+03 | 0 | 111 | 6 | 2.005E+04 | -1.039E+01 | 3.160E-01 | 1.084E+00 |
| 36 | 6.967E-01 | 9.600E-01 | 4.596E+03 | 0 | 111 | 6 | 2.005E+04 | -1.039E+01 | 3.160E-01 | 1.084E+00 |
| 37 | 6.967E-01 | 9.600E-01 | 4.596E+03 | 0 | 111 | 6 | 2.005E+04 | -1.039E+01 | 3.160E-01 | 1.084E+00 |
| 38 | 6.967E-01 | 9.600E-01 | 4.596E+03 | 0 | 111 | 6 | 2.005E+04 | -1.039E+01 | 3.160E-01 | 1.084E+00 |
| 39 | 6.985E-01 | 9.600E-01 | 4.521E+03 | 0 | 111 | 6 | 2.004E+04 | -1.039E+01 | 3.160E-01 | 1.089E+00 |
| 40 | 6.998E-01 | 9.600E-01 | 4.468E+03 | 0 | 111 | 6 | 2.003E+04 | -1.038E+01 | 3.160E-01 | 1.094E+00 |
| 41 | 6.998E-01 | 9.600E-01 | 4.468E+03 | 0 | 111 | 6 | 2.003E+04 | -1.038E+01 | 3.160E-01 | 1.094E+00 |
| 42 | 6.998E-01 | 9.600E-01 | 4.468E+03 | 0 | 111 | 6 | 2.003E+04 | -1.038E+01 | 3.160E-01 | 1.094E+00 |
| 43 | 6.987E-01 | 9.600E-01 | 4.427E+03 | 0 | 111 | 6 | 2.002E+04 | -1.038E+01 | 3.160E-01 | 1.084E+00 |
| 44 | 6.910E-01 | 9.600E-01 | 4.120E+03 | 0 | 111 | 6 | 1.996E+04 | -1.035E+01 | 3.160E-01 | 1.013E+00 |
| 45 | 6.910E-01 | 9.600E-01 | 4.120E+03 | 0 | 111 | 6 | 1.996E+04 | -1.035E+01 | 3.160E-01 | 1.013E+00 |
| 46 | 6.910E-01 | 9.600E-01 | 4.120E+03 | 0 | 111 | 6 | 1.996E+04 | -1.035E+01 | 3.160E-01 | 1.013E+00 |
| 47 | 6.910E-01 | 9.600E-01 | 4.120E+03 | 0 | 111 | 6 | 1.996E+04 | -1.035E+01 | 3.160E-01 | 1.013E+00 |
| 48 | 6.597E-01 | 9.600E-01 | 3.528E+03 | 0 | 111 | 6 | 1.965E+04 | -1.022E+01 | 3.160E-01 | 6.610E-01 |
| 49 | 6.428E-01 | 9.600E-01 | 3.211E+03 | 0 | 111 | 6 | 1.949E+04 | -1.014E+01 | 3.160E-01 | 4.716E-01 |
| 50 | 6.428E-01 | 9.600E-01 | 3.211E+03 | 0 | 111 | 6 | 1.949E+04 | -1.014E+01 | 3.160E-01 | 4.716E-01 |
| 51 | 6.428E-01 | 9.600E-01 | 3.211E+03 | 0 | 111 | 6 | 1.949E+04 | -1.014E+01 | 3.160E-01 | 4.716E-01 |
| 52 | 6.428E-01 | 9.600E-01 | 3.211E+03 | 0 | 111 | 6 | 1.949E+04 | -1.014E+01 | 3.160E-01 | 4.716E-01 |

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 RODEX3 AXIALLY DEPENDENT DATA
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          RFFP   = ADDITIONAL ROUGHNESS DUE TO FISSION PRODUCTS (IN)
          RIP    = PELLET INNER RADIUS (IN)
          ROP    = PELLET OUTER RADIUS (IN)
          SWMDEN = FRACTION OF THEORETICAL DENSITY ACCOMODATING FUEL SWELLING
          VDEZ   = FUEL/CLADDING AXIAL INTERATION
          VDSHC  = CURRENT REGION DISH VOLUME (IN3)
          VOIDFC = VOID FRACTION FOR THERMAL CONDUCTIVITY AND APPARENT GASEOUS SWELLING (IN3)
          XCOR   = THICHNESS OF CLAD OUTER ZRO2 LAYER (IN)
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XOTM = OXYGEN TO METAL RATIO
ZPST = FUEL-CLADDING AXIAL INTERACTION FORCE (LBS)

| LA | RFFP | RIP | ROP | SWMDEN | VDEZ | VDSHC | VOIDFC | XCOR | XOTM | ZPST |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 8.4420E-03 | 2.0000E-02 | 1.2278E-04 | 2.0000E+00 | .0000E+00 |
| 2 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 8.4420E-03 | 2.0000E-02 | 1.2278E-04 | 2.0000E+00 | .0000E+00 |
| 3 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 8.4420E-03 | 2.0000E-02 | 1.2595E-04 | 2.0000E+00 | .0000E+00 |
| 4 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 8.4420E-03 | 2.0000E-02 | 1.2723E-04 | 2.0000E+00 | .0000E+00 |
| 5 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 8.1773E-03 | 2.0000E-02 | 1.5342E-04 | 2.0000E+00 | .0000E+00 |
| 6 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.8187E-03 | 2.0000E-02 | 1.8890E-04 | 2.0000E+00 | .0000E+00 |
| 7 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.8176E-03 | 2.0000E-02 | 1.9257E-04 | 2.0000E+00 | .0000E+00 |
| 8 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.8135E-03 | 2.0000E-02 | 2.0557E-04 | 2.0000E+00 | .0000E+00 |
| 9 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.7839E-03 | 2.0000E-02 | 2.1021E-04 | 2.0000E+00 | .0000E+00 |
| 10 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.6202E-03 | 2.0000E-02 | 2.3580E-04 | 2.0000E+00 | .0000E+00 |
| 11 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.6200E-03 | 2.0000E-02 | 2.3749E-04 | 2.0000E+00 | .0000E+00 |
| 12 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.6186E-03 | 2.0000E-02 | 2.5539E-04 | 2.0000E+00 | .0000E+00 |
| 13 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.6183E-03 | 2.0000E-02 | 2.5584E-04 | 2.0000E+00 | .0000E+00 |
| 14 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.6040E-03 | 2.0000E-02 | 2.7823E-04 | 2.0000E+00 | .0000E+00 |
| 15 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.6040E-03 | 2.0000E-02 | 2.7823E-04 | 2.0000E+00 | .0000E+00 |
| 16 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.6063E-03 | 2.0000E-02 | 2.9800E-04 | 2.0000E+00 | .0000E+00 |
| 17 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.6064E-03 | 2.0000E-02 | 2.9898E-04 | 2.0000E+00 | .0000E+00 |
| 18 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.6692E-03 | 2.0000E-02 | 3.1723E-04 | 2.0000E+00 | .0000E+00 |
| 19 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.6773E-03 | 2.0000E-02 | 3.1958E-04 | 2.0000E+00 | .0000E+00 |
| 20 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.6802E-03 | 2.0000E-02 | 3.3712E-04 | 2.0000E+00 | .0000E+00 |
| 21 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.6808E-03 | 2.0000E-02 | 3.4101E-04 | 2.0000E+00 | .0000E+00 |
| 22 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.7570E-03 | 2.0000E-02 | 3.5645E-04 | 2.0000E+00 | .0000E+00 |
| 23 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.7822E-03 | 2.0000E-02 | 3.6155E-04 | 2.0000E+00 | .0000E+00 |
| 24 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.7859E-03 | 2.0000E-02 | 3.7696E-04 | 2.0000E+00 | .0000E+00 |
| 25 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.7876E-03 | 2.0000E-02 | 3.8405E-04 | 2.0000E+00 | .0000E+00 |
| 26 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.8465E-03 | 2.0000E-02 | 3.9686E-04 | 2.0000E+00 | .0000E+00 |
| 27 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.8830E-03 | 2.0000E-02 | 4.0478E-04 | 2.0000E+00 | .0000E+00 |
| 28 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.8893E-03 | 2.0000E-02 | 4.1136E-04 | 2.0000E+00 | .0000E+00 |
| 29 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.8945E-03 | 2.0000E-02 | 4.1673E-04 | 2.0000E+00 | .0000E+00 |
| 30 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.9148E-03 | 2.0000E-02 | 4.1696E-04 | 2.0000E+00 | .0000E+00 |
| 31 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.9364E-03 | 2.0000E-02 | 4.1722E-04 | 2.0000E+00 | .0000E+00 |
| 32 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.9364E-03 | 2.0000E-02 | 4.1722E-04 | 2.0000E+00 | .0000E+00 |
| 33 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.9364E-03 | 2.0000E-02 | 4.1722E-04 | 2.0000E+00 | .0000E+00 |
| 34 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.9361E-03 | 2.0000E-02 | 4.1717E-04 | 2.0000E+00 | .0000E+00 |
| 35 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.9303E-03 | 2.0000E-02 | 4.1631E-04 | 2.0000E+00 | .0000E+00 |
| 36 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.9303E-03 | 2.0000E-02 | 4.1631E-04 | 2.0000E+00 | .0000E+00 |
| 37 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.9303E-03 | 2.0000E-02 | 4.1631E-04 | 2.0000E+00 | .0000E+00 |
| 38 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.9303E-03 | 2.0000E-02 | 4.1631E-04 | 2.0000E+00 | .0000E+00 |
| 39 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.9352E-03 | 2.0000E-02 | 4.1531E-04 | 2.0000E+00 | .0000E+00 |
| 40 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.9386E-03 | 2.0000E-02 | 4.1461E-04 | 2.0000E+00 | .0000E+00 |
| 41 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.9386E-03 | 2.0000E-02 | 4.1461E-04 | 2.0000E+00 | .0000E+00 |
| 42 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.9386E-03 | 2.0000E-02 | 4.1461E-04 | 2.0000E+00 | .0000E+00 |
| 43 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 7.9652E-03 | 2.0000E-02 | 4.1403E-04 | 2.0000E+00 | .0000E+00 |
| 44 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 8.1607E-03 | 2.0000E-02 | 4.0973E-04 | 2.0000E+00 | .0000E+00 |
| 45 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 8.1607E-03 | 2.0000E-02 | 4.0973E-04 | 2.0000E+00 | .0000E+00 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 46 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 8.1607E-03 | 2.0000E-02 | 4.0973E-04 | 2.0000E+00 | .0000E+00 |
| 47 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 8.1607E-03 | 2.0000E-02 | 4.0973E-04 | 2.0000E+00 | .0000E+00 |
| 48 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 8.3437E-03 | 2.0000E-02 | 3.9424E-04 | 2.0000E+00 | .0000E+00 |
| 49 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 8.4420E-03 | 2.0000E-02 | 3.8591E-04 | 2.0000E+00 | .0000E+00 |
| 50 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 8.4420E-03 | 2.0000E-02 | 3.8591E-04 | 2.0000E+00 | .0000E+00 |
| 51 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 8.4420E-03 | 2.0000E-02 | 3.8591E-04 | 2.0000E+00 | .0000E+00 |
| 52 | .0000E+00 | .0000E+00 | 1.6125E-01 | 9.9500E-01 | .0000E+00 | 8.4420E-03 | 2.0000E-02 | 3.8591E-04 | 2.0000E+00 | .0000E+00 |

1

RODEX3 PELLET AXIAL/RADIAL DEPENDENT VARIABLES
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BRNLOC = BURNUP IN (RADIAL,AXIAL) REGION (MWD/MTU)

| LA -- | BRNLOC VALUES | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.4024E+04 | 1.4024E+04 | 1.4054E+04 | 1.4207E+04 | 1.4368E+04 | 1.4581E+04 | 1.4802E+04 | 1.5078E+04 | 1.5511E+04 | 1.6517E+04 |
| 2 | 1.4024E+04 | 1.4024E+04 | 1.4054E+04 | 1.4207E+04 | 1.4368E+04 | 1.4581E+04 | 1.4802E+04 | 1.5078E+04 | 1.5511E+04 | 1.6517E+04 |
| 3 | 1.4024E+04 | 1.4024E+04 | 1.4054E+04 | 1.4207E+04 | 1.4368E+04 | 1.4581E+04 | 1.4802E+04 | 1.5078E+04 | 1.5511E+04 | 1.6517E+04 |
| 4 | 1.4024E+04 | 1.4024E+04 | 1.4054E+04 | 1.4207E+04 | 1.4368E+04 | 1.4581E+04 | 1.4802E+04 | 1.5078E+04 | 1.5511E+04 | 1.6517E+04 |
| 5 | 1.7459E+04 | 1.7459E+04 | 1.7494E+04 | 1.7675E+04 | 1.7865E+04 | 1.8122E+04 | 1.8393E+04 | 1.8743E+04 | 1.9322E+04 | 2.0792E+04 |
| 6 | 2.2113E+04 | 2.2113E+04 | 2.2155E+04 | 2.2373E+04 | 2.2605E+04 | 2.2919E+04 | 2.3259E+04 | 2.3710E+04 | 2.4486E+04 | 2.6584E+04 |
| 7 | 2.2113E+04 | 2.2113E+04 | 2.2155E+04 | 2.2373E+04 | 2.2605E+04 | 2.2919E+04 | 2.3259E+04 | 2.3710E+04 | 2.4486E+04 | 2.6584E+04 |
| 8 | 2.2113E+04 | 2.2113E+04 | 2.2155E+04 | 2.2373E+04 | 2.2605E+04 | 2.2919E+04 | 2.3259E+04 | 2.3710E+04 | 2.4486E+04 | 2.6584E+04 |
| 9 | 2.2344E+04 | 2.2344E+04 | 2.2387E+04 | 2.2606E+04 | 2.2839E+04 | 2.3156E+04 | 2.3499E+04 | 2.3955E+04 | 2.4742E+04 | 2.6877E+04 |
| 10 | 2.3619E+04 | 2.3619E+04 | 2.3663E+04 | 2.3892E+04 | 2.4134E+04 | 2.4466E+04 | 2.4827E+04 | 2.5311E+04 | 2.6158E+04 | 2.8493E+04 |
| 11 | 2.3619E+04 | 2.3619E+04 | 2.3663E+04 | 2.3892E+04 | 2.4134E+04 | 2.4466E+04 | 2.4827E+04 | 2.5311E+04 | 2.6158E+04 | 2.8493E+04 |
| 12 | 2.3619E+04 | 2.3619E+04 | 2.3663E+04 | 2.3892E+04 | 2.4134E+04 | 2.4466E+04 | 2.4827E+04 | 2.5311E+04 | 2.6158E+04 | 2.8493E+04 |
| 13 | 2.3623E+04 | 2.3623E+04 | 2.3668E+04 | 2.3896E+04 | 2.4139E+04 | 2.4471E+04 | 2.4832E+04 | 2.5316E+04 | 2.6163E+04 | 2.8499E+04 |
| 14 | 2.3863E+04 | 2.3863E+04 | 2.3908E+04 | 2.4138E+04 | 2.4382E+04 | 2.4717E+04 | 2.5082E+04 | 2.5571E+04 | 2.6429E+04 | 2.8804E+04 |
| 15 | 2.3863E+04 | 2.3863E+04 | 2.3908E+04 | 2.4138E+04 | 2.4382E+04 | 2.4717E+04 | 2.5082E+04 | 2.5571E+04 | 2.6429E+04 | 2.8804E+04 |
| 16 | 2.3863E+04 | 2.3863E+04 | 2.3908E+04 | 2.4138E+04 | 2.4382E+04 | 2.4717E+04 | 2.5082E+04 | 2.5571E+04 | 2.6429E+04 | 2.8804E+04 |
| 17 | 2.3863E+04 | 2.3863E+04 | 2.3908E+04 | 2.4138E+04 | 2.4382E+04 | 2.4717E+04 | 2.5082E+04 | 2.5571E+04 | 2.6429E+04 | 2.8804E+04 |
| 18 | 2.3796E+04 | 2.3796E+04 | 2.3840E+04 | 2.4070E+04 | 2.4314E+04 | 2.4648E+04 | 2.5012E+04 | 2.5499E+04 | 2.6354E+04 | 2.8715E+04 |
| 19 | 2.3787E+04 | 2.3787E+04 | 2.3832E+04 | 2.4061E+04 | 2.4305E+04 | 2.4639E+04 | 2.5003E+04 | 2.5490E+04 | 2.6344E+04 | 2.8704E+04 |
| 20 | 2.3787E+04 | 2.3787E+04 | 2.3832E+04 | 2.4061E+04 | 2.4305E+04 | 2.4639E+04 | 2.5003E+04 | 2.5490E+04 | 2.6344E+04 | 2.8704E+04 |
| 21 | 2.3787E+04 | 2.3787E+04 | 2.3832E+04 | 2.4061E+04 | 2.4305E+04 | 2.4639E+04 | 2.5003E+04 | 2.5490E+04 | 2.6344E+04 | 2.8704E+04 |
| 22 | 2.3666E+04 | 2.3666E+04 | 2.3711E+04 | 2.3939E+04 | 2.4183E+04 | 2.4515E+04 | 2.4877E+04 | 2.5362E+04 | 2.6210E+04 | 2.8548E+04 |
| 23 | 2.3626E+04 | 2.3626E+04 | 2.3671E+04 | 2.3899E+04 | 2.4142E+04 | 2.4475E+04 | 2.4836E+04 | 2.5320E+04 | 2.6165E+04 | 2.8496E+04 |
| 24 | 2.3626E+04 | 2.3626E+04 | 2.3671E+04 | 2.3899E+04 | 2.4142E+04 | 2.4475E+04 | 2.4836E+04 | 2.5320E+04 | 2.6165E+04 | 2.8496E+04 |
| 25 | 2.3626E+04 | 2.3626E+04 | 2.3671E+04 | 2.3899E+04 | 2.4142E+04 | 2.4475E+04 | 2.4836E+04 | 2.5320E+04 | 2.6165E+04 | 2.8496E+04 |
| 26 | 2.3492E+04 | 2.3492E+04 | 2.3536E+04 | 2.3764E+04 | 2.4006E+04 | 2.4337E+04 | 2.4696E+04 | 2.5177E+04 | 2.6016E+04 | 2.8324E+04 |
| 27 | 2.3409E+04 | 2.3409E+04 | 2.3453E+04 | 2.3681E+04 | 2.3922E+04 | 2.4252E+04 | 2.4610E+04 | 2.5089E+04 | 2.5924E+04 | 2.8217E+04 |
| 28 | 2.3409E+04 | 2.3409E+04 | 2.3453E+04 | 2.3681E+04 | 2.3922E+04 | 2.4252E+04 | 2.4610E+04 | 2.5089E+04 | 2.5924E+04 | 2.8217E+04 |
| 29 | 2.3409E+04 | 2.3409E+04 | 2.3453E+04 | 2.3681E+04 | 2.3922E+04 | 2.4252E+04 | 2.4610E+04 | 2.5089E+04 | 2.5924E+04 | 2.8217E+04 |
| 30 | 2.3280E+04 | 2.3280E+04 | 2.3325E+04 | 2.3551E+04 | 2.3791E+04 | 2.4120E+04 | 2.4476E+04 | 2.4952E+04 | 2.5781E+04 | 2.8053E+04 |
| 31 | 2.3143E+04 | 2.3143E+04 | 2.3187E+04 | 2.3413E+04 | 2.3652E+04 | 2.3979E+04 | 2.4333E+04 | 2.4807E+04 | 2.5629E+04 | 2.7878E+04 |
| 32 | 2.3143E+04 | 2.3143E+04 | 2.3187E+04 | 2.3413E+04 | 2.3652E+04 | 2.3979E+04 | 2.4333E+04 | 2.4807E+04 | 2.5629E+04 | 2.7878E+04 |
| 33 | 2.3143E+04 | 2.3143E+04 | 2.3187E+04 | 2.3413E+04 | 2.3652E+04 | 2.3979E+04 | 2.4333E+04 | 2.4807E+04 | 2.5629E+04 | 2.7878E+04 |
| 34 | 2.3120E+04 | 2.3120E+04 | 2.3164E+04 | 2.3390E+04 | 2.3629E+04 | 2.3956E+04 | 2.4310E+04 | 2.4782E+04 | 2.5604E+04 | 2.7849E+04 |
| 35 | 2.2724E+04 | 2.2724E+04 | 2.2767E+04 | 2.2990E+04 | 2.3226E+04 | 2.3548E+04 | 2.3897E+04 | 2.4361E+04 | 2.5163E+04 | 2.7345E+04 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 36 | 2.2724E+04 | 2.2724E+04 | 2.2767E+04 | 2.2990E+04 | 2.3226E+04 | 2.3548E+04 | 2.3897E+04 | 2.4361E+04 | 2.5163E+04 | 2.7345E+04 |
| 37 | 2.2724E+04 | 2.2724E+04 | 2.2767E+04 | 2.2990E+04 | 2.3226E+04 | 2.3548E+04 | 2.3897E+04 | 2.4361E+04 | 2.5163E+04 | 2.7345E+04 |
| 38 | 2.2724E+04 | 2.2724E+04 | 2.2767E+04 | 2.2990E+04 | 2.3226E+04 | 2.3548E+04 | 2.3897E+04 | 2.4361E+04 | 2.5163E+04 | 2.7345E+04 |
| 39 | 2.2261E+04 | 2.2261E+04 | 2.2304E+04 | 2.2523E+04 | 2.2756E+04 | 2.3073E+04 | 2.3415E+04 | 2.3869E+04 | 2.4649E+04 | 2.6759E+04 |
| 40 | 2.1935E+04 | 2.1935E+04 | 2.1978E+04 | 2.2195E+04 | 2.2425E+04 | 2.2738E+04 | 2.3075E+04 | 2.3522E+04 | 2.4287E+04 | 2.6345E+04 |
| 41 | 2.1935E+04 | 2.1935E+04 | 2.1978E+04 | 2.2195E+04 | 2.2425E+04 | 2.2738E+04 | 2.3075E+04 | 2.3522E+04 | 2.4287E+04 | 2.6345E+04 |
| 42 | 2.1935E+04 | 2.1935E+04 | 2.1978E+04 | 2.2195E+04 | 2.2425E+04 | 2.2738E+04 | 2.3075E+04 | 2.3522E+04 | 2.4287E+04 | 2.6345E+04 |
| 43 | 2.1672E+04 | 2.1672E+04 | 2.1714E+04 | 2.1929E+04 | 2.2158E+04 | 2.2468E+04 | 2.2801E+04 | 2.3242E+04 | 2.3995E+04 | 2.6014E+04 |
| 44 | 1.9733E+04 | 1.9733E+04 | 1.9772E+04 | 1.9973E+04 | 2.0186E+04 | 2.0473E+04 | 2.0778E+04 | 2.1176E+04 | 2.1843E+04 | 2.3573E+04 |
| 45 | 1.9733E+04 | 1.9733E+04 | 1.9772E+04 | 1.9973E+04 | 2.0186E+04 | 2.0473E+04 | 2.0778E+04 | 2.1176E+04 | 2.1843E+04 | 2.3573E+04 |
| 46 | 1.9733E+04 | 1.9733E+04 | 1.9772E+04 | 1.9973E+04 | 2.0186E+04 | 2.0473E+04 | 2.0778E+04 | 2.1176E+04 | 2.1843E+04 | 2.3573E+04 |
| 47 | 1.9733E+04 | 1.9733E+04 | 1.9772E+04 | 1.9973E+04 | 2.0186E+04 | 2.0473E+04 | 2.0778E+04 | 2.1176E+04 | 2.1843E+04 | 2.3573E+04 |
| 48 | 1.2871E+04 | 1.2871E+04 | 1.2898E+04 | 1.3037E+04 | 1.3183E+04 | 1.3378E+04 | 1.3580E+04 | 1.3833E+04 | 1.4233E+04 | 1.5174E+04 |
| 49 | 9.1825E+03 | 9.1825E+03 | 9.2032E+03 | 9.3093E+03 | 9.4197E+03 | 9.5643E+03 | 9.7109E+03 | 9.8867E+03 | 1.0143E+04 | 1.0660E+04 |
| 50 | 9.1825E+03 | 9.1825E+03 | 9.2032E+03 | 9.3093E+03 | 9.4197E+03 | 9.5643E+03 | 9.7109E+03 | 9.8867E+03 | 1.0143E+04 | 1.0660E+04 |
| 51 | 9.1825E+03 | 9.1825E+03 | 9.2032E+03 | 9.3093E+03 | 9.4197E+03 | 9.5643E+03 | 9.7109E+03 | 9.8867E+03 | 1.0143E+04 | 1.0660E+04 |
| 52 | 9.1825E+03 | 9.1825E+03 | 9.2032E+03 | 9.3093E+03 | 9.4197E+03 | 9.5643E+03 | 9.7109E+03 | 9.8867E+03 | 1.0143E+04 | 1.0660E+04 |

FSSC = SWELLING + CIRCUMFERENTIAL STRAIN

LA -- FSSC VALUES
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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8.8746E-04 | 8.8746E-04 | 8.9372E-04 | 9.2595E-04 | 9.6001E-04 | 1.0057E-03 | 1.0537E-03 | 1.1144E-03 | 1.2112E-03 | 1.4440E-03 |
| 2 | 8.8746E-04 | 8.8746E-04 | 8.9372E-04 | 9.2595E-04 | 9.6001E-04 | 1.0057E-03 | 1.0537E-03 | 1.1144E-03 | 1.2112E-03 | 1.4440E-03 |
| 3 | 8.8746E-04 | 8.8746E-04 | 8.9372E-04 | 9.2595E-04 | 9.6001E-04 | 1.0057E-03 | 1.0537E-03 | 1.1144E-03 | 1.2112E-03 | 1.4440E-03 |
| 4 | 8.8746E-04 | 8.8746E-04 | 8.9372E-04 | 9.2595E-04 | 9.6001E-04 | 1.0057E-03 | 1.0537E-03 | 1.1144E-03 | 1.2112E-03 | 1.4440E-03 |
| 5 | 2.0504E-03 | 2.0375E-03 | 2.0125E-03 | 1.9982E-03 | 1.9883E-03 | 2.5384E-03 | 2.0678E-03 | 2.0599E-03 | 2.2102E-03 | 2.6053E-03 |
| 6 | 3.6262E-03 | 3.5959E-03 | 3.5284E-03 | 3.4512E-03 | 3.3816E-03 | 4.6151E-03 | 3.4418E-03 | 3.3409E-03 | 3.5639E-03 | 4.1789E-03 |
| 7 | 3.6254E-03 | 3.5954E-03 | 3.5282E-03 | 3.4511E-03 | 3.3815E-03 | 4.6207E-03 | 3.4447E-03 | 3.3409E-03 | 3.5639E-03 | 4.1789E-03 |
| 8 | 3.6226E-03 | 3.5937E-03 | 3.5274E-03 | 3.4508E-03 | 3.3812E-03 | 4.6405E-03 | 3.4548E-03 | 3.3409E-03 | 3.5639E-03 | 4.1789E-03 |
| 9 | 3.7135E-03 | 3.6995E-03 | 3.6465E-03 | 3.5738E-03 | 3.4977E-03 | 4.8223E-03 | 3.5699E-03 | 3.4119E-03 | 3.6388E-03 | 4.2668E-03 |
| 10 | 4.2157E-03 | 4.2836E-03 | 4.3046E-03 | 4.2532E-03 | 4.1412E-03 | 5.8264E-03 | 4.2058E-03 | 3.8037E-03 | 4.0526E-03 | 4.7521E-03 |
| 11 | 4.2150E-03 | 4.2830E-03 | 4.3042E-03 | 4.2530E-03 | 4.1411E-03 | 5.8278E-03 | 4.2068E-03 | 3.8037E-03 | 4.0526E-03 | 4.7521E-03 |
| 12 | 4.2075E-03 | 4.2770E-03 | 4.3004E-03 | 4.2505E-03 | 4.1397E-03 | 5.8428E-03 | 4.2172E-03 | 3.8037E-03 | 4.0526E-03 | 4.7521E-03 |
| 13 | 4.2068E-03 | 4.2766E-03 | 4.3005E-03 | 4.2509E-03 | 4.1404E-03 | 5.8451E-03 | 4.2192E-03 | 3.8052E-03 | 4.0541E-03 | 4.7539E-03 |
| 14 | 4.1753E-03 | 4.2562E-03 | 4.3080E-03 | 4.2709E-03 | 4.1756E-03 | 5.9586E-03 | 4.3234E-03 | 3.8798E-03 | 4.1329E-03 | 4.8462E-03 |
| 15 | 4.1753E-03 | 4.2562E-03 | 4.3080E-03 | 4.2709E-03 | 4.1756E-03 | 5.9586E-03 | 4.3234E-03 | 3.8798E-03 | 4.1329E-03 | 4.8462E-03 |
| 16 | 4.1687E-03 | 4.2485E-03 | 4.3000E-03 | 4.2653E-03 | 4.1723E-03 | 5.9610E-03 | 4.3294E-03 | 3.8798E-03 | 4.1329E-03 | 4.8462E-03 |
| 17 | 4.1684E-03 | 4.2482E-03 | 4.2996E-03 | 4.2650E-03 | 4.1721E-03 | 5.9612E-03 | 4.3297E-03 | 3.8798E-03 | 4.1329E-03 | 4.8462E-03 |
| 18 | 4.1901E-03 | 4.2663E-03 | 4.2943E-03 | 4.2641E-03 | 4.1865E-03 | 5.7824E-03 | 4.2519E-03 | 3.8588E-03 | 4.1106E-03 | 4.8195E-03 |
| 19 | 4.1929E-03 | 4.2686E-03 | 4.2936E-03 | 4.2640E-03 | 4.1883E-03 | 5.7594E-03 | 4.2419E-03 | 3.8560E-03 | 4.1077E-03 | 4.8160E-03 |
| 20 | 4.1897E-03 | 4.2614E-03 | 4.2868E-03 | 4.2587E-03 | 4.1852E-03 | 5.7576E-03 | 4.2452E-03 | 3.8560E-03 | 4.1077E-03 | 4.8160E-03 |
| 21 | 4.1890E-03 | 4.2599E-03 | 4.2853E-03 | 4.2575E-03 | 4.1845E-03 | 5.7572E-03 | 4.2459E-03 | 3.8560E-03 | 4.1077E-03 | 4.8160E-03 |
| 22 | 4.1590E-03 | 4.2011E-03 | 4.2217E-03 | 4.1986E-03 | 4.1268E-03 | 5.4933E-03 | 4.1331E-03 | 3.8185E-03 | 4.0679E-03 | 4.7685E-03 |
| 23 | 4.1491E-03 | 4.1817E-03 | 4.2008E-03 | 4.1791E-03 | 4.1078E-03 | 5.4062E-03 | 4.0958E-03 | 3.8061E-03 | 4.0548E-03 | 4.7529E-03 |
| 24 | 4.1454E-03 | 4.1749E-03 | 4.1934E-03 | 4.1747E-03 | 4.1049E-03 | 5.3997E-03 | 4.0961E-03 | 3.8061E-03 | 4.0548E-03 | 4.7529E-03 |
| 25 | 4.1437E-03 | 4.1718E-03 | 4.1900E-03 | 4.1726E-03 | 4.1036E-03 | 5.3966E-03 | 4.0962E-03 | 3.8061E-03 | 4.0548E-03 | 4.7529E-03 |
| 26 | 4.0999E-03 | 4.1239E-03 | 4.1216E-03 | 4.1145E-03 | 4.0690E-03 | 5.1823E-03 | 3.9913E-03 | 3.7646E-03 | 4.0108E-03 | 4.7007E-03 |
| 27 | 4.0729E-03 | 4.0944E-03 | 4.0794E-03 | 4.0785E-03 | 4.0477E-03 | 5.0497E-03 | 3.9264E-03 | 3.7388E-03 | 3.9836E-03 | 4.6685E-03 |
| 28 | 4.0756E-03 | 4.0905E-03 | 4.0795E-03 | 4.0782E-03 | 4.0485E-03 | 5.0309E-03 | 3.9197E-03 | 3.7388E-03 | 3.9836E-03 | 4.6685E-03 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 29 | 4.0778E-03 | 4.0874E-03 | 4.0797E-03 | 4.0778E-03 | 4.0492E-03 | 5.0156E-03 | 3.9141E-03 | 3.7388E-03 | 3.9836E-03 | 4.6685E-03 |
| 30 | 3.9686E-03 | 3.9748E-03 | 3.9646E-03 | 3.9607E-03 | 3.9361E-03 | 4.8918E-03 | 3.8437E-03 | 3.6991E-03 | 3.9415E-03 | 4.6190E-03 |
| 31 | 3.8521E-03 | 3.8549E-03 | 3.8420E-03 | 3.8358E-03 | 3.8155E-03 | 4.7599E-03 | 3.7685E-03 | 3.6567E-03 | 3.8967E-03 | 4.5661E-03 |
| 32 | 3.8521E-03 | 3.8549E-03 | 3.8420E-03 | 3.8358E-03 | 3.8155E-03 | 4.7599E-03 | 3.7685E-03 | 3.6567E-03 | 3.8967E-03 | 4.5661E-03 |
| 33 | 3.8521E-03 | 3.8549E-03 | 3.8420E-03 | 3.8358E-03 | 3.8155E-03 | 4.7599E-03 | 3.7685E-03 | 3.6567E-03 | 3.8967E-03 | 4.5661E-03 |
| 34 | 3.8314E-03 | 3.8342E-03 | 3.8217E-03 | 3.8134E-03 | 3.7946E-03 | 4.7486E-03 | 3.7594E-03 | 3.6497E-03 | 3.8893E-03 | 4.5574E-03 |
| 35 | 3.4705E-03 | 3.4740E-03 | 3.4668E-03 | 3.4227E-03 | 3.4313E-03 | 4.5528E-03 | 3.5999E-03 | 3.5276E-03 | 3.7604E-03 | 4.4060E-03 |
| 36 | 3.4705E-03 | 3.4740E-03 | 3.4668E-03 | 3.4227E-03 | 3.4313E-03 | 4.5528E-03 | 3.5999E-03 | 3.5276E-03 | 3.7604E-03 | 4.4060E-03 |
| 37 | 3.4705E-03 | 3.4740E-03 | 3.4668E-03 | 3.4227E-03 | 3.4313E-03 | 4.5528E-03 | 3.5999E-03 | 3.5276E-03 | 3.7604E-03 | 4.4060E-03 |
| 38 | 3.4705E-03 | 3.4740E-03 | 3.4668E-03 | 3.4227E-03 | 3.4313E-03 | 4.5528E-03 | 3.5999E-03 | 3.5276E-03 | 3.7604E-03 | 4.4060E-03 |
| 39 | 3.3388E-03 | 3.3356E-03 | 3.3120E-03 | 3.2883E-03 | 3.2571E-03 | 4.3785E-03 | 3.4310E-03 | 3.3867E-03 | 3.6115E-03 | 4.2312E-03 |
| 40 | 3.2459E-03 | 3.2380E-03 | 3.2029E-03 | 3.1936E-03 | 3.1342E-03 | 4.2556E-03 | 3.3120E-03 | 3.2874E-03 | 3.5066E-03 | 4.1080E-03 |
| 41 | 3.2459E-03 | 3.2380E-03 | 3.2029E-03 | 3.1936E-03 | 3.1342E-03 | 4.2556E-03 | 3.3120E-03 | 3.2874E-03 | 3.5066E-03 | 4.1080E-03 |
| 42 | 3.2459E-03 | 3.2380E-03 | 3.2029E-03 | 3.1936E-03 | 3.1342E-03 | 4.2556E-03 | 3.3120E-03 | 3.2874E-03 | 3.5066E-03 | 4.1080E-03 |
| 43 | 3.1962E-03 | 3.1846E-03 | 3.1458E-03 | 3.1324E-03 | 3.0748E-03 | 4.0868E-03 | 3.2181E-03 | 3.2094E-03 | 3.4242E-03 | 4.0117E-03 |
| 44 | 2.8300E-03 | 2.7906E-03 | 2.7253E-03 | 2.6808E-03 | 2.6371E-03 | 2.8424E-03 | 2.5265E-03 | 2.6343E-03 | 2.8169E-03 | 3.3020E-03 |
| 45 | 2.8300E-03 | 2.7906E-03 | 2.7253E-03 | 2.6808E-03 | 2.6371E-03 | 2.8424E-03 | 2.5265E-03 | 2.6343E-03 | 2.8169E-03 | 3.3020E-03 |
| 46 | 2.8300E-03 | 2.7906E-03 | 2.7253E-03 | 2.6808E-03 | 2.6371E-03 | 2.8424E-03 | 2.5265E-03 | 2.6343E-03 | 2.8169E-03 | 3.3020E-03 |
| 47 | 2.8300E-03 | 2.7906E-03 | 2.7253E-03 | 2.6808E-03 | 2.6371E-03 | 2.8424E-03 | 2.5265E-03 | 2.6343E-03 | 2.8169E-03 | 3.3020E-03 |
| 48 | 1.0189E-03 | 1.0052E-03 | 9.8412E-04 | 9.7783E-04 | 9.7232E-04 | 1.0571E-03 | 9.6017E-04 | 1.0143E-03 | 1.1029E-03 | 1.3248E-03 |
| 49 | 4.5596E-05 | 4.5596E-05 | 4.8350E-05 | 6.2564E-05 | 7.7590E-05 | 9.7627E-05 | 1.1835E-04 | 1.4374E-04 | 1.8180E-04 | 2.6211E-04 |
| 50 | 4.5596E-05 | 4.5596E-05 | 4.8350E-05 | 6.2564E-05 | 7.7590E-05 | 9.7627E-05 | 1.1835E-04 | 1.4374E-04 | 1.8180E-04 | 2.6211E-04 |
| 51 | 4.5596E-05 | 4.5596E-05 | 4.8350E-05 | 6.2564E-05 | 7.7590E-05 | 9.7627E-05 | 1.1835E-04 | 1.4374E-04 | 1.8180E-04 | 2.6211E-04 |
| 52 | 4.5596E-05 | 4.5596E-05 | 4.8350E-05 | 6.2564E-05 | 7.7590E-05 | 9.7627E-05 | 1.1835E-04 | 1.4374E-04 | 1.8180E-04 | 2.6211E-04 |

1

RODEX3 PELLET AXIAL/RADIAL DEPENDENT VARIABLES
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FSSCA = SWELLING - AXIAL CREEP - CIRCUMFERENTIAL CREEP STRAIN

| LA -- | FSSCA VALUES | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8.8746E-04 | 8.8746E-04 | 8.9372E-04 | 9.2595E-04 | 9.6001E-04 | 1.0057E-03 | 1.0537E-03 | 1.1144E-03 | 1.2112E-03 | 1.4440E-03 |
| 2 | 8.8746E-04 | 8.8746E-04 | 8.9372E-04 | 9.2595E-04 | 9.6001E-04 | 1.0057E-03 | 1.0537E-03 | 1.1144E-03 | 1.2112E-03 | 1.4440E-03 |
| 3 | 8.8746E-04 | 8.8746E-04 | 8.9372E-04 | 9.2595E-04 | 9.6001E-04 | 1.0057E-03 | 1.0537E-03 | 1.1144E-03 | 1.2112E-03 | 1.4440E-03 |
| 4 | 8.8746E-04 | 8.8746E-04 | 8.9372E-04 | 9.2595E-04 | 9.6001E-04 | 1.0057E-03 | 1.0537E-03 | 1.1144E-03 | 1.2112E-03 | 1.4440E-03 |
| 5 | 2.0504E-03 | 2.0375E-03 | 2.0125E-03 | 1.9982E-03 | 1.9883E-03 | 2.5384E-03 | 2.0678E-03 | 2.0599E-03 | 2.2102E-03 | 2.6053E-03 |
| 6 | 3.6262E-03 | 3.5959E-03 | 3.5284E-03 | 3.4512E-03 | 3.3816E-03 | 4.6151E-03 | 3.4418E-03 | 3.3409E-03 | 3.5639E-03 | 4.1789E-03 |
| 7 | 3.6254E-03 | 3.5954E-03 | 3.5282E-03 | 3.4511E-03 | 3.3815E-03 | 4.6207E-03 | 3.4447E-03 | 3.3409E-03 | 3.5639E-03 | 4.1789E-03 |
| 8 | 3.6226E-03 | 3.5937E-03 | 3.5274E-03 | 3.4508E-03 | 3.3812E-03 | 4.6405E-03 | 3.4548E-03 | 3.3409E-03 | 3.5639E-03 | 4.1789E-03 |
| 9 | 3.7135E-03 | 3.6995E-03 | 3.6465E-03 | 3.5738E-03 | 3.4977E-03 | 4.8223E-03 | 3.5699E-03 | 3.4119E-03 | 3.6388E-03 | 4.2668E-03 |
| 10 | 4.2157E-03 | 4.2836E-03 | 4.3046E-03 | 4.2532E-03 | 4.1412E-03 | 5.8264E-03 | 4.2058E-03 | 3.8037E-03 | 4.0526E-03 | 4.7521E-03 |
| 11 | 4.2150E-03 | 4.2830E-03 | 4.3042E-03 | 4.2530E-03 | 4.1411E-03 | 5.8278E-03 | 4.2068E-03 | 3.8037E-03 | 4.0526E-03 | 4.7521E-03 |
| 12 | 4.2075E-03 | 4.2770E-03 | 4.3004E-03 | 4.2505E-03 | 4.1397E-03 | 5.8428E-03 | 4.2172E-03 | 3.8037E-03 | 4.0526E-03 | 4.7521E-03 |
| 13 | 4.2068E-03 | 4.2766E-03 | 4.3005E-03 | 4.2509E-03 | 4.1404E-03 | 5.8451E-03 | 4.2192E-03 | 3.8052E-03 | 4.0541E-03 | 4.7539E-03 |
| 14 | 4.1753E-03 | 4.2562E-03 | 4.3080E-03 | 4.2709E-03 | 4.1756E-03 | 5.9586E-03 | 4.3234E-03 | 3.8798E-03 | 4.1329E-03 | 4.8462E-03 |
| 15 | 4.1753E-03 | 4.2562E-03 | 4.3080E-03 | 4.2709E-03 | 4.1756E-03 | 5.9586E-03 | 4.3234E-03 | 3.8798E-03 | 4.1329E-03 | 4.8462E-03 |
| 16 | 4.1687E-03 | 4.2485E-03 | 4.3000E-03 | 4.2653E-03 | 4.1723E-03 | 5.9610E-03 | 4.3294E-03 | 3.8798E-03 | 4.1329E-03 | 4.8462E-03 |
| 17 | 4.1684E-03 | 4.2482E-03 | 4.2996E-03 | 4.2650E-03 | 4.1721E-03 | 5.9612E-03 | 4.3297E-03 | 3.8798E-03 | 4.1329E-03 | 4.8462E-03 |
| 18 | 4.1901E-03 | 4.2663E-03 | 4.2943E-03 | 4.2641E-03 | 4.1865E-03 | 5.7824E-03 | 4.2519E-03 | 3.8588E-03 | 4.1106E-03 | 4.8195E-03 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 19 | 4.1929E-03 | 4.2686E-03 | 4.2936E-03 | 4.2640E-03 | 4.1883E-03 | 5.7594E-03 | 4.2419E-03 | 3.8560E-03 | 4.1077E-03 | 4.8160E-03 |
| 20 | 4.1897E-03 | 4.2614E-03 | 4.2868E-03 | 4.2587E-03 | 4.1852E-03 | 5.7576E-03 | 4.2452E-03 | 3.8560E-03 | 4.1077E-03 | 4.8160E-03 |
| 21 | 4.1890E-03 | 4.2599E-03 | 4.2853E-03 | 4.2575E-03 | 4.1845E-03 | 5.7572E-03 | 4.2459E-03 | 3.8560E-03 | 4.1077E-03 | 4.8160E-03 |
| 22 | 4.1590E-03 | 4.2011E-03 | 4.2217E-03 | 4.1986E-03 | 4.1268E-03 | 5.4933E-03 | 4.1331E-03 | 3.8185E-03 | 4.0679E-03 | 4.7685E-03 |
| 23 | 4.1491E-03 | 4.1817E-03 | 4.2008E-03 | 4.1791E-03 | 4.1078E-03 | 5.4062E-03 | 4.0958E-03 | 3.8061E-03 | 4.0548E-03 | 4.7529E-03 |
| 24 | 4.1454E-03 | 4.1749E-03 | 4.1934E-03 | 4.1747E-03 | 4.1049E-03 | 5.3997E-03 | 4.0961E-03 | 3.8061E-03 | 4.0548E-03 | 4.7529E-03 |
| 25 | 4.1437E-03 | 4.1718E-03 | 4.1900E-03 | 4.1726E-03 | 4.1036E-03 | 5.3966E-03 | 4.0962E-03 | 3.8061E-03 | 4.0548E-03 | 4.7529E-03 |
| 26 | 4.0999E-03 | 4.1239E-03 | 4.1216E-03 | 4.1145E-03 | 4.0690E-03 | 5.1823E-03 | 3.9913E-03 | 3.7646E-03 | 4.0108E-03 | 4.7007E-03 |
| 27 | 4.0729E-03 | 4.0944E-03 | 4.0794E-03 | 4.0785E-03 | 4.0477E-03 | 5.0497E-03 | 3.9264E-03 | 3.7388E-03 | 3.9836E-03 | 4.6685E-03 |
| 28 | 4.0756E-03 | 4.0905E-03 | 4.0795E-03 | 4.0782E-03 | 4.0485E-03 | 5.0309E-03 | 3.9197E-03 | 3.7388E-03 | 3.9836E-03 | 4.6685E-03 |
| 29 | 4.0778E-03 | 4.0874E-03 | 4.0797E-03 | 4.0778E-03 | 4.0492E-03 | 5.0156E-03 | 3.9141E-03 | 3.7388E-03 | 3.9836E-03 | 4.6685E-03 |
| 30 | 3.9686E-03 | 3.9748E-03 | 3.9646E-03 | 3.9607E-03 | 3.9361E-03 | 4.8918E-03 | 3.8437E-03 | 3.6991E-03 | 3.9415E-03 | 4.6190E-03 |
| 31 | 3.8521E-03 | 3.8549E-03 | 3.8420E-03 | 3.8358E-03 | 3.8155E-03 | 4.7599E-03 | 3.7685E-03 | 3.6567E-03 | 3.8967E-03 | 4.5661E-03 |
| 32 | 3.8521E-03 | 3.8549E-03 | 3.8420E-03 | 3.8358E-03 | 3.8155E-03 | 4.7599E-03 | 3.7685E-03 | 3.6567E-03 | 3.8967E-03 | 4.5661E-03 |
| 33 | 3.8521E-03 | 3.8549E-03 | 3.8420E-03 | 3.8358E-03 | 3.8155E-03 | 4.7599E-03 | 3.7685E-03 | 3.6567E-03 | 3.8967E-03 | 4.5661E-03 |
| 34 | 3.8314E-03 | 3.8342E-03 | 3.8217E-03 | 3.8134E-03 | 3.7946E-03 | 4.7486E-03 | 3.7594E-03 | 3.6497E-03 | 3.8893E-03 | 4.5574E-03 |
| 35 | 3.4705E-03 | 3.4740E-03 | 3.4668E-03 | 3.4227E-03 | 3.4313E-03 | 4.5528E-03 | 3.5999E-03 | 3.5276E-03 | 3.7604E-03 | 4.4060E-03 |
| 36 | 3.4705E-03 | 3.4740E-03 | 3.4668E-03 | 3.4227E-03 | 3.4313E-03 | 4.5528E-03 | 3.5999E-03 | 3.5276E-03 | 3.7604E-03 | 4.4060E-03 |
| 37 | 3.4705E-03 | 3.4740E-03 | 3.4668E-03 | 3.4227E-03 | 3.4313E-03 | 4.5528E-03 | 3.5999E-03 | 3.5276E-03 | 3.7604E-03 | 4.4060E-03 |
| 38 | 3.4705E-03 | 3.4740E-03 | 3.4668E-03 | 3.4227E-03 | 3.4313E-03 | 4.5528E-03 | 3.5999E-03 | 3.5276E-03 | 3.7604E-03 | 4.4060E-03 |
| 39 | 3.3388E-03 | 3.3356E-03 | 3.3120E-03 | 3.2883E-03 | 3.2571E-03 | 4.3785E-03 | 3.4310E-03 | 3.3867E-03 | 3.6115E-03 | 4.2312E-03 |
| 40 | 3.2459E-03 | 3.2380E-03 | 3.2029E-03 | 3.1936E-03 | 3.1342E-03 | 4.2556E-03 | 3.3120E-03 | 3.2874E-03 | 3.5066E-03 | 4.1080E-03 |
| 41 | 3.2459E-03 | 3.2380E-03 | 3.2029E-03 | 3.1936E-03 | 3.1342E-03 | 4.2556E-03 | 3.3120E-03 | 3.2874E-03 | 3.5066E-03 | 4.1080E-03 |
| 42 | 3.2459E-03 | 3.2380E-03 | 3.2029E-03 | 3.1936E-03 | 3.1342E-03 | 4.2556E-03 | 3.3120E-03 | 3.2874E-03 | 3.5066E-03 | 4.1080E-03 |
| 43 | 3.1962E-03 | 3.1846E-03 | 3.1458E-03 | 3.1324E-03 | 3.0748E-03 | 4.0868E-03 | 3.2181E-03 | 3.2094E-03 | 3.4242E-03 | 4.0117E-03 |
| 44 | 2.8300E-03 | 2.7906E-03 | 2.7253E-03 | 2.6808E-03 | 2.6371E-03 | 2.8424E-03 | 2.5265E-03 | 2.6343E-03 | 2.8169E-03 | 3.3020E-03 |
| 45 | 2.8300E-03 | 2.7906E-03 | 2.7253E-03 | 2.6808E-03 | 2.6371E-03 | 2.8424E-03 | 2.5265E-03 | 2.6343E-03 | 2.8169E-03 | 3.3020E-03 |
| 46 | 2.8300E-03 | 2.7906E-03 | 2.7253E-03 | 2.6808E-03 | 2.6371E-03 | 2.8424E-03 | 2.5265E-03 | 2.6343E-03 | 2.8169E-03 | 3.3020E-03 |
| 47 | 2.8300E-03 | 2.7906E-03 | 2.7253E-03 | 2.6808E-03 | 2.6371E-03 | 2.8424E-03 | 2.5265E-03 | 2.6343E-03 | 2.8169E-03 | 3.3020E-03 |
| 48 | 1.0189E-03 | 1.0052E-03 | 9.8412E-04 | 9.7783E-04 | 9.7232E-04 | 1.0571E-03 | 9.6017E-04 | 1.0143E-03 | 1.1029E-03 | 1.3248E-03 |
| 49 | 4.5596E-05 | 4.5596E-05 | 4.8350E-05 | 6.2564E-05 | 7.7590E-05 | 9.7627E-05 | 1.1835E-04 | 1.4374E-04 | 1.8180E-04 | 2.6211E-04 |
| 50 | 4.5596E-05 | 4.5596E-05 | 4.8350E-05 | 6.2564E-05 | 7.7590E-05 | 9.7627E-05 | 1.1835E-04 | 1.4374E-04 | 1.8180E-04 | 2.6211E-04 |
| 51 | 4.5596E-05 | 4.5596E-05 | 4.8350E-05 | 6.2564E-05 | 7.7590E-05 | 9.7627E-05 | 1.1835E-04 | 1.4374E-04 | 1.8180E-04 | 2.6211E-04 |
| 52 | 4.5596E-05 | 4.5596E-05 | 4.8350E-05 | 6.2564E-05 | 7.7590E-05 | 9.7627E-05 | 1.1835E-04 | 1.4374E-04 | 1.8180E-04 | 2.6211E-04 |

QDOTI = NORMALIZED RADIAL LHGR DISTRIBUTION

LA -- QDOTI VALUES
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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 9.2780E-01 | 9.2780E-01 | 9.2944E-01 | 9.3784E-01 | 9.4686E-01 | 9.5943E-01 | 9.7346E-01 | 9.9304E-01 | 1.0292E+00 | 1.1359E+00 |
| 2 | 9.2780E-01 | 9.2780E-01 | 9.2944E-01 | 9.3784E-01 | 9.4686E-01 | 9.5943E-01 | 9.7346E-01 | 9.9304E-01 | 1.0292E+00 | 1.1359E+00 |
| 3 | 9.2780E-01 | 9.2780E-01 | 9.2944E-01 | 9.3784E-01 | 9.4686E-01 | 9.5943E-01 | 9.7346E-01 | 9.9304E-01 | 1.0292E+00 | 1.1359E+00 |
| 4 | 9.2780E-01 | 9.2780E-01 | 9.2944E-01 | 9.3784E-01 | 9.4686E-01 | 9.5943E-01 | 9.7346E-01 | 9.9304E-01 | 1.0292E+00 | 1.1359E+00 |
| 5 | 9.2635E-01 | 9.2635E-01 | 9.2782E-01 | 9.3539E-01 | 9.4362E-01 | 9.5541E-01 | 9.6907E-01 | 9.8903E-01 | 1.0280E+00 | 1.1506E+00 |
| 6 | 9.2438E-01 | 9.2438E-01 | 9.2564E-01 | 9.3206E-01 | 9.3924E-01 | 9.4997E-01 | 9.6311E-01 | 9.8359E-01 | 1.0264E+00 | 1.1705E+00 |
| 7 | 9.2438E-01 | 9.2438E-01 | 9.2564E-01 | 9.3206E-01 | 9.3924E-01 | 9.4997E-01 | 9.6311E-01 | 9.8359E-01 | 1.0264E+00 | 1.1705E+00 |
| 8 | 9.2438E-01 | 9.2438E-01 | 9.2564E-01 | 9.3206E-01 | 9.3924E-01 | 9.4997E-01 | 9.6311E-01 | 9.8359E-01 | 1.0264E+00 | 1.1705E+00 |
| 9 | 9.2428E-01 | 9.2428E-01 | 9.2553E-01 | 9.3190E-01 | 9.3903E-01 | 9.4972E-01 | 9.6284E-01 | 9.8334E-01 | 1.0263E+00 | 1.1714E+00 |
| 10 | 9.2375E-01 | 9.2375E-01 | 9.2494E-01 | 9.3102E-01 | 9.3789E-01 | 9.4832E-01 | 9.6132E-01 | 9.8197E-01 | 1.0260E+00 | 1.1765E+00 |
| 11 | 9.2375E-01 | 9.2375E-01 | 9.2494E-01 | 9.3102E-01 | 9.3789E-01 | 9.4832E-01 | 9.6132E-01 | 9.8197E-01 | 1.0260E+00 | 1.1765E+00 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 9.2375E-01 | 9.2375E-01 | 9.2494E-01 | 9.3102E-01 | 9.3789E-01 | 9.4832E-01 | 9.6132E-01 | 9.8197E-01 | 1.0260E+00 | 1.1765E+00 |
| 13 | 9.2374E-01 | 9.2374E-01 | 9.2493E-01 | 9.3102E-01 | 9.3788E-01 | 9.4831E-01 | 9.6131E-01 | 9.8196E-01 | 1.0260E+00 | 1.1765E+00 |
| 14 | 9.2364E-01 | 9.2364E-01 | 9.2482E-01 | 9.3085E-01 | 9.3767E-01 | 9.4805E-01 | 9.6103E-01 | 9.8171E-01 | 1.0259E+00 | 1.1775E+00 |
| 15 | 9.2364E-01 | 9.2364E-01 | 9.2482E-01 | 9.3085E-01 | 9.3767E-01 | 9.4805E-01 | 9.6103E-01 | 9.8171E-01 | 1.0259E+00 | 1.1775E+00 |
| 16 | 9.2364E-01 | 9.2364E-01 | 9.2482E-01 | 9.3085E-01 | 9.3767E-01 | 9.4805E-01 | 9.6103E-01 | 9.8171E-01 | 1.0259E+00 | 1.1775E+00 |
| 17 | 9.2364E-01 | 9.2364E-01 | 9.2482E-01 | 9.3085E-01 | 9.3767E-01 | 9.4805E-01 | 9.6103E-01 | 9.8171E-01 | 1.0259E+00 | 1.1775E+00 |
| 18 | 9.2367E-01 | 9.2367E-01 | 9.2485E-01 | 9.3090E-01 | 9.3772E-01 | 9.4812E-01 | 9.6110E-01 | 9.8177E-01 | 1.0259E+00 | 1.1773E+00 |
| 19 | 9.2367E-01 | 9.2367E-01 | 9.2485E-01 | 9.3090E-01 | 9.3773E-01 | 9.4812E-01 | 9.6111E-01 | 9.8178E-01 | 1.0259E+00 | 1.1772E+00 |
| 20 | 9.2367E-01 | 9.2367E-01 | 9.2485E-01 | 9.3090E-01 | 9.3773E-01 | 9.4812E-01 | 9.6111E-01 | 9.8178E-01 | 1.0259E+00 | 1.1772E+00 |
| 21 | 9.2367E-01 | 9.2367E-01 | 9.2485E-01 | 9.3090E-01 | 9.3773E-01 | 9.4812E-01 | 9.6111E-01 | 9.8178E-01 | 1.0259E+00 | 1.1772E+00 |
| 22 | 9.2373E-01 | 9.2373E-01 | 9.2492E-01 | 9.3100E-01 | 9.3785E-01 | 9.4828E-01 | 9.6127E-01 | 9.8193E-01 | 1.0260E+00 | 1.1767E+00 |
| 23 | 9.2375E-01 | 9.2375E-01 | 9.2494E-01 | 9.3103E-01 | 9.3790E-01 | 9.4833E-01 | 9.6133E-01 | 9.8198E-01 | 1.0260E+00 | 1.1765E+00 |
| 24 | 9.2375E-01 | 9.2375E-01 | 9.2494E-01 | 9.3103E-01 | 9.3790E-01 | 9.4833E-01 | 9.6133E-01 | 9.8198E-01 | 1.0260E+00 | 1.1765E+00 |
| 25 | 9.2375E-01 | 9.2375E-01 | 9.2494E-01 | 9.3103E-01 | 9.3790E-01 | 9.4833E-01 | 9.6133E-01 | 9.8198E-01 | 1.0260E+00 | 1.1765E+00 |
| 26 | 9.2381E-01 | 9.2381E-01 | 9.2501E-01 | 9.3113E-01 | 9.3803E-01 | 9.4849E-01 | 9.6150E-01 | 9.8213E-01 | 1.0260E+00 | 1.1759E+00 |
| 27 | 9.2385E-01 | 9.2385E-01 | 9.2505E-01 | 9.3119E-01 | 9.3811E-01 | 9.4858E-01 | 9.6161E-01 | 9.8223E-01 | 1.0260E+00 | 1.1755E+00 |
| 28 | 9.2385E-01 | 9.2385E-01 | 9.2505E-01 | 9.3119E-01 | 9.3811E-01 | 9.4858E-01 | 9.6161E-01 | 9.8223E-01 | 1.0260E+00 | 1.1755E+00 |
| 29 | 9.2385E-01 | 9.2385E-01 | 9.2505E-01 | 9.3119E-01 | 9.3811E-01 | 9.4858E-01 | 9.6161E-01 | 9.8223E-01 | 1.0260E+00 | 1.1755E+00 |
| 30 | 9.2391E-01 | 9.2391E-01 | 9.2511E-01 | 9.3128E-01 | 9.3823E-01 | 9.4873E-01 | 9.6177E-01 | 9.8237E-01 | 1.0261E+00 | 1.1750E+00 |
| 31 | 9.2397E-01 | 9.2397E-01 | 9.2518E-01 | 9.3138E-01 | 9.3836E-01 | 9.4889E-01 | 9.6194E-01 | 9.8253E-01 | 1.0261E+00 | 1.1744E+00 |
| 32 | 9.2397E-01 | 9.2397E-01 | 9.2518E-01 | 9.3138E-01 | 9.3836E-01 | 9.4889E-01 | 9.6194E-01 | 9.8253E-01 | 1.0261E+00 | 1.1744E+00 |
| 33 | 9.2397E-01 | 9.2397E-01 | 9.2518E-01 | 9.3138E-01 | 9.3836E-01 | 9.4889E-01 | 9.6194E-01 | 9.8253E-01 | 1.0261E+00 | 1.1744E+00 |
| 34 | 9.2398E-01 | 9.2398E-01 | 9.2519E-01 | 9.3140E-01 | 9.3838E-01 | 9.4892E-01 | 9.6196E-01 | 9.8255E-01 | 1.0261E+00 | 1.1743E+00 |
| 35 | 9.2415E-01 | 9.2415E-01 | 9.2538E-01 | 9.3168E-01 | 9.3874E-01 | 9.4936E-01 | 9.6245E-01 | 9.8299E-01 | 1.0262E+00 | 1.1727E+00 |
| 36 | 9.2415E-01 | 9.2415E-01 | 9.2538E-01 | 9.3168E-01 | 9.3874E-01 | 9.4936E-01 | 9.6245E-01 | 9.8299E-01 | 1.0262E+00 | 1.1727E+00 |
| 37 | 9.2415E-01 | 9.2415E-01 | 9.2538E-01 | 9.3168E-01 | 9.3874E-01 | 9.4936E-01 | 9.6245E-01 | 9.8299E-01 | 1.0262E+00 | 1.1727E+00 |
| 38 | 9.2415E-01 | 9.2415E-01 | 9.2538E-01 | 9.3168E-01 | 9.3874E-01 | 9.4936E-01 | 9.6245E-01 | 9.8299E-01 | 1.0262E+00 | 1.1727E+00 |
| 39 | 9.2435E-01 | 9.2435E-01 | 9.2561E-01 | 9.3201E-01 | 9.3918E-01 | 9.4990E-01 | 9.6303E-01 | 9.8351E-01 | 1.0264E+00 | 1.1708E+00 |
| 40 | 9.2449E-01 | 9.2449E-01 | 9.2576E-01 | 9.3225E-01 | 9.3948E-01 | 9.5027E-01 | 9.6344E-01 | 9.8388E-01 | 1.0265E+00 | 1.1694E+00 |
| 41 | 9.2449E-01 | 9.2449E-01 | 9.2576E-01 | 9.3225E-01 | 9.3948E-01 | 9.5027E-01 | 9.6344E-01 | 9.8388E-01 | 1.0265E+00 | 1.1694E+00 |
| 42 | 9.2449E-01 | 9.2449E-01 | 9.2576E-01 | 9.3225E-01 | 9.3948E-01 | 9.5027E-01 | 9.6344E-01 | 9.8388E-01 | 1.0265E+00 | 1.1694E+00 |
| 43 | 9.2460E-01 | 9.2460E-01 | 9.2588E-01 | 9.3243E-01 | 9.3972E-01 | 9.5057E-01 | 9.6377E-01 | 9.8418E-01 | 1.0266E+00 | 1.1683E+00 |
| 44 | 9.2541E-01 | 9.2541E-01 | 9.2678E-01 | 9.3379E-01 | 9.4150E-01 | 9.5277E-01 | 9.6617E-01 | 9.8636E-01 | 1.0272E+00 | 1.1603E+00 |
| 45 | 9.2541E-01 | 9.2541E-01 | 9.2678E-01 | 9.3379E-01 | 9.4150E-01 | 9.5277E-01 | 9.6617E-01 | 9.8636E-01 | 1.0272E+00 | 1.1603E+00 |
| 46 | 9.2541E-01 | 9.2541E-01 | 9.2678E-01 | 9.3379E-01 | 9.4150E-01 | 9.5277E-01 | 9.6617E-01 | 9.8636E-01 | 1.0272E+00 | 1.1603E+00 |
| 47 | 9.2541E-01 | 9.2541E-01 | 9.2678E-01 | 9.3379E-01 | 9.4150E-01 | 9.5277E-01 | 9.6617E-01 | 9.8636E-01 | 1.0272E+00 | 1.1603E+00 |
| 48 | 9.2863E-01 | 9.2863E-01 | 9.3034E-01 | 9.3908E-01 | 9.4840E-01 | 9.6128E-01 | 9.7546E-01 | 9.9484E-01 | 1.0296E+00 | 1.1291E+00 |
| 49 | 9.3037E-01 | 9.3037E-01 | 9.3226E-01 | 9.4192E-01 | 9.5211E-01 | 9.6585E-01 | 9.8045E-01 | 9.9939E-01 | 1.0310E+00 | 1.1123E+00 |
| 50 | 9.3037E-01 | 9.3037E-01 | 9.3226E-01 | 9.4192E-01 | 9.5211E-01 | 9.6585E-01 | 9.8045E-01 | 9.9939E-01 | 1.0310E+00 | 1.1123E+00 |
| 51 | 9.3037E-01 | 9.3037E-01 | 9.3226E-01 | 9.4192E-01 | 9.5211E-01 | 9.6585E-01 | 9.8045E-01 | 9.9939E-01 | 1.0310E+00 | 1.1123E+00 |
| 52 | 9.3037E-01 | 9.3037E-01 | 9.3226E-01 | 9.4192E-01 | 9.5211E-01 | 9.6585E-01 | 9.8045E-01 | 9.9939E-01 | 1.0310E+00 | 1.1123E+00 |

1

POROS = OPEN POROSITY DISTRIBUTION

LA -- POROS VALUES
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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 |
| 2 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 |
| 3 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 |
| 4 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 1.2717E-02 | 1.1715E-02 | 9.9429E-03 | 7.8166E-03 | 5.6488E-03 | 3.8696E-03 | 2.7917E-03 | 2.5428E-03 | 2.5000E-03 | 2.5000E-03 |
| 6 | 2.6562E-02 | 2.4201E-02 | 2.0028E-02 | 1.5021E-02 | 9.9155E-03 | 5.7255E-03 | 3.1870E-03 | 2.6009E-03 | 2.5000E-03 | 2.5000E-03 |
| 7 | 2.6594E-02 | 2.4232E-02 | 2.0056E-02 | 1.5045E-02 | 9.9353E-03 | 5.7396E-03 | 3.1956E-03 | 2.6037E-03 | 2.5000E-03 | 2.5000E-03 |
| 8 | 2.6708E-02 | 2.4342E-02 | 2.0157E-02 | 1.5133E-02 | 1.0006E-02 | 5.7894E-03 | 3.2261E-03 | 2.6139E-03 | 2.5000E-03 | 2.5000E-03 |
| 9 | 2.7907E-02 | 2.5444E-02 | 2.1086E-02 | 1.5847E-02 | 1.0486E-02 | 6.0638E-03 | 3.3646E-03 | 2.6581E-03 | 2.5235E-03 | 2.5000E-03 |
| 10 | 3.4524E-02 | 3.1533E-02 | 2.6221E-02 | 1.9793E-02 | 1.3137E-02 | 7.5797E-03 | 4.1293E-03 | 2.9021E-03 | 2.6532E-03 | 2.5000E-03 |
| 11 | 3.4526E-02 | 3.1535E-02 | 2.6224E-02 | 1.9796E-02 | 1.3141E-02 | 7.5835E-03 | 4.1323E-03 | 2.9031E-03 | 2.6542E-03 | 2.5000E-03 |
| 12 | 3.4541E-02 | 3.1554E-02 | 2.6251E-02 | 1.9832E-02 | 1.3183E-02 | 7.6239E-03 | 4.1635E-03 | 2.9135E-03 | 2.6646E-03 | 2.5000E-03 |
| 13 | 3.4548E-02 | 3.1561E-02 | 2.6256E-02 | 1.9836E-02 | 1.3186E-02 | 7.6262E-03 | 4.1654E-03 | 2.9141E-03 | 2.6651E-03 | 2.5000E-03 |
| 14 | 3.4891E-02 | 3.1873E-02 | 2.6516E-02 | 2.0037E-02 | 1.3337E-02 | 7.7423E-03 | 4.2603E-03 | 2.9437E-03 | 2.6906E-03 | 2.5000E-03 |
| 15 | 3.4891E-02 | 3.1873E-02 | 2.6516E-02 | 2.0037E-02 | 1.3337E-02 | 7.7423E-03 | 4.2603E-03 | 2.9437E-03 | 2.6906E-03 | 2.5000E-03 |
| 16 | 3.4772E-02 | 3.1769E-02 | 2.6438E-02 | 1.9992E-02 | 1.3325E-02 | 7.7532E-03 | 4.2781E-03 | 2.9496E-03 | 2.6965E-03 | 2.5000E-03 |
| 17 | 3.4766E-02 | 3.1763E-02 | 2.6434E-02 | 1.9990E-02 | 1.3325E-02 | 7.7538E-03 | 4.2790E-03 | 2.9499E-03 | 2.6968E-03 | 2.5000E-03 |
| 18 | 3.2570E-02 | 2.9775E-02 | 2.4814E-02 | 1.8816E-02 | 1.2596E-02 | 7.3792E-03 | 4.1071E-03 | 2.8932E-03 | 2.6414E-03 | 2.5000E-03 |
| 19 | 3.2286E-02 | 2.9518E-02 | 2.4605E-02 | 1.8665E-02 | 1.2502E-02 | 7.3308E-03 | 4.0849E-03 | 2.8859E-03 | 2.6342E-03 | 2.5000E-03 |
| 20 | 3.2156E-02 | 2.9402E-02 | 2.4514E-02 | 1.8606E-02 | 1.2477E-02 | 7.3305E-03 | 4.0947E-03 | 2.8891E-03 | 2.6375E-03 | 2.5000E-03 |
| 21 | 3.2128E-02 | 2.9376E-02 | 2.4494E-02 | 1.8593E-02 | 1.2471E-02 | 7.3304E-03 | 4.0969E-03 | 2.8899E-03 | 2.6382E-03 | 2.5000E-03 |
| 22 | 2.9395E-02 | 2.6882E-02 | 2.2427E-02 | 1.7049E-02 | 1.1476E-02 | 6.7979E-03 | 3.8678E-03 | 2.8146E-03 | 2.5652E-03 | 2.5000E-03 |
| 23 | 2.8493E-02 | 2.6059E-02 | 2.1744E-02 | 1.6540E-02 | 1.1147E-02 | 6.6221E-03 | 3.7921E-03 | 2.7897E-03 | 2.5410E-03 | 2.5000E-03 |
| 24 | 2.8338E-02 | 2.5919E-02 | 2.1632E-02 | 1.6462E-02 | 1.1105E-02 | 6.6093E-03 | 3.7930E-03 | 2.7900E-03 | 2.5413E-03 | 2.5000E-03 |
| 25 | 2.8267E-02 | 2.5855E-02 | 2.1580E-02 | 1.6426E-02 | 1.1086E-02 | 6.6034E-03 | 3.7933E-03 | 2.7901E-03 | 2.5414E-03 | 2.5000E-03 |
| 26 | 2.6168E-02 | 2.3940E-02 | 1.9994E-02 | 1.5242E-02 | 1.0320E-02 | 6.1895E-03 | 3.5999E-03 | 2.7268E-03 | 2.5158E-03 | 2.5000E-03 |
| 27 | 2.4870E-02 | 2.2755E-02 | 1.9012E-02 | 1.4509E-02 | 9.8463E-03 | 5.9335E-03 | 3.4802E-03 | 2.6876E-03 | 2.5000E-03 | 2.5000E-03 |
| 28 | 2.4658E-02 | 2.2560E-02 | 1.8848E-02 | 1.4383E-02 | 9.7633E-03 | 5.8891E-03 | 3.4599E-03 | 2.6808E-03 | 2.5000E-03 | 2.5000E-03 |
| 29 | 2.4485E-02 | 2.2401E-02 | 1.8714E-02 | 1.4281E-02 | 9.6956E-03 | 5.8529E-03 | 3.4433E-03 | 2.6753E-03 | 2.5000E-03 | 2.5000E-03 |
| 30 | 2.3539E-02 | 2.1528E-02 | 1.7974E-02 | 1.3709E-02 | 9.3174E-03 | 5.6494E-03 | 3.3479E-03 | 2.6446E-03 | 2.5000E-03 | 2.5000E-03 |
| 31 | 2.2531E-02 | 2.0597E-02 | 1.7184E-02 | 1.3100E-02 | 8.9143E-03 | 5.4325E-03 | 3.2461E-03 | 2.6118E-03 | 2.5000E-03 | 2.5000E-03 |
| 32 | 2.2531E-02 | 2.0597E-02 | 1.7184E-02 | 1.3100E-02 | 8.9143E-03 | 5.4325E-03 | 3.2461E-03 | 2.6118E-03 | 2.5000E-03 | 2.5000E-03 |
| 33 | 2.2531E-02 | 2.0597E-02 | 1.7184E-02 | 1.3100E-02 | 8.9143E-03 | 5.4325E-03 | 3.2461E-03 | 2.6118E-03 | 2.5000E-03 | 2.5000E-03 |
| 34 | 2.2492E-02 | 2.0560E-02 | 1.7153E-02 | 1.3075E-02 | 8.8960E-03 | 5.4210E-03 | 3.2391E-03 | 2.6097E-03 | 2.5000E-03 | 2.5000E-03 |
| 35 | 2.1815E-02 | 1.9927E-02 | 1.6601E-02 | 1.2627E-02 | 8.5763E-03 | 5.2213E-03 | 3.1165E-03 | 2.5722E-03 | 2.5000E-03 | 2.5000E-03 |
| 36 | 2.1815E-02 | 1.9927E-02 | 1.6601E-02 | 1.2627E-02 | 8.5763E-03 | 5.2213E-03 | 3.1165E-03 | 2.5722E-03 | 2.5000E-03 | 2.5000E-03 |
| 37 | 2.1815E-02 | 1.9927E-02 | 1.6601E-02 | 1.2627E-02 | 8.5763E-03 | 5.2213E-03 | 3.1165E-03 | 2.5722E-03 | 2.5000E-03 | 2.5000E-03 |
| 38 | 2.1815E-02 | 1.9927E-02 | 1.6601E-02 | 1.2627E-02 | 8.5763E-03 | 5.2213E-03 | 3.1165E-03 | 2.5722E-03 | 2.5000E-03 | 2.5000E-03 |
| 39 | 2.1563E-02 | 1.9688E-02 | 1.6385E-02 | 1.2443E-02 | 8.4294E-03 | 5.1093E-03 | 3.0207E-03 | 2.5443E-03 | 2.5000E-03 | 2.5000E-03 |
| 40 | 2.1386E-02 | 1.9519E-02 | 1.6233E-02 | 1.2313E-02 | 8.3258E-03 | 5.0304E-03 | 2.9532E-03 | 2.5246E-03 | 2.5000E-03 | 2.5000E-03 |
| 41 | 2.1386E-02 | 1.9519E-02 | 1.6233E-02 | 1.2313E-02 | 8.3258E-03 | 5.0304E-03 | 2.9532E-03 | 2.5246E-03 | 2.5000E-03 | 2.5000E-03 |
| 42 | 2.1386E-02 | 1.9519E-02 | 1.6233E-02 | 1.2313E-02 | 8.3258E-03 | 5.0304E-03 | 2.9532E-03 | 2.5246E-03 | 2.5000E-03 | 2.5000E-03 |
| 43 | 2.0556E-02 | 1.8761E-02 | 1.5601E-02 | 1.1833E-02 | 7.9966E-03 | 4.8232E-03 | 2.8991E-03 | 2.5216E-03 | 2.5000E-03 | 2.5000E-03 |
| 44 | 1.4441E-02 | 1.3174E-02 | 1.0945E-02 | 8.2936E-03 | 5.5697E-03 | 3.2960E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 |
| 45 | 1.4441E-02 | 1.3174E-02 | 1.0945E-02 | 8.2936E-03 | 5.5697E-03 | 3.2960E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 |
| 46 | 1.4441E-02 | 1.3174E-02 | 1.0945E-02 | 8.2936E-03 | 5.5697E-03 | 3.2960E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 |
| 47 | 1.4441E-02 | 1.3174E-02 | 1.0945E-02 | 8.2936E-03 | 5.5697E-03 | 3.2960E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 |
| 48 | 6.6743E-03 | 6.2315E-03 | 5.4520E-03 | 4.5252E-03 | 3.5731E-03 | 2.7782E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 |
| 49 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 |
| 50 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 |
| 51 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 |
| 52 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 | 2.5000E-03 |

RODEX3 PELLET AXIAL/RADIAL DEPENDENT VARIABLES

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SWELG = GASEOUS SWELLING DISTRIBUTION

| LA | SWELG VALUES | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.5191E-03 | 1.3528E-03 | 1.0639E-03 | 7.2907E-04 | 4.0254E-04 | 1.6462E-04 | 5.1065E-05 | 1.2310E-05 | 2.0065E-06 | 2.2462E-07 |
| 2 | 1.5191E-03 | 1.3528E-03 | 1.0639E-03 | 7.2907E-04 | 4.0254E-04 | 1.6462E-04 | 5.1065E-05 | 1.2310E-05 | 2.0065E-06 | 2.2462E-07 |
| 3 | 1.5407E-03 | 1.3728E-03 | 1.0810E-03 | 7.4226E-04 | 4.1121E-04 | 1.6898E-04 | 5.2697E-05 | 1.2771E-05 | 2.0939E-06 | 2.3597E-07 |
| 4 | 1.5494E-03 | 1.3809E-03 | 1.0878E-03 | 7.4759E-04 | 4.1471E-04 | 1.7074E-04 | 5.3357E-05 | 1.2958E-05 | 2.1292E-06 | 2.4055E-07 |
| 5 | 1.1807E-02 | 1.0707E-02 | 8.7637E-03 | 6.4267E-03 | 4.0518E-03 | 2.1116E-03 | 9.4469E-04 | 3.5832E-04 | 7.8434E-05 | 6.5128E-06 |
| 6 | 2.5705E-02 | 2.3345E-02 | 1.9165E-02 | 1.4122E-02 | 8.9800E-03 | 4.7416E-03 | 2.1525E-03 | 8.2628E-04 | 1.8183E-04 | 1.5012E-05 |
| 7 | 2.5737E-02 | 2.3376E-02 | 1.9193E-02 | 1.4147E-02 | 8.9999E-03 | 4.7556E-03 | 2.1611E-03 | 8.3101E-04 | 1.8374E-04 | 1.5281E-05 |
| 8 | 2.5852E-02 | 2.3485E-02 | 1.9293E-02 | 1.4234E-02 | 9.0702E-03 | 4.8054E-03 | 2.1916E-03 | 8.4776E-04 | 1.9050E-04 | 1.6235E-05 |
| 9 | 2.7015E-02 | 2.4552E-02 | 2.0188E-02 | 1.4914E-02 | 9.5162E-03 | 5.0466E-03 | 2.2974E-03 | 8.8400E-04 | 2.0340E-04 | 1.7873E-05 |
| 10 | 3.3438E-02 | 3.0447E-02 | 2.5129E-02 | 1.8668E-02 | 1.1980E-02 | 6.3785E-03 | 2.8821E-03 | 1.0842E-03 | 2.7469E-04 | 2.6917E-05 |
| 11 | 3.3439E-02 | 3.0449E-02 | 2.5131E-02 | 1.8672E-02 | 1.1984E-02 | 6.3823E-03 | 2.8850E-03 | 1.0859E-03 | 2.7551E-04 | 2.7086E-05 |
| 12 | 3.3455E-02 | 3.0468E-02 | 2.5158E-02 | 1.8707E-02 | 1.2025E-02 | 6.4226E-03 | 2.9163E-03 | 1.1046E-03 | 2.8417E-04 | 2.8873E-05 |
| 13 | 3.3461E-02 | 3.0474E-02 | 2.5162E-02 | 1.8711E-02 | 1.2028E-02 | 6.4243E-03 | 2.9175E-03 | 1.1051E-03 | 2.8418E-04 | 2.8910E-05 |
| 14 | 3.3771E-02 | 3.0753E-02 | 2.5390E-02 | 1.8880E-02 | 1.2147E-02 | 6.5089E-03 | 2.9815E-03 | 1.1283E-03 | 2.8474E-04 | 3.0784E-05 |
| 15 | 3.3771E-02 | 3.0753E-02 | 2.5390E-02 | 1.8880E-02 | 1.2147E-02 | 6.5089E-03 | 2.9815E-03 | 1.1283E-03 | 2.8474E-04 | 3.0784E-05 |
| 16 | 3.3652E-02 | 3.0648E-02 | 2.5311E-02 | 1.8834E-02 | 1.2135E-02 | 6.5198E-03 | 2.9993E-03 | 1.1432E-03 | 2.9204E-04 | 3.2614E-05 |
| 17 | 3.3646E-02 | 3.0643E-02 | 2.5307E-02 | 1.8832E-02 | 1.2134E-02 | 6.5203E-03 | 3.0002E-03 | 1.1440E-03 | 2.9241E-04 | 3.2705E-05 |
| 18 | 3.1459E-02 | 2.8664E-02 | 2.3697E-02 | 1.7667E-02 | 1.1415E-02 | 6.1545E-03 | 2.8369E-03 | 1.0893E-03 | 2.7891E-04 | 3.2007E-05 |
| 19 | 3.1176E-02 | 2.8408E-02 | 2.3489E-02 | 1.7517E-02 | 1.1322E-02 | 6.1073E-03 | 2.8158E-03 | 1.0822E-03 | 2.7717E-04 | 3.1917E-05 |
| 20 | 3.1046E-02 | 2.8292E-02 | 2.3398E-02 | 1.7459E-02 | 1.1297E-02 | 6.1070E-03 | 2.8257E-03 | 1.0920E-03 | 2.8251E-04 | 3.3376E-05 |
| 21 | 3.1018E-02 | 2.8266E-02 | 2.3378E-02 | 1.7446E-02 | 1.1291E-02 | 6.1069E-03 | 2.8278E-03 | 1.0941E-03 | 2.8370E-04 | 3.3699E-05 |
| 22 | 2.8302E-02 | 2.5789E-02 | 2.1328E-02 | 1.5919E-02 | 1.0312E-02 | 5.5904E-03 | 2.6143E-03 | 1.0264E-03 | 2.7144E-04 | 3.2769E-05 |
| 23 | 2.7405E-02 | 2.4971E-02 | 2.0650E-02 | 1.5414E-02 | 9.9883E-03 | 5.4198E-03 | 2.5438E-03 | 1.0041E-03 | 2.6740E-04 | 3.2462E-05 |
| 24 | 2.7251E-02 | 2.4832E-02 | 2.0538E-02 | 1.5337E-02 | 9.9470E-03 | 5.4070E-03 | 2.5446E-03 | 1.0088E-03 | 2.7079E-04 | 3.3565E-05 |
| 25 | 2.7180E-02 | 2.4767E-02 | 2.0487E-02 | 1.5301E-02 | 9.9279E-03 | 5.4011E-03 | 2.5450E-03 | 1.0110E-03 | 2.7235E-04 | 3.4072E-05 |
| 26 | 2.5100E-02 | 2.2871E-02 | 1.8919E-02 | 1.4135E-02 | 9.1802E-03 | 5.0052E-03 | 2.3692E-03 | 9.5146E-04 | 2.6373E-04 | 3.3216E-05 |
| 27 | 2.3813E-02 | 2.1699E-02 | 1.7950E-02 | 1.3414E-02 | 8.7178E-03 | 4.7604E-03 | 2.2605E-03 | 9.1462E-04 | 2.5840E-04 | 3.2686E-05 |
| 28 | 2.3601E-02 | 2.1504E-02 | 1.7785E-02 | 1.3288E-02 | 8.6347E-03 | 4.7160E-03 | 2.2401E-03 | 9.0956E-04 | 2.5866E-04 | 3.2912E-05 |
| 29 | 2.3428E-02 | 2.1345E-02 | 1.7651E-02 | 1.3186E-02 | 8.5670E-03 | 4.6798E-03 | 2.2236E-03 | 9.0543E-04 | 2.5887E-04 | 3.3096E-05 |
| 30 | 2.2501E-02 | 2.0490E-02 | 1.6930E-02 | 1.2633E-02 | 8.2070E-03 | 4.4941E-03 | 2.1455E-03 | 8.8321E-04 | 2.5300E-04 | 3.2085E-05 |
| 31 | 2.1513E-02 | 1.9579E-02 | 1.6160E-02 | 1.2043E-02 | 7.8233E-03 | 4.2961E-03 | 2.0622E-03 | 8.5952E-04 | 2.4673E-04 | 3.1008E-05 |
| 32 | 2.1513E-02 | 1.9579E-02 | 1.6160E-02 | 1.2043E-02 | 7.8233E-03 | 4.2961E-03 | 2.0622E-03 | 8.5952E-04 | 2.4673E-04 | 3.1008E-05 |
| 33 | 2.1513E-02 | 1.9579E-02 | 1.6160E-02 | 1.2043E-02 | 7.8233E-03 | 4.2961E-03 | 2.0622E-03 | 8.5952E-04 | 2.4673E-04 | 3.1008E-05 |
| 34 | 2.1478E-02 | 1.9546E-02 | 1.6132E-02 | 1.2021E-02 | 7.8082E-03 | 4.2879E-03 | 2.0584E-03 | 8.5813E-04 | 2.4572E-04 | 3.0839E-05 |
| 35 | 2.0861E-02 | 1.8973E-02 | 1.5640E-02 | 1.1633E-02 | 7.5466E-03 | 4.1449E-03 | 1.9914E-03 | 8.3397E-04 | 2.2811E-04 | 2.7899E-05 |
| 36 | 2.0861E-02 | 1.8973E-02 | 1.5640E-02 | 1.1633E-02 | 7.5466E-03 | 4.1449E-03 | 1.9914E-03 | 8.3397E-04 | 2.2811E-04 | 2.7899E-05 |
| 37 | 2.0861E-02 | 1.8973E-02 | 1.5640E-02 | 1.1633E-02 | 7.5466E-03 | 4.1449E-03 | 1.9914E-03 | 8.3397E-04 | 2.2811E-04 | 2.7899E-05 |
| 38 | 2.0861E-02 | 1.8973E-02 | 1.5640E-02 | 1.1633E-02 | 7.5466E-03 | 4.1449E-03 | 1.9914E-03 | 8.3397E-04 | 2.2811E-04 | 2.7899E-05 |
| 39 | 2.0684E-02 | 1.8809E-02 | 1.5499E-02 | 1.1522E-02 | 7.4716E-03 | 4.1034E-03 | 1.9646E-03 | 8.0065E-04 | 2.0817E-04 | 2.4898E-05 |
| 40 | 2.0559E-02 | 1.8692E-02 | 1.5399E-02 | 1.1443E-02 | 7.4187E-03 | 4.0742E-03 | 1.9458E-03 | 7.7716E-04 | 1.9411E-04 | 2.2783E-05 |
| 41 | 2.0559E-02 | 1.8692E-02 | 1.5399E-02 | 1.1443E-02 | 7.4187E-03 | 4.0742E-03 | 1.9458E-03 | 7.7716E-04 | 1.9411E-04 | 2.2783E-05 |
| 42 | 2.0559E-02 | 1.8692E-02 | 1.5399E-02 | 1.1443E-02 | 7.4187E-03 | 4.0742E-03 | 1.9458E-03 | 7.7716E-04 | 1.9411E-04 | 2.2783E-05 |
| 43 | 1.9778E-02 | 1.7984E-02 | 1.4816E-02 | 1.1011E-02 | 7.1372E-03 | 3.9139E-03 | 1.8615E-03 | 7.3740E-04 | 1.8229E-04 | 2.1370E-05 |
| 44 | 1.4026E-02 | 1.2759E-02 | 1.0521E-02 | 7.8290E-03 | 5.0623E-03 | 2.7323E-03 | 1.2406E-03 | 4.4437E-04 | 9.5159E-05 | 1.0962E-05 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 45 | 1.4026E-02 | 1.2759E-02 | 1.0521E-02 | 7.8290E-03 | 5.0623E-03 | 2.7323E-03 | 1.2406E-03 | 4.4437E-04 | 9.5159E-05 | 1.0962E-05 |
| 46 | 1.4026E-02 | 1.2759E-02 | 1.0521E-02 | 7.8290E-03 | 5.0623E-03 | 2.7323E-03 | 1.2406E-03 | 4.4437E-04 | 9.5159E-05 | 1.0962E-05 |
| 47 | 1.4026E-02 | 1.2759E-02 | 1.0521E-02 | 7.8290E-03 | 5.0623E-03 | 2.7323E-03 | 1.2406E-03 | 4.4437E-04 | 9.5159E-05 | 1.0962E-05 |
| 48 | 4.9255E-03 | 4.4796E-03 | 3.6924E-03 | 2.7463E-03 | 1.7748E-03 | 9.5746E-04 | 4.3460E-04 | 1.5567E-04 | 3.3363E-05 | 3.8566E-06 |
| 49 | 3.4361E-05 | 2.9666E-05 | 2.2186E-05 | 1.4626E-05 | 8.0160E-06 | 3.6035E-06 | 1.4224E-06 | 5.0912E-07 | 1.5074E-07 | 3.8178E-08 |
| 50 | 3.4361E-05 | 2.9666E-05 | 2.2186E-05 | 1.4626E-05 | 8.0160E-06 | 3.6035E-06 | 1.4224E-06 | 5.0912E-07 | 1.5074E-07 | 3.8178E-08 |
| 51 | 3.4361E-05 | 2.9666E-05 | 2.2186E-05 | 1.4626E-05 | 8.0160E-06 | 3.6035E-06 | 1.4224E-06 | 5.0912E-07 | 1.5074E-07 | 3.8178E-08 |
| 52 | 3.4361E-05 | 2.9666E-05 | 2.2186E-05 | 1.4626E-05 | 8.0160E-06 | 3.6035E-06 | 1.4224E-06 | 5.0912E-07 | 1.5074E-07 | 3.8178E-08 |

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SWELS = SOLID SWELLING DISTRIBUTION

LA -- SWELS VALUES
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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.3972E-02 | 1.3972E-02 | 1.4002E-02 | 1.4155E-02 | 1.4315E-02 | 1.4527E-02 | 1.4747E-02 | 1.5022E-02 | 1.5453E-02 | 1.6456E-02 |
| 2 | 1.3972E-02 | 1.3972E-02 | 1.4002E-02 | 1.4155E-02 | 1.4315E-02 | 1.4527E-02 | 1.4747E-02 | 1.5022E-02 | 1.5453E-02 | 1.6456E-02 |
| 3 | 1.3972E-02 | 1.3972E-02 | 1.4002E-02 | 1.4155E-02 | 1.4315E-02 | 1.4527E-02 | 1.4747E-02 | 1.5022E-02 | 1.5453E-02 | 1.6456E-02 |
| 4 | 1.3972E-02 | 1.3972E-02 | 1.4002E-02 | 1.4155E-02 | 1.4315E-02 | 1.4527E-02 | 1.4747E-02 | 1.5022E-02 | 1.5453E-02 | 1.6456E-02 |
| 5 | 1.7278E-02 | 1.7324E-02 | 1.7407E-02 | 1.7610E-02 | 1.7799E-02 | 1.8055E-02 | 1.8325E-02 | 1.8674E-02 | 1.9250E-02 | 2.0715E-02 |
| 6 | 2.1756E-02 | 2.1865E-02 | 2.2020E-02 | 2.2291E-02 | 2.2521E-02 | 2.2835E-02 | 2.3173E-02 | 2.3622E-02 | 2.4395E-02 | 2.6486E-02 |
| 7 | 2.1754E-02 | 2.1864E-02 | 2.2020E-02 | 2.2291E-02 | 2.2521E-02 | 2.2835E-02 | 2.3173E-02 | 2.3622E-02 | 2.4395E-02 | 2.6486E-02 |
| 8 | 2.1747E-02 | 2.1859E-02 | 2.2018E-02 | 2.2291E-02 | 2.2521E-02 | 2.2835E-02 | 2.3173E-02 | 2.3622E-02 | 2.4395E-02 | 2.6486E-02 |
| 9 | 2.1808E-02 | 2.1979E-02 | 2.2203E-02 | 2.2512E-02 | 2.2755E-02 | 2.3071E-02 | 2.3412E-02 | 2.3867E-02 | 2.4651E-02 | 2.6777E-02 |
| 10 | 2.2150E-02 | 2.2643E-02 | 2.3225E-02 | 2.3734E-02 | 2.4045E-02 | 2.4376E-02 | 2.4735E-02 | 2.5218E-02 | 2.6061E-02 | 2.8388E-02 |
| 11 | 2.2149E-02 | 2.2642E-02 | 2.3225E-02 | 2.3734E-02 | 2.4045E-02 | 2.4376E-02 | 2.4735E-02 | 2.5218E-02 | 2.6061E-02 | 2.8388E-02 |
| 12 | 2.2142E-02 | 2.2638E-02 | 2.3224E-02 | 2.3734E-02 | 2.4045E-02 | 2.4376E-02 | 2.4735E-02 | 2.5218E-02 | 2.6061E-02 | 2.8388E-02 |
| 13 | 2.2145E-02 | 2.2641E-02 | 2.3229E-02 | 2.3738E-02 | 2.4050E-02 | 2.4381E-02 | 2.4740E-02 | 2.5223E-02 | 2.6066E-02 | 2.8394E-02 |
| 14 | 2.2271E-02 | 2.2792E-02 | 2.3447E-02 | 2.3971E-02 | 2.4292E-02 | 2.4626E-02 | 2.4989E-02 | 2.5476E-02 | 2.6331E-02 | 2.8697E-02 |
| 15 | 2.2271E-02 | 2.2792E-02 | 2.3447E-02 | 2.3971E-02 | 2.4292E-02 | 2.4626E-02 | 2.4989E-02 | 2.5476E-02 | 2.6331E-02 | 2.8697E-02 |
| 16 | 2.2285E-02 | 2.2800E-02 | 2.3448E-02 | 2.3971E-02 | 2.4292E-02 | 2.4626E-02 | 2.4989E-02 | 2.5476E-02 | 2.6331E-02 | 2.8697E-02 |
| 17 | 2.2286E-02 | 2.2800E-02 | 2.3448E-02 | 2.3971E-02 | 2.4292E-02 | 2.4626E-02 | 2.4989E-02 | 2.5476E-02 | 2.6331E-02 | 2.8697E-02 |
| 18 | 2.2433E-02 | 2.2908E-02 | 2.3435E-02 | 2.3913E-02 | 2.4224E-02 | 2.4557E-02 | 2.4919E-02 | 2.5405E-02 | 2.6256E-02 | 2.8609E-02 |
| 19 | 2.2452E-02 | 2.2922E-02 | 2.3433E-02 | 2.3906E-02 | 2.4215E-02 | 2.4548E-02 | 2.4910E-02 | 2.5396E-02 | 2.6247E-02 | 2.8598E-02 |
| 20 | 2.2473E-02 | 2.2928E-02 | 2.3435E-02 | 2.3906E-02 | 2.4215E-02 | 2.4548E-02 | 2.4910E-02 | 2.5396E-02 | 2.6247E-02 | 2.8598E-02 |
| 21 | 2.2478E-02 | 2.2929E-02 | 2.3435E-02 | 2.3906E-02 | 2.4215E-02 | 2.4548E-02 | 2.4910E-02 | 2.5396E-02 | 2.6247E-02 | 2.8598E-02 |
| 22 | 2.2577E-02 | 2.2917E-02 | 2.3366E-02 | 2.3797E-02 | 2.4093E-02 | 2.4425E-02 | 2.4785E-02 | 2.5268E-02 | 2.6113E-02 | 2.8442E-02 |
| 23 | 2.2610E-02 | 2.2914E-02 | 2.3343E-02 | 2.3762E-02 | 2.4053E-02 | 2.4384E-02 | 2.4744E-02 | 2.5226E-02 | 2.6069E-02 | 2.8391E-02 |
| 24 | 2.2628E-02 | 2.2920E-02 | 2.3343E-02 | 2.3763E-02 | 2.4053E-02 | 2.4384E-02 | 2.4744E-02 | 2.5226E-02 | 2.6069E-02 | 2.8391E-02 |
| 25 | 2.2636E-02 | 2.2923E-02 | 2.3342E-02 | 2.3764E-02 | 2.4053E-02 | 2.4384E-02 | 2.4744E-02 | 2.5226E-02 | 2.6069E-02 | 2.8391E-02 |
| 26 | 2.2667E-02 | 2.2917E-02 | 2.3233E-02 | 2.3635E-02 | 2.3917E-02 | 2.4247E-02 | 2.4605E-02 | 2.5084E-02 | 2.5920E-02 | 2.8219E-02 |
| 27 | 2.2686E-02 | 2.2914E-02 | 2.3165E-02 | 2.3555E-02 | 2.3833E-02 | 2.4162E-02 | 2.4519E-02 | 2.4996E-02 | 2.5828E-02 | 2.8113E-02 |
| 28 | 2.2705E-02 | 2.2911E-02 | 2.3171E-02 | 2.3555E-02 | 2.3833E-02 | 2.4162E-02 | 2.4519E-02 | 2.4996E-02 | 2.5828E-02 | 2.8113E-02 |
| 29 | 2.2719E-02 | 2.2908E-02 | 2.3175E-02 | 2.3556E-02 | 2.3833E-02 | 2.4162E-02 | 2.4519E-02 | 2.4996E-02 | 2.5828E-02 | 2.8113E-02 |
| 30 | 2.2649E-02 | 2.2822E-02 | 2.3070E-02 | 2.3432E-02 | 2.3703E-02 | 2.4031E-02 | 2.4386E-02 | 2.4860E-02 | 2.5686E-02 | 2.7949E-02 |
| 31 | 2.2573E-02 | 2.2731E-02 | 2.2959E-02 | 2.3301E-02 | 2.3564E-02 | 2.3890E-02 | 2.4243E-02 | 2.4715E-02 | 2.5534E-02 | 2.7775E-02 |
| 32 | 2.2573E-02 | 2.2731E-02 | 2.2959E-02 | 2.3301E-02 | 2.3564E-02 | 2.3890E-02 | 2.4243E-02 | 2.4715E-02 | 2.5534E-02 | 2.7775E-02 |
| 33 | 2.2573E-02 | 2.2731E-02 | 2.2959E-02 | 2.3301E-02 | 2.3564E-02 | 2.3890E-02 | 2.4243E-02 | 2.4715E-02 | 2.5534E-02 | 2.7775E-02 |
| 34 | 2.2556E-02 | 2.2712E-02 | 2.2938E-02 | 2.3278E-02 | 2.3541E-02 | 2.3867E-02 | 2.4220E-02 | 2.4691E-02 | 2.5509E-02 | 2.7746E-02 |
| 35 | 2.2259E-02 | 2.2386E-02 | 2.2575E-02 | 2.2883E-02 | 2.3140E-02 | 2.3461E-02 | 2.3808E-02 | 2.4270E-02 | 2.5070E-02 | 2.7244E-02 |
| 36 | 2.2259E-02 | 2.2386E-02 | 2.2575E-02 | 2.2883E-02 | 2.3140E-02 | 2.3461E-02 | 2.3808E-02 | 2.4270E-02 | 2.5070E-02 | 2.7244E-02 |
| 37 | 2.2259E-02 | 2.2386E-02 | 2.2575E-02 | 2.2883E-02 | 2.3140E-02 | 2.3461E-02 | 2.3808E-02 | 2.4270E-02 | 2.5070E-02 | 2.7244E-02 |

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   38  2.2259E-02  2.2386E-02  2.2575E-02  2.2883E-02  2.3140E-02  2.3461E-02  2.3808E-02  2.4270E-02  2.5070E-02  2.7244E-02
   39  2.1888E-02  2.2000E-02  2.2147E-02  2.2431E-02  2.2672E-02  2.2988E-02  2.3328E-02  2.3780E-02  2.4558E-02  2.6660E-02
   40  2.1627E-02  2.1728E-02  2.1846E-02  2.2113E-02  2.2342E-02  2.2654E-02  2.2990E-02  2.3435E-02  2.4198E-02  2.6248E-02
   41  2.1627E-02  2.1728E-02  2.1846E-02  2.2113E-02  2.2342E-02  2.2654E-02  2.2990E-02  2.3435E-02  2.4198E-02  2.6248E-02
   42  2.1627E-02  2.1728E-02  2.1846E-02  2.2113E-02  2.2342E-02  2.2654E-02  2.2990E-02  2.3435E-02  2.4198E-02  2.6248E-02
   43  2.1389E-02  2.1479E-02  2.1590E-02  2.1848E-02  2.2076E-02  2.2384E-02  2.2717E-02  2.3156E-02  2.3907E-02  2.5918E-02
   44  1.9631E-02  1.9648E-02  1.9699E-02  1.9899E-02  2.0111E-02  2.0397E-02  2.0702E-02  2.1098E-02  2.1762E-02  2.3486E-02
   45  1.9631E-02  1.9648E-02  1.9699E-02  1.9899E-02  2.0111E-02  2.0397E-02  2.0702E-02  2.1098E-02  2.1762E-02  2.3486E-02
   46  1.9631E-02  1.9648E-02  1.9699E-02  1.9899E-02  2.0111E-02  2.0397E-02  2.0702E-02  2.1098E-02  2.1762E-02  2.3486E-02
   47  1.9631E-02  1.9648E-02  1.9699E-02  1.9899E-02  2.0111E-02  2.0397E-02  2.0702E-02  2.1098E-02  2.1762E-02  2.3486E-02
   48  1.2813E-02  1.2819E-02  1.2850E-02  1.2989E-02  1.3134E-02  1.3328E-02  1.3530E-02  1.3782E-02  1.4180E-02  1.5118E-02
   49  9.1485E-03  9.1485E-03  9.1692E-03  9.2749E-03  9.3849E-03  9.5290E-03  9.6750E-03  9.8502E-03  1.0106E-02  1.0621E-02
   50  9.1485E-03  9.1485E-03  9.1692E-03  9.2749E-03  9.3849E-03  9.5290E-03  9.6750E-03  9.8502E-03  1.0106E-02  1.0621E-02
   51  9.1485E-03  9.1485E-03  9.1692E-03  9.2749E-03  9.3849E-03  9.5290E-03  9.6750E-03  9.8502E-03  1.0106E-02  1.0621E-02
   52  9.1485E-03  9.1485E-03  9.1692E-03  9.2749E-03  9.3849E-03  9.5290E-03  9.6750E-03  9.8502E-03  1.0106E-02  1.0621E-02
1
 RODEX3 FUEL ROD AXIAL/RADIAL DEPENDENT VARIABLES
 ------------------------------------------------

         RGI    = RADIAL GRID LOCATIONS (IN)

   LA -- RGI VALUES
   --    ----------
    1   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
    2   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
    3   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
    4   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
    5   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
    6   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
    7   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
    8   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
    9   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
   10   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
   11   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
   12   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
   13   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
   14   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
```

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 15 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 16 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 17 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 18 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 19 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 20 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 21 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 22 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 23 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 24 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 25 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 26 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 27 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 28 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 29 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 30 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 31 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 32 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 33 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 34 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 35 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 36 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 37 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 38 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |
| | 1.6125E-01 | 1.6455E-01 | 1.8700E-01 | | | | | | | |
| 39 | .0000E+00 | 1.7375E-02 | 3.4750E-02 | 5.2125E-02 | 6.9500E-02 | 8.6875E-02 | 1.0425E-01 | 1.1850E-01 | 1.3275E-01 | 1.4700E-01 |

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       1.6125E-01  1.6455E-01  1.8700E-01
   40   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
   41   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
   42   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
   43   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
   44   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
   45   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
   46   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
   47   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
   48   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
   49   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
   50   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
   51   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
   52   .0000E+00  1.7375E-02  3.4750E-02  5.2125E-02  6.9500E-02  8.6875E-02  1.0425E-01  1.1850E-01  1.3275E-01  1.4700E-01
       1.6125E-01  1.6455E-01  1.8700E-01
1
 RODEX3 FUEL ROD AXIAL/RADIAL DEPENDENT VARIABLES
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        HTTMP  = NODAL TEMPERATURES (F)

   LA -- HTTMP VALUES
   --    ------------
    1  1457.2  1447.4  1417.9  1369.2  1301.6  1216.1  1114.3  1020.2   918.0   809.0   693.8   628.6   610.2   591.8
    2  1457.2  1447.4  1417.9  1369.2  1301.6  1216.1  1114.3  1020.2   918.0   809.0   693.8   628.6   610.2   591.8
    3  1459.7  1449.8  1420.4  1371.6  1304.0  1218.5  1116.6  1022.5   920.2   811.1   695.8   630.7   612.3   593.9
    4  1460.7  1450.8  1421.4  1372.6  1305.0  1219.5  1117.6  1023.4   921.1   811.9   696.6   631.6   613.1   594.7
    5  1666.3  1654.1  1617.3  1556.4  1471.9  1365.1  1238.3  1121.6   995.6   862.4   722.9   649.9   626.5   603.2
    6  1945.1  1929.5  1882.8  1805.4  1698.0  1562.4  1401.9  1254.6  1096.5   930.8   758.4   674.6   644.6   614.7
    7  1945.4  1929.9  1883.2  1805.8  1698.5  1563.0  1402.5  1255.4  1097.3   931.6   759.3   675.7   645.7   615.7
    8  1946.7  1931.2  1884.6  1807.3  1700.2  1564.9  1404.8  1257.9  1100.2   934.7   762.6   679.5   649.3   619.2
    9  1943.6  1928.0  1881.5  1804.3  1697.3  1562.4  1402.8  1256.4  1099.3   934.4   762.9   680.4   650.2   620.0
   10  1926.2  1910.7  1864.3  1787.6  1681.6  1548.4  1391.7  1248.3  1094.4   932.9   764.5   685.5   654.8   624.1
   11  1926.1  1910.7  1864.3  1787.5  1681.6  1548.5  1391.8  1248.5  1094.6   933.2   764.8   686.0   655.2   624.5
   12  1925.5  1910.0  1863.8  1787.3  1681.7  1549.1  1393.0  1250.3  1097.1   936.2   768.4   690.4   659.5   628.7
   13  1924.6  1909.2  1862.9  1786.5  1681.0  1548.4  1392.6  1249.9  1096.8   936.1   768.4   690.5   659.6   628.7
   14  1880.4  1865.4  1820.8  1747.1  1645.4  1517.9  1368.2  1231.2  1084.1   929.4   767.4   692.5   662.2   631.9
   15  1880.4  1865.4  1820.8  1747.1  1645.4  1517.9  1368.2  1231.2  1084.1   929.4   767.4   692.5   662.2   631.9
```

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 1878.3 | 1863.4 | 1819.0 | 1745.5 | 1644.3 | 1517.5 | 1368.5 | 1232.3 | 1085.9 | 931.9 | 770.7 | 696.9 | 666.4 | 635.9 |
| 17 | 1878.2 | 1863.3 | 1818.9 | 1745.4 | 1644.3 | 1517.4 | 1368.6 | 1232.3 | 1086.0 | 932.1 | 770.9 | 697.1 | 666.6 | 636.1 |
| 18 | 1842.4 | 1828.0 | 1785.0 | 1714.0 | 1616.1 | 1493.6 | 1349.6 | 1217.8 | 1076.2 | 926.9 | 770.3 | 698.5 | 668.6 | 638.7 |
| 19 | 1837.8 | 1823.5 | 1780.6 | 1709.9 | 1612.5 | 1490.5 | 1347.2 | 1216.0 | 1074.9 | 926.3 | 770.2 | 698.7 | 668.9 | 639.1 |
| 20 | 1835.4 | 1821.1 | 1778.4 | 1707.9 | 1610.9 | 1489.5 | 1346.9 | 1216.3 | 1076.0 | 928.0 | 772.7 | 702.2 | 672.2 | 642.2 |
| 21 | 1834.8 | 1820.5 | 1777.9 | 1707.5 | 1610.6 | 1489.3 | 1346.8 | 1216.4 | 1076.2 | 928.4 | 773.2 | 702.9 | 672.9 | 642.9 |
| 22 | 1824.8 | 1810.7 | 1768.6 | 1699.1 | 1603.4 | 1483.5 | 1342.7 | 1213.7 | 1074.9 | 928.5 | 774.7 | 705.3 | 675.4 | 645.4 |
| 23 | 1821.5 | 1807.5 | 1765.6 | 1696.3 | 1601.0 | 1481.6 | 1341.3 | 1212.7 | 1074.5 | 928.6 | 775.3 | 706.1 | 676.2 | 646.3 |
| 24 | 1818.7 | 1804.7 | 1762.9 | 1693.9 | 1599.0 | 1480.2 | 1340.5 | 1212.6 | 1074.9 | 929.7 | 777.0 | 708.9 | 678.9 | 648.8 |
| 25 | 1817.4 | 1803.4 | 1761.7 | 1692.8 | 1598.1 | 1479.5 | 1340.1 | 1212.5 | 1075.1 | 930.2 | 777.8 | 710.2 | 680.1 | 650.0 |
| 26 | 1817.3 | 1803.4 | 1761.8 | 1693.2 | 1598.8 | 1480.5 | 1341.3 | 1213.9 | 1076.8 | 932.1 | 779.9 | 712.6 | 682.4 | 652.2 |
| 27 | 1817.3 | 1803.4 | 1761.9 | 1693.4 | 1599.2 | 1481.1 | 1342.1 | 1214.8 | 1077.8 | 933.2 | 781.2 | 714.2 | 683.9 | 653.6 |
| 28 | 1816.5 | 1802.6 | 1761.2 | 1692.8 | 1598.8 | 1480.9 | 1342.3 | 1215.3 | 1078.6 | 934.3 | 782.6 | 716.2 | 685.9 | 655.6 |
| 29 | 1815.8 | 1801.9 | 1760.5 | 1692.3 | 1598.4 | 1480.8 | 1342.5 | 1215.7 | 1079.3 | 935.3 | 783.7 | 717.9 | 687.6 | 657.2 |
| 30 | 1826.3 | 1812.4 | 1770.7 | 1702.0 | 1607.4 | 1488.9 | 1349.3 | 1221.4 | 1083.8 | 938.5 | 785.8 | 719.2 | 688.7 | 658.2 |
| 31 | 1837.5 | 1823.5 | 1781.5 | 1712.3 | 1617.0 | 1497.4 | 1356.6 | 1227.5 | 1088.6 | 942.0 | 788.0 | 720.6 | 690.0 | 659.3 |
| 32 | 1837.5 | 1823.5 | 1781.5 | 1712.3 | 1617.0 | 1497.4 | 1356.6 | 1227.5 | 1088.6 | 942.0 | 788.0 | 720.6 | 690.0 | 659.3 |
| 33 | 1837.5 | 1823.5 | 1781.5 | 1712.3 | 1617.0 | 1497.4 | 1356.6 | 1227.5 | 1088.6 | 942.0 | 788.0 | 720.6 | 690.0 | 659.3 |
| 34 | 1838.8 | 1824.8 | 1782.8 | 1713.5 | 1618.1 | 1498.4 | 1357.4 | 1228.2 | 1089.1 | 942.3 | 788.2 | 720.6 | 690.0 | 659.3 |
| 35 | 1861.6 | 1847.3 | 1804.6 | 1734.2 | 1637.0 | 1515.0 | 1371.2 | 1239.4 | 1097.5 | 947.9 | 790.9 | 721.2 | 690.3 | 659.4 |
| 36 | 1861.6 | 1847.3 | 1804.6 | 1734.2 | 1637.0 | 1515.0 | 1371.2 | 1239.4 | 1097.5 | 947.9 | 790.9 | 721.2 | 690.3 | 659.4 |
| 37 | 1861.6 | 1847.3 | 1804.6 | 1734.2 | 1637.0 | 1515.0 | 1371.2 | 1239.4 | 1097.5 | 947.9 | 790.9 | 721.2 | 690.3 | 659.4 |
| 38 | 1861.6 | 1847.3 | 1804.6 | 1734.2 | 1637.0 | 1515.0 | 1371.2 | 1239.4 | 1097.5 | 947.9 | 790.9 | 721.2 | 690.3 | 659.4 |
| 39 | 1877.8 | 1863.4 | 1820.2 | 1749.0 | 1650.6 | 1527.0 | 1381.1 | 1247.3 | 1103.4 | 951.7 | 792.8 | 721.5 | 690.5 | 659.4 |
| 40 | 1889.2 | 1874.7 | 1831.2 | 1759.4 | 1660.1 | 1535.4 | 1388.0 | 1252.9 | 1107.6 | 954.5 | 794.1 | 721.8 | 690.6 | 659.4 |
| 41 | 1889.2 | 1874.7 | 1831.2 | 1759.4 | 1660.1 | 1535.4 | 1388.0 | 1252.9 | 1107.6 | 954.5 | 794.1 | 721.8 | 690.6 | 659.4 |
| 42 | 1889.2 | 1874.7 | 1831.2 | 1759.4 | 1660.1 | 1535.4 | 1388.0 | 1252.9 | 1107.6 | 954.5 | 794.1 | 721.8 | 690.6 | 659.4 |
| 43 | 1881.5 | 1867.1 | 1824.0 | 1752.7 | 1654.2 | 1530.3 | 1384.0 | 1249.8 | 1105.3 | 953.0 | 793.6 | 721.2 | 690.3 | 659.4 |
| 44 | 1824.5 | 1811.0 | 1770.5 | 1703.4 | 1610.5 | 1493.2 | 1354.1 | 1226.2 | 1088.3 | 942.5 | 789.6 | 716.9 | 688.0 | 659.1 |
| 45 | 1824.5 | 1811.0 | 1770.5 | 1703.4 | 1610.5 | 1493.2 | 1354.1 | 1226.2 | 1088.3 | 942.5 | 789.6 | 716.9 | 688.0 | 659.1 |
| 46 | 1824.5 | 1811.0 | 1770.5 | 1703.4 | 1610.5 | 1493.2 | 1354.1 | 1226.2 | 1088.3 | 942.5 | 789.6 | 716.9 | 688.0 | 659.1 |
| 47 | 1824.5 | 1811.0 | 1770.5 | 1703.4 | 1610.5 | 1493.2 | 1354.1 | 1226.2 | 1088.3 | 942.5 | 789.6 | 716.9 | 688.0 | 659.1 |
| 48 | 1433.5 | 1424.7 | 1398.4 | 1354.9 | 1294.6 | 1218.3 | 1127.4 | 1043.1 | 951.3 | 853.1 | 749.0 | 695.3 | 676.6 | 657.8 |
| 49 | 1223.4 | 1217.1 | 1198.5 | 1167.6 | 1124.9 | 1070.6 | 1005.5 | 944.6 | 877.7 | 805.1 | 727.2 | 683.8 | 670.4 | 657.0 |
| 50 | 1223.4 | 1217.1 | 1198.5 | 1167.6 | 1124.9 | 1070.6 | 1005.5 | 944.6 | 877.7 | 805.1 | 727.2 | 683.8 | 670.4 | 657.0 |
| 51 | 1223.4 | 1217.1 | 1198.5 | 1167.6 | 1124.9 | 1070.6 | 1005.5 | 944.6 | 877.7 | 805.1 | 727.2 | 683.8 | 670.4 | 657.0 |
| 52 | 1223.4 | 1217.1 | 1198.5 | 1167.6 | 1124.9 | 1070.6 | 1005.5 | 944.6 | 877.7 | 805.1 | 727.2 | 683.8 | 670.4 | 657.0 |

# RLBLOCA Analysis: Initialized S-RELAP5 Conditions

```
RELAP5 ROD NUMBER     =      201
RODEX3 ROD NUMBER     =        1
INTERNAL ROD PRESSURE =    870.90     PSIA
```

| AXIAL NODE NO. | PELLET INNER (F) | SHOULDER (F) | PELLET OUTER (F) | CLAD INNER (F) | CLAD OUTER (F) | COOLANT (F) | GAP COEFFICIENT (BTU/HR-FT2-F) | LHGR (KW/FT) | PLASTIC STRAIN |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1457.199 | 1114.303 | 693.794 | 628.592 | 591.765 | 594.004 | 3.1843E+03 | 2.26041 | .00000 |
| 2 | 1457.199 | 1114.303 | 693.794 | 628.592 | 591.765 | 594.004 | 3.1843E+03 | 6.42202 | .00000 |
| 3 | 1459.662 | 1116.641 | 695.814 | 630.722 | 593.865 | 594.004 | 3.1897E+03 | 9.64527 | .00000 |
| 4 | 1460.656 | 1117.585 | 696.630 | 631.582 | 594.713 | 594.004 | 3.1919E+03 | 11.69661 | .00000 |
| 5 | 1666.346 | 1238.307 | 722.860 | 649.860 | 603.180 | 594.004 | 3.5203E+03 | 12.72002 | .00000 |
| 6 | 1945.058 | 1401.887 | 758.403 | 674.628 | 614.652 | 594.004 | 3.9654E+03 | 13.09391 | .00000 |
| 7 | 1945.426 | 1402.524 | 759.328 | 675.695 | 615.653 | 594.004 | 3.9722E+03 | 13.21333 | .00000 |
| 8 | 1946.729 | 1404.782 | 762.603 | 679.475 | 619.199 | 594.004 | 3.9962E+03 | 13.30864 | .00000 |
| 9 | 1943.582 | 1402.775 | 762.892 | 680.404 | 619.956 | 594.004 | 4.0344E+03 | 13.38465 | .00000 |
| 10 | 1926.201 | 1391.689 | 764.491 | 685.535 | 624.141 | 594.004 | 4.2450E+03 | 13.31140 | .00000 |
| 11 | 1926.140 | 1391.805 | 764.827 | 685.957 | 624.531 | 594.004 | 4.2497E+03 | 13.01866 | .00000 |
| 12 | 1925.487 | 1393.033 | 768.380 | 690.417 | 628.662 | 594.004 | 4.2991E+03 | 12.58605 | .00000 |
| 13 | 1924.609 | 1392.550 | 768.361 | 690.458 | 628.725 | 594.004 | 4.3001E+03 | 12.17346 | .00000 |
| 14 | 1880.358 | 1368.226 | 767.420 | 692.488 | 631.932 | 594.004 | 4.3541E+03 | 11.88323 | .00000 |
| 15 | 1880.358 | 1368.226 | 767.420 | 692.488 | 631.932 | 594.004 | 4.3541E+03 | 11.68776 | .00000 |
| 16 | 1878.299 | 1368.536 | 770.688 | 696.863 | 635.949 | 594.004 | 4.4195E+03 | 11.47782 | .00000 |
| 17 | 1878.197 | 1368.551 | 770.851 | 697.081 | 636.150 | 594.004 | 4.4228E+03 | 11.17499 | .00000 |
| 18 | 1842.427 | 1349.598 | 770.305 | 698.527 | 638.728 | 594.004 | 4.4358E+03 | 10.80168 | .00000 |
| 19 | 1837.807 | 1347.150 | 770.234 | 698.714 | 639.061 | 594.004 | 4.4375E+03 | 10.45185 | .00000 |
| 20 | 1835.358 | 1346.867 | 772.656 | 702.160 | 642.203 | 594.004 | 4.5021E+03 | 10.19948 | .00000 |
| 21 | 1834.815 | 1346.804 | 773.193 | 702.923 | 642.899 | 594.004 | 4.5164E+03 | 10.03341 | .00000 |
| 22 | 1824.839 | 1342.651 | 774.749 | 705.319 | 645.448 | 594.004 | 4.5390E+03 | 9.87536 | .00000 |
| 23 | 1821.545 | 1341.280 | 775.264 | 706.110 | 646.291 | 594.004 | 4.5465E+03 | 9.65760 | .00000 |
| 24 | 1818.697 | 1340.476 | 777.030 | 708.898 | 648.814 | 594.004 | 4.6150E+03 | 9.38520 | .00000 |
| 25 | 1817.387 | 1340.106 | 777.843 | 710.181 | 649.976 | 594.004 | 4.6466E+03 | 9.12709 | .00000 |
| 26 | 1817.346 | 1341.339 | 779.890 | 712.643 | 652.223 | 594.004 | 4.6754E+03 | 8.94888 | .00000 |
| 27 | 1817.320 | 1342.102 | 781.156 | 714.166 | 653.612 | 594.004 | 4.6933E+03 | 8.85261 | .00000 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 28 | 1816.457 | 1342.298 | 782.583 | 716.244 | 655.590 | 594.004 | 4.7397E+03 | 8.77796 | .00000 |
| 29 | 1815.754 | 1342.459 | 783.745 | 717.937 | 657.202 | 594.004 | 4.7775E+03 | 8.66114 | .00000 |
| 30 | 1826.283 | 1349.298 | 785.805 | 719.234 | 658.231 | 594.004 | 4.7448E+03 | 8.49417 | .00000 |
| 31 | 1837.507 | 1356.589 | 788.000 | 720.616 | 659.329 | 594.004 | 4.7099E+03 | 8.33800 | .00000 |
| 32 | 1837.507 | 1356.589 | 788.000 | 720.616 | 659.329 | 594.004 | 4.7099E+03 | 8.24294 | .00000 |
| 33 | 1837.507 | 1356.589 | 788.000 | 720.616 | 659.329 | 594.004 | 4.7099E+03 | 8.22019 | .00000 |
| 34 | 1838.812 | 1357.383 | 788.157 | 720.648 | 659.331 | 594.004 | 4.7037E+03 | 8.23718 | .00000 |
| 35 | 1861.569 | 1371.220 | 790.898 | 721.200 | 659.362 | 594.004 | 4.5961E+03 | 8.23919 | .00000 |
| 36 | 1861.569 | 1371.220 | 790.898 | 721.200 | 659.362 | 594.004 | 4.5961E+03 | 8.19256 | .00000 |
| 37 | 1861.569 | 1371.220 | 790.898 | 721.200 | 659.362 | 594.004 | 4.5961E+03 | 8.10879 | .00000 |
| 38 | 1861.569 | 1371.220 | 790.898 | 721.200 | 659.362 | 594.004 | 4.5961E+03 | 8.04085 | .00000 |
| 39 | 1877.788 | 1381.091 | 792.789 | 721.533 | 659.381 | 594.004 | 4.5212E+03 | 8.03128 | .00000 |
| 40 | 1889.220 | 1388.049 | 794.122 | 721.768 | 659.394 | 594.004 | 4.4684E+03 | 8.08159 | .00000 |
| 41 | 1889.220 | 1388.049 | 794.122 | 721.768 | 659.394 | 594.004 | 4.4684E+03 | 8.14363 | .00000 |
| 42 | 1889.220 | 1388.049 | 794.122 | 721.768 | 659.394 | 594.004 | 4.4684E+03 | 8.14969 | .00000 |
| 43 | 1881.494 | 1383.997 | 793.580 | 721.183 | 659.363 | 594.004 | 4.4267E+03 | 8.05896 | .00000 |
| 44 | 1824.543 | 1354.129 | 789.588 | 716.869 | 659.132 | 594.004 | 4.1196E+03 | 7.87435 | .00000 |
| 45 | 1824.543 | 1354.129 | 789.588 | 716.869 | 659.132 | 594.004 | 4.1196E+03 | 7.63839 | .00000 |
| 46 | 1824.543 | 1354.129 | 789.588 | 716.869 | 659.132 | 594.004 | 4.1196E+03 | 7.37721 | .00000 |
| 47 | 1824.543 | 1354.129 | 789.588 | 716.869 | 659.132 | 594.004 | 4.1196E+03 | 7.05405 | .00000 |
| 48 | 1433.517 | 1127.359 | 749.004 | 695.344 | 657.759 | 594.004 | 3.5284E+03 | 6.55574 | .00000 |
| 49 | 1223.364 | 1005.484 | 727.193 | 683.775 | 657.021 | 594.004 | 3.2107E+03 | 5.75235 | .00000 |
| 50 | 1223.364 | 1005.484 | 727.193 | 683.775 | 657.021 | 594.004 | 3.2107E+03 | 4.56052 | .00000 |
| 51 | 1223.364 | 1005.484 | 727.193 | 683.775 | 657.021 | 594.004 | 3.2107E+03 | 2.95011 | .00000 |
| 52 | 1223.364 | 1005.484 | 727.193 | 683.775 | 657.021 | 594.004 | 3.2107E+03 | 1.02277 | .00000 |